24314

TWO-YEAR EVALUATION REPORT

Cedartown Municipal Landfill Site
Cedartown, Georgia

DECEMBER 1996
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CONESTOGA-ROVERS & ASSOCIATES

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EXECUTIVE SUMMARY

The former Cedartown Municipal Landfill (Site) located on the perimeter of Cedartown, Georgia, is an abandoned iron mine (Ledbetter Mine) which was used by the City of Cedartown as a municipal landfill from the mid 1950s to mid-May 1980. The majority of the wastes disposed of at the Site were municipal solid wastes.

The United States Environmental Protection Agency (USEPA) included the Site on the National Priorities List (NPL) in March 1989, due to the calculated Hazardous Ranking System (HRS) score of 33.62. This groundwater score was due to the presence of a volatile organic compound in a monitoring well located within the limits of the landfill.

The Cedartown Municipal Landfill Site Group (Cedartown Group) completed a Remedial Investigation (RI) and Feasibility Study (FS) in July 1993 pursuant to USEPA's Administrative Order on Consent (AOC). USEPA subsequently issued a Record of Decision (ROD) for the Site on November 2, 1993. On this basis, the Cedartown Group prepared an RD/RA Work Plan, pursuant to the Unilateral Administrative Order (UAO) for the RD/RA. The RD/RA Work Plan outlined the tasks necessary to implement the remedial action specified in the ROD.

The RD component of the RD/RA Work Plan activities included decommissioning of Site monitoring wells not used in the monitoring program, the installation of one additional Site background monitoring well and the implementation of institutional controls at the Site. The RA activities included a semi-annual inspection of the landfill cover stability and seep control. Also, the RA activities included a quarterly Site groundwater and surface water monitoring program for two years.

One of the requirements of the RD/RA Work Plan was the submission of a Two-Year Evaluation Report to USEPA. This Two-Year Evaluation Report was to determine whether groundwater Performance Standards were appropriate for the Site and if natural attenuation processes were effective.

The Cedartown Group conducted the RD/RA Work Plan activities from January 1995 until October 1996, at which time the Two-Year Evaluation Report was completed.

In addition, the Cedartown Group prepared a technical review entitled, "Naturally Occurring Manganese, Cedartown Municipal Landfill Site, Cedartown, Georgia" which was submitted to USEPA on November 7, 1996. This review documented the fact that naturally occurring manganese at the Site is sporadic and related to iron ore previously mined at the Site.

This document, along with the results of the Two-Year Evaluation, provide the basis for the Cedartown Group position that sufficient data have been collected to support the removal of the Site from the NPL. Therefore, a request for de-listing has been included in this Two-Year Evaluation Report.

The findings of this Two-Year Evaluation Report are as follows:

- manganese is naturally occurring in groundwater in the region surrounding the Site at concentrations exceeding the levels detected at the Site;

- manganese is the only contaminant of concern consistently detected in the Site perimeter monitoring wells;

- USEPA's groundwater Performance Standards were determined to be appropriate for the Site; however, the documented naturally occurring presence of manganese in soil, surface water, sediment and groundwater makes the use of any Performance Standard for manganese at this Site questionable;

- three perimeter monitoring wells (OW-1, OW-3 and OW-4) have statistically significantly higher concentrations of manganese than the Performance Standard of 0.84 mg/L;

- these three perimeter monitoring wells also had statistically significantly higher concentrations of manganese than the pooled mean manganese concentration in the interior monitoring wells, indicating the elevated levels of manganese are not due to the landfill, but are due to naturally occurring background levels;

- the Site should be removed from the National Priorities List and be placed under the oversight of the Georgia Department of Natural Resources; and

- the potential risk to human health has been eliminated due to the acquisition of adjacent land by the City of Cedartown and the placement of zoning restrictions prohibiting future development and use of groundwater.

1.0 INTRODUCTION

1.1 PURPOSE

The former Cedartown Municipal Landfill (Site), located on the perimeter of Cedartown, Georgia, is the Ledbetter Mine[1] which was used by the City of Cedartown as a municipal landfill from the mid 1950s to mid-May 1980. The majority of the wastes disposed of at the Site were municipal solid wastes. The location of the Site is shown on Figure 1.1, while a base plan of the Site is presented on Figure 1.2.

In the late 1980s, the United States Environmental Protection Agency (USEPA) conducted a preliminary assessment of the Site which involved an initial site investigation and an evaluation of the Site using the Hazardous Ranking System (HRS). The aggregate HRS score for the Site was 33.62, which derived exclusively from the groundwater pathway. The high groundwater score was due to the presence of a volatile organic compound detected in USEPA monitoring well CL-08-WP. The Site was subsequently proposed for inclusion on the National Priorities List (NPL) in June 1988 and was finalized in March 1989.

The Cedartown Municipal Landfill Site Group (Cedartown Group) completed a Remedial Investigation (RI) and Feasibility Study (FS) in July 1993 pursuant to USEPA's Administrative Order on Consent (AOC). The results of the RI confirmed that the only medium of concern at the Site is groundwater. The contaminants of concern (COCs) at the Site were beryllium, cadmium, chromium, lead, and manganese. It will be shown in this report that the only remaining COC is manganese.

Pursuant to the Unilateral Administrative Order (UAO) for the Remedial Design/Remedial Action (RD/RA) for the Site, dated March 22, 1994, the Group prepared an RD/RA Work Plan (CRA, October 1994). The RD/RA Work Plan described the tasks necessary to implement the

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1 "A Preliminary Report on a Part of the Iron Ores of Georgia - Polk, Bartow and Floyd Counties", Bulletin No. 10-A, S.W. McCallie, Geological Survey of Georgia, 1900.

remedial action specified in the Record of Decision (ROD) issued on November 2, 1993.

One of the requirements of the RD/RA Work Plan was the preparation and submission of a two-year review report. The purpose of the two-year report was to:

- summarize groundwater and surface water sampling activities;
- summarize the groundwater and surface water data;
- present the results of the statistical analysis;
- determine the appropriateness of the groundwater Performance Standards;
- present the results of the comparison of downgradient groundwater chemistry to Performance Standards;
- present the results of any trend analyses performed; and
- provide recommendations for the modification or elimination of the monitoring program and appropriate future action.

The Cedartown Group prepared a technical review entitled, "Naturally Occurring Manganese, Cedartown Municipal Landfill Site, Cedartown, Georgia" and submitted this report to USEPA on November 7, 1996. This review documents the fact that naturally occurring manganese has been recovered, analyzed and reported from the subject Site, thus establishing high background levels of manganese.

This, together with the results of the Two-Year Evaluation, provides the basis for the Cedartown Group position that sufficient data have been collected to support the removal of the Site from the NPL. Therefore, a request for de-listing has been included in this Two-Year Evaluation Report.

1.2 DESCRIPTION OF THE SELECTED REMEDY

The selected remedy as described in the Declaration of the ROD is as follows:

"*DESCRIPTION OF THE SELECTED REMEDY*

This action is the first and final action planned for the Site. This alternative calls for the design and implementation of response measures which will protect human health and the environment. The action addresses the principal threat at the Site, the contaminant sources in the *wastes, as well as the ground water contamination at the Site.*

The major components of the selected remedy include:

- *cover maintenance and seep controls;*
- *institutional controls, such as record and deed notices, zoning and land-use restriction;*
- *ground/surface water monitoring program to insure natural attenuation processes would be effective and that contaminants would not migrate;*
- *a two year review during which EPA would determine whether ground water Performance Standards continue to be appropriate and if natural attenuation processes are effective. EPA shall consider and at* EPA's *discretion implement an active ground water remediation if ground water Performance Standards continue to be appropriate and natural attenuation processes are not effective,*
- *a contingency remedial action which includes ground water extraction, on-Site treatment, and discharge under National Pollutant Discharge Elimination System (NPDES) to a nearby surface water or POTW; and,*
- *continued ground water monitoring upon attainment of the Performance Standards at sampling intervals to be approved by EPA. The ground water monitoring program would continue until EPA approves a five-year review concluding that the alternative has achieved continued attainment of the Performance Standards and remains protective of human health and the environment."*

1.3 REPORT ORGANIZATION

The Two-Year Evaluation Report is organized as follows:

Section 1.0	Introduction;
Section 2.0	Summary of Remedial Design Activities;
Section 3.0	Summary of Remedial Action Activities;
Section 4.0	Site Groundwater Flow Evaluation;
Section 5.0	Summary of Analytical Data;
Section 6.0	Site Statistical Evaluation;
Section 7.0	Assessment of Manganese Presence;
Section 8.0	Adequacy of Site Remedial Actions;
Section 9.0	Conclusions; and
Section 10.0	Recommendations.

2.0 SUMMARY OF REMEDIAL DESIGN ACTIVITIES

2.1 GENERAL

The RD tasks undertaken during the implementation of the selected remedy were:

i) the implementation of institutional controls;
ii) the decommissioning of the monitoring wells that were not used in the monitoring program; and
iii) the installation of one additional background monitoring well.

The following subsections of this report describe the RD tasks completed under the UAO.

2.1.1 Institutional Controls

The ROD required the implementation of institutional controls to prohibit the use of groundwater and prevent the future disturbance of landfilled areas. In order to meet the requirements, the City of Cedartown (City) negotiated with landowners adjacent to the landfill to deed portions of their lands to the City.

The City is in the process of receiving deeds to properties where landfill activities occurred so as to completely control this area. Deeds are from AmSouth Bank as Trustee for the Leary Estate (the principal area of landfill operations), the Hon Company (adjacent to the coke pond) and Tilley properties (where the coke pond is actually located). The exact location of the properties being deeded to the City is shown on Figure 2.1. The area involves fill operations at the Site, which was leased by the City from AmSouth Bank and the Leary Estate. Therefore, through the obtaining of these deeds, the City will control all of the area where landfilling activities occurred and the immediate vicinity around the landfilling operations.

In anticipation of the acquisition of this additional property, the City has modified its existing zoning classifications by Ordinance Number 14, 1996. This Ordinance restricts the use of all of the property which is shown by Figure 2.1. These properties will be rezoned as a "special use (district) within the City of Cedartown". As specified in the City Zoning Ordinance Amendment, the following uses shall be permitted on this property:

- *"The planting of permanent vegetation, ground cover, timber or any other vegetation to prevent erosion, sedimentation or to prevent soil disturbance in the designated district.*

- *The property in this classification has previously been declared to potentially be a threat to human health and the environment; or could be potentially such a threat, based upon either federal regulations, state procedures and/or local decisions of the zoning and planning commission of the City of Cedartown. As such, no improvements which would allow human occupation of the property, no ground water collecting facilities, ponds, lakes; nor any wells (drinking water, commercial use wells, raw water or any other type wells) shall be permitted in this district."*

A certified copy of Ordinance 14, 1996 of the City of Cedartown, creating a special restrictive use classification by zoning ordinance of the Municipality is provided in Appendix A These actions taken by the City have satisfied the requirements for institutional controls intended in the ROD.

2.2 MONITORING WELL ABANDONMENT

Several of the groundwater monitoring wells installed during the USEPA site investigation were not included in the RA groundwater monitoring program. As a result, it was agreed to decommission these monitoring wells during the RD. The following monitoring wells were decommissioned during the RD:

Monitoring Well No.	*Rationale*
CL-02-WP	Well screen straddles residuum/ bedrock interface
CL-08-WP	Drilled through waste
CL-09-WT	Shallow monitoring well, not required in monitoring program
CL-11-WP	Unknown lithology

The locations of the monitoring wells decommissioned during the RD are presented on Figure 2.2.

Prior to initiating the field activities for this task, detailed decommissioning procedures were developed for each monitoring well. These decommissioning procedures were previously provided to USEPA in the Pre-Final Construction Report. (A copy of this report is provided in Appendix B). In general, monitoring well decommissioning included the following tasks:

- removing the surface protection;
- checking the riser pipe for plumbness and alignment;
- overdrilling the well with 4 1/4-inch ID hollow-stem augers or a 4-inch ID core barrel;
- removing all the 2-inch diameter well materials;
- backfilling the borehole with bentonite grout; and
- restoring the ground surface.

These procedures were followed for monitoring wells CL-02-WP, CL-09-WT and CL-11-WP. The full details of the decommissioning activities are provided in the Pre-Final Construction Report. Attempts were made to decommission monitoring well CL-08-WP using these procedures. However, a blockage was discovered at 3 feet below grade, which prevented the overcoring. As a result, the 2-inch diameter well screen and riser pipe were filled with bentonite grout. The details of the decommissioning of monitoring well CL-08-WP are also provided in Appendix B.

Subsequent to the decommissioning of monitoring well CL-08-WP, CRA reviewed the original construction documents for the well. Based on this review, it was determined that the closure was adequate. The details of this review and assessment also are provided in Appendix B.

2.3 BACKGROUND MONITORING WELL CONSTRUCTION

During the RI, two monitoring wells (CL-09-WP and OW-6B) were designated as background monitoring wells. The purpose of these background monitoring wells was to provide an indication of the soil and groundwater chemistry for similar Site geologic conditions unaffected by landfilling operations. However, there was a variation in the groundwater chemistry between these two monitoring wells during the three RI sampling events. In order to improve the definition of background groundwater quality, an additional background monitoring well was installed upgradient of the landfill as part of the selected remedy.

On December 21, 1994, bedrock monitoring well OW-7 was constructed as an open borehole. Upon initiation of development on January 4, 1995, the monitoring well was found to have collapsed and be non-yielding; therefore, replacement monitoring well OW-7R was constructed on January 19, 1995. Details of the construction are discussed in the "Final Construction Report" presented in Appendix C.

2.4 MONITORING WELL OW-3 MODIFICATIONS

Perimeter monitoring well OW-3 was installed during the RI. The monitoring well was originally constructed with a 6-inch diameter low-carbon steel to a depth of 156 feet; and an open hole to 193 feet below grade.

During the RA groundwater sampling events in April and July 1995, it was noted that it was becoming increasingly difficult to achieve low turbidity (i.e. less that 10 NTUs) during well purging. This fact

was attributed to the degradation of the low-carbon steel casing and the presence of iron-reducing bacteria. It was therefore recommended to USEPA that perimeter monitoring well OW-3 be modified by completing the monitoring well with 2-inch diameter stainless steel material. USEPA granted approval for the modification of perimeter monitoring well OW-3 on October 17, 1995.

Monitoring well OW-3 was converted to a 2-inch diameter monitoring well in October 1995. The full details of the conversion were previously provided to USEPA in Progress Report No. 18 dated November 3, 1995. A copy of this correspondence is provided in Appendix D.

3.0 SUMMARY OF REMEDIAL ACTION ACTIVITIES

3.1 LANDFILL COVER AND SEEP INSPECTIONS

The Site was closed in 1979. Site inspections performed during the RI indicated that the cover was in good repair, most of the Site was well vegetated and only one leachate seep was found. As a result of the stability of the Site, landfill cover maintenance and seep control activities were performed on a semi-annual basis for the duration of the RA program. This task included performing a reconnaissance survey of the entire Site to ensure that conditions did not arise which may have posed a threat to human health or the environment. The semi-annual inspections were performed by the City of Cedartown staff. The primary objectives of this task were:

i) to confirm that the integrity of the landfill cover was maintained such that landfill refuse was not exposed at the ground surface; and
ii) to record and report any uncontrolled leachate seeps discharging to the surface.

Landfill cover and seep inspections were conducted by Mr. David Johnson, City of Cedartown Manager, on the following dates:

- February 10, 1995;
- November 21, 1995;
- March 19, 1996; and
- October 11, 1996.

The landfill cover was found to be in good condition with only sporadic (old in nature) superficial refuse. The condition of the east seep remained unchanged, with no evidence of new uncontrolled discharges of leachate.

The semi-annual inspection logs for each of the above dates were reported in the appropriate monthly progress reports. Copies of the semi-annual inspection logs are provided in Appendix E.

3.2 SITE GROUNDWATER SAMPLING

Groundwater sampling was conducted as part of the Selected Remedy. The Site monitoring well network consisted of perimeter monitoring wells and interior monitoring wells. The purpose of the perimeter well groundwater monitoring program was to evaluate the impact of the landfill, if any, on the downgradient water quality. The purpose of the interior well groundwater monitoring program was to verify the effectiveness of natural attenuation of the contaminants of concern. A summary of the monitoring well network completion details are provided in Table 3.1; while these locations are shown on Figure 3.1.

Groundwater sampling occurred on the following dates:

- Round One: January 4 - 11 and January 23, 1995;
- Round Two: April 24 - May 2, 1995;
- Round Three: July 19 - July 24, 1995;
- Round Four: October 23 - October 26, 1995;
- Round Five: January 2 - January 5, 1996;
- Round Six: April 22 - April 25, 1996;
- Round Seven: July 8 - July 11, 1996; and
- Round Eight: October 23 - October 28, 1996.

All groundwater sampling was conducted in accordance with the methods and procedures presented in Appendix A of the USEPA-approved RD/RA Work Plan. In order to minimize the suspended particulate matter in the groundwater samples, low-flow purging techniques were used. This method was effective in reducing the turbidity of most samples to levels below the objective of 25 NTU.

During each sampling event, the groundwater level in each monitoring well was measured and recorded. During purging, the specified parameters (pH, conductivity, temperature, and turbidity) were measured to verify stabilization had occurred. Groundwater samples were collected directly into laboratory-supplied bottles. The groundwater samples

were preserved with nitric acid, stored on ice and shipped by overnight courier to the contract laboratory.

Due to dry conditions, it was not possible to obtain groundwater samples from all three interior monitoring wells during each sampling event. The number of groundwater samples obtained from each interior well during the eight sampling events were:

- CL-05-WP 6 samples
- CL-06-WP 3 samples
- CL-07-WP 2 samples

Each groundwater sample collected was analyzed for the five groundwater contaminants of concern: beryllium, cadmium, chromium, lead, and manganese. Laboratory analyses were conducted by Quanterra Environmental Services, Inc. of North Canton, Ohio.

The full details of the field activities associated with each groundwater sampling event were previously provided to USEPA in a series of Technical Memoranda. Copies of these Technical Memoranda are provided in Appendix F.

3.3 SITE SURFACE WATER SAMPLING

As part of the Selected Remedy, surface water sampling was conducted to evaluate the impact, if any, of the east seep on the water quality in the Coke Pond. Surface water sampling was conducted in conjunction with the groundwater sample collection activities. The surface water sample was analyzed for parameters indicative of leachate impact from the east seep. These parameters included aluminum, chromium, copper, lead, nickel, and zinc. Laboratory analyses were conducted by Quanterra Environmental Services, Inc. of North Canton, Ohio. Technical memoranda detailing the field sampling activities for each sample round are presented in Appendix F.

4.0 SITE GROUNDWATER FLOW EVALUATION

As previously stated, groundwater level measurements were made during each groundwater monitoring event. In addition, three rounds of groundwater level measurements were collected during the RI. A summary of all groundwater level measurements is provided in Table 4.1.

During the RI, it was established that only water levels from monitoring wells completed entirely in the Bedrock Aquifer would be used to construct groundwater contours for this unit. As a result, monitoring wells CL-03-WP, CL-04-WP, CL-05-WP, CL-06-WP, CL-07-WP, and CL-09-WP were not used in preparing groundwater contours for the Bedrock Aquifer. Using this precedent, groundwater contours were prepared for the Bedrock Aquifer for each sampling round. The RI and RD Bedrock Aquifer contours are shown on Figures 4.1 to 4.11, inclusive.

Examination of these figures shows that the direction of groundwater flow in the Bedrock Aquifer is northeast. This primary direction of groundwater flow was consistent through all monitoring events. Another feature of the groundwater contours is the absence of any mounding due to leakage from the landfill. This is most likely due to the absence of a continuous leachate mound, and, the presence of a clay unit between the landfill and the underlying bedrock.

5.0 SUMMARY OF ANALYTICAL DATA

5.1 DATA VALIDATION

CRA submitted all investigative samples to Quanterra Environmental Services, Inc. of North Canton, Ohio. Each of Quanterra's laboratory reports is presented in Appendix G. Following the receipt of analytical data for each round of RA sampling, a formal assessment of the reported analytical data, from a quality control (QC) perspective, was conducted by CRA. On the basis of these reviews, the investigative data were acceptable for use in a quantitative assessment. Further details of each QC assessment are presented in the data validation memoranda included in Appendix H.

5.2 SITE GROUNDWATER RESULTS

5.2.1 Overview

Groundwater samples were collected from the monitoring well network on a quarterly basis during the RA. The locations of each of the monitoring wells in the RA monitoring well network are shown on Figure 3.1. Each of the groundwater samples were analyzed for beryllium, cadmium, chromium, lead and manganese.

The first round of RA sampling was conducted in January 1995. Groundwater monitoring has continued on a quarterly basis from that time until October 1996. The following subsections of this report present a summary of the analytical results. The statistical evaluation of the data is presented in Section 6.0 and an assessment of the significance of the presence of manganese is presented in Section 7.0.

5.2.2 Site Background Monitoring Wells

Three Site background monitoring wells are included in the groundwater monitoring network. These monitoring wells include: OW-6B, OW-7R, and CL-09-WP. The locations of the background monitoring wells are shown on Figure 3.1.

Over the eight rounds of RA sampling, the analytical data have remained relatively consistent. Neither beryllium nor cadmium were detected in any of the background monitoring wells in any of the RA sampling events. Manganese has been detected in each of the background monitoring wells, at concentrations ranging from 0.0101 mg/L (in CL-09-WP in January 1996) to 0.491 mg/L (in OW-7R in January 1995). This is consistent with the known levels of manganese in the abandoned Ledbetter Mine.

Lead was detected in two of the three background monitoring wells. Lead was detected in one round of sampling in OW-7R at 0.011 mg/L in January 1995, but has not been detected in this well since that time. Monitoring well OW-6B has also had detections of lead in three monitoring rounds. The detected concentrations in OW-6B have ranged from 0.0036 mg/L in April 1996 to 0.005 mg/L in April 1995.

Chromium was detected on one occasion in two of the background monitoring wells. Chromium was detected at a concentration of 0.0101 mg/L in OW-7R in January 1995, and chromium was found at 0.0162 mg/L in OW-6B in October 1996. In all other quarterly sampling events, chromium was not detected in any of the background monitoring wells.

A summary of the background monitoring well data is presented in Table 5.1.

5.2.3 Site Interior Monitoring Wells

The three interior monitoring wells included in the groundwater monitoring network are: CL-05-WP, CL-06-WP, and CL-07-WP. The purpose of monitoring these interior wells during the RA was to determine the degree of natural attenuation occurring between the base of the landfill and the perimeter monitoring wells. As stated in the USEPA-approved RD/RA Work Plan, the data generated from the interior well monitoring program will not be used to determine if further remedial action is required.

Attempts to collect samples from the interior monitoring wells were made during each quarterly sampling event; however, during many sampling events, samples could not be collected from the interior wells due to dry conditions. The available analytical data are discussed in the following paragraphs.

None of the interior monitoring wells contained beryllium or cadmium in any of the RA sampling events.

Manganese was detected in each of the interior monitoring wells during each sampling event. Monitoring well CL-05-WP was sampled six times during the RA sampling program and had manganese detections ranging from 1.27 mg/L in January 1995 to 2.46 mg/L in April 1995. Monitoring well CL-06-WP was sampled only three times during the RA sampling program and had manganese concentrations ranging from 0.204 mg/L in April 1996 to 0.888 mg/L in April 1995. Monitoring well CL-07-WP was sampled only twice during RA sampling and contained manganese at 0.274 mg/L in April 1996 and at 0.810 mg/L in May 1995.

Lead was also detected in each of the interior wells in at least one RA sampling event. Monitoring well CL-05-WP contained lead at 0.003 mg/L in the sample collected in July 1995. No other samples collected from this well contained detectable levels of lead. Lead was also detected once in monitoring well CL-06-WP at a concentration of 0.0046 mg/L (April 1995). Monitoring well CL-07-WP contained detectable levels of lead in both

sampling events. The lead levels in CL-07-WP were 0.0268 mg/L in May 1995 and 0.0113 mg/L in April 1996.

Chromium was detected only in monitoring wells CL-06-WP and CL-07-WP. Chromium was detected in each of the three sampling events at CL-06-WP and ranged from 0.0103 mg/L in April 1996 to 0.423 mg/L in January 1995. Chromium was detected in each of the two rounds of groundwater sampling at CL-07-WP at concentrations of 0.23 mg/L in May 1995 and 0.398 mg/L in April 1996.

A summary of the interior monitoring well analytical data is presented in Table 5 2.

5.2.4 Site Perimeter Monitoring Wells

Seven monitoring wells are included in the Site perimeter monitoring well network for the RA sampling. These wells include: OW-1, OW-2, OW-3, OW-4, OW-5, CL-03-WP, and CL-04-WP. The purpose of the perimeter well sampling is to determine the impact, if any, of the landfill on the downgradient chemistry, and the effectiveness of natural attenuation in achieving the groundwater performance standards at the perimeter of the Site.

None of the perimeter monitoring wells contained beryllium, cadmium or lead in any of the RA sampling events.

Chromium was detected only in OW-1 and only in one sampling event during the RA groundwater monitoring program. Chromium was detected at a concentration of 0.0104 mg/L in OW-1 in July 1996.

Manganese was detected on at least one occasion in each of the perimeter monitoring wells. This is consistent with the naturally occurring sporadic and random concentrations of manganese reported in the region of the Site. Both CL-04-WP and OW-5 contained manganese on only

one occasion at concentrations of 0.0197 mg/L (October 1996) and 0.0108 mg/L (January 1995), respectively. However, manganese has been consistently detected in monitoring wells OW-1, OW-2, OW-3, and OW-4. Manganese concentrations have ranged from 0.0164 mg/L (July 1996) to 4.18 mg/L (April 1996) in OW-1; from 0.285 mg/L (October 1995) to 1.17 mg/L (July 1995) in OW-2; from 0.114 mg/L (January 1995) to 5.3 mg/L (July 1996) in OW-3; from 1.93 mg/L (October 1996) to 5.74 mg/L (October 1995) in OW-4; and from non-detect to 0.0726 mg/L (July 1995) in CL-03-WP.

A summary of the perimeter well groundwater data is presented in Table 5.3.

The distribution of the manganese detections is erratic, as is illustrated on Figure 5.1. The consistent detections are found in perimeter monitoring wells OW-1, OW-2, OW-3, and OW-4. The perimeter monitoring well manganese concentrations are generally higher than the manganese concentrations detected in the interior monitoring wells. Because manganese concentrations are generally higher in the perimeter wells than in the interior wells, and the consistent detection is limited to four perimeter monitoring wells located on three sides of the landfill area; it appears that the elevated levels of manganese are due to naturally occurring levels of manganese in the groundwater. A more thorough assessment of manganese in groundwater at the Site is discussed in Section 7.0.

5.3 SITE SURFACE WATER RESULTS

The purpose of the surface water sampling program is to evaluate the impact, if any, of the east seep on the water quality in the Coke Pond. During the RA, the surface water in the Coke Pond was sampled on a quarterly basis for aluminum, chromium, copper, lead, nickel, and zinc. The surface water parameter list was based on detected metals in the ponded seep area during the RI. The ponded seep area potentially flows into the Coke Pond. The findings of the Coke Pond surface water sampling events are discussed in the following paragraphs.

Zinc was detected in the surface water samples collected from the Coke Pond in four out of the eight RA sampling events. The detected zinc concentrations ranged from 0.0221 mg/L in October 1996 to 0.085 mg/L in July 1995. Copper was detected in two of the eight sampling events at a concentration of 0.018 mg/L in both January 1995 and July 1995. Aluminum and lead were detected only in July 1995 at concentrations of 1.87 mg/L and 0.0222 mg/L, respectively.

A summary of the surface water analytical data is presented in Table 5.4.

6.0 SITE STATISTICAL EVALUATION

6.1 OVERVIEW

A statistical analysis was performed using the eight rounds of analytical data obtained during the RA sampling events. The purpose of the evaluation was to determine the appropriateness of the groundwater Performance Standards; and to evaluate the chemistry in the Site perimeter monitoring wells.

The statistical analyses presented in this section were conducted in accordance with all the procedures described in the RD/RA Work Plan. However, these procedures do not consider the random, naturally occurring distribution of manganese at the Site. As a result, the meaningfulness of the statistical analysis is questionable.

The results of the statistical analysis are reported below, and an assessment of the significance of the manganese detections is provided in Section 7.0.

6.2 DESCRIPTION OF METHODS

USEPA originally provided groundwater and surface water Performance Standards in the ROD. However, the groundwater Performance Standard for manganese was revised by USEPA in November 1995 from 0.175 mg/L to 0.84 mg/L. A summary of the groundwater Performance Standards for the Site is presented in Table 6.1.

In general, a statistical evaluation procedure was used to determine the COC background groundwater concentrations; and to compare the downgradient monitoring wells to the Performance Standards. Details of the statistical evaluation procedures are discussed in the following subsections.

6.2.1 Determination of the Appropriateness of the Performance Standards

The appropriateness of the Performance Standards was assessed by comparing background monitoring well concentrations to the groundwater Performance Standard values for each COC. For a Performance Standard to remain valid, it had to be greater than the background concentration for the Site. A confidence interval approach was used. The 95 percent upper confidence limit (UCL) was compared to the Performance Standard using the student-t test. This test determined if the mean of the pooled background COC concentration was significantly less than or greater than the Performance Standard. The mathematical basis for the calculation is as follows:

The data from the background monitoring wells were pooled and the mean ($\bar{X}$) and variance (S_X^2) of the background data were calculated as,

$$\overline{X} = \frac{X_1 + X_2 + \ldots + X_N}{N}$$

$$S_X^2 = \frac{(X_1 - \overline{X})^2 + (X_2 - \overline{X})^2 + \ldots + (X_N - \overline{X})^2}{(N-1)}$$

where: X_N = monitoring data value N for background concentration of the specific COC

N = number of background samples

The t-statistic, t^*, is calculated as

$$t^* = \frac{\bar{X} - PS}{\frac{S}{\sqrt{N}}}$$

where: PS = groundwater Performance Standard for the COC

S = standard deviation

The critical comparison statistic, t_C, was selected from the student-t table for (N-1) degrees of freedom and a 5 percent level of significance. The t-statistic, t*, was compared to t_C with the following decision rules:

i) if t* was positive and equal to or larger than t_C, then the mean background value of the specific COC was significantly greater than the Performance Standard at the 5 percent level and the Performance Standard was not appropriate;

ii) if t* was negative and the absolute value was equal to or larger than t_C, then the mean background value of the specific COC was significantly less than the Performance Standard at the 5 percent level and the Performance Standard was appropriate; and

iii) if the absolute value of t* was less than t_C, then it was concluded that there was no significant difference between the mean value of the specific COC and the Performance Standard. In this case, there is no indication that the Performance Standard is significantly less than the background concentration and the Performance Standard is considered inappropriate.

6.2.2 Evaluation of Downgradient Water Quality vs. Specific Performance Standards

The COCs for which the Performance Standards are valid were evaluated individually in each of the seven downgradient monitoring wells using the confidence interval approach described above, with the following decision rules:

i) if t* was positive and equal to or larger than t_C, then the mean downgradient value of the specific COC was significantly greater than the Performance Standard at the 5 percent level;

ii) if t* was negative and the absolute value was equal to or larger than t_C, then the mean downgradient value of the specific COC was

significantly less than the Performance Standard at the 5 percent level; and

iii) if the absolute value of t^* was less than t_c, then it was concluded that there was no significant difference between the mean value of the COC and the Performance Standard.

6.2.3 Evaluation of Surface Water Quality vs. Performance Standards

The water quality data in the Coke Pond were evaluated to determine what impact, if any, the east seep has had on the water quality of the Coke Pond. The surface water was assessed using the confidence interval approach (as described in Section 6.2.1) comparing the surface water quality data to the surface water Performance Standards. The surface water Performance Standards are summarized in Table 6.2.

The specific surface water COCs were evaluated individually using the confidence interval approach with the following decisions rules:

i) if t^* was positive and equal or larger than t_c, then the mean value of the specific COC was significantly greater than the Performance Standard at the 5 percent level;

ii) if t^* was negative and the absolute value was equal or larger than t_c, then the mean value of the specific COC was significantly less than the Performance Standard at the 5 percent level; and

iii) if the absolute value of t^* was less than t_c, then it was concluded that there was no significant difference between the mean value of the specific COC and the Performance Standard.

6.3 SITE GROUNDWATER

6.3.1 Appropriateness of the Performance Standards

A statistical analysis was performed to determine if the Performance Standards noted in Table 6.1 are appropriate based on the background concentrations of the COCs in the Site groundwater.

A summary of the calculated statistical results for the background wells is presented in Table 6.3.

The statistical analysis has demonstrated that the Performance Standard for each of the COCs is appropriate and will be used for the comparison with downgradient water quality.

However, as discussed in Section 6.1, the meaningfulness of the statistical evaluation of the Performance Standard for manganese is questionable due to the naturally occurring random and sporadic distribution of manganese at the Site.

6.3.2 Downgradient Water Quality vs. Specific Performance Standards

The perimeter monitoring well groundwater data were assessed to determine if there had been a statistically significant increase or decrease in COC concentrations due to Site conditions. The manganese and chromium concentrations in each of the perimeter monitoring wells were compared to the respective Performance Standard. No comparisons were performed for the other COCs since beryllium, cadmium, and lead were not detected in any of the perimeter monitoring wells.

Performance Standards were met for all COCs in the perimeter monitoring wells with the exception of manganese in OW-1, OW-3, and OW-4. A summary of the calculated statistical results is presented in Table 6.4.

In perimeter monitoring wells OW-1, OW-3, and OW-4, the mean manganese concentration over the eight rounds of RA sampling was determined to be statistically significantly higher than the Performance Standard of 0.84 mg/L. Therefore, a trend evaluation was completed to determine if substantial increases above the Performance Standard occurred in two consecutive rounds, or if the trend is decreasing and Performance Standards are likely to be met within five years of this two-year review.

The concentrations of manganese in monitoring wells OW-1, OW-3, and OW-4 have been plotted against time in Figures 6.1, 6.2, and 6.3, respectively. A linear regression analysis was performed for the data from each monitoring well to determine the trend in manganese concentrations with time in each monitoring well. The procedures used in this evaluation are presented in Appendix I.

In perimeter monitoring wells OW-1, OW-3, and OW-4, the Performance Standard for manganese of 0.84 mg/L was exceeded in at least two consecutive rounds. The manganese concentrations in perimeter monitoring wells OW-1 and OW-4 are decreasing with time and are expected to reach the Performance Standard in 3 years and 14 years, respectively. The manganese concentrations in perimeter well OW-3 appear to be increasing slightly and are not expected to reach the Performance Standard within the next three years. The manganese concentrations detected in perimeter monitoring well OW-3 further verify the random and sporadic levels of manganese reported in the region of the Site.

The significance of the manganese concentrations found in the perimeter monitoring wells is further discussed in Section 7.0.

6.4 SITE SURFACE WATER

An assessment of the surface water data from the Coke Pond was completed to determine what impact, if any, the east seep has on the water quality of the Coke Pond.

The data evaluation reveals that the surface water quality in the Coke Pond meets the lowest Performance Standard for each COC. In each case, the mean concentration of each COC was statistically determined to be either significantly lower or not significantly different than the lowest applicable Performance Standard. A summary of the calculated statistical results for the surface water data is presented in Table 6.5.

7.0 ASSESSMENT OF MANGANESE PRESENCE

7.1 GENERAL

Based on the findings of the statistical evaluation in Section 6.0, manganese is the only COC present in Site groundwater which is present at concentrations significantly greater than the Performance Standard. Therefore, manganese is the main COC considered in this Section. Although mean manganese concentrations significantly exceed Performance Standards in three of the perimeter monitoring wells (OW-1, OW-3, and OW-4), these elevated manganese concentrations do not appear to be due to the presence of the landfill. Studies have shown that elevated levels of manganese are naturally occurring in soil, surface water and groundwater in the region of the Site.

The following sections discuss the distribution of manganese in groundwater at the Site and provide an evaluation of manganese presence with respect to the landfill.

7.2 ASSESSMENT OF COC DISTRIBUTION

7.2.1 Evaluation of Downgradient Water Quality vs. Interior Water Quality

A statistical analysis was performed using the eight quarters of analytical data obtained during the RA sampling events. The purpose of this evaluation was to determine whether there was a statistically significant increase or decrease in COC concentrations downgradient of the Site due the presence of the landfill. The water quality in each perimeter monitoring well was compared to that of the interior monitoring wells for manganese and chromium, using the confidence interval approach described in Section 6.2.1. No comparisons were performed for the other COCs since beryllium, cadmium, and lead were not detected in any of the perimeter wells.

A summary of calculated statistical results is presented in Table 7.1.

The mean manganese concentration in perimeter monitoring well OW-2 was determined to be not significantly different from the pooled mean manganese concentration in the interior monitoring wells.

However, in perimeter monitoring wells OW-1, OW-3 and OW-4, the mean manganese concentrations over the eight rounds of RA sampling were each determined to be statistically significantly higher than the pooled mean manganese concentration in the interior monitoring wells.

The interior monitoring wells provide data which are representative of the groundwater directly impacted by the landfill. In this case, the pooled mean manganese concentration directly below the landfill was 1.218 mg/L. However, further downgradient, the manganese concentrations are significantly greater than the concentrations in groundwater below the landfill. Therefore, the presence of the landfill cannot be the sole source of the elevated levels of manganese in perimeter monitoring wells OW-1, OW-3, and OW-4. An alternate source of manganese has been documented through independent research and is discussed in Section 7.2.2.

The mean chromium concentration for each of the perimeter wells over the eight rounds of RA sampling was determined to be lower than the pooled interior well mean chromium concentration. This change was not significantly different, but does indicate that natural attenuation is occurring between the base of the landfill and the perimeter wells.

7.2.2 Assessment of Manganese Distribution

7.2.2.1 Natural Regional Distribution of Manganese

A recent review has established that the region surrounding the Site has naturally-occurring elevated manganese levels in soil, surface water, sediment and groundwater. According to USEPA's "STORET" database, manganese levels as high as 46,200 parts per million (ppm) have been detected in stream sediments about 26 miles northeast of Cedartown[1]. The United States Geological Survey (USGS) database "WATSTORE" documents manganese concentrations ranging from 500 to 57,000 parts per billion (ppb) in Georgia surface water, while levels ranging from 500 to 10,000 ppb have been reported in Georgia groundwater[1]. Substantial manganese deposits have been identified within 5 to 6 miles of the Site, in Polk County. Manganese mining occurred at several locations within 30 miles of Cedartown, and an ore sample collected from the Ledbetter Mine was found to contain manganese at 11,500 ppm. Also, groundwater manganese levels throughout the State of Georgia are higher than those detected at the Site.

Prior to being used as a landfill, the Site was an iron ore mine (the Ledbetter Mine). The relationship between iron ore and manganese has been documented both globally and with respect to Georgia iron ore deposits. Manganese is one of the most common of the impurities associated with brown iron ore. Such iron ores, for example, the Clinton iron ores, are commonly found in the Northwest of Georgia. Manganese ores, as well as brown iron ores, are reported to occur as pockets or irregular deposits. Manganese ore deposits in the nearby Cartersville and Cave Springs districts occur as irregular, lenticular bodies which vary in size, ranging from small grains to large masses. Chemical analyses of manganese ore samples from these districts have indicated manganese levels in the range of 15 percent to 60 percent.

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1 Reference: "Naturally Occurring Manganese, Cedartown Municipal Landfill Site, Cedartown, Georgia", October 30, 1996, Superior Consultants and Wm. C. Hutton Consultants.

Therefore, it is apparent that the elevated levels of manganese in perimeter monitoring wells OW-1, OW-3, and OW-4 are due to naturally occurring manganese in the area of the Site. The presence of randomly distributed naturally occurring manganese at the Site does make the use of the groundwater Performance Standard of 0.84 mg/L at this Site questionable.

7.2.2.2 Transport

Leachate migration from the landfill to the downgradient wells would occur via the limestone stratum underlying the waste and clay residuum. Therefore, it is relevant to assess the COC concentrations in the leachate as it leaves the landfill proper and migrates to the underlying Bedrock Aquifer, which is the conduit for leachate migration to the downgradient monitoring wells.

As the leachate migrates from the landfill to the underlying Bedrock Aquifer, and then downgradient, natural attenuation would result in the reduction of leachate concentrations in the groundwater, as processes such as advection, dispersion, dilution, and sorption take place. This attenuation ultimately results in reduced solute concentrations along the groundwater flowpath. Even conservative tracers (i.e. compounds that do not interact with porous media or undergo decay), exhibit natural attenuation along a given groundwater flowpath.

If it is assumed that migration of leachate from the landfill is occurring and is impacting the downgradient monitoring wells, it would be expected to find some contaminants in the downgradient monitoring wells at concentrations significantly less than those observed where the leachate exits the landfill and enters the aquifer. This decreasing concentration trend was observed with chromium at all the downgradient monitoring wells. However, at three downgradient monitoring wells, increased manganese concentrations were observed (OW-1, OW-3, OW-4), and at another downgradient monitoring well (OW-2), no significant attenuation was observed.

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McCallie, S.W. (1900). A Preliminary Report on the Part of the Iron Ores of Georgia, Polk, Bartow and Floyd Counties, Bulletin No. 10-A, Geological Survey of Georgia.

Superior Consultants and Wm. C. Hutton Consultants (1996), Naturally Occurring Manganese, Cedartown Municipal Landfill Site, Cedartown, Georgia, October.

U.S. EPA (1989), Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities. Interim Final Guidance, Office of Solid Waste, Waste Management Division, April.

U.S. EPA (1992), Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities. Addendum to Interim Final Guidance, Office of Solid Waste, Permits and State Programs Division, July, 84p.

10.0 RECOMMENDATIONS

Based on the results of the RA monitoring program and the other remedial actions undertaken by the Cedartown Group, the following recommendations are made:

i) the Site should be de-listed from the NPL;

ii) the Site should be placed under the oversight of the Georgia Department of Natural Resources; and

iii) any further actions, including monitoring, at the Site would be conducted in accordance with agreements reached with the State of Georgia.

also significantly greater than the manganese concentrations in the interior monitoring wells. This confirms that the manganese is not originating from the landfill, but is due to naturally occurring background levels.

vi) The potential risk to human health has been eliminated due to the acquisition of adjacent land by the City of Cedartown and the placement of zoning restrictions prohibiting future development and use of Site groundwater.

9.0 CONCLUSIONS

The data collected during the RA were evaluated to determine if the groundwater Performance Standards are appropriate and if natural attenuation processes are effective. The RA data and the research demonstrate the following:

i) The Site should be removed from the National Priorities List since all appropriate remedial actions have been or are currently being conducted.

ii) Independent research has shown that the presence of manganese at the Site is sporadic and related to the iron ore previously mined at the Site. In addition, this research has identified that manganese commonly occurs in northeast Georgia in soil, surface water, sediment and groundwater. The concentrations of manganese in groundwater in Georgia are higher than those detected at the Site; indicating the ubiquitous distribution of this metal.

iii) Based solely on the statistical evaluation of the Site background monitoring well data, the groundwater Performance Standards specified in the ROD are appropriate. However, the documented naturally occurring presence of manganese in soil, surface water, sediment and groundwater makes the use of any Performance Standard for manganese at this Site questionable.

iv) The only COC consistently detected in the Site perimeter monitoring wells is manganese. Manganese was consistently detected in only four of the seven perimeter monitoring wells. This random, sporadic distribution is consistent with the manganese naturally occurring in this area.

v) The concentrations of manganese in perimeter monitoring wells OW-1, OW-3, and OW-4, were found to be statistically significantly higher than the Performance Standard of 0.84 mg/L. However, the manganese concentrations in these perimeter monitoring wells are

Due to the naturally occurring manganese in the soil and groundwater, no further response actions will reduce the manganese concentrations in Site groundwater to the Performance Standard specified in the ROD. In addition, the performance of further groundwater quality monitoring will not provide any valuable information with respect to Site conditions.

8.5 SUMMARY

The Cedartown Group has performed all appropriate response actions at the Site. No further response actions will reduce the concentration of manganese in the groundwater to the Performance Standard; for the manganese is naturally occurring.

As a result of these findings, it is appropriate for USEPA to delete the Site from the NPL; and transfer responsibility for the Site to the State of Georgia.

During the RI only one leachate seep (east seep) was identified. Leachate seep inspections conducted concurrently with the cover inspections have confirmed that no new seeps have developed. Given this fact, and the lack of impact of the east seep on surface water quality, no further response actions for leachate control are warranted.

8.3 SITE SURFACE WATER MONITORING

The surface water quality monitoring conducted has shown that the east seep has not impacted the water quality of the Coke Pond. The analyses have shown that the concentrations of the surface water COCs meet the most stringent Performance Standards for the Site. As a result, further surface water monitoring is not required.

8.4 SITE GROUNDWATER MONITORING

The Site groundwater monitoring data collected during the RA has shown that the only groundwater COC detected consistently in the background and perimeter monitoring wells is manganese. The distribution of manganese in the groundwater was found to be random in nature. In addition, the concentration of manganese was found to be higher in three perimeter monitoring wells than in the interior monitoring wells. This fact confirms that the landfill is not the source of manganese in these perimeter monitoring wells.

Independent research has established that manganese is naturally occurring in the soil, surface water, sediment, and groundwater surrounding the Site. The sporadic nature of the elevated manganese detections in Site groundwater is consistent with the documented sporadic occurrence of manganese and brown iron ore deposits in the former Ledbetter Mine.

8.0 ADEQUACY OF SITE REMEDIAL ACTIONS

The following section of this report summarizes the remedial actions undertaken to date by the Cedartown Group at the Site. The purpose of this section is to identify that the remedial actions undertaken have addressed the potential risk at the Site; and that further response actions are not appropriate. Based on this, the deletion of the Site from the NPL is warranted.

8.1 INSTITUTIONAL CONTROLS

During the RI, it was determined that the only medium of concern was groundwater. This was based on a calculated potential risk to human health based on the consumption of groundwater. At the time of the RI, there were no groundwater users in the vicinity of the Site. This fact holds true today. In order to guarantee the there will be no future use of groundwater in the vicinity of the Site, the City has acquired the lands illustrated on Figure 2.1. An ordinance has been passed by the City establishing a "Special Use (district)". This designation prevents subsurface disturbances and use of groundwater.

This action has eliminated the potential exposure pathway of groundwater consumption.

8.2 LANDFILL COVER AND SEEP MONITORING

As part of the RA, landfill cover inspections have been undertaken on a semi-annual basis (see Section 3.1). These inspections have confirmed that the landfill cover is in good repair and is well vegetated. It was also noted that the condition of the cover has not changed over the period of the inspections. This fact is not surprising, given that the landfill closed in 1979; and that waste was placed in discrete excavations. Therefore, significant additional settlement is not expected. As a result, no further cover upgrades are required.

There is no explanation for the observed increased manganese concentrations downgradient of the Site other than the presence of another source of manganese. The literature and history of the area support the assertion that this elevated manganese is naturally occurring in the soil and groundwater; therefore, remedial action at the Site would not result in a reduction of manganese concentrations in groundwater downgradient of the Site. The sporadic nature of elevated manganese is also consistent with the established geology of the area, in which manganese deposits are known to occur as irregular lenticular bodies of varying size.

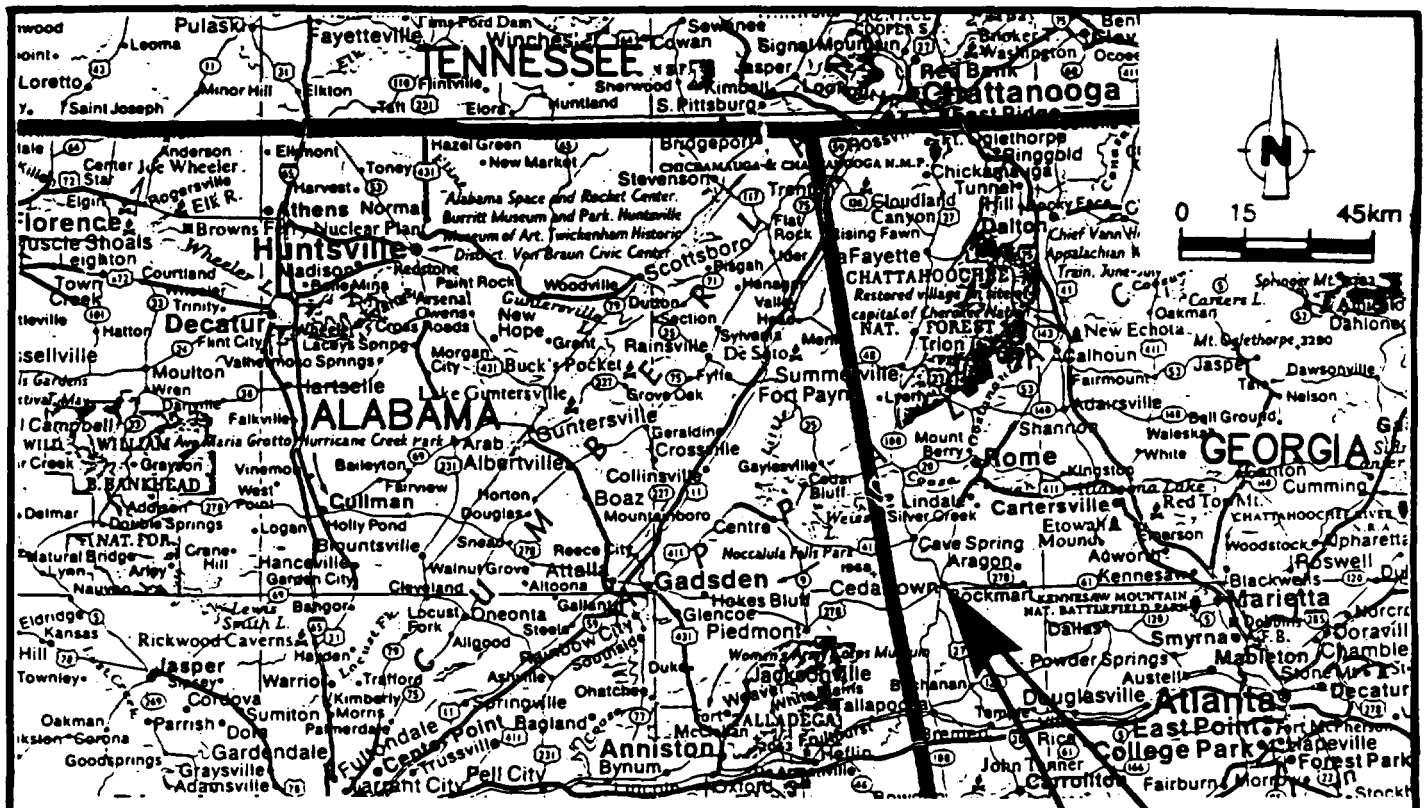
7.3 SUMMARY

The elevated manganese concentrations observed downgradient of the Site are considered to be naturally occurring in the soil and groundwater of the area. The data obtained during the RA sampling support the assertion that the observed elevated manganese concentrations are naturally occurring. Assuming that leachate is migrating from the landfill to the perimeter monitoring wells, the increased manganese concentrations downgradient can only be attributed to another source of manganese. Based on the well documented naturally-occurring manganese deposits in the region, and naturally high manganese concentrations in surface water and groundwater throughout the State, it is concluded that these elevated manganese concentrations are naturally occurring.

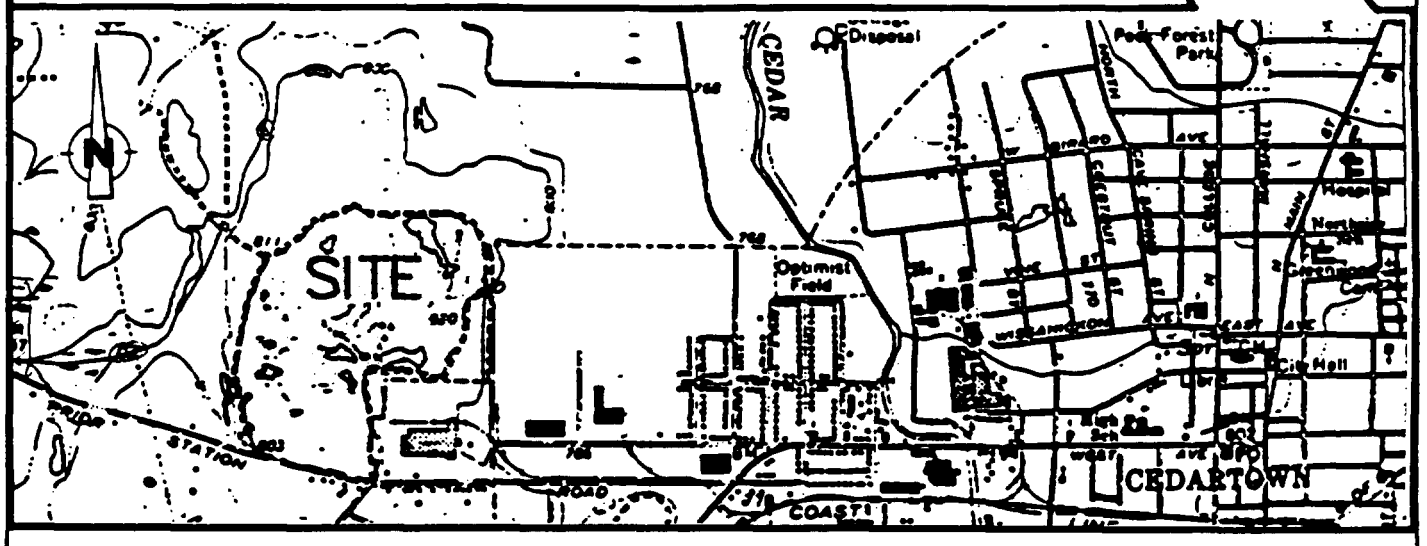
The sporadic nature of the elevated manganese concentrations in the groundwater is consistent with the documented sporadic nature of manganese and brown iron ore deposits in the region. These deposits typically occur as lenticular bodies of irregular size and distribution.

Due to the naturally occurring high manganese concentrations in the region's soil and waters, remedial action at the Site would not result in a reduction of manganese concentrations in the area downgradient of the Site.

FIGURES



SOURCE: CLOSE-UP U.S.A.
NATIONAL GEOGRAPHIC SOCIETY

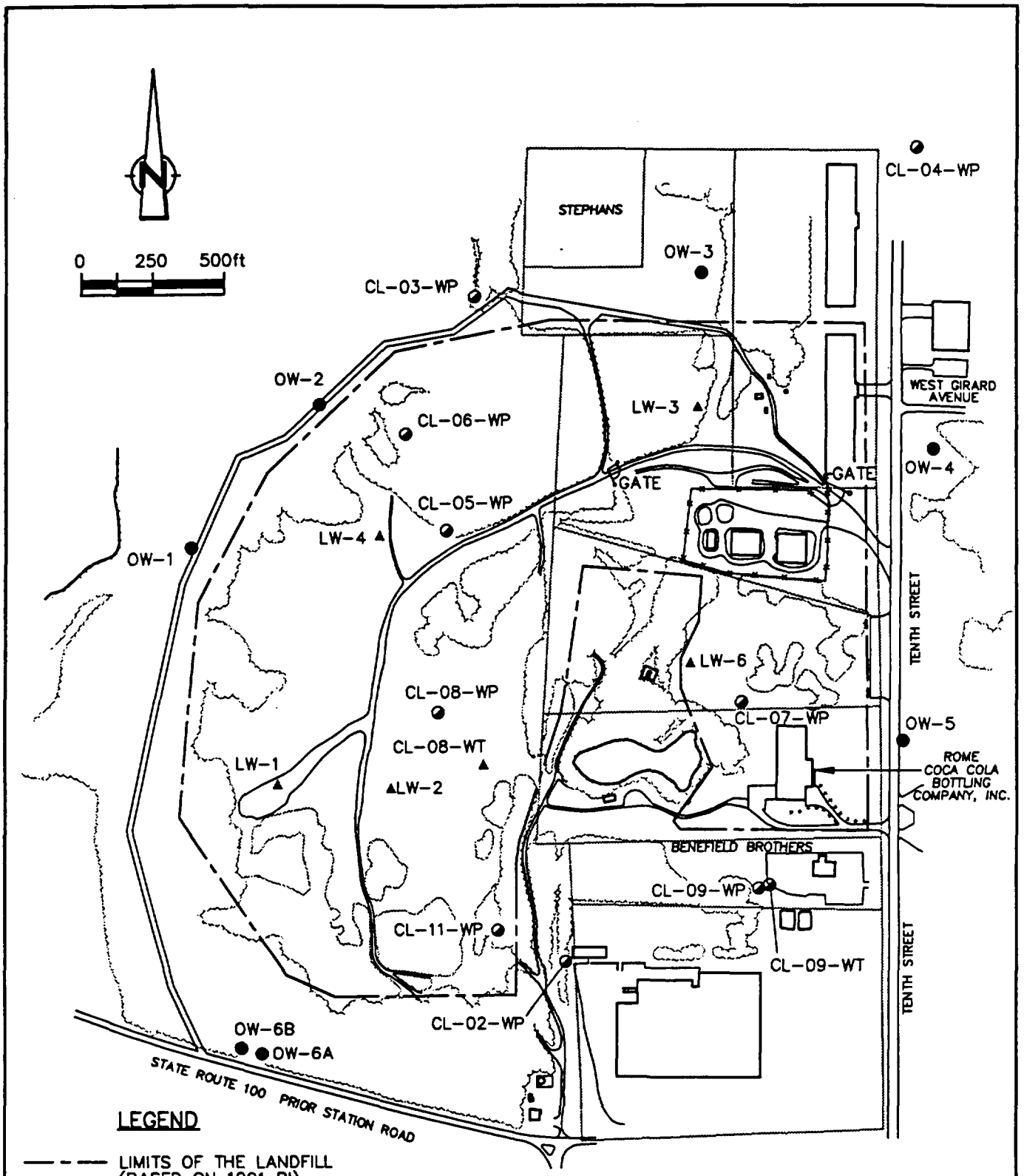


SOURCE: USGS QUADRANGLE MAP
CEDARTOWN WEST, GA.

figure 1.1
SITE LOCATION
CEDARTOWN MUNICIPAL LANDFILL SITE
Cedartown, Georgia

CRA

3482 (11) NOV 21/96 (W) REV.0

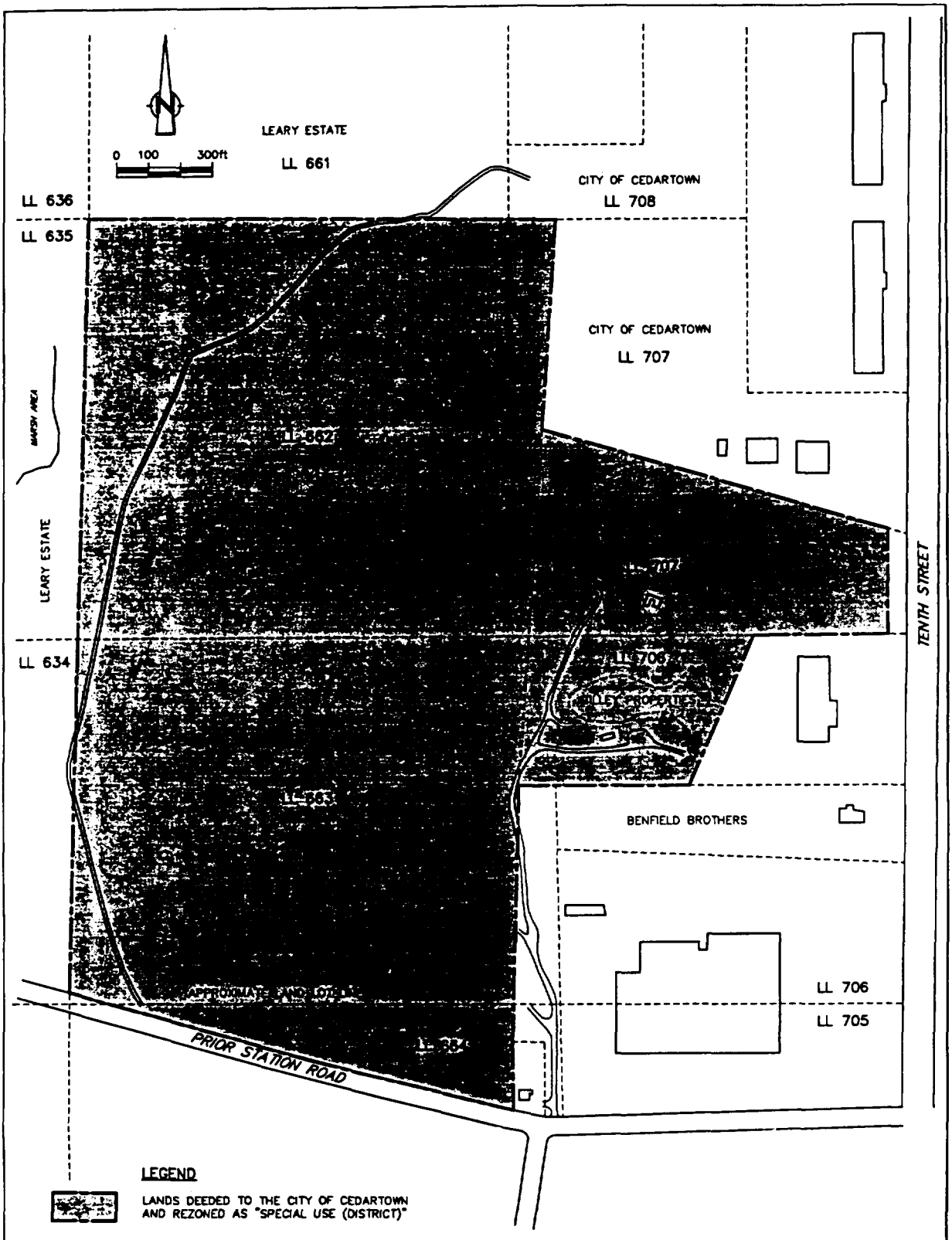


CRA

figure 1.2

SITE PLAN
CEDARTOWN MUNICIPAL LANDFILL SITE
Cedartown, Georgia

3482 (11) DEC 18/96(W) REV.0 (P-40)

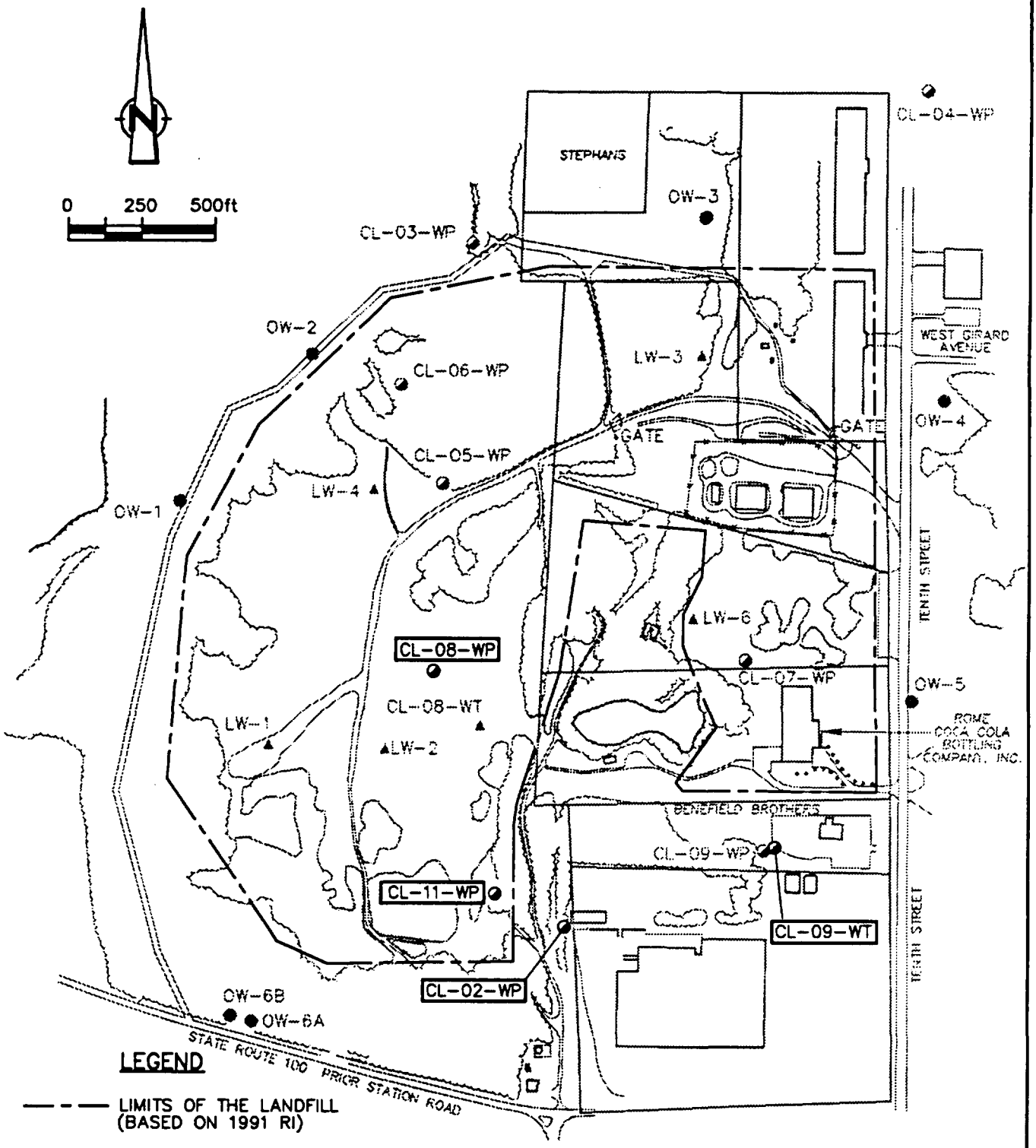


SOURCE: ELBERT H. ANGEL
CEDARTOWN, GEORGIA
JULY 15, 1994 (REVISED MARCH 8, 1995)

figure 2.1
ZONING MAP
CEDARTOWN MUNICIPAL LANDFILL SITE
Cedartown, Georgia

CRA

3482 (11) DEC 16/96(W) REV.0 (P-55)



LEGEND

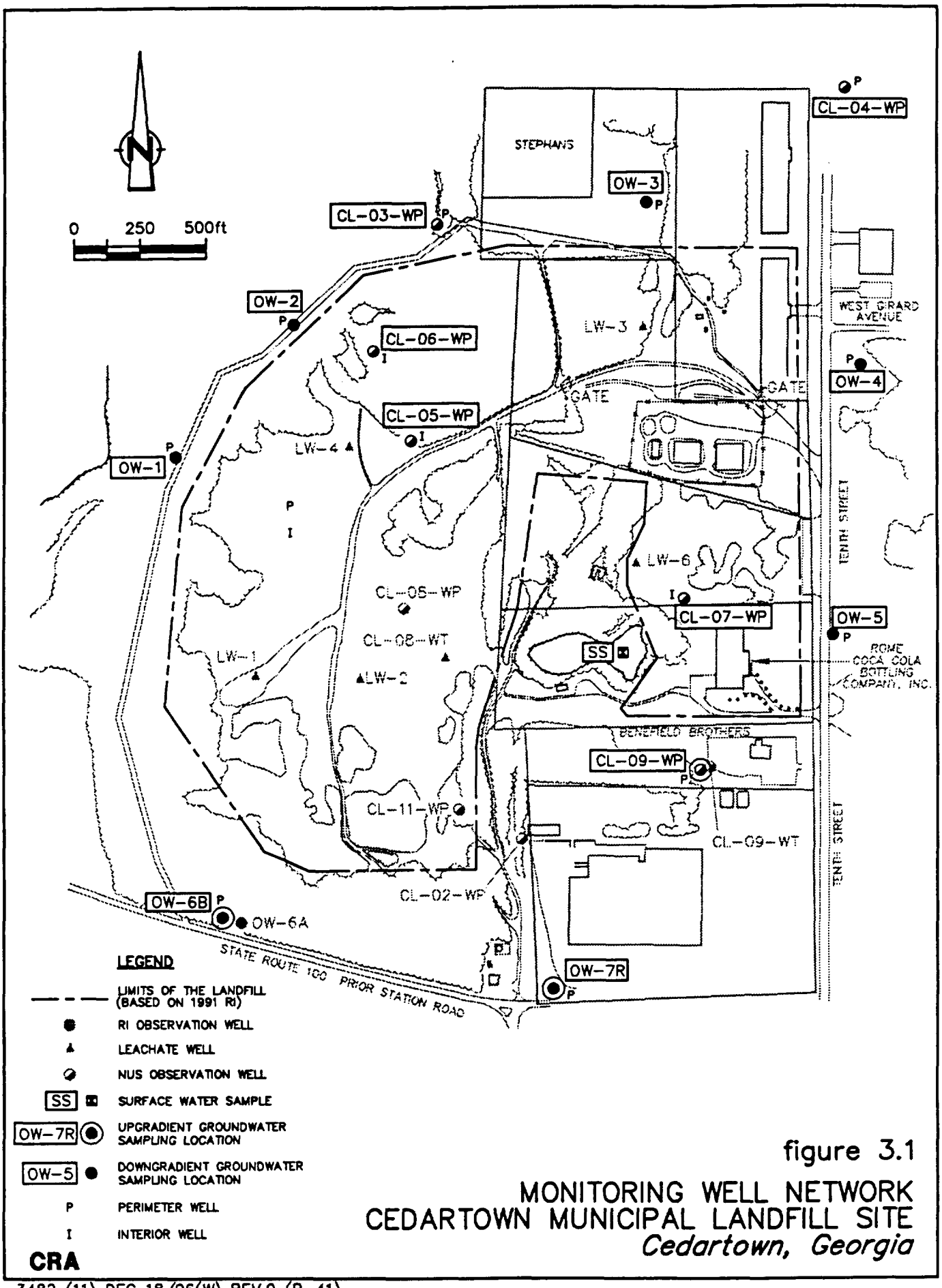
- LIMITS OF THE LANDFILL (BASED ON 1991 RI)
- RI OBSERVATION WELL
- LEACHATE WELL
- NUS OBSERVATION WELL
- FENCE/GATE
- CL-02-WP DECOMMISSIONED WELL

CRA

figure 2.2

LOCATION OF DECOMMISSIONED WELLS
CEDARTOWN MUNICIPAL LANDFILL SITE
Cedartown, Georgia

3482 (11) DEC 18/96(W) REV.0 (P-48)

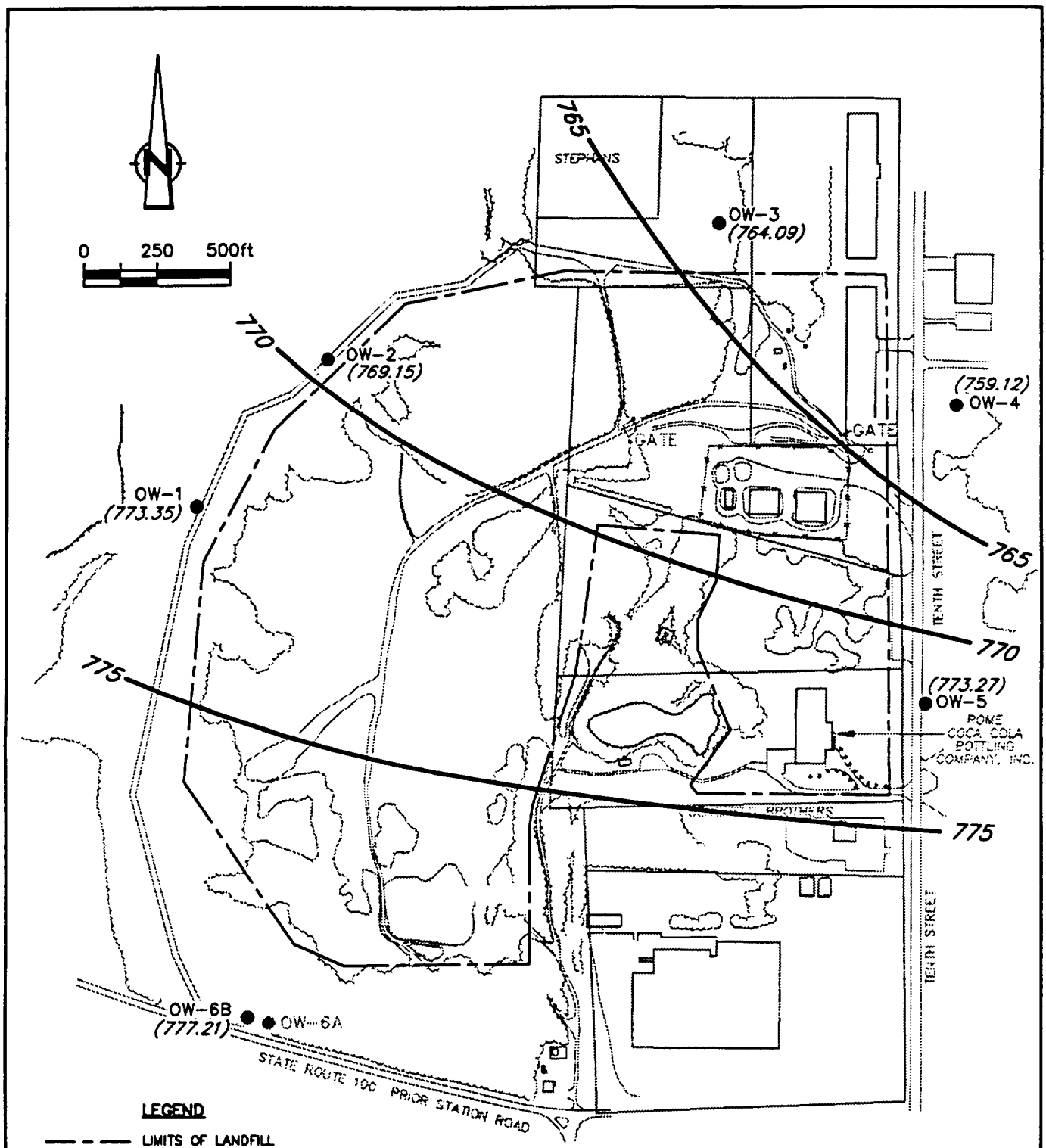


CRA

figure 3.1

MONITORING WELL NETWORK
CEDARTOWN MUNICIPAL LANDFILL SITE
Cedartown, Georgia

3482 (11) DEC 18/96(W) REV.0 (P-41)



LEGEND

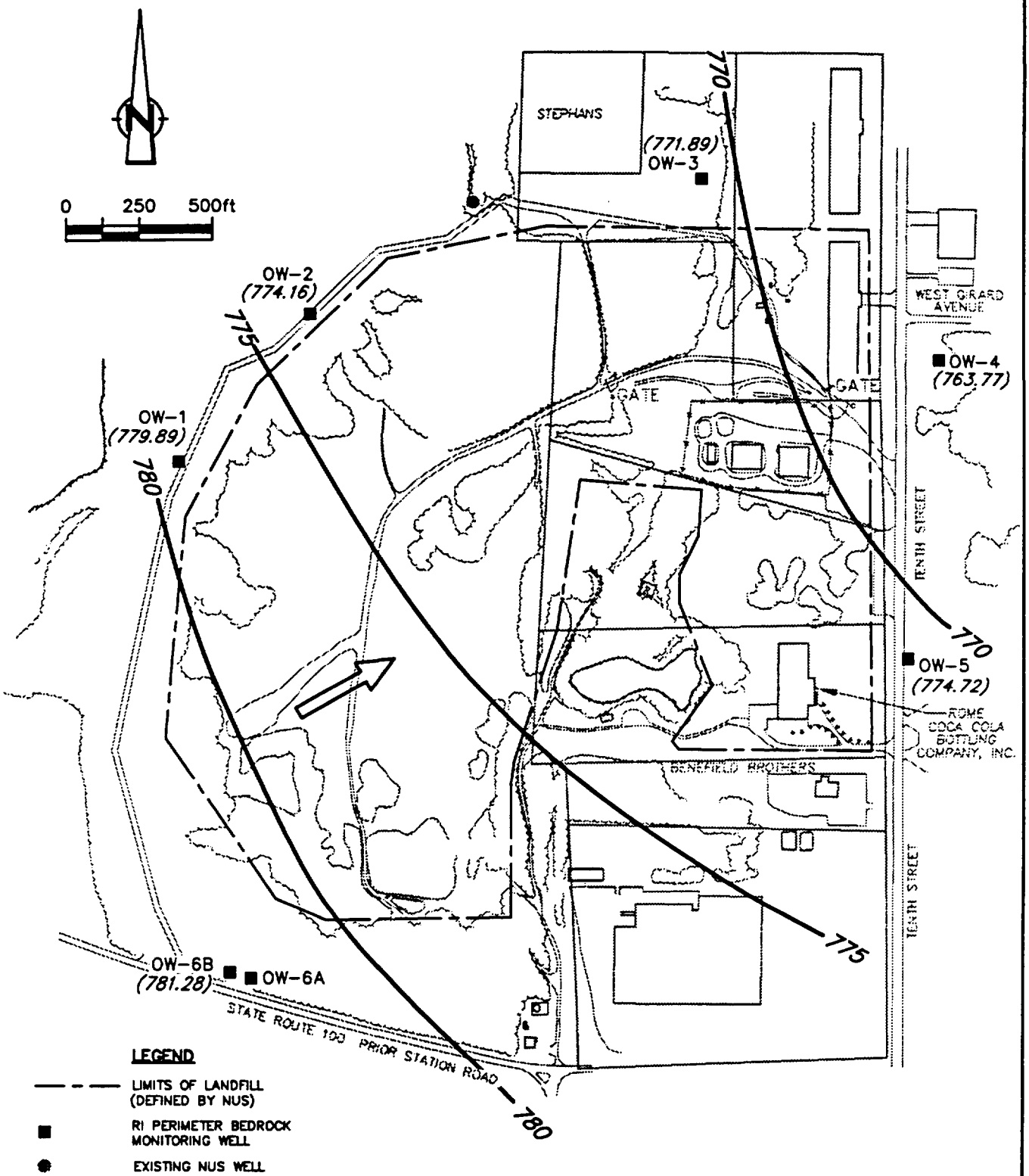
- LIMITS OF LANDFILL (BASED ON 1991 RI)
- RI OBSERVATION WELL
- OW-5 GROUNDWATER SAMPLING LOCATION
- (778.35) GROUNDWATER ELEVATION (ft. AMSL)
- 775 GROUNDWATER CONTOUR

figure 4.1

BEDROCK GROUNDWATER CONTOURS
OCTOBER 1991
CEDARTOWN MUNICIPAL LANDFILL SITE
Cedartown, Georgia

CRA

3482 (11) DEC 18/96(W) REV.0 (P-49)



LEGEND

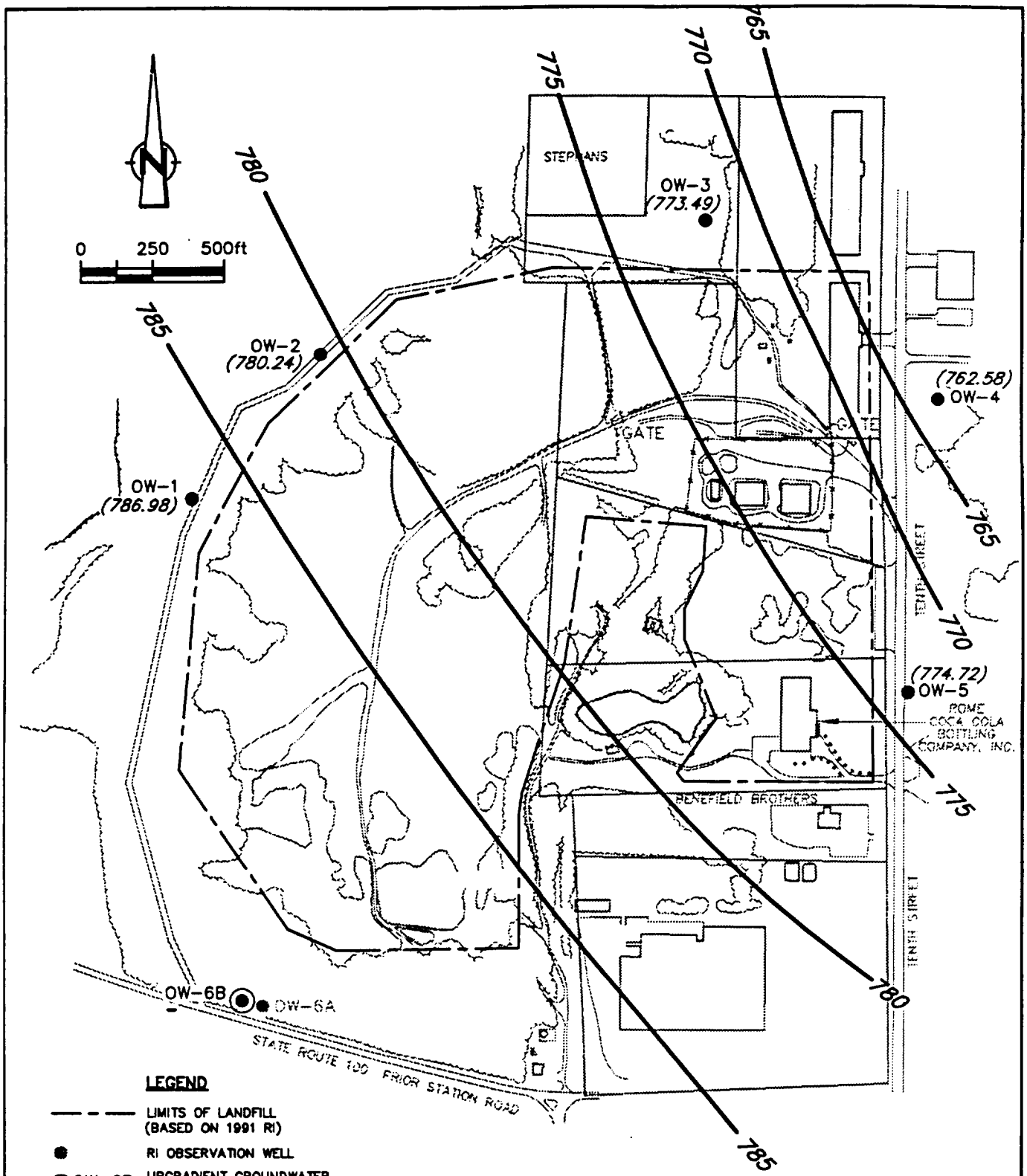
- LIMITS OF LANDFILL (DEFINED BY NUS)
- RI PERIMETER BEDROCK MONITORING WELL
- EXISTING NUS WELL
- (786.15) GROUNDWATER ELEVATION (ft. AMSL)
- 775 GROUNDWATER CONTOUR
- GROUNDWATER FLOW

figure 4.2

BEDROCK GROUNDWATER CONTOURS
DECEMBER 1991
CEDARTOWN MUNICIPAL LANDFILL SITE
Cedartown, Georgia

CRA

3482 (11) DEC 18/96(W) REV.0 (P-50)



LEGEND

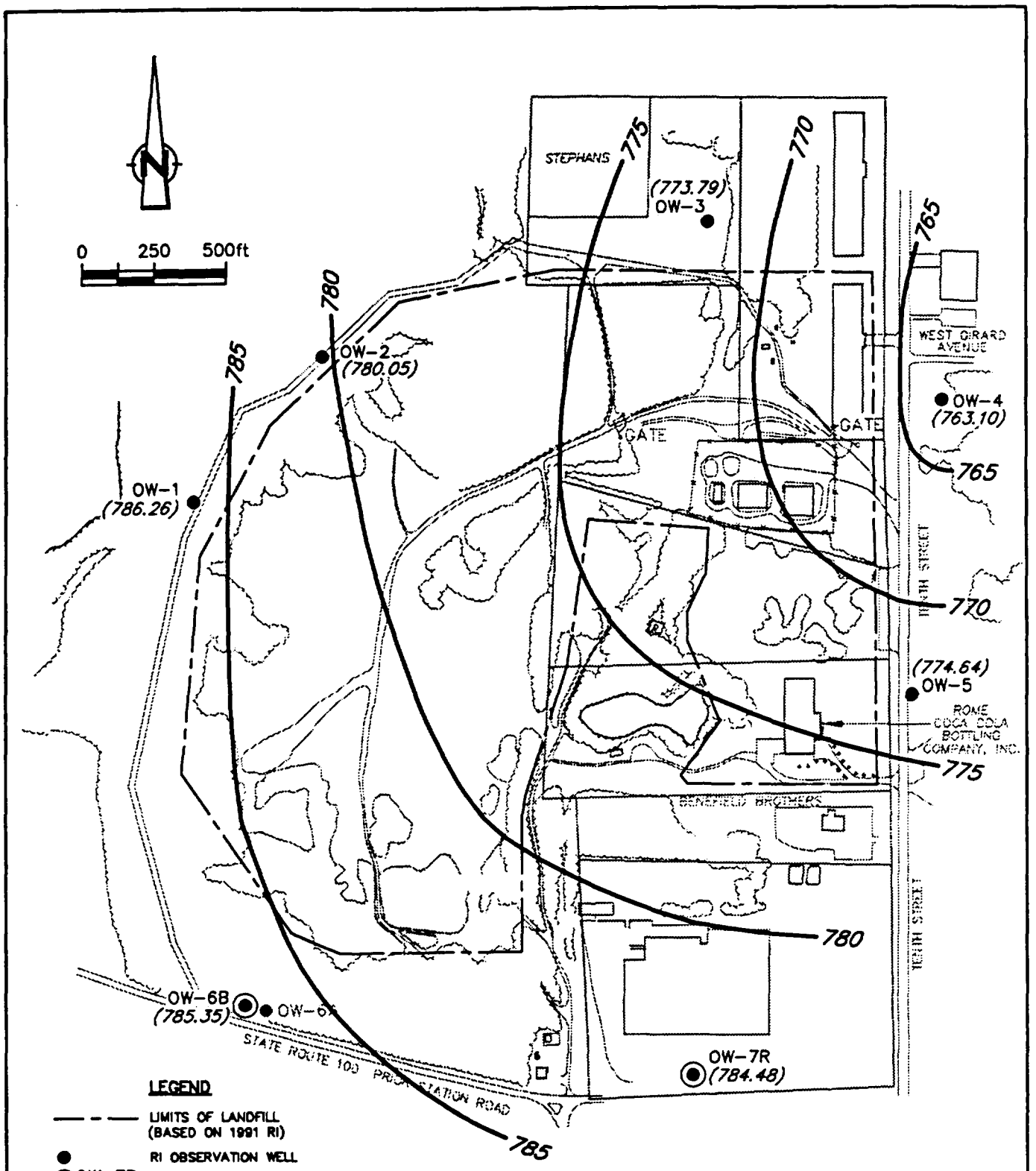
- LIMITS OF LANDFILL (BASED ON 1991 RI)
- RI OBSERVATION WELL
- OW-6B UPGRADIENT GROUNDWATER SAMPLING LOCATION
- OW-5 DOWNGRADIENT GROUNDWATER SAMPLING LOCATION
- (778.35) GROUNDWATER ELEVATION (ft. AMSL)
- 775 GROUNDWATER CONTOUR
- NOT SAMPLED/INSTALLED

figure 4.3

BEDROCK GROUNDWATER CONTOURS
JUNE 1993
CEDARTOWN MUNICIPAL LANDFILL SITE
Cedartown, Georgia

CRA

3482 (11) DEC 18/96(W) REV.0 (P-51)



LEGEND

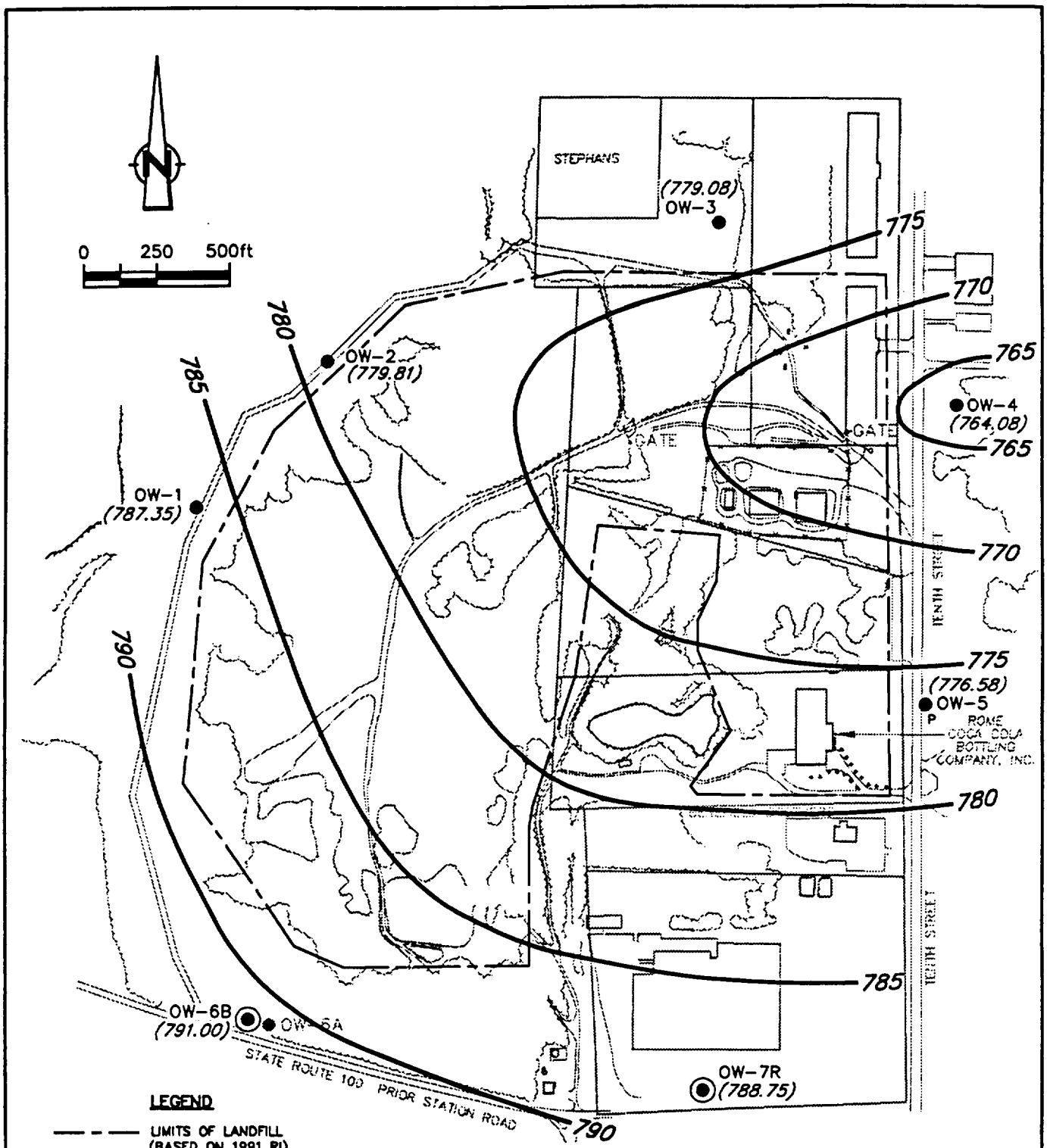
- — — — LIMITS OF LANDFILL (BASED ON 1991 RI)
- ● RI OBSERVATION WELL
- ◉ OW-7R UPGRADIENT GROUNDWATER SAMPLING LOCATION
- ● OW-5 DOWNGRADIENT GROUNDWATER SAMPLING LOCATION
- (785.35) GROUNDWATER ELEVATION (ft. AMSL)
- 785 —— GROUNDWATER CONTOUR

figure 4.4

BEDROCK GROUNDWATER CONTOURS
JANUARY 1995
CEDARTOWN MUNICIPAL LANDFILL SITE
Cedartown, Georgia

CRA

3482 (11) DEC 18/96(W) REV.0 (P-42)



LEGEND

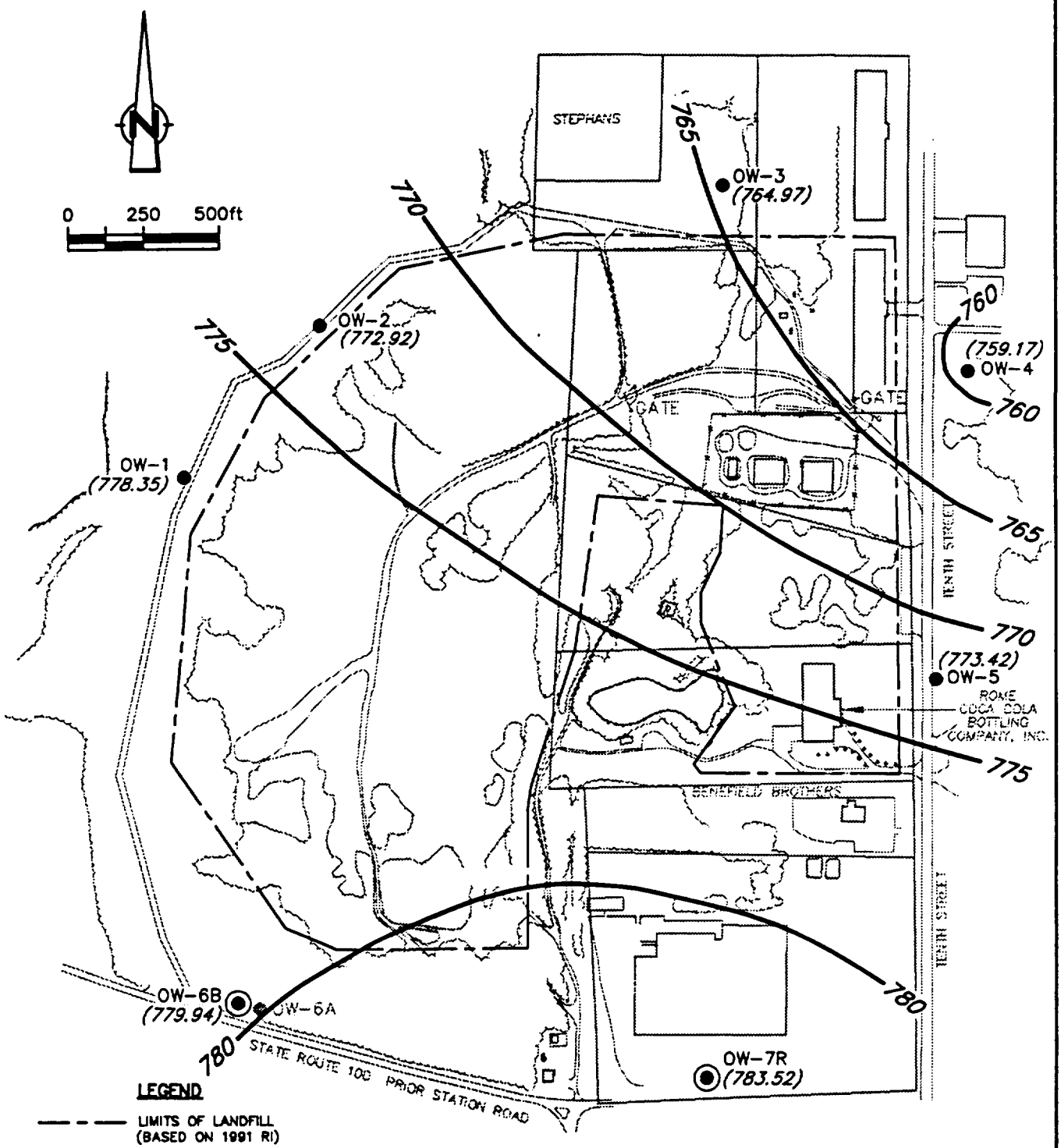
- — — — LIMITS OF LANDFILL (BASED ON 1991 RI)
- ● RI OBSERVATION WELL
- ◉ OW-7R UPGRADIENT GROUNDWATER SAMPLING LOCATION
- ● OW-5 DOWNGRADIENT GROUNDWATER SAMPLING LOCATION
- (791.00) GROUNDWATER ELEVATION (ft. AMSL)
- 785 —— GROUNDWATER CONTOUR

figure 4.5

BEDROCK GROUNDWATER CONTOURS
APRIL 1995
CEDARTOWN MUNICIPAL LANDFILL SITE
Cedartown, Georgia

CRA

3482 (11) DEC 18/96(W) REV.0 (P-43)



LEGEND

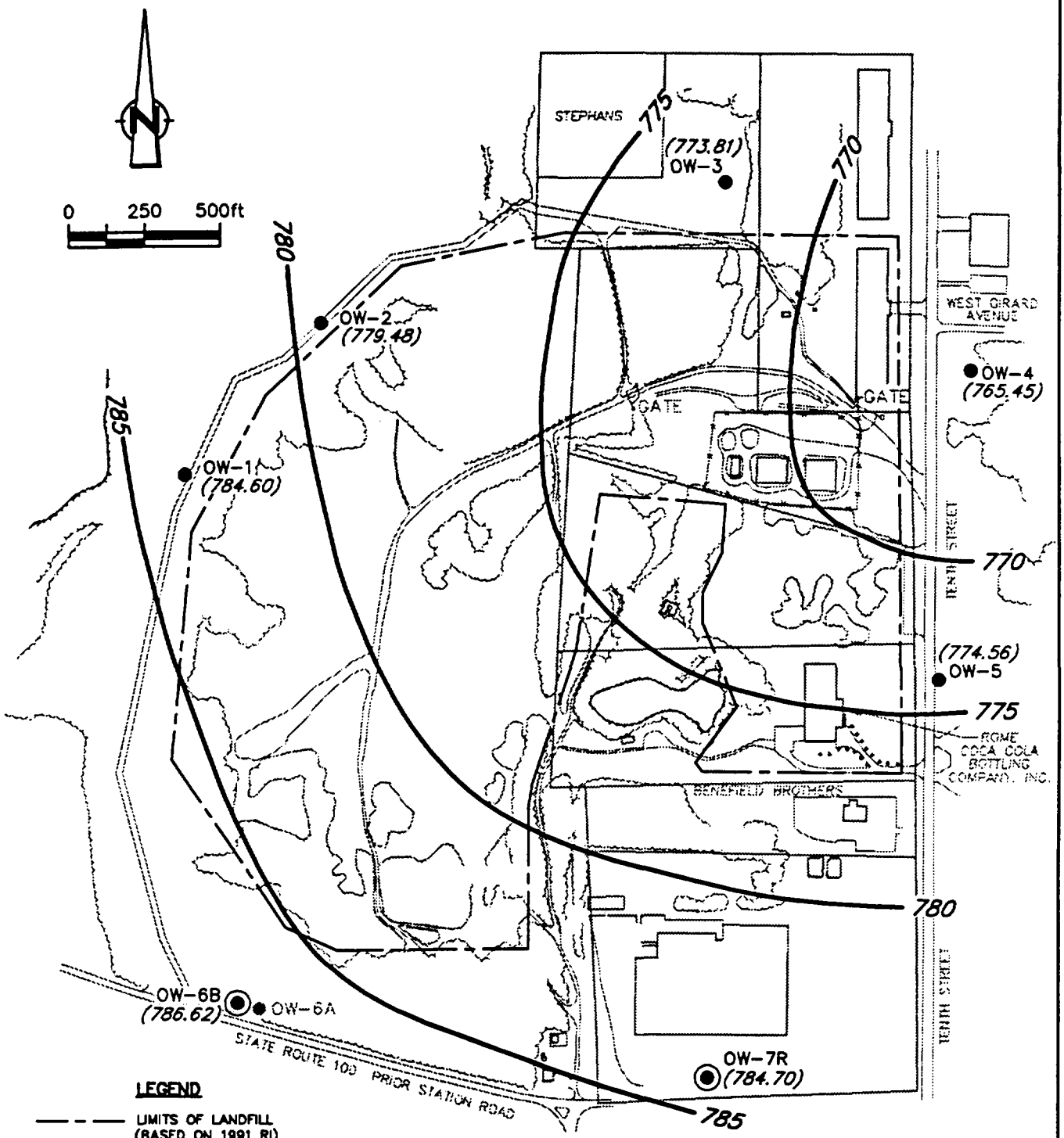
- LIMITS OF LANDFILL (BASED ON 1991 RI)
- RI OBSERVATION WELL
- OW-7R UPGRADIENT GROUNDWATER SAMPLING LOCATION
- OW-5 DOWNGRADIENT GROUNDWATER SAMPLING LOCATION
- (778.35) GROUNDWATER ELEVATION (ft. AMSL)
- 775 GROUNDWATER CONTOUR

figure 4.6

BEDROCK GROUNDWATER CONTOURS
JULY 1995
CEDARTOWN MUNICIPAL LANDFILL SITE
Cedartown, Georgia

CRA

3482 (11) DEC 18/96(W) REV.0 (P-44)



LEGEND

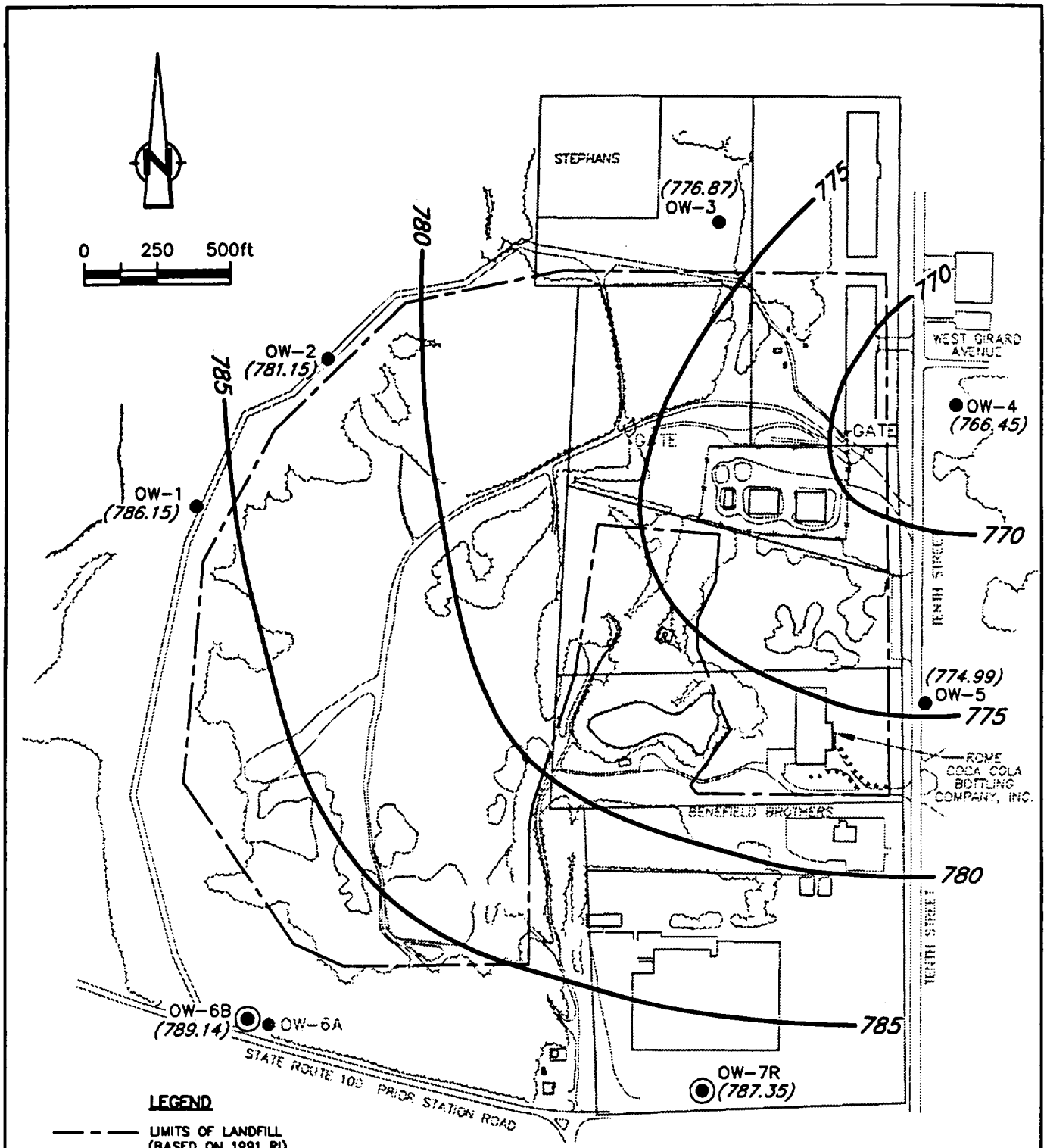
- LIMITS OF LANDFILL (BASED ON 1991 RI)
- RI OBSERVATION WELL
- OW-7R UPGRADIENT GROUNDWATER SAMPLING LOCATION
- OW-5 DOWNGRADIENT GROUNDWATER SAMPLING LOCATION
- (784.60) GROUNDWATER ELEVATION (ft. AMSL)
- 775 GROUNDWATER CONTOUR

figure 4.7

BEDROCK GROUNDWATER CONTOURS
OCTOBER 1995
CEDARTOWN MUNICIPAL LANDFILL SITE
Cedartown, Georgia

CRA

3482 (11) DEC 18/96(W) REV.0 (P-45)



LEGEND

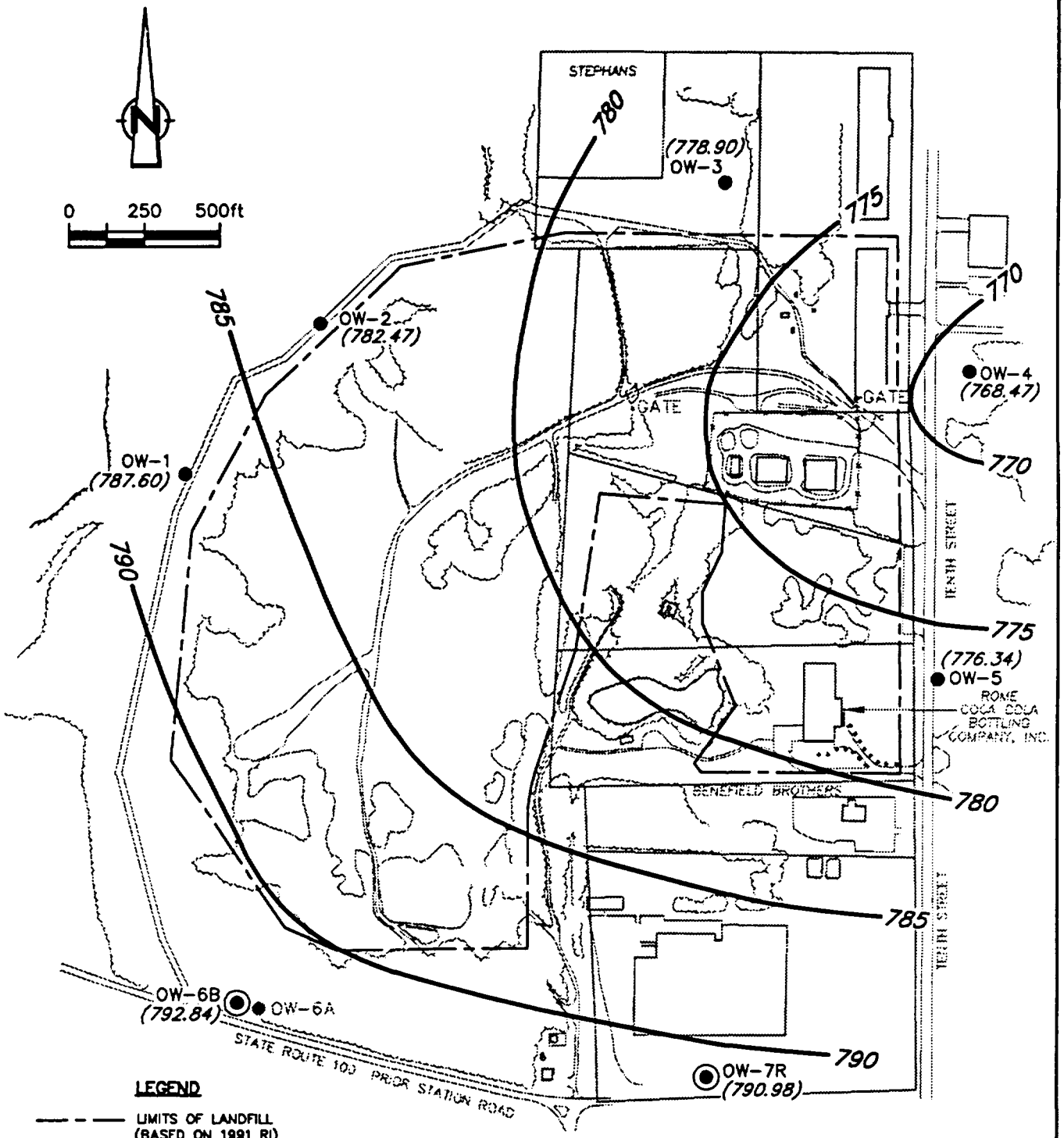
- — — — LIMITS OF LANDFILL (BASED ON 1991 RI)
- ● RI OBSERVATION WELL
- ◉ OW-7R UPGRADIENT GROUNDWATER SAMPLING LOCATION
- ● OW-5 DOWNGRADIENT GROUNDWATER SAMPLING LOCATION
- (786.15) GROUNDWATER ELEVATION (ft. AMSL)
- 775 —— GROUNDWATER CONTOUR

figure 4.8

BEDROCK GROUNDWATER CONTOURS
JANUARY 1996
CEDARTOWN MUNICIPAL LANDFILL SITE
Cedartown, Georgia

CRA

3482 (11) DEC 18/96(W) REV.0 (P-46)



LEGEND

- LIMITS OF LANDFILL (BASED ON 1991 RI)
- RI OBSERVATION WELL
- OW-7R UPGRADIENT GROUNDWATER SAMPLING LOCATION
- OW-5 DOWNGRADIENT GROUNDWATER SAMPLING LOCATION
- (787.60) GROUNDWATER ELEVATION (ft. AMSL)
- 785 GROUNDWATER CONTOUR

figure 4.9

BEDROCK GROUNDWATER CONTOURS
APRIL 1996
CEDARTOWN MUNICIPAL LANDFILL SITE
Cedartown, Georgia

CRA

3482 (11) DEC 18/96(W) REV.0 (P-47)

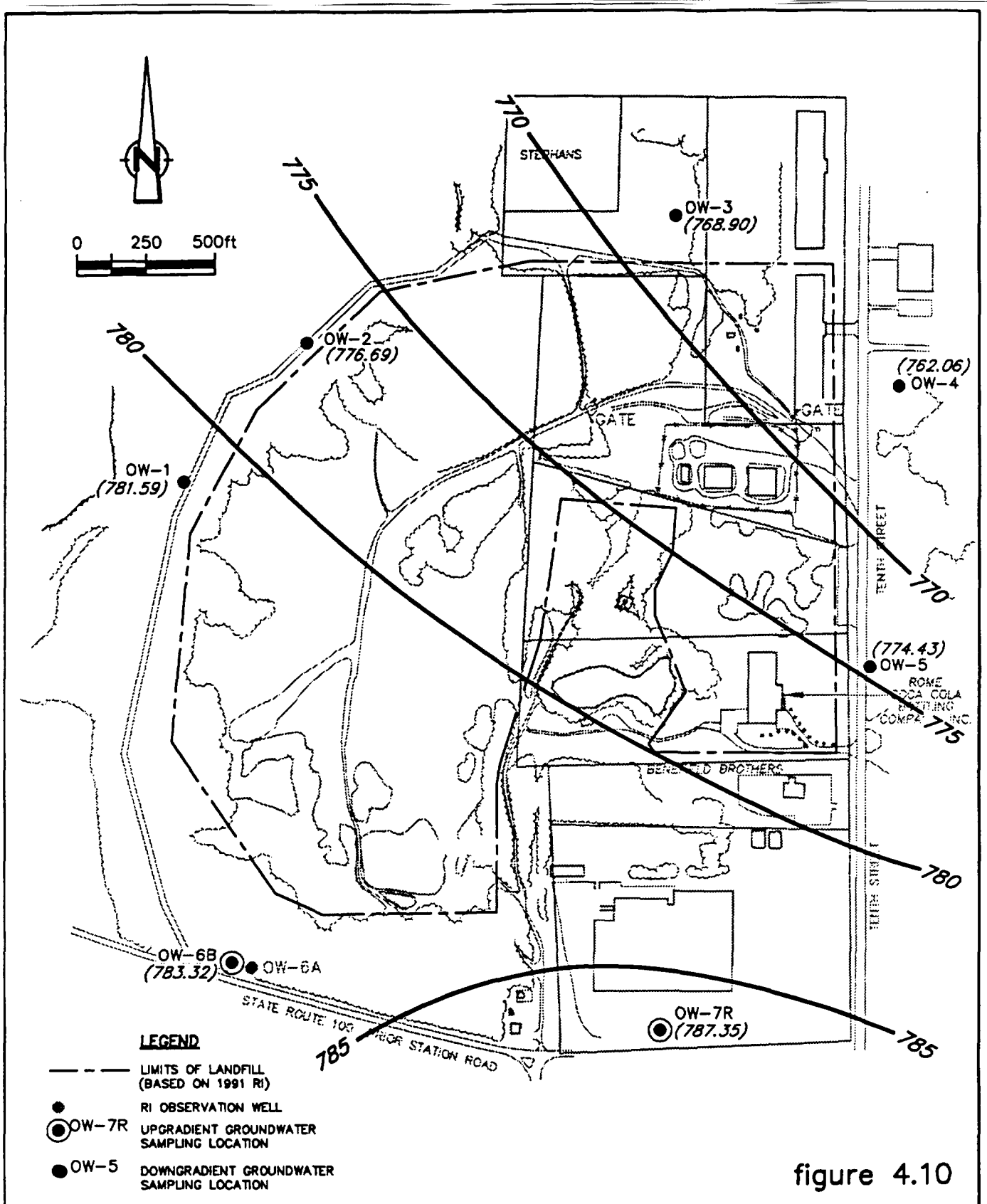


figure 4.10

BEDROCK GROUNDWATER CONTOURS
JULY 1996
CEDARTOWN MUNICIPAL LANDFILL SITE
Cedartown, Georgia

CRA

3482 (11) DEC 18/96(W) REV.0 (P-53)

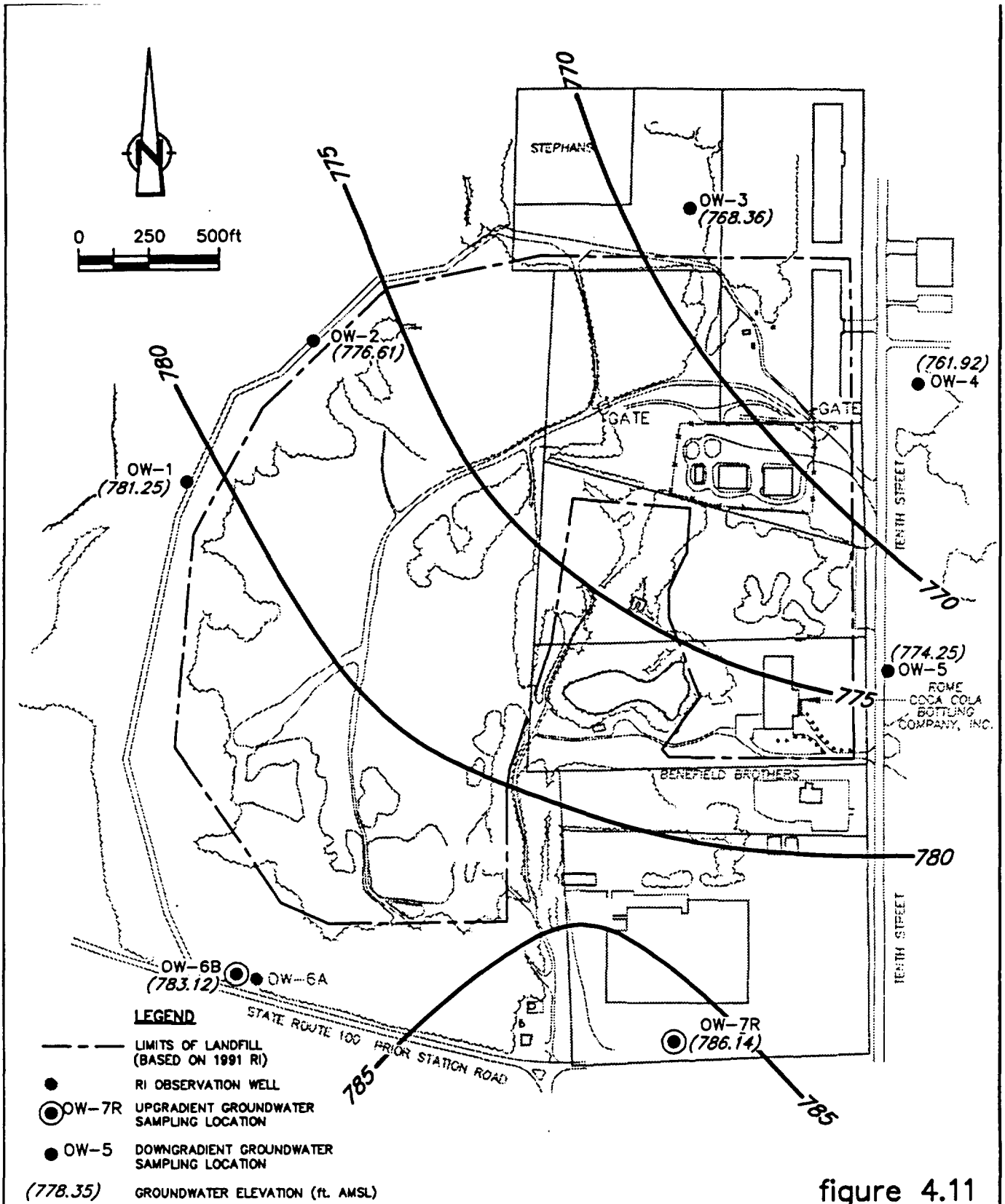


figure 4.11

BEDROCK GROUNDWATER CONTOURS
OCTOBER 1996
CEDARTOWN MUNICIPAL LANDFILL SITE
Cedartown, Georgia

CRA

3482 (11) DEC 18/96(W) REV.0 (P-52)

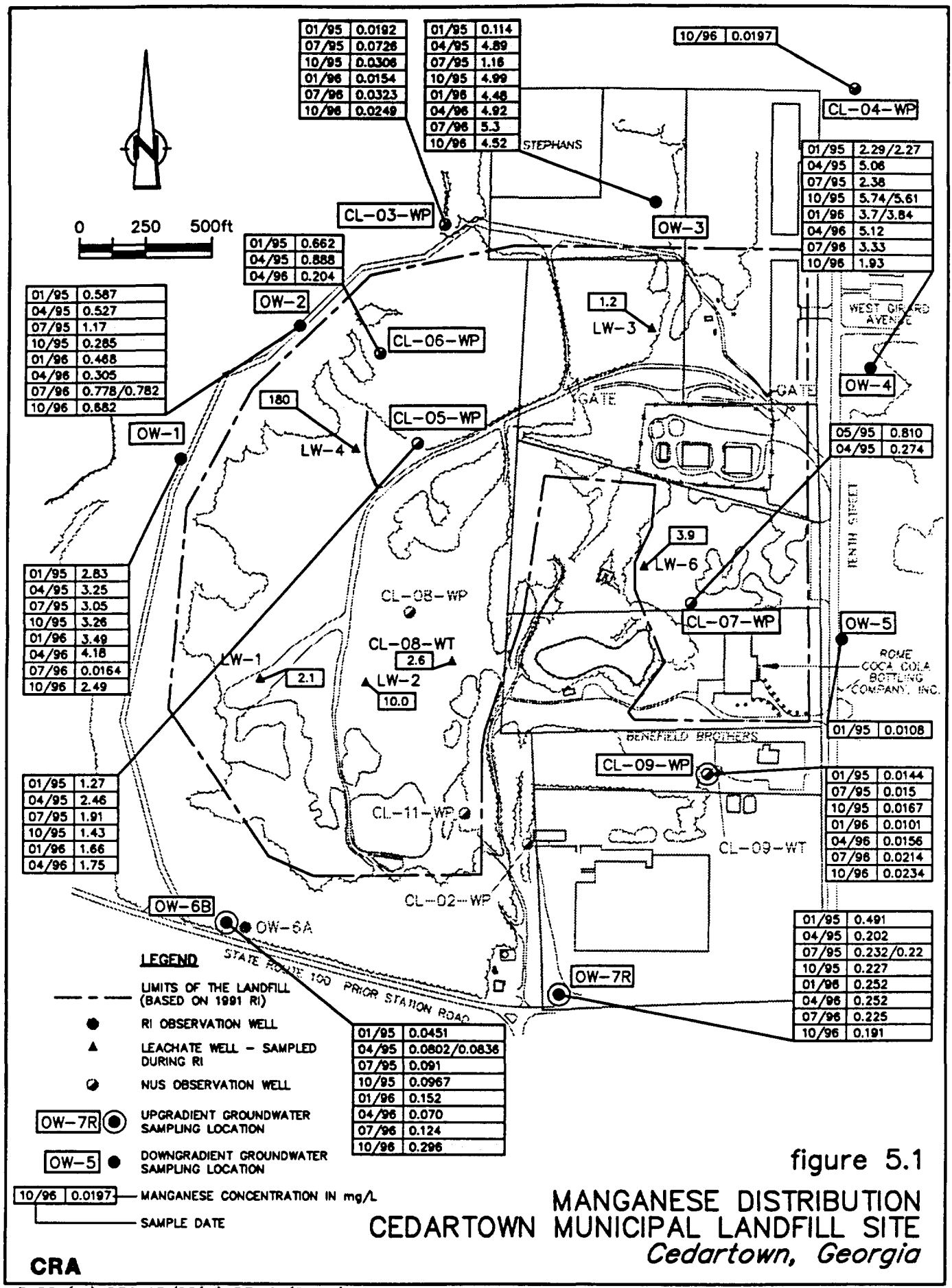


figure 5.1

MANGANESE DISTRIBUTION
CEDARTOWN MUNICIPAL LANDFILL SITE
Cedartown, Georgia

CRA

3482 (11) DEC 18/96(W) REV.0 (P-54)

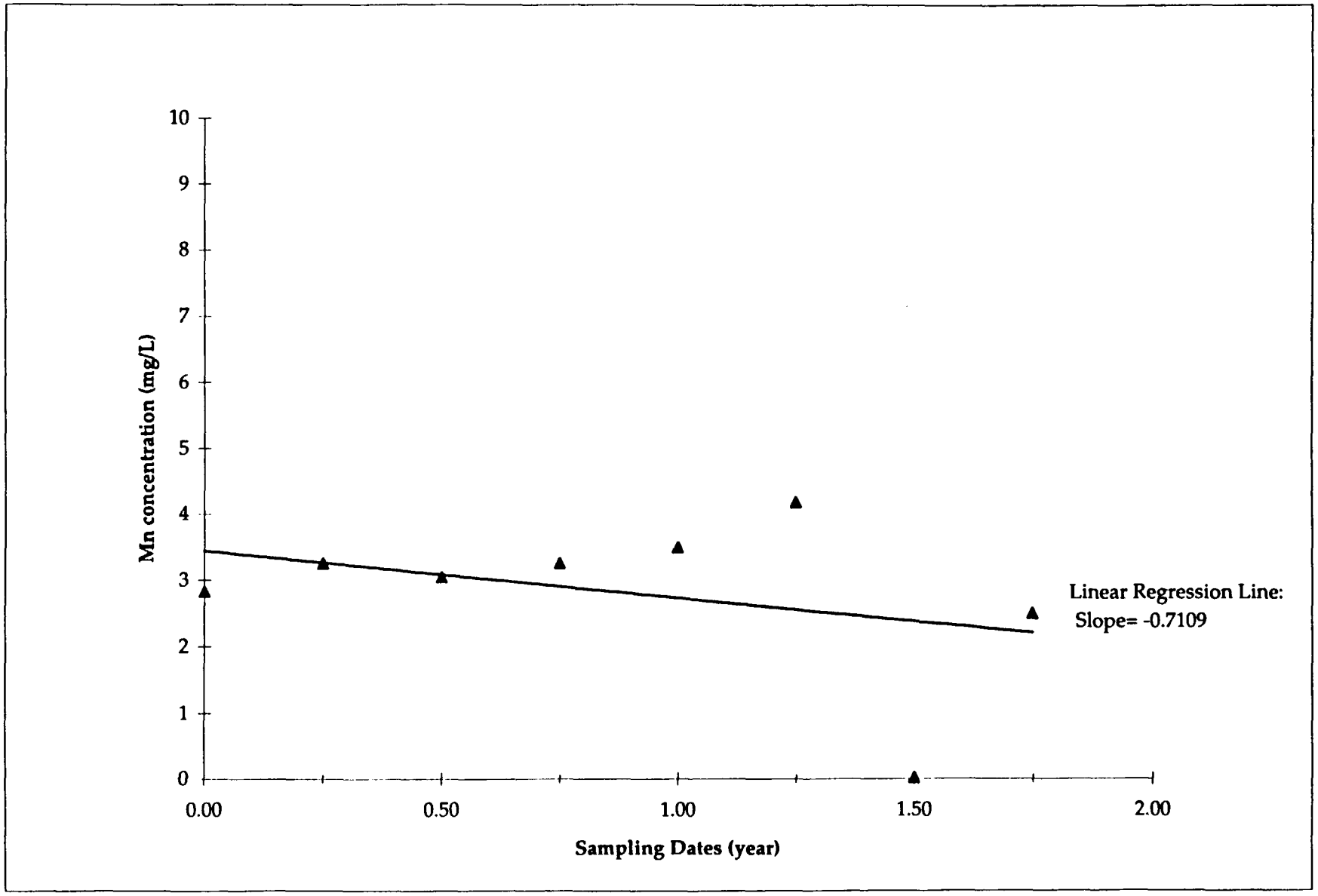


Figure 6.1
Manganese Concentration vs. Time -OW-1
Cedartown Municipal Landfill Site
Cedartown, Georgia

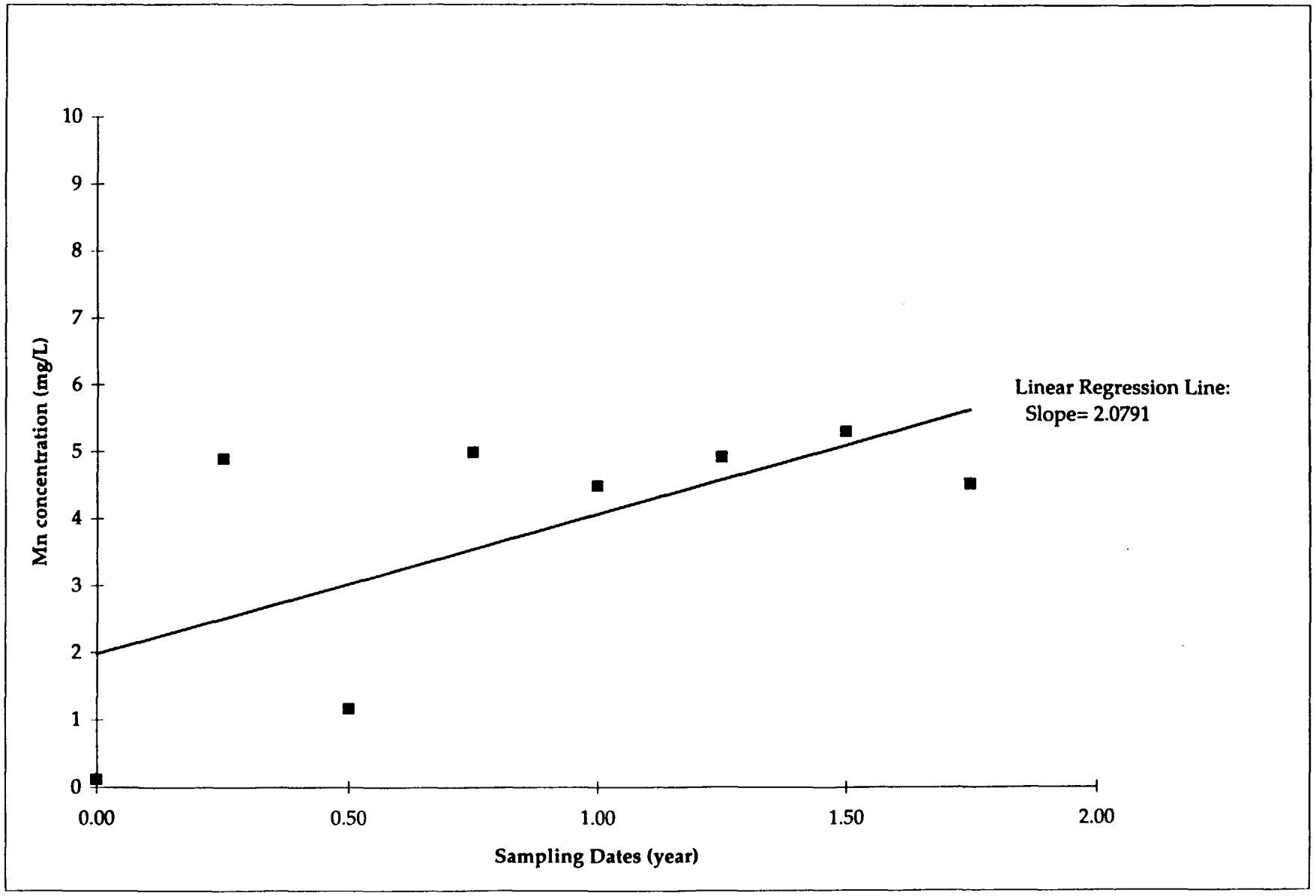


Figure 6.2
Manganese Concentration vs. Time- OW-3
Cedartown Muncipal Landfill Site
Cedartown, Georgia

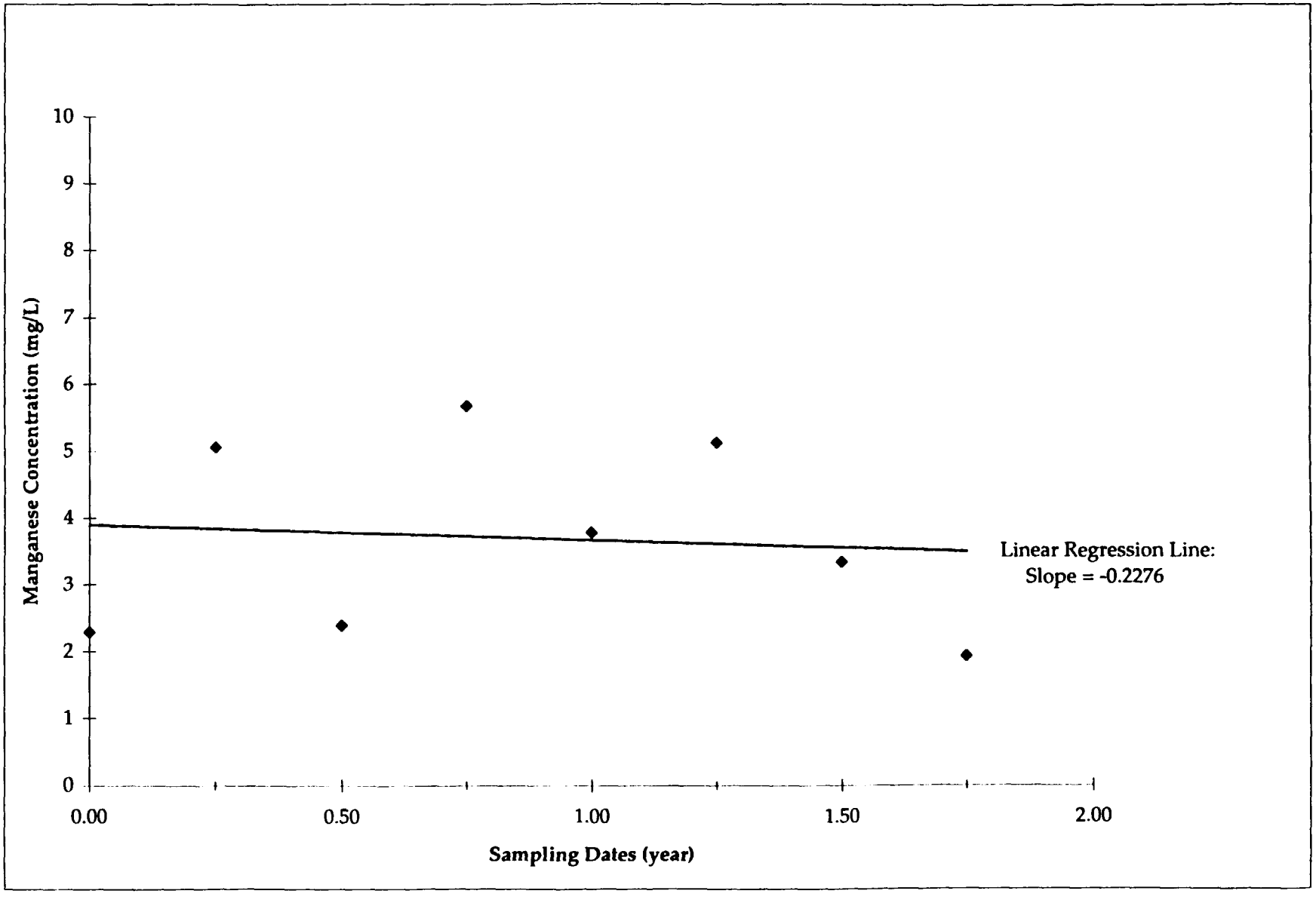


Figure 6.3
Manganese Concentration vs. Time- OW-4
Cedartown Municipal Landfill Site
Cedartown, Georgia

TABLES

TABLE 3.1

CONSTRUCTION DETAILS FOR MONITORING WELL NETWORK
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Well Number	*Ground Elevation (Ft. AMSL) (1)*	*Top of Well Elevation (Ft. AMSL)*	*Screened Interval*		*Bottom of Well*		*Screened Interval Lithologic Material*
			Elevation (Ft. AMSL)	*Depth (Ft. BGS)*	*Elevation (Ft. AMSL)*	*Depth (Ft. BGS)*	
OW-1	820.79	823.80	761.79-771.79	49.0-59.0	760.79	60.0	Dolostone
OW-2	824.45	827.50	767.45-782.45	42.0-57.0	764.45	60.0	Dolostone
OW-3	801.50	803.29	Open Hole		608.50	193.0 (3)	Limestone
OW-4	799.00	801.52	739.0-749.0	50.0-60.0	730.00	69.0	Limestone
OW-5	795.42	797.92	712.42-732.42	63.0-83.0	710.42	85.0	Limestone
OW-6B	804.12	805.12	Open Hole		696.12	108.0 (4)	Limestone
OW-7R	806.70	809.30	724.70-734.70	72.0-82.0	724.70	88.0	Siderite
CL-03-WP (5)	833.60	836.41	736.1-751.1	82.5-97.5	735.60	98.0	Clay/limestone
CL-04-WP (5)	796.81	796.81	755.31-765.31	31.5-41.5	754.81	42.0	Limestone
CL-05-WP (5)	850.10	853.34	733.6-743.6	106.5-116.5	733.10	117.0	Limestone
CL-06-WP (5)	857.40	861.02	770.4-780.4	77.0-87.0	769.90	87.5	Limestone
CL-07-WP (5)	823.30	824.90	793.3-803.3	20.0-30.0	792.80	30.5	Limestone
CL-09-WP (5)	802.40	803.63	770.9-780.9	21.5-31.5	770.40	32.0	Limestone

Notes:

(1) AMSL - above mean sea level
(2) BGS - below ground surface
(3) Well has since collapsed to 646.50 Ft. AMSL or 155 Ft. BGS.
(4) Well has since collapsed to 752.12 Ft. AMSL or 52.0 Ft. BGS.
(5) Source: NUS Corporation

TABLE 4.1

GROUNDWATER ELEVATION SUMMARY
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Monitoring Well	*Monitoring Well Classification*	*Reference Elevation*	*Water Level Elevations (1)*					
			October 1991	*December 1991*	*January 1995*	*April 1995*	*July 1995*	*October 1995*
OW-1	P	823.80	773.35	779.88	786.26	787.35	778.35	784.60
OW-2	P	827.50	769.15	774.16	780.05	779.81	772.92	779.48
OW-3	P	803.29	764.09	771.89	773.79	779.08	764.97	773.81
OW-4	P	801.52	759.12	763.77	763.10	764.98	759.17	765.45
OW-5	P	797.92	773.27	774.72	774.64	776.58	773.42	774.56
OW-6B	B	805.12	777.21	781.28	785.35	791.00	779.94	786.62
OW-7R	B	809.30	-- (4)	-- (4)	784.48	788.75	783.52	784.70
CL-03-WP	P	836.41	775.99	777.01	786.54	791.47	781.31	785.41
CL-04-WP	P	796.81	757.28	776.39	761.33	764.30	756.59	763.50
CL-05-WP	I	853.34	-- (3)	-- (3)	780.22	783.40	777.99	778.23
CL-06-WP	I	861.02	-- (3)	-- (3)	776.80	773.38	-- (2)	776.18
CL-07-WP	I	824.90	-- (3)	-- (3)	801.09	801.42	792.75	792.75
CL-09-WP	D	803.18	783.18	790.91	788.74	794.96	785.03	790.28

Notes:

(1) Elevations are feet above mean sea level.
(2) Dry.
(3) Not sampled.
(4) OW-7R installed during RD.
P - Perimeter monitoring well
B - Background monitoring well
I - Interior monitoring well

TABLE 4.1

GROUNDWATER ELEVATION SUMMARY
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Monitoring Well	*Monitoring Well Classification*	*Reference Elevation*	*Water Level Elevations (1)*			
			January 1996	*April 1996*	*July 1996*	*October 1996*
OW-1	P	823.80	786.15	787.60	781.59	781.25
OW-2	P	827.50	781.15	782.47	776.69	776.61
OW-3	P	803.29	776.87	778.90	768.90	768.36
OW-4	P	801.52	766.45	768.47	762.06	761.92
OW-5	P	797.92	774.99	776.34	774.43	774.25
OW-6B	B	805.12	789.14	792.84	783.82	783.12
OW-7R	B	809.30	787.35	790.98	787.35	786.14
CL-03-WP	P	836.41	789.95	790.89	785.33	785.01
CL-04-WP	P	796.81	767.81	766.61	760.41	758.04
CL-05-WP	I	853.34	782.22	786.69	-- (3)	-- (3)
CL-06-WP	I	861.02	777.78	775.16	-- (3)	-- (3)
CL-07-WP	I	824.90	792.81	800.44	-- (3)	-- (3)
CL-09-WP	D	803.18	793.95	796.62	788.73	788.42

Notes:

(1) Elevations are feet above mean sea level.
(2) Dry.
(3) Not sampled.
P - Perimeter monitoring well
B - Background monitoring well
I - Interior monitoring well

GROUNDWATER METALS RESULTS FOR BACKGROUND MONITORING WELLS
REMEDIAL ACTION GROUNDWATER MONITORING
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Location:		*CL-09-WP*							
Sample ID:		*W-3482-JOS-010695-07*	*GW-3482-JOS-042695-022*	*GW-3482-JOS-072195-09*	*GW-3482-JOS-102695-11*	*GW-3482-JOS-010296-04(MS/MSD)*	*GW-3482-JOS-042496-14*	*GW-3482-JOS-071096-09*	*GW-3482-JOS 102396-02(MS/MSD)*
Date Sampled:		*1/6/95*	*4/26/95*	*7/21/95*	*10/26/95*	*1/2/96*	*4/24/96*	*7/10/96*	*10/23/96*
Parameters	**Units**								
Beryllium	mg/L	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Cadmium	mg/L	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Chromium	mg/L	ND(0.01)	ND(0.0100)	ND(0.01)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)
Lead	mg/L	ND(0.005)	ND(0.0030)	ND(0.003)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)
Manganese	mg/L	**0.0144**	ND(0.0100)	**0.015**	**0.0167**	**0.0101**	**0.0156**	**0.0214**	**0.0234**

Location:		*OW-7R*								
Sample ID:		*W-3482-JOS-012395-15*	*GW-3482-JOS-042895-023*	*GW-3482-JOS-071995-01*	*GW-3482-JOS-071995-02*	*GW-3482-JOS-102495-03*	*GW-3482-JOS-010396-05*	*GW-3482-JOS-042496-11*	*GW-3482-JOS-071096-05*	*GW-3482-JOS-102496-07*
Date Sampled:		*1/23/95*	*4/28/95*	*7/19/95*	*7/19/95 (Dup)*	*10/24/95*	*1/3/96*	*4/24/96*	*7/10/96*	*10/24/96*
Parameters	**Units**									
Beryllium	mg/L	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Cadmium	mg/L	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Chromium	mg/L	**0.0101**	ND(0.0100)	ND(0.01)	ND(0.01)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)
Lead	mg/L	**0.011**	ND(0.0030)	ND(0.003)	ND(0.003)	ND(0.0030)	ND(0.0300)	ND(0.0030)	ND(0.0030)	ND(0.0030)
Manganese	mg/L	**0.491**	**0.202**	**0.232**	**0.22**	**0.227**	**0.252**	**0.252**	**0.225**	**0.191**

Note:

ND - Not detected at the reporting limit stated in parentheses.

GROUNDWATER METALS RESULTS FOR BACKGROUND MONITORING WELLS
REMEDIAL ACTION GROUNDWATER MONITORING
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Location:		*OW-6B*								
Sample ID:		*W-3482-JOS-010595-02*	*GW-3482-JOS-042595-017*	*GW-3482-JOS-042595-18*	*GW-3482-JOS-072395-011*	*GW-3482-JOS-102695-13*	*GW-3482-JOS-010396-06*	*GW-3482-JOS-042496-12*	*GW-3482-JOS-071196-12*	*GW-3482-JOS-102896-12*
Date Sampled:		*1/5/95*	*4/25/95*	*4/25/95* (Dup)	*7/23/95*	*10/26/95*	*1/3/96*	*4/24/96*	*7/11/96*	*10/28/96*
Parameters	**Units**									
Beryllium	mg/L	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Cadmium	mg/L	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Chromium	mg/L	ND(0.01)	ND(0.0100)	ND(0.0100)	ND(0.01)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	**0.0162**
Lead	mg/L	ND(0.005)	**0.0050**	**0.0048**	ND(0.003)	ND(0.0030)	**0.0042**	**0.0036**	ND(0.0030)	ND(0.0030)
Manganese	mg/L	**0.0451**	**0.0802**	**0.0836**	**0.091**	**0.0967**	**0.152**	**0.070**	**0.124**	**0.296**

Note:

ND - Not detected at the reporting limit stated in parentheses.

GROUNDWATER METALS RESULTS FOR INTERIOR MONITORING WELLS
REMEDIAL ACTION GROUNDWATER MONITORING
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Location:		*CL-05-WP*					
Sample ID:		*W-3482-JOS-011095-11*	*GW-3482-JOS-042895-027*	*GW-3482-JOS-072195-08*	*GW-3482-JOS-102695-10*	*GW-3482-JOS-010496-13*	*GW-3482-JOS-042396-08*
Date Sampled:		*1/10/95*	*4/28/95*	*7/21/95*	*10/26/95*	*1/4/96*	*4/23/96*
Parameters	**Units**						
Beryllium	mg/L	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Cadmium	mg/L	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Chromium	mg/L	ND(0.01)	ND(0.0100)	ND(0.01)	ND(0.0100)	ND(0.0100)	ND(0.0100)
Lead	mg/L	ND(0.003)	ND(0.0030)	**0.003**	ND(0.0030)	ND(0.0030)	ND(0.0030)
Manganese	mg/L	**1.27**	**2.46**	**1.91**	**1.43**	**1.66**	**1.75**

Location:		*CL-06-WP*			*CL-07-WP*	
Sample ID:		*W-3482-JOS-011195-14*	*GW-3482-JOS-042795-026*	*GW-3482-JOS-042396-07*	*GW-3482-JOS-050295-029*	*GW-3482-JOS-042496-15*
Date Sampled:		*1/11/95*	*4/27/95*	*4/23/96*	*5/2/95*	*4/24/96*
Parameters	**Units**					
Beryllium	mg/L	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Cadmium	mg/L	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Chromium	mg/L	**0.423**	**0.173**	**0.0103**	**0.230**	**0.398**
Lead	mg/L	ND(0.003)	**0.0046**	ND(0.0030)	**0.0268**	**0.0113**
Manganese	mg/L	**0.662**	**0.888**	**0.204**	**0.810**	**0.274**

ND - Not detected at the reporting limit stated in parentheses.

TABLE 5.3

GROUNDWATER METALS RESULTS FOR PERIMETER MONITORING WELLS
REMEDIAL ACTION GROUNDWATER MONITORING
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Location:		*OW-1*							
Sample ID:		*W-3482-JOS-011095-09*	*W-3482-JOS-051095-028*	*GW-3482-JOS-072095-05*	*W-3482-JOS-102495-04*	*GW-3482-JOS-010396-10*	*GW-3482-JOS-042396-05*	*GW-3482-JOS-072696-01*	*GW-3482-JOS-102596-10*
Date Sampled:		*1/10/95*	*5/10/95*	*7/20/95*	*10/24/95*	*1/3/96*	*4/23/96*	*7/26/96*	*10/25/96*
Parameters	**Units**								
Beryllium	mg/L	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Cadmium	mg/L	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Chromium	mg/L	ND(0.01)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	0.0104	ND(0.0100)
Lead	mg/L	ND(0.003)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)
Manganese	mg/L	2.83	3.25	3.05	3.26	3.49	4.18	0.0164	2.49

Location:		*OW-2*								
Sample ID:		*W-3482-JOS-010595-01*	*GW-3482-JOS-042795-025*	*GW-3482-JOS-072095-06*	*GW-3482-JOS-102395-02*	*GW-3482-JOS-010396-09*	*GW-3482-JOS 042396-06(MS/MSD)*	*GW-3482-JOS 071096-06*	*GW-3482-JOS 071096-07 (Dup)*	*GW-3482-JOS-102496-06*
Date Sampled:		*1/5/95*	*4/27/95*	*7/20/95*	*10/23/95*	*1/3/96*	*4/24/96*	*7/10/96*	*7/10/96*	*10/24/96*
Parameters	**Units**									
Beryllium	mg/L	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Cadmium	mg/L	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Chromium	mg/L	ND(0.01)	ND(0.0100)	ND(0.01)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)
Lead	mg/L	ND(0.005)	ND(0.0030)	ND(0.003)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)
Manganese	mg/L	0.587	0.527	1.17	0.285	0.468	0.305	0.778	0.782	0.682

ND - Not detected at the reporting limit stated in parentheses.

GROUNDWATER METALS RESULTS FOR PERIMETER MONITORING WELLS
REMEDIAL ACTION GROUNDWATER MONITORING
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Location:		OW-3							
Sample ID:		*W-3482-JOS-011095-10*	*GW-3482-JOS-042695-024*	*W-3482-JOS-072295-010*	*GW-3482-JOS-102695-012*	*GW-3482-JOS-010496-11*	*GW-3482-JOS-042396-10*	*GW-3482-JOS-071196-11*	*GW-3482-JOS-102496-09*
Date Sampled:		*1/10/95*	*4/26/95*	*7/22/95*	*10/26/95*	*1/4/96*	*4/23/96*	*7/11/96*	*10/24/96*
Parameters	**Units**								
Beryllium	mg/L	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Cadmium	mg/L	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Chromium	mg/L	ND(0.01)	ND(0.0100)	ND(0.01)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)
Lead	mg/L	ND(0.003)	ND(0.0030)	ND(0.003)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)
Manganese	mg/L	0.114	4.89	1.16	4.99	4.48	4.92	5.3	4.52

Location:		OW-4										
Sample ID:		*W-3482-JOS-010695-04*	*W-3482-JOS-010695-05*	*GW-3482-JOS-042595-019*	*W-3482-JOS-071995-04*	*GW-3482-JNP-102595-05*	*GW-3482-JNP-102595-06*	*GW-3482-JOS-010296-02*	*GW-3482-JOS-010296-03*	*GW-3482-JOS-042496-13*	*GW-3482-JOS-070996-02*	*GW-3482-JOS 102396-05*
Date Sampled:		*1/6/95*	*1/6/95 (Dup)*	*4/25/95*	*7/19/95*	*10/25/95*	*10/25/95 (Dup)*	*1/2/96*	*1/2/96 (Dup)*	*4/24/96*	*7/9/96*	*10/23/96*
Parameters	**Units**											
Beryllium	mg/L	ND(0.005)	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Cadmium	mg/L	ND(0.005)	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Chromium	mg/L	ND(0.01)	ND(0.01)	ND(0.0100)	ND(0.01)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)
Lead	mg/L	ND(0.005)	ND(0.005)	ND(0.0030)	ND(0.003)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)
Manganese	mg/L	2.29	2.27	5.06	2.38	5.74	5.61	3.7	3.84	5.12	3.33	1.93

Location:		CL-03-WP							
Sample ID:		*W-3482-JOS-010995-08*	*GW-3482-JOS-042695-021*	*W-3482-JOS-071995-03*	*GW-3482-JOS-102595-09*	*GW-3482-JOS-010396-07*	*GW-3482-JOS-042396-09*	*GW-3482-JOS-072696-02*	*GW-3482-JOS-102596-11*
Date Sampled:		*1/9/95*	*4/26/95*	*7/19/95*	*10/25/95*	*1/3/96*	*4/23/96*	*7/26/96*	*10/25/96*
Parameters	**Units**								
Beryllium	mg/L	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Cadmium	mg/L	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Chromium	mg/L	ND(0.0100)	ND(0.0100)	ND(0.01)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)
Lead	mg/L	ND(0.003)	ND(0.0030)	ND(0.003)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)
Manganese	mg/L	0.0192	ND(0.0100)	0.0726	0.0306	0.0154	ND(0.0100)	0.0323	0.0249

ND - Not detected at the reporting limit stated in parentheses.

GROUNDWATER METALS RESULTS FOR PERIMETER MONITORING WELLS
REMEDIAL ACTION GROUNDWATER MONITORING
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Location:		*CL-04-WP*							
Sample ID:		*W-3482-JOS-010695-03*	*GW-3482-JOS-042595-016*	*GW-3482-JOS-102395-01*	*GW-3482-JOS-010296-01*	*GW-3482-JOS-042296-02*	*GW-3482-JOS-042296-03*	*GW-3482-JOS-070996-01*	*GW-3482-JOS-102396-01*
Date Sampled:		*1/6/95*	*4/25/95*	*10/23/95*	*1/2/96*	*4/22/96*	*4/22/96 (Dup)*	*7/9/96*	*10/23/96*
Parameters	**Units**								
Beryllium	mg/L	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Cadmium	mg/L	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Chromium	mg/L	ND(0.01)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)
Lead	mg/L	ND(0.005)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)
Manganese	mg/L	ND(0.01)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	0.0197

Location:		*OW-5*								
Sample ID:		*W-3482-JOS-010695-06*	*GW-3482-JOS-042595-020*	*W-3482-JOS-072095-07*	*GW-3482-JNP-102595-07*	*GW-3482-JOS-010496-12*	*GW-3482-JOS-042296-04*	*GW-3482-JOS-071096-04*	*GW-3482-JOS-102396-03*	*GW-3482-JOS-102396-04*
Date Sampled:		*1/6/95*	*4/25/95*	*7/20/95*	*10/25/95*	*1/4/96*	*4/22/96*	*7/10/96*	*10/23/06*	*10/23/06 (DUP)*
Parameters	**Units**									
Beryllium	mg/L	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Cadmium	mg/L	ND(0.005)	ND(0.0050)	ND(0.005)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0050)
Chromium	mg/L	ND(0.01)	ND(0.0100)	ND(0.01)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)
Lead	mg/L	ND(0.005)	ND(0.0030)	ND(0.003)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)
Manganese	mg/L	0.0108	ND(0.0100)	ND(0.01)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)

ND - Not detected at the reporting limit stated in parentheses.

TABLE 5.4

SURFACE WATER METALS RESULTS
REMEDIAL ACTION SURFACE WATER MONITORING
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Location:		*Coke Pond*				
Sample ID:		*SW-3482-JOS-011195-13*	*SW-3482-JOS-042895-002*	*SW-3482-JOS-072195-01*	*SW-3482-JOS-102595-01*	*SW-3482-JOS-010396-01*
Date Sampled:		*1/11/95*	*4/28/95*	*7/21/95*	*10/25/95*	*1/3/96*
Parameters	**Units**					
Aluminum	mg/L	ND(0.2)	ND(0.200)	**1.87**	ND(0.200)	ND(0.200)
Chromium	mg/L	ND(0.01)	ND(0.0100)	ND(0.01)	ND(0.0100)	ND(0.0100)
Copper	mg/L	**0.018**	ND(0.0050)	**0.018**	ND(0.0050)	ND(0.0050)
Lead	mg/L	ND(0.003)	ND(0.0030)	**0.0222**	ND(0.0030)	ND(0.0030)
Nickel	mg/L	ND(0.04)	ND(0.0400)	ND(0.04)	ND(0.0400)	ND(0.0400)
Zinc	mg/L	ND(0.02)	ND(0.0200)	**0.085**	ND(0.0200)	ND(0.0200)

Location:		*Coke Pond*		
Sample ID:		*SW-3482-JOS-042496-01*	*SW-3482-JOS-071196-01*	*SW-3482-JOS-102896-01*
Date Sampled:		*4/24/96*	*7/11/96*	*10/23/96*
Parameters	**Units**			
Aluminum	mg/L	ND(0.200)	ND(0.200)	ND(0.200)
Chromium	mg/L	ND(0.0100)	ND(0.0100)	ND(0.0100)
Copper	mg/L	ND(0.0050)	ND(0.0050)	ND(0.0050)
Lead	mg/L	ND(0.0030)	ND(0.0030)	ND(0.0030)
Nickel	mg/L	ND(0.0400)	ND(0.0400)	ND(0.0400)
Zinc	mg/L	**0.0234**	**0.0247**	**0.0221**

ND - Not detected at the reporting limit stated in parentheses.

TABLE 6.1

GROUNDWATER CONTAMINANTS OF CONCERN AND PERFORMANCE STANDARDS
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Contaminant of Concern	*Performance Standard ($\mu g/L$)*
Manganese	840[a]
Beryllium	4[b]
Cadmium[c]	5[b]
Chromium[d]	100[b]
Lead	15[e]

a Revised USEPA groundwater protection level for manganese (November 1995).

b Safety Drinking Water Act Maximum Contaminant Level (MCL).

c Included due to contaminant concentrations and frequency of detection.

d While chromium was below detection during third sampling round, it was detected above standards in previous rounds. Therefore, it was retained for determining performance standards.

e EPA Action Level from Lead and Copper Rule, 56 FR, June 7, 1991.

TABLE 6.2

SURFACE WATER CONTAMINANTS OF CONCERN AND PERFORMANCE STANDARDS CEDARTOWN MUNICIPAL LANDFILL SITE CEDARTOWN, GEORGIA

Contaminant of Concern	*FAWQC (1, 2)*		*GSWQS (3)*
	Acute (µg/L)	*Chronic (µg/L)*	*(µg/L)*
Aluminum	750 (4)	87 (4)	NA
Chromium	984	117	120 a
Copper	9	6.5	6.5 a
Lead	82	3.2	1.3 a
Nickel	1,400	160	88 a
Zinc	120	110	60 a

Notes:

FAWQC	-	Federal Ambient Water Quality Criteria.
GSWQS	-	Georgia State Water Quality Standards.
NA	-	Not Available.
ND	-	Not Detected.
a	-	Assumed Surface Water Hardness ≤100 (as mg/L $CaCO_3$).

References:

(1)	-	USEPA Quality Criteria for Water 1986 EPA/440/5-86-001 May 1986, 51 Federal Register 43665, Update September 1987.
(2)	-	IRIS - EPA Integrated Risk Information System Database, July 1992.
(3)	-	Rules and Regulations for Water Quality Control, Chapter 391-3-6, 1993, Georgia Department of Natural Resources, Atlanta, Georgia.
(4)	-	EPA Region IV "Toxic Substance Spreadsheet", EPA Water Quality Standards Unit.

TABLE 6.3

STATISTICAL ANALYSES - BACKGROUND MONITORING WELLS
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Parameter	*Mean (x) (mg/L)*	*Standard Deviation (S_x)*	*Variance (S_x^2)*	*t-Statistic (t^*)*	*Critical Comparison Statistic (t_c)*	*Performance Standard Appropriate*
chromium	0.006	0.002	4×10^{-6}	-239.7	2.060	Yes
lead	0.003	0.003	9×10^{-6}	-20.4	2.060	Yes
manganese	0.133	0.120	0.014	-30.04	2.060	Yes

Assumptions:

1. Non-detect concentrations were assumed to equal one-half the detection limit.
2. Duplicate data are considered discrete sample points.

TABLE 6.4

STATISTICAL ANALYSES - PERIMETER MONITORING WELLS
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

	Well	*Mean (y) (mg/L)*	*Standard Deviation (S_y)*	*Variance (S_y^2)*	*t-Statistic (t^*)*	*Critical Comparison Statistic (t_c)*	*Significant Difference*
Manganese	OW-1	2.82	1.24	1.54	4.52	2.365	Yes (higher)
	OW-2	0.62	0.27	0.07	-2.44	2.306	Yes (lower)
	OW-3	3.8	1.99	3.96	4.21	2.365	Yes (higher)
	OW-4	3.75	1.44	2.07	6.7	2.228	Yes (higher)
	OW-5	0.006	0.002	4×10^{-6}	-1,251	2.306	Yes (lower)
	CL-03-WP	0.026	0.022	0.0005	-104.7	2.365	Yes (lower)
	CL-04-WP	0.007	0.005	3×10^{-5}	-471.2	2.365	Yes (lower)
Chromium	OW-1	0.006	0.002	4×10^{-6}	-132.9	2.365	Yes (lower)
	OW-2	ND	--	--	--	--	--
	OW-3	ND	--	--	--	--	--
	OW-4	ND	--	--	--	--	--
	OW-5	ND	--	--	--	--	--
	CL-03-WP	ND	--	--	--	--	--
	CL-04-WP	ND	--	--	--	--	--

Assumptions:

1. Non-detect concentrations were assumed to equal one-half the detection limit.
2. Duplicate data are considered discrete sample points.
3. Performance standard for manganese is 0.84 mg/L.
4. Performance standard for chromium is 0.1 mg/L.

TABLE 6.5

STATISTICAL ANALYSES - COKE POND SURFACE WATER
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Metal	Performance Standard (mg/L) Acute	Chronic	State	Mean (x) (mg/L)	Number (N)	Standard Deviation (S_x)	Variance (S_x^2)	t-Statistic (t*)	Critical Comparison Statistic (t_c)	Significant Difference
Aluminum	.750	.087	NA	0.321	8	0.626	0.392	1.06	2.365	No
Chromium	.984	.117	.120	ND	--	--	--	--	--	--
Copper	.009	.0065	.0065	0.006	8	0.007	5×10^{-5}	-0.202	2.365	No
Lead	.082	.0032	.0013	0.004	8	0.007	5×10^{-5}	1.091	2.365	No
Nickel	1.4	.160	.088	ND	--	--	--	--	--	--
Zinc	.120	.110	.060	0.024	8	0.025	0.0006	-4.07	2.365	Yes (lower)

Assumptions:

1. Non-detect concentrations were assumed to equal one-half the detection limit.
2. Surface water results were compared to the lowest level criterion in each case.

TABLE 7.1

STATISTICAL ANALYSES - PERIMETER MONITORING WELL DATA VS. INTERIOR MONITORING WELL DATA
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

	Well	*Mean (y) (mg/L)*	*Standard Deviation (Sy)*	*Variance (Sy^2)*	*t-Statistic (t*)*	*Critical Comparison Statistic (t_c)*	*Significant Difference*
Manganese	OW-1	2.82	1.24	1.53	2.94	2.78	Yes (higher)
	OW-2	0.62	0.27	0.075	-1.76	3.42	No
	OW-3	3.8	1.99	3.95	3.33	2.57	Yes (higher)
	OW-4	3.75	1.44	2.07	4.67	2.69	Yes (higher)
	OW-5	0.006	0.002	3.70E-06	-3.72	3.51	Yes (lower)
	CL-03-WP	0.026	0.022	4.70E-04	-3.65	3.51	Yes (lower)
	CL-04-WP	0.007	0.005	2.70E-05	-3.71	3.51	Yes (lower)
	Interior (pooled)	1.218	0.73	0.53	–	–	–
Chromium	OW-1	0.006	0	0	-2.08	2.77	No
	OW-2	ND	0	0	-2.08	2.77	No
	OW-3	ND	0	0	-2.08	2.77	No
	OW-4	ND	0	0	-2.08	2.77	No
	OW-5	ND	0	0	-2.08	2.77	No
	CL-03-WP	ND	0	0	-2.08	2.77	No
	CL-04-WP	ND	0	0	-2.08	2.77	No
	Interior (pooled)	0.17	0.17	0.03	–	–	–

Assumptions:

1. Non-detect (ND) concentrations were assumed to equal one-half the detection limit.
2. Duplicate data are considered discrete sample points.
3. Interior well data are pooled from wells CL-05-WP, CL-06-WP and CL-07-WP.

A

APPENDIX A

CITY OF CEDARTOWN
ZONING RESTRICTION ORDINANCE

CEDARTOWN. GEORGIA

CERTIFICATION OF ORDINANCE

CITY OF CEDARTOWN

I, EMILY C. SHAW, AS CITY CLERK AND CUSTODIAN OF RECORDS FOR THE CITY OF CEDARTOWN, HEREBY CERTIFY THAT THE ATTACHED ORDINANCE IS A TRUE AND CORRECT COPY OF ORDINANCE NO. 14. 1996, ZONING. AS CONTAINED ON FILE IN THE CITY CLERKS OFFICE OF THE CITY OF CEDARTOWN.

THIS THE 6th DAY OF DECEMBER. 1996.

SIGNED: Emily C Shaw
CITY CLERK

ORDINANCE NO. 14, 1996

AN ORDINANCE BY THE CITY COMMISSION OF THE CITY OF CEDARTOWN, GEORGIA

WHEREAS, there is a need to change the districts within the zoning code of the City of Cedartown, as contained in appendix "B" entitled "zoning", As to article four (IV) thereof; and

WHEREAS, recently the City of Cedartown has determined it necessary to acquire certain property to be annexed to the City of Cedartown, which said property was formerly used for the disposal of municipal solid waste in the city and was the former site of the "Cedartown Landfill"; and

WHEREAS, the Commission desires to restrict the zoning within the uses of this property, and must therefore create another zoning classification within the city concerning this special use; and

WHEREAS, in the future there may be certain additional special use zoning classifications for the uses hereinafter defined or similar problems which may result in amendments of the zoning ordinance of the City of Cedartown is such special circumstances; and

WHEREAS, there is a need by this ordinance to adopt certain provisions to authorize these changes in this ordinance;

Now, Therefore, be it ordained by the City Commission of the City of Cedartown, and is hereby ordained and established by said authority as follows:

Section 1:

This ordinance shall be first read and reviewed by the Commission at its September, 1996 meeting. A public notice concerning these proposed changes in the zoning code of the City of Cedartown shall, after the ordinance has been reviewed, be published in the Cedartown Standard. Said notice is attached here to exhibit "A" and made apart hereof by reference. Public comments shall be obtained before final approval of these amendments, at a public hearing to be called and held at the regular October meeting of the City Commission of the City of Cedartown, to be held on Monday, October 14, 1996 at seven o'clock in the evening.

Section 2:

The Code of the City of Cedartown as contained in appendix "B" thereof, in article four shall stand amended by adding to section 4.1 thereof entitled "Division into Districts" the following two new additional districts or designations to be defined as follows:

"SU-1 special use (restricted) district

SU-2 (Special Use Classification)"

Section 3:

The Code of the City of Cedartown shall stand further amended as to Appendix "B" article seven (VII) entitled "Use Requirements by District", by adding thereto a new section to be designated as section 7.10. Said section shall read as follows:

"Sec.7.10. Special Use (Restricted) district"

Within a special use (Restricted) district, the following uses shall be permitted:

7.10.1. The planting of permanent vegetation, ground cover, timber or any other vegetation to prevent erosion, sedimentation or to prevent soil disturbance in the designated district.

7.10.2. The property in this classification has previously been declared to potentially be a threat to human health and the environment; or could be potentially such a threat, based upon either federal regulations, state procedures and\or local decisions of the zoning and planning commission of the City of Cedartown. As such, no improvements which would allow human occupation of the property, no ground water collection facilities, ponds, lakes; nor any wells (drinking water, commercial use wells, raw water or any other type wells) shall be permitted in this district.

Section 4:

The Code of the City of Cedartown shall stand further amended by creating a new article eight (VIII) to Appendix "B"-

Zoning which shall be entitled "Article VIII-Special Use Classification District". This new article shall read as follows:

ARTICLE VIII (8). SPECIAL USE DISTRICT

a) A "Special Use District" shall be defined as a district which creates , adjacent to abutting Residential, Commercial, or Industrial zones, a certain new classification of property based upon a "Special Use" of said property, or special stipulations concerning the use of the property; since the property because of its unique character, location or use does not fit within the general use requirements by districts, as contained in article VII hereof. This use classification is based upon either special conditions for the use of the property, certain restrictions that will be applied to the use, or other similar circumstances so that the property thereafter will be designated with the Special Use. As an example, An "R-1" use could have a further classification of "SU" Appended to it in that the residential single family dwellings to be built upon the property shall be based upon lots with either additional set back requirements as those contained in the subdivisions regulations, square footage use restriction, or other similar restrictions that may be placed by the developer of the property; or Special Uses placed upon the property by the ~~the~~ city in connection with any review and approval of zoning of the property.

b) The use to be permitted by this designation either as a special district under this article, or as a designation within any other Residential, Commercial or Industrial District, shall consider the following uses and matters affecting the property:

1) The use and zoning of surrounding property;
2) The need for a special buffer, special circumstances with regard to the zoning

classification, for other special use requirement of the property based upon location, terrain, size, topography or similar criteria;

3) The overall zoning development plan of the City of Cedartown as it relates to the geographical district within one square mile radius of the location of the property;

4) Environmental conditions, uses, concerns for similar requirements;

5) The submitted development plan, or proposed building plan of the property.

6) Other criteria as may be established by the planning commission or building inspector of the City of Cedartown in a review of any requested zoning.

Section 5:

All laws or parts of laws in conflict herewith are specifically repealed. In the event any portion of this ordinance should be declared unconstitutional or otherwise unenforceful, all remaining portions thereof shall continue in full force and effect.

ADOPTED AND APPROVED by the City Commission of the City of Cedartown on the 14th day of October, 1996, at a regular meeting thereof, duly called and held, all Commissioners voting "Aye", none voting "No".

APPROVED:

By: Bart Wood

CHAIRMAN, CEDARTOWN CITY COMMISSION

ATTEST:

SECRETARY, CEDARTOWN CITY COMMISSION

EXHIBIT "A"

NOTICE OF ZONING AMENDMENT-CITY OF CEDARTOWN

Notice is hereby given that an ordinance has been introducec at the September, 1996 meeting of the Cedartown City Commission which, if adopted would make some changes in the zoning code of the city. The first change would be to create a special restricted use classification for property, so that property which may be environmentally hazardous, subject to environmental investigations, or otherwise in need of special restrictions could be so classified pursuant to the zoning ordinances of Cedartown.

The Ordinance also would create a "Special Use Classification" which could be added to the existing zoning restrictions of the City of Cedartown, or create a Special Use District for property based upon the property's unique topography, uses to be made of the property, the need for zoning buffers, or similar matters.

The effect of this ordinance is to create two new zoning classifications which will be used in the future in making decisions concerning zoning within the City of Cedartown. A copy of the proposed ordinance amendments is on file in the office of the Clerk at City Hall. The document is available for public inspection during normal business hours.

A Public Hearing, concerning this proposed zoning ordinance amendment shall be conducted at the October regular meeting of the City Commission of the City of Cedartown, to be held on October 14, 1996 at seven o'clock (7:00) in the evening.

This 9th day of September, 1996.

Emily C. Shaw

Emily C. Shaw, City Clerk
City of Cedartown

279

EXHIBIT "A"
NOTICE OF
ZONING AMENDMENT
CITY OF CEDARTOWN

9/18/96

Notice is hereby given that an ordinance has been introduced at the September, 1996 meeting of the Cedartown City Commission which, if adopted would make some changes in the zoning code of the city. The first change would be to create a special restricted use classification for property, so that property which may be environmentally hazardous, subject to environmental investigations, or otherwise in need of special restrictions could be so classified pursuant to the zoning ordinances of Cedartown.

The Ordinance also would create a "Special Use Classification" which could be added to the existing zoning restrictions of the City of Cedartown, or create a Special Use District for property based upon the property's unique topography, uses to be made of the property, the need for zoning buffers, or similar matters.

The effect of this ordinance is to create two new zoning classifications which will be used in the future in making decisions concerning zoning within the City of Cedartown. A copy of the proposed ordinance amendments is on file in the office of the Clerk at City Hall. The document is available for public inspection during normal business hours.

A Public Hearing, concerning this proposed zoning ordinance amendment shall be conducted at the October regular meeting of the City Commission of the City of Cedartown, to be held on October 14, 1996 at seven o'clock (7:00) in the evening.

This 9th day of September, 1996.

Emily C. Shaw, City Clerk
City of Cedartown

September 19, 26, 1996

B

APPENDIX B

PRE-FINAL CONSTRUCTION REPORT

FILE COPY

CONESTOGA-ROVERS & ASSOCIATES
351 Oakbrook Drive, Suite 150
Norcross, Georgia 30093
(404) 441-0027 Fax (404) 441-2050

December 29, 1994 Reference No. 3482

Ms. Annie Godfrey
Remedial Project Manager
South Superfund Branch
United States Environmental Protection Agency
Region IV
345 Courtland Street, NE
Atlanta, Georgia 30365

Dear Ms. Godfrey:

Re: Pre-Final Construction Report
Cedartown Municipal Landfill Site - Cedartown, Georgia

INTRODUCTION

In accordance with the approved Remedial Action/Remedial Design (RD/RA) Work Plan for the Cedartown Municipal Landfill (CML) Site, four existing groundwater monitoring wells (CL-02-WP, CL-08-WP, CL-09-WT and CL-11-WP) were decommissioned and one upgradient groundwater monitoring well (OW-7) was installed. These activities were performed by Richard Simmons Drilling Co., Inc. and were conducted during the periods of December 13 - 15 and December 19 - 21, 1994. This letter report details the above activities.

This report was not included in the approved RD/RA Work Plan. However, the content and schedule for the Pre-Final Construction Report were established in a letter dated December 4, 1994 (Mateyk to Godfrey).

MONITORING WELL DECOMMISSIONING

Groundwater monitoring wells CL-02-WP, CL-08-WP, CL-09-WT and CL-11-WP, previously installed by NUS, were decommissioned according to the methods presented in the approved RD/RA Work Plan. These procedures were general in nature. Therefore, detailed well specific protocols were prepared for the field personnel to follow. The well specific decommissioning procedures are presented in Attachment A.

Initially, each well to be decommissioned was sounded to verify the total depth. It should be noted that the depths of monitoring well installations, CL-02-WP, CL-08-WP and CL-11-WP as reported by NUS, were reported incorrectly. These monitoring wells

were installed ten feet above the depths reported by NUS. The reported installed depths and the actual measured depths of all four wells are presented in Table 1.

The following paragraphs summarize the decommissiong activities. Any deviations from these procedures will be explained in the following text.

Monitoring Well CL-02-WP

Monitoring well CL-02-WP was first checked for straightness with PVC pipe and sounded for a total depth and found to be installed at a depth of 42 feet BGS. The 2-inch diameter stainless steel riser pipe and screen were overcored using a 4-inch diameter diamond core bit using air-rotary techniques for the entire depth of the well. Upon reaching the target depth, all of the stainless steel material was removed from the borehole and the borehole was grouted from the bottom up using the tremie method. The area surrounding the borehole was cleaned up and an attempt was made to restore the area to original condition.

Monitoring Well CL-08-WP

After sounding CL-08-WP for a total depth of 92 feet BGS, an attempt was made to overcore the 2-inch diameter stainless steel riser and screen. An undetermined impenetrable obstruction at approximately 3 feet BGS prevented the removal of any stainless steel well material; therefore, the well material was grouted in place from the bottom up using the tremie method. The 8-inch diameter surface casing, 4-inch diameter protective casing, and 2-inch diameter stainless steel riser were cut off two feet below grade and removed. The area surrounding the borehole was then restored to original condition.

Monitoring Well CL-09-WT

Monitoring well CL-09-WT was sounded and checked for straightness to a depth 22 feet BGS. This depth is approximately the same as that reported by NUS. The 2-inch diameter stainless steel riser and screen were then overcored using a 4-inch diameter diamond core bit and air-rotary technique. All the stainless steel well material was removed from the borehole and the borehole grouted from the bottom up using the tremie method. The area surrounding the borehole was cleaned up and restored to original condition.

Monitoring Well CL-11-WP

After checking for straightness and sounding monitoring well CL-11-WP for a total depth of 52 feet BGS, an attempt was made to overcore the 2-inch diameter stainless steel riser and screen. A 4-inch diameter diamond core bit and air-rotary technique was used. During the coring of this well, the core barrel went off line at a depth of 22 feet BGS. Although several attempts were made to realign the core barrel, all subsequent attempts failed. Therefore, the upper 22 feet of stainless steel riser was removed and the remaining well material and borehole were grouted from the bottom up using the tremie method. The area surrounding the borehole was cleaned up and restored to original condition.

UPGRADIENT MONITORING WELL INSTALLATION

The upgradient monitoring well location, OW-7, is located approximately 300 feet south of the limits of the Site in order to monitor the groundwater quality prior to the groundwater passing beneath the Site. This location was moved 140 feet north of the proposed location due to unfavorable surface water runoff conditions.

Monitoring well OW-7 was installed utilizing 6-1/4-inch inside diameter (10-inch outside diameter) hollow-stem augers to bore through the overburden. Soil samples for geologic record were collected at 5-foot intervals until auger refusal in order to describe and classify the soil. The soil samples were classified using the Unified Soil Classification System (USCS) and will be stored at the City for a period of one year. Although the soil samples were screened for the presence of volatile organic contamination using an organic vapor analyzer, no values above background were detected. All soil cuttings were placed in a drum and transported to the landfill.

Upon auger refusal, the hollow stem augers were removed from the borehole. The borehole was then reamed to ten inches in diameter using a tricone bit and wet-rotary drilling methods. The 10-inch diameter hole was advanced two feet into competent bedrock. Steel casing, six inches in diameter, was installed in the borehole where it was grouted in place from the bottom up using a tremie pipe placed at the bottom of the borehole. Grout was continually pumped until undiluted grout returned to the surface. At this time, the casing was pushed into the bedrock notch to further seal the annulus. With approval from on-Site USEPA personnel, the seal was allowed to set for a period of 16 hours prior to commencing bedrock coring.

All coring was performed in accordance with ASTM-D2113-83, using clean potable water as the circulation medium. The core hole was advanced using an "N" sized core

barrel (1.88-inch diameter core and 2.98-inch hole). Due to the karst nature of the geology in the Cedartown area, only four feet of bedrock was encountered prior to penetrating a clay-filled cavern.

The core run was retrieved, laid in a core box and visually inspected by a geologist. The core was logged noting fractures, aperture size, orientation, spacing, filling, roughness and discontinuity type. Rock quality designations, water loss and gains, and any staining or secondary mineralization within the fractures were also noted. The core box was labeled indicating job name, job number, hole number, run number, run interval and date. The core box was stored in the on-Site warehouse and will remain there for a period of one year.

Upon completing the bedrock coring, the core hole was reamed to six inches in diameter to a target depth of 25 feet BGS using wet rotary techniques. The drilling fluid was circulated to remove rock cuttings from the borehole and containerized.

At the completion of the well, a locking protective cap was installed and a concrete pad (3 feet x 3 feet x 1 foot) built around it.

A draft stratigraphic log and instrumentation sketch for this monitoring well is provided as Attachment B. A final stratigraphic and well instrumentation log will be submitted with the Final Construction Report.

Development and surveying of monitoring well OW-7 will be undertaken in January 1995. The details of these activities will be presented in the Final Construction Report.

WASTE MATERIAL HANDLING

All wastes generated during the activities were transported back on Site and temporarily stored in drums. All soil material will be spread on Site as approved by USEPA in a letter dated December 8, 1994 (Godfrey to Johnson). This letter is provided in Attachment C. All drilling water will be transported and disposed of at the City of Cedartown POTW.

December 29, 1994 Reference No. 3482

If you have any questions or require additional information, please contact the writer at your convenience.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

John Schwaller

JS/bl/2

c.c. Madeline Kellam - GAEPD
David Johnson - City of Cedartown
Hadley Bedbury - Maxus
Gordon Tate - Superior Consultants
Holly Kline - Alston & Bird
Michael Mateyk - CRA

TABLE 1

NUS MONITORING WELL INSTALLATION DEPTHS
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Well Number	*Installation Depth (1)*	*Sounded Depth (2)*
CL-02-WP	51.5	42
CL-08-WP	103.5	92
CL-09-WT	21.5	22
CL-11-WP	62	52

Notes:

(1) Installation depth as reported by NUS in feet below ground surface (BGS).
(2) Installation depth as field measured by CRA on December 13 - 15, 1994 in feet BGS.

ATTACHMENT A

November 25, 1994 Reference No. 3482

DECOMMISSIONING PROCEDURES
MONITORING WELL CL-08-WP
CEDARTOWN MUNICIPAL LANDFILL SITE

1.0 MONITORING WELL DETAILS

(Note: the following details were found on the NUS well log.)

Surface Casing:	8-inch diameter, set to a depth of 33 feet bgs
Borehole diameter:	Not stated. Assumed to be six or eight inches
Riser Pipe Material:	Stainless steel (Schedule unknown, likely Sch 5)
Riser Pipe Diameter:	2-inches
Well Screen Material:	Stainless steel
Well Screen Diameter:	2-inches
Depth of Well Screen:	103.5 feet bgs

2.1 DECOMMISSIONING PROCEDURES

1. Remove above ground protective casing from the monitoring well by excavating by hand around the well.

2. Check 2-inch diameter pipe for plumbness and alignment by lowering a 3-foot PVC dummy into the well. Note any areas of problems.

3. Set up drill rig over the well.

4. Commence coring with a 4-inch outside diameter core barrel. (Note circulation water must be potable water from the City of Cedartown's municipal water supply system.) All drilling water will be contained and transferred to the on-Site storage tanks.

4. Continue coring operation to 105 feet bgs, if possible. Remove all 2-inch diameter screen and riser pipe. **Note: if the core barrel cannot be kept straight during coring go to contingency procedure.**

5. Remove coring equipment and install tremie pipe into the borehole. Pump pure bentonite grout into the well to three feet below ground surface. Allow grout to set over night.

6. The following day top up the bentonite grout to three feet bgs, if required. Excavate around the 8-inch diameter surface casing to a

3.0 CONTINGENCY PROCEDURES

1. If the augers go off line during coring operations attempt to return coring barrel/augers to a plumb alignment.

2. If this is not possible, cut the stainless steel pipe off at the depth of problem. (**Note: The minimum acceptable depth at which the 2-inch diameter pipe can be cutoff is 20 feet bgs.**) Remove coring equipment or augers and cutoff 2-inch diameter pipe.

3. Lower the tremie tube into the well and, if possible, into the 2-inch diameter pipe. Pump grout into the 2-inch diameter pipe and the borehole up to a depth of three feet bgs. Allow the grout to set overnight.

4. Complete the closure as specified in 6. above.

4.0 EQUIPMENT DECONTAMINATION

1. Move all down-hole equipment to the existing on-Site decontamination pad.

2. Clean all equipment with clean hot water under high pressure. Contain all decontamination water in the on-Site tanks.

5.0 WASTE MATERIAL HANDLING

1. As the well is off the landfill and on private lands, all drilling water must be contained and transferred to the on-Site tanks.

2. Drill cuttings can be used to backfill the upper three feet of the hole, with the remainder hauled back to the landfill for spreading at a place designated by CRA.

3. Contractor generated non-hazardous waste is to be removed by the Contractor.

3. Contractor generated non-hazardous waste is to be removed by the Contractor.

ATTACHMENT B

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME CEDARTOWN HOW [illegible]
PROJECT NUMBER 3[illegible]2
CLIENT C.M.L. SITE GROUP
LOCATION CEDARTOWN, GA.

DRILLING CONTRACTOR
DRILLER
SURFACE ELEVATION
WEATHER (AM)
(PM)

HOLE DESIGNATION OB-1-7
DATE STARTED 12-19-94
DATE COMPLETED 12-20-94
DRILLING METHOD 6 1/4" HSA/6" wet rotary
CRA SUPERVISOR JOHN SCHUALLER

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION (ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS)	SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 0"	6"	6"	6"	SAMPLE INTERVAL	PID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
3		10	CL - clay, silt, stiff, medium plasticity, poor structure, light brown, moist, chert fragments, purple mottling, trace [illegible]	1SS	SS	1	5 (11)	6	5	5/5	0		
				2SS	SS	2	4 (9)	5	7	5/10	0		
			END of HOLE @ 10.8' BGS										
			NOTE: 10" placed to 12.8' BGS										

NOTES AND COMMENTS

PROJECT NAME: [illegible]

PROJECT Nº: [illegible]

CLIENT: [illegible]

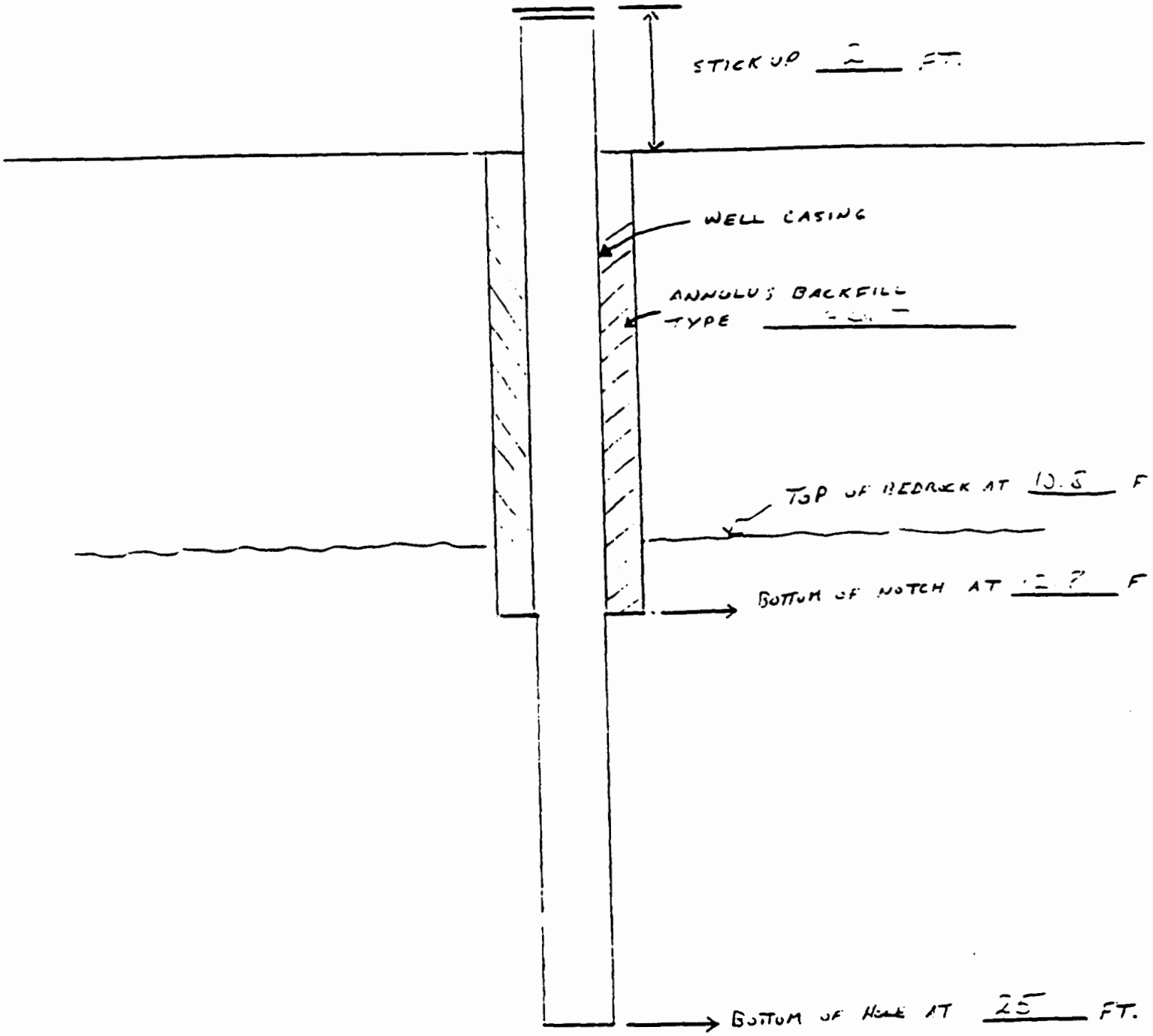
LOCATION: [illegible]

HOLE DESIGNATION: [illegible]

DATE COMPLETED: [illegible]

DRILLING METHOD: [illegible]

CRA SUPERVISOR: JONAS [illegible]



NOTE: ALL DIMENSIONS ARE BELOW GROUND SURF

WELL CASING MATERIAL 6" Z CARBON STEEL

WELL CASING DIAMETER 6" Ø

HOLE DIAMETER 6" Ø

DEVELOPMENT —

ATTACHMENT C

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

Rec'd. CRA
DEC 12 1994

December 8, 1994

4WD-SSRB

Mr. David D. Johnson
Cedartown City Manager
P.O. Box 65
Cedartown, GA 30125

RE: Cedartown Municipal Landfill Superfund Site, Cedartown, GA
Procedure for Disposal of Investigation Derived Waste (IDW)

Dear Mr. Johnson:

In a telephone conversation on December 8, 1994 with John Schwaller of Conestoga-Rovers, Associates, he discussed with me the disposal of IDW from the Cedartown Municipal Landfill site. The plan to dispose all cuttings from the decommissioning and installation of monitoring wells on site appears reasonable. Any free liquid which is recovered should be mixed with kiln dust or an equivalent substance before disposal. Section 4.5 of the Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual summarizes the protocols for handling IDW. These SOPs and any other applicable regulations must be followed. Please do not hesitate to call me at (404) 347-2643 extension 6250, if you have any questions.

Sincerely,

Annie M. Godfrey

Annie M. Godfrey
Remedial Project Manager
South Superfund Remedial Branch

cc: John Schwaller, CRA

CRA
1351 Oakbrook Drive
Suite #150
Norcross, Georgia 30093
(404) 441-0027

MEMO

TO: David Johnson

REFERENCE NO: 3482

FROM: John Schwaller

DATE: February 14, 1995

RE: Construction Research
Decommissioned Monitoring Well CL-08-WP
Cedartown Municipal Landfill Site - Cedartown, Georgia

Conestoga-Rovers & Associates (CRA)was requested by the Technical Committee to further investigate the construction methods for monitoring well CL-08-WP. This further investigation was required due to the fact that when the monitoring well was decommissioned in December 1994, the 2-inch diameter riser pipe could not be overcored to the minimum depth specified in the decommissioning procedures. Instead, the 2-inch diameter well was filled with bentonite grout. The focus of the additional research was to determine if the 8-inch diameter surface casing and the 2-inch diameter riser pipe were pressure grouted at the time of construction. If this was the case, then the decommissioned CL-08-WP monitoring well would not be a potential pathway of contaminant migration from the landfill. The following memorandum presents the results of the further research.

CRA initially reviewed our files with respect to CL-08-WP. CRA only had the stratigraphic and instrumentation log for the well. The stratigraphic and instrumentation log did not specify the method of grout placement. Therefore, CRA contacted the following individuals to attempt to obtain actual documentation of the grout placement methods:

i) Mr. Michael Talbot - Drilling Manager: Law Engineering, Inc.;

ii) Ms. Priscilla Fritsch - Engineer: NUS/Halliburton Corporation; and

iii) Ms. Annie Godfrey - CML Site Project Manager: USEPA Region IV.

Inquiries at Law Engineering, Inc. (Law) with Mr. Talbot, revealed that no documents or staff involved with the installation of monitoring well CL-08-WP were in Law's possession.

CRA contacted NUS/Halliburton Corp., the primary contractor overseeing the initial CML Site investigation in 1987. The writer spoke with Ms. Priscilla Fritsch who was an engineer with NUS/Halliburton at the time of the monitoring well installation in 1987. Ms. Fritsch informed the writer that in 1987 NUS/Halliburton was under a Field Investigation Team (FIT) contract with the USEPA and that contract terminated in 1991. At that time, all documents related to projects under the FIT contract were forwarded to USEPA. However, Ms. Fritsch indicated that since NUS/Halliburton was under contract to perform USEPA field work, all field work would have been performed using USEPA Region IV standard operating protocols (SOP's). These SOP's specified tremie grouting. Ms. Fritsch suggested the writer undertake a file search at the USEPA.

The writer then contacted Ms. Annie Godfrey and requested she look into the matter as these records are much easily accessible to USEPA personnel. Ms. Godfrey agreed and on February 13, 1995 CRA received via facsimile the NUS well record, draft stratigraphic/instrumentation log, and Law Engineering Inc. log of time and materials for the construction and installation of monitoring well CL-08-WP. These documents are presented in Attachment A.

Upon review of these documents it was found that both the 8-inch diameter surface casing and the 2-inch diameter well were pressure grouted. With this information, CRA is comfortable that all potential conduits of contaminant migration to bedrock are sealed off, and that monitoring well CL-08-WP decommissioning procedures conducted by CRA on December 15, 1994 were appropriate and satisfactory.

Should you have any questions please contact the writer at your convenience.

3482/JS/8

c.c. Hadley Bedbury
Gordon Tate
Holly Kline
Michael Mateyk

FILE COPY

CRA
1351 Oakbrook Drive
Suite #150
Norcross, Georgia 30093
(404) 441-0027

MEMO

TO: Gordon Tate
Hadley Bedbury

REFERENCE NO: 3482

FROM: John Schwaller

DATE: February 28, 1995

RE: Former Monitoring Well CL-08-WP
Cedartown Municipal Landfill Site - Cedartown, Georgia

During our telephone conversation of February 22, 1995, it was noted that Maxus had identified that the log of time and materials, documented by Law Engineering, Inc. (Law) during the construction of monitoring well CL-08-WP, did not accurately reflect the amount of grout needed to properly seal the monitoring well or surface casing. Therefore, pursuant to your request, CRA has again reviewed the documents provided by USEPA and described in a memo dated February 14, 1995 (Schwaller to Johnson). The following memorandum further explains CRA's position on the construction techniques utilized by Law during the grouting procedure of former monitoring well CL-08-WP.

CRA acknowledges the fact that the log of time and materials documented by Law does not correspond to the amount of grout needed to properly seal the 2-inch diameter stainless steel well material nor the 8-inch diameter surface casing. However, it is documented by NUS/Halliburton that pressure grouting was the method used to grout both the 2-inch diameter well material and the 8-inch diameter surface casing. The fact that CRA observed grout at the surface in both the annulus surrounding the 2-inch diameter well material and the 8-inch diameter surface casing supports this documentation and provides CRA with a certain level of comfort that the monitoring well was properly grouted at the time of construction.

Again, CRA realizes that the documentation of time and materials does not fully support the construction of former monitoring well CL-08-WP. However, it is CRA's experience that time and material logs documented by drilling firms are not exact and cannot be solely relied upon for construction documentation.

In summation, CRA is confident that any potential conduits of contaminant migration to the bedrock have been sealed off for the following reasons:

1) The 8-inch diameter surface casing was pressure grouted and grout was observed by CRA in the annulus.

2) The 2-inch diameter well was pressure grouted and grout was observed by CRA in the annulus between the 2-inch diameter well and the 8-inch diameter surface casing.

3) The interior of the former monitoring well was properly sealed off during the decommissioning activities of December 1994.

Should you have any questions please contact the writer at your convenience.

JS/bl/9

c.c. David Johnson
Holly Kline
Michael Mateyk

ATTACHMENT A

Project:
Project No:
Boring or Well No.:
Date:
Subcontractor:
Page Two

LOG OF TIME AND MATERIALS

ampling

Shelby Tubes (each) _____

Split Spoon Samples (each) _____

Miscellaneous

CORE RUN (FT) 10

_____ ( ) _____

NUS Representative: _____

Subcontractor's Representative: Heather Callen

Project: Colbran Landfill
Project No: F-8703-26 CL08 WP
Boring or Well No.: ~~[illegible]~~ ~~[illegible]~~
Date: 5/13/87
Subcontractor: Law Eng

LOG OF TIME AND MATERIALS

Drilling

Hollow Stem Auger (D) w/sampling	
Hollow Stem Auger (D) w/o sampling	
6-in. Rotary (B)	30 ft
10-in. Rotary (B)	21

Materials

2-in dia. SS casing (ft.)	
2-in. dia. SS screen, (10 ft. section)	
2-in. dia. SS Screen, (15 ft. section)	
SS Top Caps	
8-in. dia. Carbon Steel Casing	30
Locking Protective Casing (each)	
Bentonite Pellets (bucket)	
Bentonite Powder (bag)	9
Portland Cement (bag)	12
Ready-mix Cement (bag)	
Sand (Ft^3 or bag)	

Time

Well Construction (D) (hr)		
Well Construction (B) (hr)		
Double Casing Installaiton (B) (hr)		2
Well Development (D) (hr)	(5/30)	2.75
Well Development (B) (hr)		
Decontamination (hr)		2
Drilling Waste Control (hr)		

Project: Cedartown Landfill
Project No: F4 8703-26
Boring or Well No: CL08 WP
Date: 5/14/87
Subcontractor: Law ENO

LOG OF TIME AND MATERIALS

Drilling

Hollow Stem Auger (D) w/sampling	
Hollow Stem Auger (D) w/o sampling	
6-in. Rotary ~~(B)~~ D	94.5 ~~63.5~~ ft
10-in. Rotary (B)	

Materials

2-in dia. SS casing (ft.)	
2-in. dia. SS screen, (10 ft. section)	
2-in. dia. SS Screen, (15 ft. section)	
SS Top Caps	
8-in. dia. Carbon Steel Casing	
Locking Protective Casing (each)	
Bentonite Pellets (bucket)	
Bentonite Powder (bag)	5 [illegible]
Portland Cement (bag)	
Ready-mix Cement (bag)	
Sand (Ft^3 or bag)	

Time

Well Construction (D) (hr)	5
Well Construction (B) (hr)	
Double Casing Installaiton (B) (hr)	
Well Development (D) (hr)	
Well Development (B) (hr)	
Decontamination (hr)	0.5
Drilling Waste Control (hr)	

3482

MUS WELL RECORD

Project: Cedartown Landfill
Well No.: CP 08 WP
Coordinates:
On-Site Geologist: Shannel/Collins
Elevation (top of pipe):
Elevation (land surface):
Elevation (water table):
Date Measured:
Status of Well: Complete

CASING

Type: SS — Carbon Steel
Diameter: 2 in — 8 in
Length: 95 ft — 30 cm
Type of Joint: Threaded/Couple — coupled
Screen Slot: No. 10
Screen Length: 10 ft
Screen Setting: 92-102

DRILLING

Drilling Started: 5/12/89
Drilling Completed: 5/15/89
Drilling Company: Law Eng
Registration No.:
Permit No.:
Name of Driller: W. Collins
Type of Rig: Mobile Drill
Drilling Fluid: Bent. Mud

GRAVEL

Type: Sand
Size: 20-40
Volume: 30 ft
Depth:

GROUT

Type: cement-bentonite
Method: pressure — pressure
Volume:
Depth: 98 - 0 ft — 30-0 ft

HOLE DATA

Hole Diameter: 10 in / 6 in
Thickness of Overburden:
Depth Drilled in Rock:
Total Depth of Hole: 105 ft

BACKFILL

Type:

DEVELOPMENT

Method:
Rate of Flow:
Length of Time:

COMMENTS

Teflon wrapped SS casing joints
Stainless casing installed

DRILLING LOG

Depth From	Depth To	Formation Description

FAX TRANSMITTAL

To: John Schweller	From: Annie Godfrey
Company: Conestoga Rovers	Phone: 847 2643 x 6250
Fax: 441-2050	Fax: 347-3058

Project: CEDARTOWN LANDFILL
Project No: F4 8703-26
Boring or Well No.: C1 08 WP
Date: 5/15/91
Subcontractor: LAW ENG.

LOG OF TIME AND MATERIALS

Drilling

Hollow Stem Auger (D) w/sampling	
Hollow Stem Auger (D) w/o sampling	
6-in. Rotary (B)	
10-in. Rotary (B)	

Materials

2-in dia. SS casing (ft.)	~~85~~ 95
2-in. dia. SS Screen, (10 ft. section)	10 ft
2-in. dia. SS Screen, (15 ft. section)	
SS Top Cap	1
8-in. dia. Carbon Steel Casing	
Locking Protective Casing (each)	1
Bentonite Pellets (bucket) 5 ft	
Bentonite Powder (bag)	
Portland Cement (bag)	7
Rapid-Setting Cement (bag)	
Sand (bag) 63 ft	

Time

Well Construction (D) (hr)	3
Well Construction (B) (hr)	
Monitoring Well Installaiton (B) (hr)	
Well Development (D) (hr)	
Well Development (B) (hr)	
Decontamination (hr)	1
Drilling Waste Control (hr)	

Project:
Project No:
Boring or Well No.:
Date:
Subcontractor:
Page Two

LOG OF TIME AND MATERIALS

Sampling

Shelby Tubes (each) _____

Split Spoon Samples (each) _____

Miscellaneous

CORE RUN (FT) 10

_____ ( ) _____

NUS Representative: _____

Subcontractor's Representative: Dezzi Collesi

Project:
Project No:
Boring or Well No.:
Date:
Subcontractor:
Page Two

LOG OF TIME AND MATERIALS

Sampling

Shelby Tubes (each) 2

Split Spoon Samples (each) 2

Miscellaneous

_____ (_____) _____

_____ (_____) _____

NUS Representative: _____

Subcontractor's Representative: [illegible]

NUS CORPORATION
A Halliburton Company

PROJECT Cedartown Landfill
PROJECT NO. FL8703-26 BORING NO. CLOSEUP DIAMETER
FIELD GEOLOGIST J. Sherrod DRILLING DATE 5-12-87 5-15-87
SURFACE ELEVATION 954.5 STICK UP ELEVATION 956.21
DATE/STATIC WATER LEVEL 5-18-87 18 ft bls (776.5 elev)
SUBCONTRACTOR Law Eng. DRILLER H. Collins
DRILLING METHOD Mud Rotary SCALE: 1" = not to VERTICAL

LITHOLOGY / SURFACE	PROFILE	DEPTH, FEET	SOIL SAMPLE: NUMBER	PENETRATION (BLOWS)	RECOVERY (INCHES)	HEAD SPACE, PPM	BLOWS/6"	ROCK SAMPLE: RUN	RECOVERY %	RQD %	WELL CONSTRUCTION DETAILS (NOT TO HORIZONTAL SCALE)	REMARKS
no topsoil												
clay: mottled, red-purpl, kaolinitic		2										circulation loss in fill
clay and fill material to 20 ft												Surface casing to 30 ft bls
clay: red-brn, mottled streaky, sl sandy		20		1.5	1.4	22						
void space 44-51 ft												
clay: red-brn, as above												Void space 45-52 ft
shale: blk, sl. competent		73										
limestone: red-brn, massive highly dissolution, voids common		94.5						106	57%	-		
		105 TD										104 ft TD

Well construction details (not to horizontal scale):
- locking cover
- 8 in dia surface casing
- bent./cement grout
- 2 in dia SS casing
- bentonite seal
- sand pack 14'
- 10 ft wa 10 slot
- 6

Project:
Project No:
Boring or Well No.:
Date:
Subcontractor:
Page Two

LOG OF TIME AND MATERIALS

Sampling

Shelby Tubes (each) 2

Split Spoon Samples (each) 2

Miscellaneous

_____ (_____) _____

_____ (_____) _____

NUS Representative: _____

Subcontractor's Representative: [illegible]

Project: [illegible]
Project No: F9-8703-26 CL08 WP
Boring or Well No.: ~~[illegible]~~ ~~[illegible]~~
Date: 5/15/07
Subcontractor: [illegible]

LOG OF TIME AND MATERIALS

Drilling

Hollow Stem Auger (D) w/sampling	
Hollow Stem Auger (D) w/o sampling	
6-in. Rotary (B)	~~30~~ m
10-in. Rotary (B)	71

Materials

2-in dia. SS casing (ft.)	
2-in. dia. SS screen, (10 ft. section)	
2-in. dia. SS Screen, (15 ft. section)	
SS Top Caps	
8-in. dia. Carbon Steel Casing	30
Locking Protective Casing (each)	
Bentonite Pellets (bucket)	
Bentonite Powder (bag)	9
Portland Cement (bag)	12
Ready-mix Cement (bag)	
Sand (Ft^3 or bag)	

Time

Well Construction (D) (hr)		
Well Construction (B) (hr)		
Double Casing Installaiton (B) (hr)		2
Well Development (D) (hr)	(5730)	2.75
Well Development (B) (hr)		
Decontamination (hr)		2
Drilling Waste Control (hr)		

3482

MUS WELL RECORD

Project: Cedartown Landfill
Well No.: CR 08 WP
Coordinates:
On-Site Geologist: Channel/Collins
Elevation (top of PVC):
Elevation (land surface):
Elevation (water table):
Date Measured:
Status of Well: Complete

DRILLING

Drilling Started: 5/12/89
Drilling Completed: 5/15/89
Drilling Company: Law Eng
Registration No.:
Permit No.:
Name of Driller: H. Collins
Type of Rig: Mobile Drill
Drilling Fluid: Bent. Mud

HOLE DATA

Hole Diameter: 10 in / 6 in
Thickness of Overburden:
Depth Drilled in Rock:
Total Depth of Hole: 108 ft

DEVELOPMENT

Method:
Rate of Flow:
Length of Time:

CASING

Type: SS — Carbon Steel
Diameter: 2 in — 8 in
Length: 95 ft — 30 ft
Type of Joint: Threaded/Flush — coupled
Screen Slot: No. 10
Screen Length: 10 ft
Screen Setting: 92-102

GRAVEL

Type: Sand
Size: 20-40
Volume: 30 ft
Depth:

GROUT

Type: Cement-bentonite
Method: Pressure — Pressure
Volume:
Depth: 38-0 ft — 30-0 ft

BACKFILL

Type:

COMMENTS

Teflon wrapped SS casing joints
Stainless casing installed

DRILLING LOG

Depth From	Depth To	Formation Description

FAX TRANSMITTAL

To: John Schweller	From: Annie Godfrey
Company: Conestoga Rovers	Phone: 847 2643 x 6250
Fax: 441-2050	Fax: 347-3058

Project: Cedartown Landfill
Project No: F4 8703-26
Boring or Well No.: CL08 WP
Date: 5/14/87
Subcontractor: Law Eng.

LOG OF TIME AND MATERIALS

Drilling

Hollow Stem Auger (D) w/sampling	
Hollow Stem Auger (D) w/o sampling	
6-in. Rotary ~~(B)~~ D	94.5 ~~63.5~~ ft
10-in. Rotary (B)	

Materials

2-in dia. SS casing (ft.)	
2-in. dia. SS screen, (10 ft. section)	
2-in. dia. SS Screen, (15 ft. section)	
SS Top Caps	
8-in. dia. Carbon Steel Casing	
Locking Protective Casing (each)	
Bentonite Pellets (bucket)	
Bentonite Powder (bag)	5 [illegible]
Portland Cement (bag)	
Ready-mix Cement (bag)	
Sand (Ft^3 or bag)	

Time

Well Construction (D) (hr)	5
Well Construction (B) (hr)	
Double Casing Installaiton (B) (hr)	
Well Development (D) (hr)	
Well Development (B) (hr)	
Decontamination (hr)	0.5
Drilling Waste Control (hr)	

Project: CEDARTOWN LANDFILL
Project No: F4 8703-26
Boring or Well No.: C1 08 WP
Date: 5/15/91
Subcontractor: LAW ENG.

LOG OF TIME AND MATERIALS

Drilling

Hollow Stem Auger (D) w/sampling	
Hollow Stem Auger (D) w/o sampling	
6-in. Rotary (B)	
10-in. Rotary (B)	

Materials

2-in. diam. PVC casing (ft.)	~~85~~ 95
2-in. diam. SS screen, (10 ft. section)	10 ft
2-in. diam. SS screen, (15 ft. section)	
SS Top Cap	1
8-in. diam. Carbon Steel Casing	
Locking Protective Casing (each)	1
Bentonite Pellets (bucket) 3 ft	
Bentonite Powder (bag)	
Portland Cement (bag)	7
Rapid-Setting Cement (bag)	
Sand (bag) 63 ft	

Time

Well Construction (D) (hr)	3
Well Construction (B) (hr)	
Monitoring Well Installaiton (B) (hr)	
Well Development (D) (hr)	
Well Development (B) (hr)	
Decontamination (hr)	1
Drilling Waste Control (hr)	

C

APPENDIX C

FINAL CONSTRUCTION REPORT

COPY

CONESTOGA-ROVERS & ASSOCIATES
251 Cassbrook Drive Suite 150
Norcross Georgia 30093
(404) 441-0027 Fax (404) 441-2050

February 2, 1995

Reference No. 3482

Ms. Annie Godfrey
Remedial Project Manager
South Superfund Branch
United States Environmental Protection Agency
Region IV
345 Courtland Street, NE
Atlanta, Georgia 30365

Dear Ms. Godfrey:

Re: Final Construction Report
Cedartown Municipal Landfill Site - Cedartown, Georgia

INTRODUCTION

In accordance with the approved Remedial Action/Remedial Design (RD/RA) Work Plan for the Cedartown Municipal Landfill (CML) Site, one upgradient monitoring well (OW-7R) was installed. This monitoring well replaces the non-yielding monitoring well OW-7 which was decommissioned in conjunction with the installation of the replacement well. These activities were performed by Richard Simmons Drilling Co., Inc. and were conducted between the dates January 17 - 20, 1995. The final construction activities including development and surveying were completed on January 23, 1995. This letter report details the above activities.

This report was not included in the approved RD/RA Work Plan. However, the content and schedule for the Final Construction Report were established in a letter dated December 4, 1994 (Mateyk to Godfrey) and an extension to the submittal date approved in a letter dated January 19, 1995 (Godfrey to Johnson).

UPGRADIENT MONITORING WELL INSTALLATION

The upgradient monitoring well location, OW-7R, is located approximately 625 feet east of Tenth Street and approximately 45 feet north of Prior Station Road. This monitoring well was required to replace the original upgradient monitoring well OW-7 which was found to be non-yielding on January 4, 1995. The upgradient monitoring well location was moved in an attempt to locate competent water bearing bedrock.

Monitoring well OW-7R was installed utilizing 6-1/4 inch inside diameter (10-inch outside diameter) hollow-stem augers to bore through the overburden. Soil samples for geologic record were collected at 5-foot intervals until auger refusal in order to describe and classify the soil. The soil samples were classified using the Unified Soil Classification System (USCS) and will be stored at the City for a period of one year. Although the soil samples were screened for the presence of volatile organic contamination using an organic vapor analyzer, no values above background were detected. All soil cuttings were temporarily placed on polyethylene sheeting and then transported to the landfill.

Upon auger refusal, the hollow stem augers were removed from the borehole. The borehole was then reamed to 10 inches in diameter using a tricone bit and air-rotary drilling methods. The 10-inch diameter hole was advanced three feet into competent bedrock. Steel casing six inches in diameter was installed in the borehole where it was grouted in place from the bottom up using a tremie pipe placed at the bottom of the borehole. Grout was continually pumped until undiluted grout returned to the surface. At this time, the casing was pushed into the bedrock notch to further seal the annulus. With prior approval from USEPA field personnel, the grout was allowed to cure for a minimum of 16 hours prior to any coring activity.

All coring was performed in accordance with ASTM-D2113-83 using clean potable water as the circulation medium. The core hole was advanced using an "N" sized core barrel (1.88-inch diameter core and 2.98-inch hole). Due to the karst nature of the geology in the Cedartown area, only four feet of bedrock was encountered prior to penetrating a clay-filled cavern.

The core run was retrieved, laid in a core box and visually inspected by a geologist. The core was logged noting fractures, aperture size, orientation, spacing, filling, roughness and discontinuity type. Rock quality designations, water loss and gains, and any staining or secondary mineralization within the fractures were also noted. The core box was labeled indicating job name, job number, hole number, run number, run interval and date. The core box was stored in the on-Site warehouse and will remain there for a period of one year.

Upon completing the bedrock coring, the core hole was reamed to six inches in diameter to a target depth of 104 feet BGS using wet rotary techniques. The drilling fluid was circulated to remove rock cuttings from the borehole and containerized.

USEPA requested that the monitoring well be completed with a 2-inch diameter stainless steel screen and riser rather than as an open hole. Prior to any installation of

well material, an attempt to determine the yield of monitoring well OW-7R was made. A 3-inch diameter stainless steel air-lift pump extracted approximately 150 gallons of very turbid groundwater. The well recovered sufficiently and the total depth of the borehole was now approximately 88 feet BGS. It was then determined that the hole would be water bearing and to install stainless steel well material.

A 10-foot length of 2-inch diameter stainless steel (#10 slot) well screen and thread coupled to Schedule 10 stainless steel riser pipe was installed in the borehole to a depth of 82 feet BGS. A 20 mesh graded silica sand pack was placed beneath and around the well screen which extended from the bottom of the borehole to a depth of 62 feet BGS. Above the sand pack, a 7-foot thick bentonite plug was installed and allowed to hydrate for approximately one hour prior to tremie grouting the remaining annular space.

The monitoring well was completed with a locking protective cap and a concrete pad.

The stratigraphic and instrumentation log for this monitoring well is provided in Attachment A.

Development of monitoring well OW-7R consisted of bailing and surging the screened interval with a stainless steel bailer and new nylon rope. A total of 50 gallons of groundwater was removed. Water quality remained turbid exhibiting greater than 200 nephelometric units (NTUs). The clarity however did improve over the course of development. Water quality is expected to improve over time as the groundwater passes through the monitoring well. A summary of groundwater purge data is presented in Table 1.

Monitoring well OW-7R was surveyed by Georgia Registered Land Surveyor, Mr. Vann Angel of Cedartown, Georgia on January 20, 1995. The reference point where all groundwater measurements will be taken is at an elevation of 809.3 feet above mean sea level.

Monitoring well completion details for all monitoring wells included in the groundwater monitoring network is presented in Table 2.

DECOMMISSIONING OF MONITORING WELL OW-7

Monitoring well OW-7 was decommissioned in conjunction with the construction of monitoring well OW-7R. Monitoring well OW-7, constructed as an open hole, was sounded and found to have collapsed to a depth of 19 feet below ground surface (bgs).

The concrete pad was removed and the casing cut off two feet below grade. The borehole was then grouted from the bottom up using the tremie method. The area surrounding the borehole was restored to original condition.

WASTE MATERIAL HANDLING

All soil was transported to the landfill and spread on Site as approved by USEPA in a letter dated December 8, 1994 (Godfrey to Johnson). All drilling water and waste water was temporarily stored in the on Site storage tanks pending disposal at the City of Cedartown POTW.

If you have any questions or require any additional information, please contact the writer at your convenience.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

John Schwaller

JS/kt/8

c.c. Madeline Kellam - GAEPD
David Johnson - City of Cedartown
Hadley Bedbury - Maxus
Gordon Tate - Superior Consultants
Holly Kline - Alston & Bird
Michael Mateyk - CRA

TABLE 2

CONSTRUCTION DETAILS FOR MONITORING WELL NETWORK
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Well Number	Ground Elevation (Ft. AMSL((1)	Top of Well Elevation (Ft. AMSL)	Screened Interval		Bottom of Well		Screened Interval Lithologic Material
			Elevation (Ft. AMSL)	Depth (Ft. BGS)	Elevation (Ft. AMSL)	Depth (Ft. BGS)	
OW-1	820.79	823.80	761.79-771.79	49.0-59.0	760.79	60.0	Dolostone
OW-2	824.45	827.50	767.45-782.45	42.0-57.0	764.45	60.0	Dolostone
OW-3	801.50	803.29	Open Hole		608.50	193.0 (3)	Limestone
OW-4	799.00	801.52	739.0-749.0	50.0-60.0	730.00	69.0	Limestone
OW-5	795.42	797.92	712.42-732.42	63.0-83.0	710.42	85.0	Limestone
OW-6B	804.12	805.12	Open Hole		696.12	108.0 (4)	Limestone
OW-7R	806.70	809.30	724.70-734.70	72.0-82.0	724.70	88.0	Siderite
CL-03-WP (5)	833.60	836.41	736.1-751.1	82.5-97.5	735.60	98.0	Clay/limestone
CL-04-WP (5)	796.81	796.81	755.31-765.31	31.5-41.5	754.81	42.0	Limestone
CL-05-WP (5)	850.10	853.34	733.6-743.6	106.5-116.5	733.10	117.0	Limestone
CL-06-WP (5)	857.40	861.02	770.4-780.4	77.0-87.0	769.90	87.5	Limestone

TABLE 2

CONSTRUCTION DETAILS FOR MONITORING WELL NETWORK
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Well Number	*Ground Elevation (Ft. AMSL((1)*	*Top of Well Elevation (Ft. AMSL)*	*Screened Interval*		*Bottom of Well*		*Screened Interval Lithologic Material*
			Elevation (Ft. AMSL)	*Depth (Ft. BGS)*	*Elevation (Ft. AMSL)*	*Depth (Ft. BGS)*	
CL-07-WP (5)	823.30	824.90	793.3-803.3	20.0-30.0	792.80	30.5	Limestone
CL-09-WP (5)	802.40	803.63	770.9-780.9	21.5-31.5	770.40	32.0	Limestone

Notes:

(1) AMSL - above mean sea level
(2) BGS - below ground surface
(3) Well has since collapsed to 646.50 Ft. AMSL or 155 Ft. BGS.
(4) Well has since collapsed to 752.12 Ft. AMSL or 52.0 Ft. BGS.
(5) Source: NUS Corporation

TABLE 1

WELL DEVELOPMENT DATA SUMMARY
ROUND ONE QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
JANUARY 1995

Well Number	*Water Level (FT.BTOC)(1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µs/cm)(2)*	*Temperature (°F)(3)*	*Turbidity (NTUs)(4)*	*Method*
OW-7R	784.48	9.5	1	10	8.40	380	66.3	>200	Stainless Steel
			2	20	8.60	520	64.2	>200	Bailer
			3	30	7.90	400	63.5	>200	
			4	40	7.60	250	62.1	>200	
			5	50	7.10	150	60.1	>200	

Notes:

(1) Feet below top of casing.
(2) Micromhos per centimeter.
(3) Degrees Fahrenheit.
(4) Nephelometric units.

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

PROJECT NAME: CEDARTOWN MUNICIPAL LANDFILL SITE
PROJECT NUMBER: 3482
CLIENT: CEDARTOWN MUNICIPAL LANDFILL SITE GROUP
LOCATION: CEDARTOWN, GA

HOLE DESIGNATION: OW-7R
DATE COMPLETED: JANUARY 19, 1995
DRILLING METHOD: 6 ¼" ID HSA
CRA SUPERVISOR: J. SCHWALLER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE
	REFERENCE POINT (Top of Riser)	809.30				
	GROUND SURFACE	806.70				
	[illegible] very stiff to hard, [illegible] to well structured, yellowish orange to [illegible] brown red, dry to moist, noncohesive		CONCRETE SEAL	1SS		5
2.5						
5.0						
7.5				3SS		[illegible]
10.0	[illegible]		[illegible] CORE-HOLE			
12.5				5SS		[illegible]
15.0			BENTONITE GROUT			
17.5	[illegible]			7SS		[illegible]
20.0			[illegible] STEEL CASING			
22.5				9SS		
25.0			[illegible] Stainless STEEL PIPE			
27.5	[illegible] greater cohesion [illegible] gray [illegible] increased [illegible] content [illegible] cerite pieces			11SS		19
30.0						
32.5				13SS		15

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (BEDROCK)

PROJECT NAME: CEDARTOWN MUNICIPAL LANDFILL SITE
PROJECT NUMBER: 3482
CLIENT: CEDARTOWN MUNICIPAL LANDFILL SITE GROUP
LOCATION: CEDARTOWN, GA

HOLE DESIGNATION: OW-7R
DATE COMPLETED: JANUARY 19, 1995
DRILLING METHOD: NX CORE/6" WET ROTARY
CRA SUPERVISOR: J. SCHWALLER

DEPTH ft. BGS	DESCRIPTION OF STRATA	ELEV. ft. AMSL	MONITOR INSTALLATION	BEDROCK INTERVAL	RUN NUMBER	CORE RECOVERY %	RQD %	WATER RETURN %
	Overburden							
61.5			BENTONITE GROUT; CARBON STEEL CASING; BENTONITE SEAL					
64.0								
66.5	[illegible]							
69.0			CARBON STEEL CASING					
71.5								
74.0			SAND PACK					
76.5	[illegible] weathered [illegible]							
79.0			[illegible]					
81.5								
84.0								
86.5			BOREHOLE					
89.0								
91.5			NATIVE SOIL					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

PROJECT NAME: CEDARTOWN MUNICIPAL LANDFILL SITE
PROJECT NUMBER: 3482
CLIENT: CEDARTOWN MUNICIPAL LANDFILL SITE GROUP
LOCATION: CEDARTOWN, GA

HOLE DESIGNATION: OW-7R
DATE COMPLETED: JANUARY 19, 1995
DRILLING METHOD: 6 ¼" ID HSA
CRA SUPERVISOR: J. SCHWALLER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'H' VALUE	PID (ppm)
37.5			BENTONITE GROUT	SS			
40.0							
42.5			PRE-PACK	SS			
45.0							
47.5			CARBON STEEL PIPE	SS			
50.0			STEEL CASING				
52.5				SS		50	
55.0							
57.5			BENTONITE SEAL	SS			
60.0	END OF OVERBURDEN - [illegible]						
62.5							
65.0							
67.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE: REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(BEDROCK)

PROJECT NAME: CEDARTOWN MUNICIPAL LANDFILL SITE
PROJECT NUMBER: 3482
CLIENT: CEDARTOWN MUNICIPAL LANDFILL SITE GROUP
LOCATION: CEDARTOWN, GA

HOLE DESIGNATION: OW-7R
DATE COMPLETED: JANUARY 19, 1995
DRILLING METHOD: NX CORE/6" WET ROTARY
CRA SUPERVISOR: J. SCHWALLER

DEPTH ft. BGS	DESCRIPTION OF STRATA	ELEV. ft. AMSL	MONITOR INSTALLATION	BEDROCK INTERVAL	RUN NUMBER	CORE RECOVERY %	RQD %	WATER RETURN %
96.5			6" O EOREHOLE					
99.0			NATIVE SOIL					
101.5								
104.0	END OF HOLE 3[illegible] ft BGS							
106.5			SCREEN DETAILS Screened Interval [illegible] to 82ft BGS Length: [illegible] Diameter: 2 Slot Size: #10 Material: Stainless Steel Sand Pack 63 to 88ft BGS Material: #10 20 Sand					
109.0								
111.5								
114.0								
116.5								
119.0								
121.5								
124.0								
126.5								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼

D

APPENDIX D

MONITORING WELL OW-3 MODIFICATIONS

September 21, 1995 Reference No. 3482

Ms. Annie Godfrey
Remedial Project Manager
South Superfund Branch
United States Environmental Protection Agency
Region IV
345 Courtland Street
Atlanta, Georgia 30365

Dear Ms. Godfrey:

Re: Completion of Monitoring Well OW-3
with Stainless Steel Well Material
Cedartown Municipal Landfill Site
Cedartown, Georgia

Further to the Group's direction, Conestoga-Rovers & Associates (CRA) has been investigating the cause for the anomalously high manganese concentration occurring in perimeter monitoring well OW-3. The groundwater analytical data from groundwater samples collected from monitoring well OW-3 during Round Two and Three of the Quarterly Groundwater Sampling Events exhibited 4.89 mg/L and 1.16 mg/L of manganese, respectively. These high concentrations were not detected during the Remedial Investigation (RI) conducted in 1991 nor were they detected in the first sampling event (January 1995) conducted during the RA. Based on this investigation, it is CRA's opinion that the present construction of monitoring well OW-3 may be suspect.

Perimeter monitoring well OW-3 was originally constructed as an open borehole monitoring well during the RI. Monitoring well OW-3 was constructed as an open borehole monitoring well because at the time of construction, CRA did not feel comfortable that construction of a stainless steel well would be possible within the cavernous clay filled voids indicative of the karst geology encountered. Although the groundwater yield has not significantly diminished, this monitoring well has collapsed since its' construction in 1991 from its' original depth of 193 feet below ground surface (bgs) to approximately 155 feet bgs. Because the groundwater is now in direct contact with the carbon steel surface casing, it is becoming increasingly difficult to achieve low levels of turbidity (< 10 NTUs) due to the degradation of the carbon steel casing. The degradation of the steel casing is producing rust particles and recently observed iron-reducing bacteria growth which can not be removed or diminished through additional purging or reduced flow.

Upgradient monitoring well OW-7R was constructed during the Remedial Design (RD) with stainless steel well material in the same geologic conditions as monitoring well OW-3, and has been a successful completion. Therefore, CRA has recommended to the Group that stainless steel well material be installed in monitoring well OW-3. The installation of stainless steel well material is recommended to prevent any contact with the steel casing and thereby obtain representative groundwater samples.

On September 13, 1995 CRA was granted permission by the Group to initiate steps to complete monitoring well OW-3 with stainless steel well material. Based on your verbal approval of September 18, 1995, CRA has tentatively scheduled the construction for the week of October 16, 1995. Construction is anticipated to be completed in approximately four days. Upon review, please direct written approval to Mr. David Johnson, City Manager of Cedartown.

Should you have any questions, please feel free to contact me at (770) 441-0027.

Yours truly,

CONESTOGA - ROVERS & ASSOCIATES

John O. Schwaller

JS/kt/21

c.c. Hadley Bedbury - Maxus
Gordon Tate - Superior Consultants
Mike Mateyk - CRA

CONESTOGA-ROVERS & ASSOCIATES
1251 Oakbrook Drive, Suite 150
Norcross, Georgia 30093
(404) 441-0027 Fax (404) 441-2050

October 6, 1995

Reference No. 3482

Ms. Annie Godfrey
Remedial Project Manager
South Superfund Branch
United States Environmental Protection Agency
Region IV
345 Courtland Street, NE
Atlanta, Georgia 30365

Dear Ms. Godfrey:

Re: Perimeter Monitoring Well OW-3 Retrofit Construction
Cedartown Municipal Landfill Site
Cedartown, Georgia

Pursuant to your request, please find the enclosed figure of the proposed retrofit construction of perimeter monitoring well OW-3 located at the above referenced site. Construction of this monitoring well is scheduled for October 16, 1995 as discussed with you previously.

We trust that this figure meets your needs; however, should you have any additional questions please feel free to contact me at (770) 441-0027.

Yours truly,

CONESTOGA - ROVERS & ASSOCIATES

Kristen Tolin for

John O. Schwaller

Encl.

JS/kt/23

c.c. David Johnson - City of Cedartown
Hadley Bedbury - Maxus
Gordon Tate - Superior Consultants
Mike Mateyk - CRA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

October 16, 1995

Mr. David D. Johnson
Cedartown City Manager
P.O. Box 65
Cedartown, GA 31025

Subject: Completion of Monitoring Well OW-03

Dear Mr. Johnson:

EPA has reviewed the proposed completion plans for OW-03 submitted by your consultant, Conestoga-Rovers & Associates, on September 21, 1995 and October 6, 1995. EPA hereby approves the completion of OW-03 with stainless steel casing as proposed in the October 6, 1995 drawing. It is our understanding that completion of this well will be performed this week. If you have any questions, please call me at (404) 347-3555, extension 6250.

Sincerely,

Annie M. Godfrey

Annie M. Godfrey, P.E.
Remedial Project Manager
South Superfund Remedial Branch

cc: John Schwaller, CRA
Madeleine Kellam, GaEPD

CRA

CONESTOGA-ROVERS & ASSOCIATES
1351 Oakbrook Drive, Suite 150
Norcross, Georgia 30093
(770) 441-0027 Fax: (770) 441-2050

November 3, 1995

Reference No. 3482

Ms. Annie Godfrey
Remedial Project Manager
South Superfund Branch
United States Environmental Protection Agency
Region IV
345 Courtland Street, NE
Atlanta, Georgia 30365

Dear Ms. Godfrey:

Re: Remedial Design/Remedial Action
Cedartown Municipal Landfill Site - Cedartown, Georgia
Progress Report No. 18
Reporting Period: October 1 to October 31, 1995

In accordance with Section XIV, paragraphs A and B of the Unilateral Administrative Order (UAO) for the Remedial Design/Remedial Action (RD/RA) for the Cedartown Municipal Landfill (CML) Site, Conestoga-Rovers & Associates (CRA) is pleased to submit on behalf of the Cedartown PRP Group, Monthly Progress Report No. 18 for October 1995. For ease of reference, activities have been reported separately for RD/RA activities.

A. REMEDIAL DESIGN

1. Activities Undertaken This Reporting Period

The City of Cedartown has delivered all documents to the owners of the lands adjacent to the Site necessary to transfer said lands to the City. The City of Cedartown is awaiting the execution of these deeds and expects them in a timely manner.

2. Deliverables Submitted This Reporting Period

i) Analytical Data

None submitted this reporting period.

ii) Tests

None submitted this reporting period.

iii) Other Data/Information

None submitted this reporting period.

3. Problems Encountered

None encountered this reporting period.

4. Corrective Measures to Rectify Problems

None required this reporting period.

5. Changes to RD

None required this reporting period.

6. Activities Scheduled for the Next Reporting Period

All requirements of the RD will be completed once the City finalizes the adjacent land acquisition. USEPA will be informed of the date of acquisition.

B. REMEDIAL ACTION

1. Activities Undertaken This Reporting Period

i) USEPA approval for the installation of stainless steel well material in monitoring well OW-3 was granted in a letter dated October 16, 1995 (Godfrey to Johnson).

ii) The installation of stainless steel well material in monitoring well OW-3 was initiated on October 16, 1995 and completed on October 17, 1995. A stratigraphic and instrumentation log is presented in Attachment A. Development of monitoring well OW-3 was conducted on October 24 and 25, 1995. Development details are presented in Attachment B.

iii) The fourth round of groundwater sample collection for the analysis of beryllium, cadmium, chromium, lead, and manganese was initiated on October 23, 1995.

iv) The fourth round of surface water sample collection from the Coke Pond for the analyses of aluminum, chromium, copper, lead, nickel, and zinc occurred in conjunction with the groundwater sample collection activity.

2. Deliverables Submitted This Reporting Period

i) Analytical Data

None submitted this reporting period.

ii) Tests

None submitted this reporting period.

iii) Other Data/Information

None submitted this reporting period.

3. Problems Encountered

None encountered this reporting period.

4. Corrective Measures to Rectify Problems

None required this reporting period.

5. Changes to RA

None required this reporting period.

6. Activities Scheduled for the Next Reporting Period

i) Analytical data and data validation for the fourth round of groundwater and surface water sample collection will be submitted.

ii) The second seep and landfill cover inspection will be performed by the City of Cedartown staff.

C. SCHEDULE

The final schedule for the RD/RA was submitted to USEPA in a letter dated December 21, 1994 (Mateyk to Godfrey). All activities presented in that document are complete or are presently on schedule.

We trust this progress report will meet your need at this time. However, if you have any questions or require additional information, please contact the writer at your convenience.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

John O. Schwaller

JS/kt/24

c.c. Madeline Kellam - GAEPD
David Johnson - City of Cedartown
Hadley Bedbury - Maxus
Gordon Tate - Superior Consultants
Holly Kline - Alston & Bird
Michael Childres - Troutman Sanders
Michael Mateyk - CRA

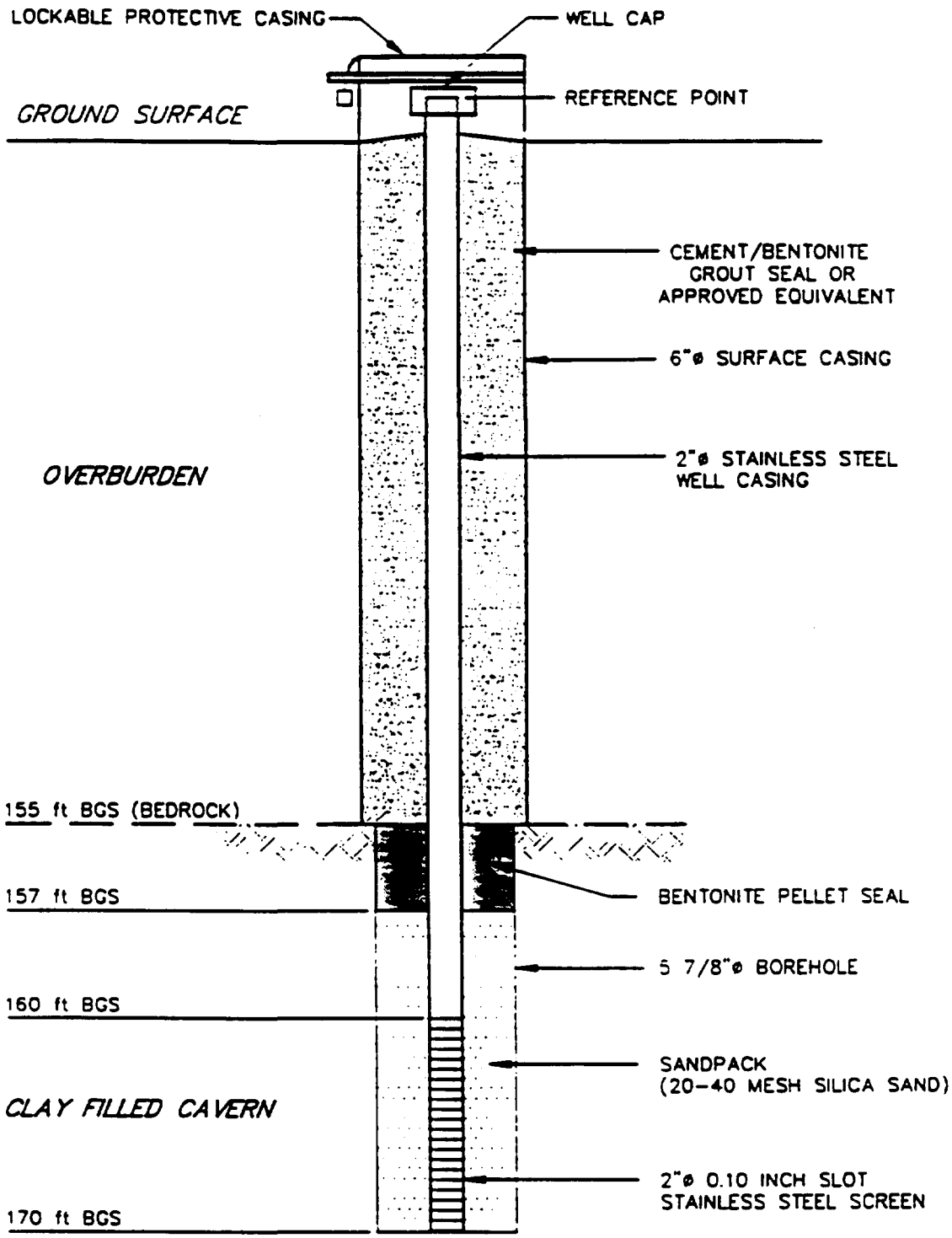


figure 1

PROPOSED OW3 WELL CONSTRUCTION
CEDARTOWN MUNICIPAL LANDFILL SITE
Cedartown, Georgia

CRA

3482 (1) OCT 11/95(A) REV.0 (D-01)

ATTACHMENT A

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-21)

PROJECT NAME: CEDARTOWN MUNICIPAL LANDFILL SITE
PROJECT NO.: 3482
CLIENT: CITY OF CEDARTOWN
LOCATION: CEDARTOWN, GA.

HOLE DESIGNATION: OW-3 (Page 1 of 7)
DATE COMPLETED: AUGUST 4, 1991
RETROFIT: OCTOBER 17, 1995
DRILLING METHOD: 4 1/4" ID HSA, 5 7/8" WET ROTARY
CRA SUPERVISOR: J. ERIC HOLT, J. SCHWALLER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE N VALUE	SAMPLE OVA (ppm)
	REFERENCE POINT (Top of 6" Casing)	803.29					
	GROUND SURFACE	801.5					
	CL-CLAY(FILL), little sand, little gravel, organics, soft, red brown, moist		CONCRETE SEAL	ASS		6	0
	- trace gravel						
2.5				BSS		4	0
	- organic carbon, orange mottled						
5.0			CEMENT/ BENTONITE GROUT	CSS		3	0
	- very soft						
7.5				DSS		3	20
	- moist to saturated		8"ø STEEL CASING	ESS		6	20
10.0	- little gravel, trace fine sand, tan brown, dry to moist			FSS		17	
	- gray, tan brown vertical mottling, dry						
12.5				GSS		28	
	- kaolinite, stiff to hard, vertical layering		12"ø BOREHOLE				
15.0				HSS		37	
	- white kaolinite, very hard, red orange striations						
17.5				ISS		44	
				JSS		44	0
20.0							
				KSS		35	0
22.5			CEMENT/ BENTONITE GROUT	LSS		36	0
	- trace fine sand, trace gravel, stiff, moist						
25.0				MSS		35	0
	- tan and gray brown, vertical striations, rusted partings, dry to moist						
27.5				NSS		52	0
	- very stiff						
				OSS		49	0
30.0	- trace sand, very stiff, brown, orange brown striations, dry		2"ø STAINLESS STEEL CASING	PSS		52	
32.5	- little sand, striations oriented 45°, white and brown			QSS		50	

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-21)

PROJECT NAME: CEDARTOWN MUNICIPAL LANDFILL SITE
PROJECT NO.: 3482
CLIENT: CITY OF CEDARTOWN
LOCATION: CEDARTOWN, GA.

HOLE DESIGNATION: OW-3 (Page 3 of 7)
DATE COMPLETED: AUGUST 4, 1991
RETROFIT: OCTOBER 17, 1995
DRILLING METHOD: 4 1/4" ID HSA, 5 7/8" WET ROTARY
CRA SUPERVISOR: J. ERIC HOLT, J. SCHWALLER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE OVA (ppm)
67.5							
70.0	– little silt, stiff, very plastic, moist to saturated		CEMENT/ BENTONITE GROUT	AESS	X	47	
72.5			6"ø STEEL CASING				
75.0							
77.5							
80.0	– some silt, soft to stiff, moist to wet		12"ø BOREHOLE	AFSS	X	45	
82.5							
85.0							
87.5			CEMENT/ BENTONITE GROUT				
90.0	– stiff			AGSS	X	35	
92.5							
95.0			2"ø STAINLESS STEEL CASING				
97.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC-AND-INSTRUMENTATION LOG
(OVERBURDEN)

(L-21)

PROJECT NAME: CEDARTOWN MUNICIPAL LANDFILL SITE
PROJECT NO.: 3482
CLIENT: CITY OF CEDARTOWN
LOCATION: CEDARTOWN, GA.

HOLE DESIGNATION: OW-3 (Page 5 of 7)
DATE COMPLETED: AUGUST 4, 1991
RETROFIT: OCTOBER 17, 1995
DRILLING METHOD: 4 1/4" ID HSA, 5 7/8" WET ROTARY
CRA SUPERVISOR: J. ERIC HOLT, J. SCHWALLER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE NVALUE	SAMPLE OVA (ppm)
132.5			CEMENT/ BENTONITE GROUT				
135.0			8"ø STEEL CASING				
137.5			PURE BENTONITE GROUT				
140.0			12"ø BOREHOLE				
142.5							
145.0			CEMENT/ BENTONITE GROUT				
147.5							
150.0			2"ø STAINLESS STEEL CASING				
152.5							
155.0			FINE SAND PACK				
	END OF OVERBURDEN HOLE @ 156.0 FT. BGS	645.5					
157.5							
160.0			5"ø BOREHOLE				
162.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE: REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-21)

PROJECT NAME: CEDARTOWN MUNICIPAL LANDFILL SITE
PROJECT NO.: 3482
CLIENT: CITY OF CEDARTOWN
LOCATION: CEDARTOWN, GA.

HOLE DESIGNATION: OW-3 (Page 2 of 7)
DATE COMPLETED: AUGUST 4, 1991
RETROFIT: OCTOBER 17, 1995
DRILLING METHOD: 4 1/4" ID HSA, 5 7/8" WET ROTARY
CRA SUPERVISOR: J. ERIC HOLT, J. SCHWALLER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	STATE	N VALUE	OVA (ppm)
	– trace sand, brown, white and orange mottling, dry to moist			QSS	X	50	
35.0	– silt lense, saturated – brown and red, near vertical banding		CEMENT/ BENTONITE GROUT	RSS	X	37	
37.5	– brown and gray			SSS	X	40	
				TSS	X	39	
40.0			6"ø STEEL CASING	USS	X	44	
42.5	– dry			VSS	X	50	
	– little sand			WSS	X	56	0
45.0	– trace sand			XSS	X	57	0
47.5	– little silt		12"ø BOREHOLE	YSS	X	64	0
50.0	– fossil (monograptid) – some silt, little sand, dry to wet – saturated lense with some sand and broken shale (6")			ZSS	X	66	0
52.5	– little gravel, vertical banding, vertical glauconite lenses			AASS	X	69	0
55.0	– fossil (monograptid) – some silt, trace sand, near vertical banding, dry to moist		CEMENT/ BENTONITE GROUT	ABSS	X	63	0
57.5	– trace glauconite, vertical banding			ACSS	X	60	0
60.0				ADSS	X	58	0
62.5			2"ø STAINLESS STEEL CASING				
65.0							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-21)

PROJECT NAME: CEDARTOWN MUNICIPAL LANDFILL SITE

PROJECT NO.: 3482

CLIENT: CITY OF CEDARTOWN

LOCATION: CEDARTOWN, GA.

HOLE DESIGNATION: OW-3 (Page 4 of 7)

DATE COMPLETED: AUGUST 4, 1991

RETROFIT: OCTOBER 17, 1995

DRILLING METHOD: 4 1/4" ID HSA, 5 7/8" WET ROTARY

CRA SUPERVISOR: J. ERIC HOLT, J. SCHWALLER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUES	SAMPLE OVA (ppm)
100.0							
102.5			CEMENT/ BENTONITE GROUT				
105.0			6"ø STEEL CASING				
107.5				AHSS	X	41	
110.0							
112.5			12"ø BOREHOLE				
115.0							
117.5			CEMENT/ BENTONITE GROUT				
120.0							
122.5							
125.0			2"ø STAINLESS STEEL CASING				
127.5							
130.0							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE: REFER TO CURRENT ELEVATION TABLE.

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(BEDROCK)

(L-22)

PROJECT NAME: CEDARTOWN MUNICIPAL LANDFILL SITE
PROJECT NO.: 3482
CLIENT: CITY OF CEDARTOWN
LOCATION: CEDARTOWN, GA.

HOLE DESIGNATION: OW-3 (Page 6 of 7)
DATE COMPLETED: AUGUST 4, 1991
RETROFIT: OCTOBER 17, 1995
DRILLING METHOD: 4 1/4" ID HSA, 5 7/8" WET ROTARY
CRA SUPERVISOR: J. ERIC HOLT, J. SCHWALLER

DEPTH	DESCRIPTION OF STRATA	ELEVATION	MONITOR INSTALLATION	BIENDTRECORCVKAL	RNUUNMBER	CRORECOVERY	RQD	WRATTEURRN
ft BGS		ft. AMSL				%	%	%
155.0			CEMENT/BENTONITE GROUT; 12"ø BOREHOLE; 8"ø STEEL CASING					
157.5	LIMESTONE(Newala Formation): fine grained, cherty, calcite filled fractures following bedding orientation (39°), light to dark gray	645.5			1	100	70	
160.0			WELL SCREEN					
162.5	KARST CAVITY	638.5						
165.0								
167.5			SAND PACK					
170.0								
172.5								
175.0			NATIVE MATERIAL					
177.5								
180.0								
182.5			6"ø BOREHOLE					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE: REFER TO CURRENT ELEVATION TABLE

▽ WATER FOUND ▼ STATIC WATER LEVEL NM – NOT MEASURED

STRATIGRAPHIC AND INSTRUMENTATION LOG
(BEDROCK)

(L-22)

PROJECT NAME: CEDARTOWN MUNICIPAL LANDFILL SITE
PROJECT NO.: 3482
CLIENT: CITY OF CEDARTOWN
LOCATION: CEDARTOWN, GA.

HOLE DESIGNATION: OW-3
(Page 7 of 7)
DATE COMPLETED: AUGUST 4, 1991
RETROFIT: OCTOBER 17, 1995
DRILLING METHOD: 4 1/4" ID HSA
5 7/8" WET ROTARY
CRA SUPERVISOR: J. ERIC HOLT
J. SCHWALLER

DEPTH	DESCRIPTION OF STRATA	ELEVATION	MONITOR INSTALLATION	BIENDTRERORCVKAL	RNUUNMBER	CRORECOVERY	RQD	WRATTEURRN
ft BGS		ft. AMSL				%	%	%
185.0			NATIVE MATERIAL					
187.5								
190.0			6"ø BOREHOLE					
192.5	END OF HOLE @ 193 FT. BGS	608.5						
195.0			SCREEN DETAILS: Screened Interval: 161.0 to 171.0' BGS Length -10.0' Diameter -2.0" Slot # 10 Material -Stainless Steel Sand pack interval: 155.0 to 173.0' BGS Material -#20-40 Sand					
197.5								
200.0								
202.5								
205.0								
207.5								
210.0								
212.5								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE: REFER TO CURRENT ELEVATION TABLE

▽ WATER FOUND ▽: STATIC WATER LEVEL NM - NOT MEASURED

ATTACHMENT B

DEVELOPMENT DETAILS
MONITORING WELL OW-3
CEDARTOWN MUNICIPAL LANDFILL SITE
OCTOBER 1995

Well Number	*Initial Well Volume (gallons)*	*Volume Number (1)*	*Total Gallons Purged*	*pH*	*Conductivity (µs/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
OW-3	22.5	1	25	--	--	--	>1,000	Bladder pump
		2	50	--	--	--	>1,000	
		3	75	--	--	--	>1,000	
		4	100	--	--	--	>1,000	
		5	125	--	--	--	>1,000	
		6	150	7.4	175	65	225	
		7	175	7.2	205	65	15	
		8	200	7.0	198	65	11	
		9	225	7.4	200	65	6	
		10	250	7.3	210	65	5	

Notes:

(1) Well was surged during volumes 1 to 6.
(2) Micromhos per centimeter.
(3) Degrees Fahrenheit.
(4) Nephelometric units.

APPENDIX E

SEMI-ANNUAL INSPECTION LOGS

SEMIANNUAL INSPECTION LOG
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Inspector's Name/Title	John D. Johnson, City Manager	
Date of Inspection	March 19, 1996	(month/day/year)
Time of Inspection	0830 - 1200	(military time)
Weather Conditions	Cold, windy, 42° F, wet	(i.e., Temp. °F, precipitation)

Activity	*Items*	*Condition/ Status*	*Observations/Comments*	*Corrective Action Taken*
Landfill Cover	• Vegetative Cover	Good		
	• Evidence of Erosion	None		
	• Evidence of Subsidence	None		
	• Evidence of Exposed Refuse	Sporadic	(very old in nature)	(N/A)
	• Access Controlled	Yes		
Seep Inspection	• Condition of East Seep	Unchanged		
	• Evidence of New Uncontrolled Discharge of Leachate	None		
	• Evidence of New Surface Staining	None		

SEMIANNUAL INSPECTION LOG
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Inspector's Name/Title	David Johnson/City Manager	
Date of Inspection	November 21, 1995	(month, day, year)
Time of Inspection	1400 hours to 1730 hours	(military time)
Weather Conditions	Clear - 59 deg. F	(i.e., Temp deg. F, precipitation)

Activity	*Items*	*Conditional Status*	*Observations/Comments (1)*	*Corrective Action Taken*
Landfill Cover	Vegetative Cover	Good		NA
	Evidence of Erosion	None		NA
	Evidence of Subsidence	None		NA
	Evidence of Exposed Refuse	None	Surficial refuse only	NA
	Access Controlled	Yes		NA
Seep Inspection	Condition of East Seep	Unchanged		NA
	Evidence of New Uncontrolled Discharge of Leachate	None		NA
	Evidence of New Surface Staining	None		NA

Notes:

(1) Note areas of concern on attached figure.

SEMIANNUAL INSPECTION LOG
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Inspector's Name/Title	David Johnson, City Manager	
Date of Inspection	February 10, 1995	(month/day/year)
Time of Inspection	1330 hours to 1745 hours	(military time)
Weather Conditions	Clear - Windy - 67°F	(i.e., Temp.°F, precipitation)

Activity	*Items*	*Condition/ Status*	*Observations/Comments* [1]	*Corrective Action Taken*
Landfill Cover	• Vegetative Cover	Good		NA
	• Evidence of Erosion	None		NA
	• Evidence of Subsidence	None		NA
	• Evidence of Exposed Refuse	None	Surficial refuse only	NA
	• Access Controlled	Yes		NA
Seep Inspection	• Condition of East Seep	Unchanged		NA
	• Evidence of New Uncontrolled Discharge of Leachate	None		NA
	• Evidence of New Surface Staining	None		NA

[1] Note areas of concern on attached figure.

SEMIANNUAL INSPECTION LOG
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Inspector's Name/Title	J. David Johnson, City Manager	
Date of Inspection	10/11/96	(month/day/year)
Time of Inspection	1430 - 1745 hours	(military time)
Weather Conditions	Clear, Cool, and Dry; 73°	(i.e., Temperature °F, precipitation)

Activity	*Items*	*Condition/ Status*	*Observations/Comments*[1]	*Corrective Action Taken*
Landfill Cover	• Vegetative Cover	Good	Increased Growth	
	• Evidence of Erosion	None		
	• Evidence of Subsidence	None		
	• Evidence of Exposed Refuse	Sporadic		
	• Access Controlled	Yes		
Seep Inspection	• Condition of East Seep	Unchanged		
	• Evidence of New Uncontrolled Discharge of Leachate	None		
	• Evidence of New Surface Staining			

[1] Note areas of concern on attached figure.

APPENDIX F

FIELD TECHNICAL MEMORANDA

CRA
1351 Oakbrook Drive
Suite #150
Norcross, Georgia 30093
(404) 441-0027

MEMO

TO: Mike Mateyk

REFERENCE NO: 3482

FROM: John Schwaller

DATE: February 2, 1995

RE: Round One Groundwater and Surface Water Sampling
Cedartown Municipal Landfill Site - Cedartown, Georgia

1.0 INTRODUCTION

The following technical memorandum summarizes the field activities associated with the first round of groundwater and surface water samples collected at the Cedartown Municipal Landfill Site (CML Site). All activities were conducted in accordance with the approved Remedial Design/Remedial Action (RD/RA) Work Plan. The scope of work of this sampling activity included:

i) well inspections;
ii) water level measurements;
iii) purging 13 of 13 monitoring wells (of all monitoring wells);
iv) sampling 10 of 10 perimeter monitoring wells for beryllium, cadmium, chromium, lead, and manganese analysis;
v) sampling 2 of 3 interior monitoring wells for beryllium, cadmium, chromium, lead, and manganese analysis; and
vi) sampling of the Coke Pond for aluminum, chromium, copper, lead, nickel, and zinc analysis.

This round of sample collection occurred during the periods January 4 - 11 and January 23, 1995.

The following sections in this memorandum describe the field activities.

2.0 WELL INSPECTION

All monitoring wells sampled were located and in good condition. Due to the age and condition of the locks, a majority of them had to be cut in order to gain access to the wells. New locks were ordered and installed on the protective casings.

3.0 GROUNDWATER SAMPLING PROCEDURES

3.1 Water Level Measurements

Prior to purging and sampling the monitoring wells, the water level was measured using an electric sounding device. All measurements were taken from the northern side of the well casing. Water level measurements were recorded to the nearest 0.01 foot. The water level indicator was decontaminated prior to each use as described in Section 5.0 of this memorandum. Water level measurements and elevations are presented in Table 1.

3.2 Purging

With the exception of monitoring well OW-7R, all monitoring wells were purged prior to sampling using a low-flow purging technique. Monitoring well OW-7R could not be purged in this manner due to the excessive sedimentation of the well. This sedimentation is most likely due to the lithology in which this well had to be constructed. The following presents the types of methods used to purge all monitoring wells on the Site:

- Bladder Pump

All 2-inch diameter monitoring wells with the exception of monitoring wells OW-7R and CL-09-WP were purged using a 1.88-inch diameter Teflon bladder/stainless steel body pump and utilizing polyethylene tubing. The pump was suspended in the well using new nylon rope.

- Peristaltic Pump

Monitoring well CL-09-WP was purged using a peristaltic pump utilizing new internal silicone tubing within the pump itself and polyethylene intake tubing. This pump was utilized due to the shallow depth of this monitoring well.

- Airlift Pump

Because of the large volumes of water needed to purge the larger 6-inch and 8-inch diameter monitoring wells (OW-3 and OW-6B), these wells were purged using a 3-inch diameter stainless steel airlift pump utilizing polyethylene tubing. The pump was suspended in the well using new nylon rope.

- Stainless Steel Bailer

Because the water quality of monitoring well OW-7R was extremely turbid, a bladder pump could not be utilized in this location; therefore, a stainless steel bailer and new nylon rope was used to purge this monitoring well.

All polyethylene tubing used during purging was dedicated to the respective monitoring wells with the exception of monitoring well OW-6B.

Purging was conducted in accordance with the approved RD/RA Work Plan. Field parameters of pH, conductivity, temperature, and turbidity were measured after each well volume, except where noted, to determine whether to terminate purging upon removal of three times the standing water volume or continue to a maximum of five times the volume. Calibration of field instruments were performed daily. New disposable latex gloves were used before and between all purging events. A summary of purge data is presented in Table 2.

3.3 Groundwater Sampling

Groundwater samples were collected from all wells purged, with the exception of monitoring well CL-07-WP, for the analysis of beryllium, cadmium, chromium, lead and manganese. A groundwater sample could not be collected from monitoring well CL-07-WP because it was purged dry and did not recover to a sufficient level. With the exception of the groundwater sample collected from monitoring well OW-7R, all groundwater samples collected exhibited a turbidity of less than

50 nephelometric units (NTUs). Groundwater samples were collected using the following methods:

- Bladder pump

Groundwater samples were collected from all 2-inch diameter monitoring wells, with the exception of monitoring wells OW-7R, CL-06-WP, and CL-09-WP using the same bladder pump in which the well was purged with.

- Peristaltic pump

A groundwater sample was collected from monitoring well CL-09-WP using the same peristaltic pump and polyethylene intake tubing in which the well was purged with.

- Teflon bailer

Groundwater samples were collected from monitoring wells OW-7R, CL-06-WP, and the larger diameter monitoring wells OW-3 and OW-6B using a disposable Teflon bailer and new nylon rope.

Sample personnel wore new disposable latex gloves before and between all sample events. Samples were immediately preserved with nitric acid and placed on ice in laboratory supplied coolers. One duplicate sample, one matrix spike/matrix spike duplicate sample and one equipment blank were collected for quality control purposes. All samples were sent under proper laboratory protocols and chain-of-custody procedures to Quanterra Environmental Services of North Canton, Ohio.

A summary of sample data and methods used to collect the groundwater samples are presented in Table 3.

4.0 SURFACE WATER SAMPLING PROCEDURES

One surface water sample was collected from the Coke Pond for the analysis of aluminum, chromium, copper, lead, nickel and zinc. A grab sample was collected directly from the Coke Pond into the sample container and immediately preserved with nitric acid and placed on ice. All laboratory and chain of custody

protocols followed during the groundwater sample collection were followed during the surface water sample collection.

5.0 DECONTAMINATION

All equipment, including the airlift pump, bladder pumps, stainless steel bailer and water level tape were cleaned prior to use. Cleaning consisted of brushing particulates free with an Alconox solution, rinsing with tap water, rinsing thoroughly with deionized water, and allowing to air dry. All pumps were wrapped with aluminum foil prior to storage or transport.

6.0 WASTE MATERIAL HANDLING

All purge water was temporarily stored on-Site in polyethylene tanks until final disposal to the City of Cedartown POTW.

JS/kt/7

c.c. David Brytowski

TABLE 1

GROUNDWATER ELEVATION SUMMARY
QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
JANUARY 1995

Monitoring Well	*Reference Elevation*	*Water Level Elevations (1)*			
		January 1995	*April 1995*	*July 1995*	*October 1995*
OW-1	823.80	786.26			
OW-2	827.50	780.05			
OW-3	803.29	773.79			
OW-4	801.52	763.10			
OW-5	797.92	774.64			
OW-6B	805.12	785.35			
OW-7R	809.30	784.48			
CL-03-WP	836.41	786.54			
CL-04-2P	796.81	761.33			
CL-05-WP	853.34	780.22			
CL-06-WP	861.02	776.80			
CL-07-WP	824.90	801.09			
CL-09-WP	803.18	788.74			

Notes:

(1) Elevations are feet above mean sea level.

TABLE 2

WELL PURGING DATA SUMMARY
ROUND ONE QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
JANUARY 1995

Well Number	*Water Level Elevation(1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm)(2)*	*Temperature (°F)(3)*	*Turbidity (NTUs)(4)*	*Method*
OW-1	786.26	3.8	1	4	6.81	523	55	14	Bladder pump
			2	8	6.73	540	57	8	
			3	12	6.67	555	58	4	
OW-2	780.05	1.96	5	10	-	-	-	3.5	Bladder pump
OW-3	773.79	185	1	185	8.30	730	62.4		Airlift pump
			2	370	8.41	698	63.0		
			3	555	8.03	739	63.2		
			4	740	7.20	479	64.2		
			5	925	7.30	445	62.5	14.36	
OW-4	763.1	3.8	5	20	-	-	-	43	Bladder pump
OW-5	774.64	9.8	1	10	7.80	410	58	20.0	Bladder pump
			2	20	7.50	420	60	12.0	
			3	30	7.74	369	60	11.2	
OW-6B	785.35	83.8	5	420	-	-	-	47	Airlift pump

TABLE 2

WELL PURGING DATA SUMMARY
ROUND ONE QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
JANUARY 1995

Well Number	*Water Level (FT.BTOC)(1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µs/cm)(2)*	*Temperature (ÞF)(3)*	*Turbidity (NTUs)(4)*	*Method*
OW-7R	784.48	9.5	1	10	8.40	380	66.3	>200	Stainless Steel Bailer (5)
			2	20	8.60	520	64.2	>200	
			3	30	7.90	400	63.5	>200	
			4	40	7.60	250	62.1	>200	
			5	50	7.10	150	60.1	>200	
CL-03-WP	786.54	8.4	1	8.5	7.49	290	61.8	30	Bladder pump
			2	17.0	7.20	290	61.0	25	
			3	25.5	7.13	270	59.7	23	
			4	34.0	7.14	275	59.4	21.6	
CL-04-WP	761.33	0.88	5	5	-	-	-	4.9	Bladder pump
CL-05-WP	780.22	7.0	1	7	8.02	590	61	30.6	Bladder pump
			2	14	7.91	584	60	22.4	
			3	21	7.67	577	59	23.8	
			4	28	7.55	572	58.3	19.38	
CL-06-WP	776.8	0.6	1	0.5	7.60	535	55.4	>200	Bladder pump
			2(6)	1.0	7.52	549	57.2	47	

TABLE 2

WELL PURGING DATA SUMMARY
ROUND ONE QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
JANUARY 1995

Well Number	*Water Level (FT.BTOC)(1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µs/cm)(2)*	*Temperature (ÞF)(3)*	*Turbidity (NTUs)(4)*	*Method*
CL-07-WP	801.09	1.0	1(7)	1.5	7.03	829	63	>200	Bladder pump
CL-09-WP	788.74	2.8	1	3	7.25	630	63	19.0	Peristaltic pump
			2	6	7.20	550	62.5	13.0	
			3	9	7.12	531	61.5	12.5	

Notes:

- Parameters not measured due to faulty equipment.
(1) Feet above mean sea level.
(2) Micromhos per centimeter.
(3) Degrees fahrenheit.
(4) Nephelometric units.
(5) Stainless steel bailer was necessary due to extreme sedimentation.
(6) Well was purged dry after two volumes.
(7) Well was purged dry and did not recover.

TABLE 3

SAMPLE SUMMARY
ROUND ONE QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
JANUARY 1995

Sample Number	*Source*	*Parameters*	*Turbidity*	*Method*	*Comments*
W-3482-JOS-010595-01	OW-2	(1)	3.5	(3)	
W-3482-JOS-010595-02	OW-6B	(1)	47	(4)	
W-3482-JOS-010695-03	CL-04-WP	(1)	4.9	(3)	
W-3482-JOS-010695-04	OW-4	(1)	43	(3)	W-3482-JOS-010695-05 (Duplicate)
W-3482-JOS-010695-06	OW-5	(1)	11.2	(3)	
W-3482-JOS-010695-07	CL-09-WP	(1)	12.5	(5)	
W-3482-JOS-010995-08	CL-03-WP	(1)	21.6	(3)	
W-3482-JOS-011095-09 MS/MSD	OW-1	(1)	4.0	(3)	Matrix Spike/Matrix Spike Duplicate
W-3482-JOS-011095-10	OW-3	(1)	14.36	(4)	
W-3482-JOS-011095-11	CL-05-WP	(1)	19.38	(3)	
W-3482-JOS-011195-12	Rinsate Blank	(1)	-	-	Rinsate of Bladder Pump
W-3482-JOS-011195-13	Coke Pond	(2)	-	-	Surface Water Grab Sample
W-3482-JOS-011195-14	CL-06-WP	(1)	47	(4)	
W-3482-JOS-012395-15	OW-7R	(1)	>200	(4)	

Notes:

(1) beryllium, cadmium, chromium, lead, manganese
(2) aluminum, chromium, copper, lead, nickel, zinc
(3) Teflon bailer/stainless steel body pump
(4) disposable Teflon bailer
(5) Peristaltic pump

CRA
1351 Oakbrook Drive
Suite #150
Norcross, Georgia 30093
(404) 441-0027

MEMO

TO: Mike Mateyk

REFERENCE NO: 3482

FROM: John Schwaller

DATE: May 2, 1995

RE: Round Two Groundwater and Surface Water Sampling
Cedartown Municipal Landfill Site - Cedartown, Georgia

1.0 INTRODUCTION

The following technical memorandum summarizes the field activities associated with the second round of groundwater and surface water sampling at the Cedartown Municipal Landfill Site (CML Site). All activities were conducted in accordance with the approved Remedial Design/Remedial Action (RD/RA) Work Plan. The scope of work of this sampling activity included:

i) well inspections;
ii) water level measurements;
iii) purging 13 of 13 monitoring wells (of all monitoring wells);
iv) sampling 10 of 10 perimeter monitoring wells for beryllium, cadmium, chromium, lead, and manganese analysis;
v) sampling 3 of 3 interior monitoring wells for beryllium, cadmium, chromium, lead, and manganese analysis; and
vi) sampling of the Coke Pond for aluminum, chromium, copper, lead, nickel, and zinc analysis.

This round of sample collection occurred during the periods April 24 through May 2, 1995.

The following sections in this memorandum describe the field activities.

2.0 WELL INSPECTION

All monitoring wells scheduled to be sampled were initially located and found to be in good condition.

3.0 GROUNDWATER SAMPLING PROCEDURES

3.1 Water Level Measurements

Prior to purging and sampling the monitoring wells, the water level was measured using an electric sounding device. All measurements were taken from the northern side of the well casing. Water level measurements were recorded to the nearest 0.01 foot. The water level indicator was decontaminated prior to each use as described in Section 5.0 of this memorandum. Water level measurements and elevations are presented in Table 1.

3.2 Purging

All monitoring wells were purged prior to sampling using a low-flow purging technique. The following presents the types of methods used to purge all monitoring wells on the Site:

- Bladder Pump

All 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP, were purged using a 1.88-inch diameter Teflon bladder/stainless steel body pump and utilizing polyethylene tubing. The pump was suspended in the monitoring well using new nylon rope.

- Peristaltic Pump

Monitoring well CL-09-WP was purged using a peristaltic pump utilizing new internal silicone tubing within the pump itself and Teflon intake tubing. This pump was utilized due to the shallow depth of this monitoring well and the high water elevation.

- Airlift Pump

Because of the large volumes of water needed to purge the 6-inch and 8-inch diameter monitoring wells (OW-3 and OW-6B), these monitoring wells were purged using a 3-inch diameter stainless steel airlift pump utilizing polyethylene tubing. The pump was suspended in the well using new nylon rope.

All polyethylene tubing used during purging was re-dedicated to the respective monitoring wells with the exception of monitoring well CL-09-WP in which the Teflon tubing was discarded due to age and poor condition.

Purging was conducted in accordance with the approved RD/RA Work Plan. Except where noted, field parameters of pH, conductivity, temperature, and turbidity were measured after each well volume. Purging continued until stabilization of pH, conductivity, and temperature had been achieved. Additionally, purging was continued until a goal of less than 10 nephelometric units (NTUs) could be achieved. If less than 10 NTUs could not be achieved, the original goal of 50 NTUs was used. Calibration of field instruments was performed daily. New disposable latex gloves were used before and between all purging events. A summary of purge data is presented in Table 2.

3.3 Groundwater Sampling

Groundwater samples were collected from all wells purged for the analysis of beryllium, cadmium, chromium, lead, and manganese. With the exception of the groundwater samples collected from monitoring wells OW-6B, CL-06-WP, and CL-07-WP, all groundwater samples collected exhibited a turbidity of less than 50 NTUs. The turbidity was above 50 NTUs at monitoring well OW-6B due to an orange colored suspected iron algae growth, while monitoring wells CL-06-WP and CL-07-WP were purged dry resulting in the removal of sediment deposited in the bottom of the wells.

Groundwater samples were collected using the following methods:

- Bladder pump

Groundwater samples were collected from all 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP using the same bladder pump in which the well was purged with.

- Peristaltic pump

A groundwater sample was collected from monitoring well CL-09-WP using the same peristaltic pump and Teflon intake tubing used for purging.

- Teflon bailer

Groundwater samples were collected from the larger diameter monitoring wells OW-3 and OW-6B using a disposable Teflon bailer and new nylon rope.

Sample personnel wore new disposable latex gloves before and between all sample events. Samples were immediately preserved with nitric acid and placed on ice in laboratory supplied coolers. One duplicate sample, one matrix spike/matrix spike duplicate sample and one equipment blank were collected for quality control purposes. All samples were sent under proper laboratory protocols and chain-of-custody procedures to Quanterra Environmental Services of North Canton, Ohio.

A sample key, sample field data, and methods used to collect the groundwater samples are presented in Table 3.

4.0 SURFACE WATER SAMPLING PROCEDURES

One surface water sample was collected from the Coke Pond for the analysis of aluminum, chromium, copper, lead, nickel and zinc. A grab sample was collected directly from the Coke Pond into the sample container and immediately preserved with nitric acid and placed on ice. All laboratory and chain of custody protocols followed during the groundwater sample collection were followed during the surface water sample collection.

5.0 DECONTAMINATION

All equipment, including the airlift pump, bladder pumps, and water level tape were cleaned prior to use. Cleaning consisted of brushing particulates free with an Alconox solution, rinsing thoroughly with deionized water, and allowing to air dry. All pumps were disassembled prior to decontamination and wrapped with aluminum foil prior to storage or transport.

6.0 WASTE MATERIAL HANDLING

All purge water was temporarily stored on-Site in polyethylene tanks until final disposal to the City of Cedartown POTW.

JS/kt/10

c.c. David Brytowski - CRA
Hadley Bedbury - Maxus Energy
Gordon Tate - Superior Consultants
David Johnson - City of Cedartown

TABLE 1

GROUNDWATER ELEVATION SUMMARY
QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE

Monitoring Well	*Reference Elevation*	*Water Level Elevations (1)*			
		January 1995	*April 1995*	*July 1995*	*October 1995*
OW-1	823.80	786.26	787.35		
OW-2	827.50	780.05	779.81		
OW-3	803.29	773.79	779.08		
OW-4	801.52	763.10	764.98		
OW-5	797.92	774.64	776.58		
OW-6B	805.12	785.35	791.00		
OW-7R	809.30	784.48	788.75		
CL-03-WP	836.41	786.54	791.47		
CL-04-WP	796.81	761.33	764.30		
CL-05-WP	853.34	780.22	783.40		
CL-06-WP	861.02	776.80	773.38		
CL-07-WP	824.90	801.09	801.42		
CL-09-WP	803.18	788.74	794.96		

Notes:

(1) Elevations are feet above mean sea level.

TABLE 2

WELL PURGING DATA SUMMARY
ROUND TWO QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICPAL LANDFILL SITE
APRIL 1995

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
OW-1	787.35	4	1	4	--	--	--	--	Bladder pump
			2	8	6.9	535	66	12	
			3	12	6.7	560	67	10	
			4	16	6.7	573	66	18	
			5	20	6.8	599	68	11	
			6	24	6.9	588	69	7	
OW-2	779.81	2	1	2	--	--	--	--	Bladder pump
			2	4	7.1	821	63	10	
			3	6	6.9	671	66	4	
			4	8	6.9	685	65	2	
			5	10	6.9	680	66	2	
			6	12	6.9	708	68	2	
OW-3	779.08	192	1	200	12.3	1110	61	32	Purge pump
			2	400	6.8	501	71	130	
			3	600	6.4	484	75	260	
			4	800	6.2	484	72	74	
			5	1000	5.9	450	71	34	
OW-4	764.98	4	1	4	6.9	2420	71	12	Bladder pump
			2	8	6.8	1980	67	5	
			3	12	6.7	3990	69	3.4	
			4	16	6.9	4050	69	3.3	
			5	20	6.7	4090	67	7	

TABLE 2

WELL PURGING DATA SUMMARY
ROUND TWO QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICPAL LANDFILL SITE
APRIL 1995

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
OW-5	776.58	10	1	10	7.8	808	68	113	Bladder pump
			2	20	8.0	790	67	17	
			3	33	8.1	793	68	8.6	
OW-6B	791.00	99	1	100	--	--	--	--	Purge pump
			2	200	6.6	250	64	303	
			3	300	6.8	207	63	345	
			4	400	6.9	292	55	99	
			5	500	6.7	353	68	98	
			6	600	7.3	428	67	75	
			7	700	7.0	410	67	73 (5)	
OW-7R (6)	788.75	10	1	10	6.9	86	67	8	Bladder pump
			2	20	6.9	64	68	5	
			3	30	--	--	--	--	
			4	40	6.2	62	72	4.2	
			5	50	6.8	64	70	15	
			6	60	6.6	66	72	11	
			7	70	--	--	--	--	
			8	80	7.1	69	59	7	
			9	90	7.0	60	62	6	
			10	100	--	--	--	--	
			11	110	6.6	54	65	4	
			12	120	6.3	54	66	4.7	

TABLE 2

WELL PURGING DATA SUMMARY
ROUND TWO QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICPAL LANDFILL SITE
APRIL 1995

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
CL-03-WP	791.47	9	1	10	--	--	--	--	Bladder pump
			2	20	8.5	815	66	250	
			3	30	7.7	966	72	71	
			4	40	6.9	496	73	29	
			5	50	6.8	332	76	21	
			6	60	6.8	387	73	20	
CL-04-WP	764.30	1.4	1	2	6.8	262	62	28	Bladder pump
			2	4	6.5	320	66	25	
			3	6	6.5	256	66	9	
			4	8	6.7	293	63	33	
			5	11	7.2	210	63	4	
CL-05-WP	783.40	7.5	1	8	7.0	469	60	25	Bladder pump
			2	16	7.1	602	64	36	
			3	24	6.8	610	66	4.7	
			4	32	6.9	618	68	8	
CL-06-WP (7)	773.38	0.9	1	0.75	7.1	588	72	135	Bladder pump
CL-07-WP (8)	801.42	1.5	1	1.5	7.6	810	66	>1000	Bladder pump
CL-09-WP	794.96	3.9	1	4	7.1	389	72	19	Peristaltic pump
			2	8	6.7	338	73	8	
			3	12	6.3	356	76	10	

TABLE 2

WELL PURGING DATA SUMMARY
ROUND TWO QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICPAL LANDFILL SITE
APRIL 1995

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*

Notes:

(1) Elevations are feet above mean sea level.
(2) micromhos
(3) Degrees Fahrenheit
(4) Nephelometric units
(5) Sample observed to contain iron bacteria - like algae.
(6) Development of volumes 1-6 was conducted on 4/27/95. Purging of volumes 7-12 and sampling was conducted on 4/28/95.
(7) Well was purged dry after one volume on 4/27/95 and recovered sufficiently on 4/27/95 to collect a sample.
(8) Well was purged dry after one volume on 5/1/95 and recovered sufficiently on 5/2/95 to collect a sample.

TABLE 3

SAMPLE KEY/FIELD DATA
ROUND TWO QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
APRIL 1995

Sample Number	*Source*	*Turbidity (NTUs)*	*Parameters*	*Method*	*Comments*
GW-3482-JOS-042595-016	CL-04-WP	4	(1)	(2)	
GW-3482-JOS-042595-017	OW-6B	73	(1)	(3)	GW-3482-JOS-042595-018 (Duplicate)
GW-3482-JOS-042595-019	OW-4	7	(1)	(2)	
GW-3482-JOS-042595-020	OW-5	8.6	(1)	(2)	
GW-3482-JOS-042695-021	CL-03-WP	20	(1)	(2)	
GW-3482-JOS-042695-022	CL-09-WP	3	(1)	(4)	
GW-3482-JOS-042895-023	OW-7R	4.7	(1)	(2)	
GW-3482-JOS-042695-024	OW-3	34	(1)	(3)	
GW-3482-JOS-042795-025	OW-2	2	(1)	(2)	
GW-3482-JOS-042795-026	CL-06-WP	133	(1)	(2)	
GW-3482-JOS-042795-027	CL-05-WP	8	(1)	(2)	
GW-3482-JOS-050195-028 MS/MSD	OW-1	7	(1)	(2)	Matrix Spike/Matrix Spike Duplicate
GW-3482-JOS-050295-029	CL-07-WP	>1000	(1)	(2)	

TABLE 3

SAMPLE KEY/FIELD DATA
ROUND TWO QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
APRIL 1995

Sample Number	*Source*	*Turbidity (NTUs)*	*Parameters*	*Method*	*Comments*
SW-3482-JOS-042895-002	Coke Pond	--	(5)	--	Surface water grab sample
RB-1	Bladder pump	--	(1)	--	Rinsate blank prior to use in OW-1

Notes:

(1) Beryllium, cadmium, chromium, lead, manganese

(2) Bladder pump

(3) Disposable teflon bailer

(4) Peristaltic pump

(5) Aluminum, chromium, copper, lead, nickel, and zinc

CRA
1351 Oakbrook Drive
Suite #150
Norcross, Georgia 30093
(770) 441-0027

MEMO

TO: Mike Mateyk

REFERENCE NO: 3482

FROM: John Schwaller

DATE: August 23, 1995

RE: Round Three Groundwater and Surface Water Sampling
Cedartown Municipal Landfill Site - Cedartown, Georgia

1.0 INTRODUCTION

The following technical memorandum summarizes the field activities associated with the third round of groundwater and surface water sampling at the Cedartown Municipal Landfill Site (CML Site). All activities were conducted in accordance with the approved Remedial Design/Remedial Action (RD/RA) Work Plan. The scope of work of this sampling activity included:

i) well inspections;
ii) water level measurements;
iii) purging 13 of 13 monitoring wells (of all monitoring wells);
iv) sampling 9 of 10 perimeter monitoring wells for beryllium, cadmium, chromium, lead, and manganese analysis;
v) sampling 1 of 3 interior monitoring wells for beryllium, cadmium, chromium, lead, and manganese analysis; and
vi) sampling of the Coke Pond for aluminum, chromium, copper, lead, nickel, and zinc analysis.

This round of sample collection occurred during the periods July 19 through July 24, 1995.

The following sections in this memorandum describe the field activities.

2.0 WELL INSPECTION

All monitoring wells scheduled to be sampled were initially located and found to be in good condition.

3.0 GROUNDWATER SAMPLING PROCEDURES

3.1 Water Level Measurements

Prior to purging and sampling each monitoring well, the water level was measured using an electric sounding device. All measurements were taken from the northern side of the well casing. Water level measurements were recorded to the nearest 0.01 foot. The water level indicator was decontaminated prior to each use as described in Section 5.0 of this memorandum. Water level measurements and elevations are presented in Table 1.

3.2 Purging

All monitoring wells were purged prior to sampling using a low-flow purging technique. The following presents the types of methods used to purge all monitoring wells on the Site:

- Bladder Pump

All 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP, were purged using a 1.88-inch diameter Teflon bladder/stainless steel body pump and utilizing polyethylene tubing. The pump was suspended in the monitoring well using new nylon rope.

- Peristaltic Pump

Monitoring well CL-09-WP was purged using a peristaltic pump utilizing new internal silicone tubing within the pump itself and Teflon intake tubing. This pump was utilized due to the shallow depth of this monitoring well and the high water elevation.

- Airlift Pump

Because of the large volumes of water needed to purge the 6-inch and 8-inch diameter monitoring wells (OW-3 and OW-6B), these monitoring wells were purged using a 3-inch diameter stainless steel airlift pump utilizing polyethylene tubing. The pump was suspended in the well using new nylon rope.

All polyethylene and Teflon tubing used during purging was re-dedicated to the respective monitoring wells.

Purging was conducted in accordance with the approved RD/RA Work Plan. Field parameters of pH, conductivity, temperature, and turbidity were measured after each well volume. Purging continued until stabilization of pH, conductivity, and temperature had been achieved. Additionally, purging was continued until a goal of less than 10 nephelometric units (NTUs) could be achieved. If less than 10 NTUs could not be achieved, the original goal of 50 NTUs was used. Calibration of field instruments was performed daily. New disposable latex gloves were used before and between all purging events. A summary of purge data is presented in Table 2.

3.3 Groundwater Sampling

Groundwater samples were collected from all wells purged for the analysis of beryllium, cadmium, chromium, lead, and manganese. Although all groundwater samples collected exhibited a turbidity of less than 50 NTUs, it is becoming extremely difficult to achieve these levels in monitoring wells OW-3 and OW-6B due to the degradation of the carbon steel casing. This degradation is producing rust particles and iron algae growth which cannot be removed or diminished through additional pumping or reduced flow. The installation of stainless steel well material in these monitoring wells should be considered.

Groundwater samples were collected using the following methods:

- Bladder pump

Groundwater samples were collected from all 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP using the same bladder pump in which the well was purged with.

- Peristaltic pump

A groundwater sample was collected from monitoring well CL-09-WP using the same peristaltic pump and Teflon intake tubing used for purging.

- Teflon bailer

Groundwater samples were collected from the larger diameter monitoring wells OW-3 and OW-6B using a disposable Teflon bailer and new nylon rope.

Sample personnel wore new disposable latex gloves before and between all sample events. Samples were immediately preserved with nitric acid and placed on ice in laboratory supplied coolers. One duplicate sample, one matrix spike/matrix spike duplicate sample and one equipment blank were collected for quality control purposes. All samples were sent under proper laboratory protocols and chain-of-custody procedures to Quanterra Environmental Services of North Canton, Ohio.

A sample key, sample field data, and methods used to collect the groundwater samples are presented in Table 3.

4.0 SURFACE WATER SAMPLING PROCEDURES

One surface water sample was collected from the Coke Pond for the analysis of aluminum, chromium, copper, lead, nickel and zinc. A grab sample was collected directly from the Coke Pond into the sample container and immediately preserved with nitric acid and placed on ice. All laboratory and chain of custody protocols followed during the groundwater sample collection were followed during the surface water sample collection.

5.0 DECONTAMINATION

All equipment, including the airlift pump, bladder pumps, and water level tape were cleaned prior to use. Cleaning consisted of brushing particulates free with an Alconox solution, rinsing thoroughly with deionized water, and allowing to air dry. All pumps were disassembled prior to decontamination and wrapped with aluminum foil prior to storage or transport.

6.0 WASTE MATERIAL HANDLING

All purge water was temporarily stored on-Site in polyethylene tanks until final disposal to the City of Cedartown POTW.

JS/kt/12

c.c. David Brytowski - CRA
Hadley Bedbury - Maxus Energy
Gordon Tate - Superior Consultants
David Johnson - City of Cedartown

TABLE 1

GROUNDWATER ELEVATION SUMMARY
QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE

Monitoring Well	*Reference Elevation*	*Water Level Elevations (1)*			
		January 1995	*April 1995*	*July 1995*	*October 1995*
OW-1	823.80	786.26	787.35	778.35	
OW-2	827.50	780.05	779.81	772.92	
OW-3	803.29	773.79	779.08	764.97	
OW-4	801.52	763.10	764.98	759.17	
OW-5	797.92	774.64	776.58	773.42	
OW-6B	805.12	785.35	791.00	779.94	
OW-7R	809.30	784.48	788.75	783.52	
CL-03-WP	836.41	786.54	791.47	781.31	
CL-04-WP	796.81	761.33	764.30	756.59	
CL-05-WP	853.34	780.22	783.40	777.99	
CL-06-WP	861.02	776.80	773.38	-- (2)	
CL-07-WP	824.90	801.09	801.42	792.75	
CL-09-WP	803.18	788.74	794.96	785.03	

Notes:

(1) Elevations are feet above mean sea level.
(2) Dry.

TABLE 2

WELL PURGING DATA SUMMARY
ROUND THREE QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICPAL LANDFILL SITE
JULY 1995

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
OW-1	778.35	2.5	1	3	6.9	572	67	95	Bladder pump
			2	6	6.8	575	67	36	
			3	10	6.7	580	67	9	
OW-2	772.92	1.0	1	1	6.9	850	71	17	Bladder pump
			2	2	7.1	815	70	7	
			3	3	6.9	815	70	8	
			4	4	6.9	815	70	7	
			5	5	6.9	810	70	7	
OW-3	764.97	171	1	175	6.8	523	64	36	Airlift pump
			2	350	7.0	594	64	160	
			3	525	7.9	430	64	330	
			4	700	8.1	275	64	68	
			5	875	8.4	257	64	25	
OW-4	759.17	3	1	3	7.2	2120	70	50	Bladder pump
			2	6	7.1	2400	69	25	
			3	10	7.1	2320	69	14	
OW-5	773.42	10	1	10	7.9	439	74	4	Bladder pump
			2	20	7.8	424	71	2	
			3	33	7.8	427	71	2	

TABLE 2

WELL PURGING DATA SUMMARY
ROUND THREE QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICPAL LANDFILL SITE
JULY 1995

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
OW-6B	779.94	70	1	100	7.3	383	62	100	Airlift pump
			2	200	7.4	348	62	55	
			3	300	7.3	340	63	25	
			4	400	7.3	330	63	25	
			5	500	7.4	340	62	25 (5)	
OW-7R	783.52	9	1	10	6.0	49	72	20	Bladder pump
			2	20	5.6	45	71	7	
			3	30	5.7	43	71	8	
CL-03-WP	781.31	8	1	8	6.7	393	74	11	Bladder pump
			2	16	7.1	375	70	4	
			3	25	7.2	410	71	3	
CL-04-WP (6)	756.59	0.1	--	--	--	--	--	--	Bladder pump
CL-05-WP	777.99	7.0	1	7	7.3	693	69	49	Bladder pump
			2	14	7.3	686	68	35	
			3	21	7.4	691	68	18	
CL-06-WP (6)	Dry	0.0	--	--	--	--	--	--	Bladder pump
CL-07-WP (6)	792.75	0.1	--	--	--	--	--	--	Bladder pump

TABLE 2

WELL PURGING DATA SUMMARY
ROUND THREE QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICPAL LANDFILL SITE
JULY 1995

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
CL-09-WP	785.03	2.3	1	2	7.6	435	70	28	Peristaltic pump
			2	4	7.2	401	68	11	
			3	6	7.2	400	69	6	
			4	10	7.2	403	68	6	

Notes:

(1) Elevations are feet above mean sea level.
(2) micromhos
(3) Degrees Fahrenheit
(4) Nephelometric units
(5) Sample observed to contain rust particles.
(6) Well was dry.

3.0 GROUNDWATER SAMPLING PROCEDURES

3.1 Water Level Measurements

Prior to purging and sampling each monitoring well, the water level was measured using an electric sounding device. All measurements were taken from the northern side of the well casing. Water level measurements were recorded to the nearest 0.01 foot. The water level indicator was decontaminated prior to each use as described in Section 5.0 of this memorandum. Water level measurements and elevations are presented in Table 1.

3.2 Purging

All monitoring wells were purged prior to sampling using a low-flow purging technique. The following presents the types of methods used to purge all monitoring wells on the Site:

- Bladder Pump

All 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP, were purged using a 1.88-inch diameter Teflon bladder/stainless steel body pump and utilizing polyethylene tubing. The pump was suspended in the monitoring well using new nylon rope.

- Peristaltic Pump

Monitoring well CL-09-WP was purged using a peristaltic pump utilizing new internal silicone tubing within the pump itself and Teflon intake tubing. This pump was utilized due to the shallow depth of this monitoring well and the high water elevation.

- Airlift Pump

Because of the need to purge a large volume of water from 8-inch diameter monitoring well OW-6B, this monitoring well was purged using a 3-inch diameter stainless steel airlift pump utilizing polyethylene tubing. The pump was suspended in the well using new nylon rope.

All polyethylene and Teflon tubing used during purging was re-dedicated to the respective monitoring wells.

Purging was conducted in accordance with the approved RD/RA Work Plan. Field parameters of pH, conductivity, temperature, and turbidity were measured after each well volume. Purging continued until stabilization of pH, conductivity, and temperature had been achieved. Additionally, purging was continued until a goal of less than 10 nephelometric units (NTUs) could be achieved. If less than 10 NTUs could not be achieved, the original goal of 50 NTUs was used. Calibration of field instruments was performed daily. New disposable latex gloves were used before and between all purging events. A summary of purge data is presented in Table 2.

3.3 Groundwater Sampling

Groundwater samples were collected from all wells purged for the analysis of beryllium, cadmium, chromium, lead, and manganese. All groundwater samples, with the exception of the groundwater sample collected from monitoring well OW-6B, exhibited a turbidity of 10 NTUs or less. The degradation of the carbon steel casing at monitoring well OW-6B is producing rust particles and iron algae growth which cannot be removed or diminished through additional purging or reduced flow.

Groundwater samples were collected using the following methods:

- Bladder pump

Groundwater samples were collected from all 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP using the same bladder pump in which the well was purged with.

- Peristaltic pump

A groundwater sample was collected from monitoring well CL-09-WP using the same peristaltic pump and Teflon intake tubing used for purging.

- Teflon bailer

A groundwater sample was collected from the larger diameter monitoring well OW-6B using a disposable Teflon bailer and new nylon rope.

Sample personnel wore new disposable latex gloves before and between all sample events. Samples were immediately preserved with nitric acid and placed on ice in laboratory supplied coolers. One duplicate sample, one matrix spike/matrix spike duplicate sample and one equipment blank were collected for quality control purposes. All samples were sent under proper laboratory protocols and chain-of-custody procedures to Quanterra Environmental Services of North Canton, Ohio.

A sample key, sample field data, and methods used to collect the groundwater samples are presented in Table 3.

4.0 SURFACE WATER SAMPLING PROCEDURES

One surface water sample was collected from the Coke Pond for the analysis of aluminum, chromium, copper, lead, nickel and zinc. A grab sample was collected directly from the Coke Pond into the sample container and immediately preserved with nitric acid and placed on ice. All laboratory and chain of custody protocols followed during the groundwater sample collection were followed during the surface water sample collection.

5.0 DECONTAMINATION

All equipment, including the airlift pump, bladder pumps, and water level tape were cleaned prior to use. Cleaning consisted of brushing particulates free with an Alconox solution, rinsing thoroughly with deionized water, and allowing to air dry. All pumps were disassembled prior to decontamination and wrapped with aluminum foil prior to storage or transport.

6.0 WASTE MATERIAL HANDLING

All purge water was temporarily stored on-Site in polyethylene tanks until final disposal to the City of Cedartown POTW.

c.c. Hadley Bedbury - Maxus Energy
Gordon Tate - Superior Consultants
David Johnson - City of Cedartown

TABLE 1

GROUNDWATER ELEVATION SUMMARY
QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE

Monitoring Well	*Reference Elevation*	*Water Level Elevations (1)*			
		January 1995	*April 1995*	*July 1995*	*October 1995*
OW-1	823.80	786.26	787.35	778.35	784.60
OW-2	827.50	780.05	779.81	772.92	779.48
OW-3	803.29	773.79	779.08	764.97	773.81
OW-4	801.52	763.10	764.98	759.17	765.45
OW-5	797.92	774.64	776.58	773.42	774.56
OW-6B	805.12	785.35	791.00	779.94	786.62
OW-7R	809.30	784.48	788.75	783.52	784.70
CL-03-WP	836.41	786.54	791.47	781.31	785.41
CL-04-WP	796.81	761.33	764.30	756.59	763.50
CL-05-WP	853.34	780.22	783.40	777.99	778.23
CL-06-WP	861.02	776.80	773.38	-- (2)	776.18
CL-07-WP	824.90	801.09	801.42	792.75	792.75
CL-09-WP	803.18	788.74	794.96	785.03	790.28

Notes:

(1) Elevations are feet above mean sea level.
(2) Dry.

TABLE 2

WELL PURGING DATA SUMMARY
ROUND FOUR QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICPAL LANDFILL SITE
OCTOBER 1995

Well Number	*Water Level (ft. AMSL)(1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µs/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
OW-1	786.15	5	5	20	--	--	--	2	Bladder pump
OW-2	781.15	2	5	10	--	--	--	2	Bladder pump
OW-3	776.87	23	5	100	--	--	--	4	Bladder pump
OW-4	766.45	4	5	20	--	--	--	8	Bladder pump
OW-5	774.99	10	5	50	--	--	--	4	Bladder pump
OW-6B	789.14	90	1	5	450	--	--	70(5)	Airlift pump
OW-7R	787.35	10	1	10	6.0	44	66	40	Bladder pump
			2	20	6.4	42	68	10	
			3	30	6.4	43	68	6	
CL-03-WP	789.95	8	1	10	7.2	160	68	18	Bladder pump
			2	20	6.9	154	64	12	
			3	30	7.1	156	62	10	
CL-04-WP	767.81	1	1	1.5	6.8	399	72	6	Bladder pump
			2	3.0	7.2	210	68	9	
			3	4.5	7.0	242	69	11	
			4	6.0	7.2	257	70	2	

TABLE 2

WELL PURGING DATA SUMMARY
ROUND FOUR QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICPAL LANDFILL SITE
OCTOBER 1995

Well Number	*Water Level (ft. AMSL)(1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µs/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
CL-05-WP	782.22	7.0	1	7	7.9	2.85	59	18	Bladder pump
			2	14	7.8	292	58	33	
			3	21	7.5	292	59	10	
CL-06-WP (6)	777.78	0.6	--	--	--	--	--	--	Bladder pump
CL-07-WP (6)	792.81	0.1	--	--	--	--	--	--	Bladder pump
CL-09-WP	793.95	4	1	3	7.4	219	63	35	Peristaltic pump
			2	6	7.4	212	65	10	
			3	10	7.3	210	68	4	

Notes:

(1) Elevations are feet above mean sea level.
(2) micromhos
(3) Degrees Fahrenheit
(4) Nephelometric units
(5) Sample observed to contain rust particles.
(6) Well was dry.

TABLE 3

SAMPLE KEY/FIELD DATA
ROUND FOUR QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
OCTOBER 1995

Sample Number	*Source*	*Turbidity (NTUs)*	*Parameters*	*Method*	*Comments*
GW-3482-JOS-102395-01	CL-04-WP	2	(1)	(2)	
GW-3482-JOS-102395-02	OW-2	2	(1)	(2)	
GW-3482-JOS-102495-03 MS/MSD	OW-7R	6	(1)	(2)	Matrix spike/matrix spike duplicate
GW-3482-JOS-102495-04	OW-1	2	(1)	(2)	
GW-3482-JNP-102595-05	OW-4	6	(1)	(2)	GW-3482-JOS-102595-06 (Duplicate)
GW-3482-JNP-102595-07	OW-5	6	(1)	(2)	
GW-3482-JOS-102595-08	Bladder Pump	--	(1)		Rinsate blank prior to use in CL-03-WP
GW-3482-JOS-102595-09	CL-03-WP	10	(1)	(2)	
GW-3482-JOS-102695-10	CL-05-WP	10	(1)	(2)	
GW-3482-JOS-102695-11	CL-09-WP	4	(1)	(4)	
SW-3482-JOS-102695-12	OW-3	3	(1)	(2)	
SW-3482-JOS-102695-13	OW-6B	65	(1)	(3)	
SW-3482-JOS-102595-01	Coke Pond	--	(5)		Surface water grab sample

Notes:

(1) Beryllium, cadmium, chromium, lead, manganese
(2) Bladder pump
(3) Disposable teflon bailer
(4) Peristaltic pump
(5) Aluminum, chromium, copper, lead, nickel, and zinc

CRA
1351 Oakbrook Drive
Suite #150
Norcross, Georgia 30093
(770) 441-0027

MEMO

TO: Mike Mateyk

REFERENCE NO: 3482

FROM: John Schwaller

DATE: January 9, 1996

RE: Round Five Groundwater and Surface Water Sampling
Cedartown Municipal Landfill Site - Cedartown, Georgia

1.0 INTRODUCTION

The following technical memorandum summarizes the field activities associated with the fifth round of groundwater and surface water sampling at the Cedartown Municipal Landfill Site (CML Site). All activities were conducted in accordance with the approved Remedial Design/Remedial Action (RD/RA) Work Plan. The scope of work of this sampling activity included:

i) well inspections;
ii) water level measurements;
iii) purging 13 of 13 monitoring wells;
iv) sampling 10 of 10 perimeter monitoring wells for beryllium, cadmium, chromium, lead, and manganese analysis;
v) sampling 1 of 3 interior monitoring wells for beryllium, cadmium, chromium, lead, and manganese analysis; and
vi) sampling of the Coke Pond for aluminum, chromium, copper, lead, nickel, and zinc analysis.

This round of sample collection occurred during the periods January 2 through January 5, 1996.

The following sections in this memorandum describe the field activities.

2.0 WELL INSPECTION

All monitoring wells scheduled to be sampled were initially located and found to be in good condition.

3.0 GROUNDWATER SAMPLING PROCEDURES

3.1 Water Level Measurements

Prior to purging and sampling each monitoring well, the water level was measured using an electric sounding device. All measurements were taken from the northern side of the well casing. Water level measurements were recorded to the nearest 0.01 foot. The water level indicator was decontaminated prior to each use as described in Section 5.0 of this memorandum. Water level measurements and elevations are presented in Table 1.

3.2 Purging

All monitoring wells were purged prior to sampling using a low-flow purging technique. The following presents the types of methods used to purge all monitoring wells on the Site:

- Bladder Pump

All 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP, were purged using a 1.88-inch diameter Teflon bladder/stainless steel body pump and utilizing polyethylene tubing. The pump was suspended in the monitoring well using new nylon rope.

- Peristaltic Pump

Monitoring well CL-09-WP was purged using a peristaltic pump utilizing new internal silicone tubing within the pump itself and Teflon intake tubing. This pump was utilized due to the shallow depth of this monitoring well and the high water elevation.

- Airlift Pump

Because of the need to purge a large volume of water from 8-inch diameter monitoring well OW-6B, this monitoring well was purged using a 3-inch diameter stainless steel airlift pump utilizing polyethylene tubing. The pump was suspended in the well using new nylon rope.

All polyethylene and Teflon tubing used during purging was re-dedicated to the respective monitoring wells.

Purging was conducted in accordance with the approved RD/RA Work Plan. Field parameters of pH, conductivity, and temperature could not be recorded due to faulty equipment and delayed replacement. Purging consisted of the removal of five well volumes of groundwater. Additionally, purging was continued until a goal of less than 10 nephelometric units (NTUs) could be achieved. If less than 10 NTUs could not be achieved, the original goal of 50 NTUs was used. Calibration of field instruments was performed daily. New disposable latex gloves were used before and between all purging events. A summary of purge data is presented in Table 2.

3.3 Groundwater Sampling

Groundwater samples were collected from all wells purged for the analysis of beryllium, cadmium, chromium, lead, and manganese. All groundwater samples, with the exception of groundwater samples collected from monitoring well OW-6B and CL-03-WP, exhibited a turbidity of 10 NTUs or less.

Groundwater samples were collected using the following methods:

- Bladder pump

Groundwater samples were collected from all 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP using the same bladder pump in which the well was purged with.

- Peristaltic pump

A groundwater sample was collected from monitoring well CL-09-WP using the same peristaltic pump and Teflon intake tubing used for purging.

- Teflon bailer

A groundwater sample was collected from the larger diameter monitoring well OW-6B using a disposable Teflon bailer and new nylon rope.

Sample personnel wore new disposable latex gloves before and between all sample events. Samples were immediately preserved with nitric acid and placed on ice in laboratory supplied coolers. One duplicate sample, one matrix spike/matrix spike duplicate sample and one equipment blank were collected for quality control purposes. All samples were sent under proper laboratory protocols and chain-of-custody procedures to Quanterra Environmental Services of North Canton, Ohio.

A sample key, sample field data, and methods used to collect the groundwater samples are presented in Table 3.

4.0 SURFACE WATER SAMPLING PROCEDURES

One surface water sample was collected from the Coke Pond for the analysis of aluminum, chromium, copper, lead, nickel and zinc. A grab sample was collected directly from the Coke Pond into the sample container and immediately preserved with nitric acid and placed on ice. All laboratory and chain of custody protocols followed during the groundwater sample collection were followed during the surface water sample collection.

5.0 DECONTAMINATION

All equipment, including the airlift pump, bladder pumps, and water level tape were cleaned prior to use. Cleaning consisted of brushing particulates free with an Alconox solution, rinsing thoroughly with deionized water, and allowing to air dry. All pumps were disassembled prior to decontamination and wrapped with aluminum foil prior to storage or transport.

6.0 WASTE MATERIAL HANDLING

All purge water was temporarily stored on-Site in polyethylene tanks until final disposal to the City of Cedartown POTW.

JS/br/15

c.c. Hadley Bedbury - Maxus Energy

Gordon Tate - Superior Consultants
David Johnson - City of Cedartown

TABLE 1

GROUNDWATER ELEVATION SUMMARY
QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE

Monitoring Well	*Reference Elevation*	*Water Level Elevations (1)*				
		January 1995	*April 1995*	*July 1995*	*October 1995*	*January 1996*
OW-1	823.80	786.26	787.35	778.35	784.60	786.15
OW-2	827.50	780.05	779.81	772.92	779.48	781.15
OW-3	803.29	773.79	779.08	764.97	773.81	776.87
OW-4	801.52	763.10	764.98	759.17	765.45	766.45
OW-5	797.92	774.64	776.58	773.42	774.56	774.99
OW-6B	805.12	785.35	791.00	779.94	786.62	789.14
OW-7R	809.30	784.48	788.75	783.52	784.70	787.35
CL-03-WP	836.41	786.54	791.47	781.31	785.41	789.95
CL-04-WP	796.81	761.33	764.30	756.59	763.50	767.81
CL-05-WP	853.34	780.22	783.40	777.99	778.23	782.22
CL-06-WP	861.02	776.80	773.38	-- (2)	776.18	777.78
CL-07-WP	824.90	801.09	801.42	792.75	792.75	792.81
CL-09-WP	803.18	788.74	794.96	785.03	790.28	793.95

Notes:

(1) Elevations are feet above mean sea level.
(2) Dry.

TABLE 2

WELL PURGING DATA SUMMARY
ROUND FIVE QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICPAL LANDFILL SITE
JANUARY 1996

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Tota Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
OW-1	786.15	4	5	20	--	--	--	2	Bladder pump
OW-2	781.15	2	5	10	--	--	--	2	Bladder pump
OW-3	776.87	23	5	100	--	--	--	4	Bladder pump
OW-4	766.45	4	5	20	--	--	--	8	Bladder pump
OW-5	774.99	10	5	50	--	--	--	4	Bladder pump
OW-6B	789.14	90	5	450	--	--	--	70(5)	Airlift pump
OW-7R	787.35	10	5	50	--	--	--	7	Bladder pump
CL-03-WP	789.95	9	5	45	--	--	--	15	Bladder pump
CL-04-WP	767.81	2	5	10	--	--	--	7	Bladder pump
CL-05-WP	782.22	7	5	35	--	--	--	4	Bladder pump
CL-06-WP (6)	777.78	0.8	--	--	--	--	--	--	Bladder pump
CL-07-WP (6)	792.81	0.1	--	--	--	--	--	--	Bladder pump
CL-09-WP	793.95	4	5	20	--	--	--	3	Peristaltic pump

TABLE 2

WELL PURGING DATA SUMMARY
ROUND FIVE QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICPAL LANDFILL SITE
JANUARY 1996

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*

Notes:

-- - Instrument inoperable.
(1) Elevations are feet above mean sea level.
(2) micromhos
(3) Degrees Fahrenheit
(4) Nephelometric units
(5) Sample observed to contain rust particles.
(6) Well was dry.

TABLE 3

SAMPLE KEY/FIELD DATA
ROUND FIVE QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
JANUARY 1996

Sample Number	*Source*	*Turbidity (NTUs)*	*Parameters*	*Method*	*Comments*
GW-3482-JOS-010296-01	CL-04-WP	7	(1)	(2)	
GW-3482-JOS-010296-02	OW-4	8	(1)	(2)	GW-3482-JOS-010296-03 (duplicate)
GW-3482-JOS-010296-04 MS/MSD	CL-09-WP	3	(1)	(4)	Matrix spike/matrix spike duplicate
GW-3482-JOS-010396-05	OW-7R	7	(1)	(2)	
GW-3482-JNP-010396-06	OW-6B	70	(1)	(3)	
GW-3482-JNP-010396-07	CL-03-WP	15	(1)	(2)	
GW-3482-JOS-010396-08	Bladder Pump	--	(1)		Rinsate blank prior to use in OW-1
GW-3482-JOS-010396-09	OW-2	2	(1)	(2)	
GW-3482-JOS-010396-10	OW-1	4	(1)	(2)	
GW-3482-JOS-010496-11	OW-3	4	(1)	(2)	
GW-3482-JOS-010496-12	OW-5	4	(1)	(2)	
GW-3482-JOS-010496-13	CL-05-WP	4	(1)	(2)	
SW-3482-JOS-010396-01	Coke Pond	--	(5)		Surface water grab sample

Notes:

(1) Beryllium, cadmium, chromium, lead, manganese
(2) Bladder pump
(3) Disposable teflon bailer
(4) Peristaltic pump
(5) Aluminum, chromium, copper, lead, nickel, and zinc

CRA
1351 Oakbrook Drive
Suite #150
Norcross, Georgia 30093
(770) 441-0027

MEMO

TO: Mike Mateyk REFERENCE NO: 3482

FROM: John Schwaller DATE: April 29, 1996

RE: Round Six Groundwater and Surface Water Sampling
Cedartown Municipal Landfill Site - Cedartown, Georgia

1.0 INTRODUCTION

The following technical memorandum summarizes the field activities associated with the sixth round of groundwater and surface water sampling at the Cedartown Municipal Landfill Site (CML Site). All activities were conducted in accordance with the approved Remedial Design/Remedial Action (RD/RA) Work Plan. The scope of work of this sampling activity included:

i) well inspections;
ii) water level measurements;
iii) purging 13 of 13 monitoring wells;
iv) sampling 10 of 10 perimeter monitoring wells for beryllium, cadmium, chromium, lead, and manganese analysis;
v) sampling 3 of 3 interior monitoring wells for beryllium, cadmium, chromium, lead, and manganese analysis; and
vi) sampling of the Coke Pond for aluminum, chromium, copper, lead, nickel, and zinc analysis.

This round of sample collection occurred during the periods April 22 through April 25, 1996.

The following sections in this memorandum describe the field activities.

2.0 WELL INSPECTION

All monitoring wells scheduled to be sampled were initially located and found to be in good condition.

3.0 GROUNDWATER SAMPLING PROCEDURES

3.1 Water Level Measurements

Prior to purging and sampling each monitoring well, the water level was measured using an electric sounding device. All measurements were taken from the northern side of the well casing. Water level measurements were recorded to the nearest 0.01 foot. The water level indicator was decontaminated prior to each use as described in Section 5.0 of this memorandum. Water level measurements and elevations are presented in Table 1.

3.2 Purging

All monitoring wells were purged prior to sampling using a low-flow purging technique. The following presents the types of methods used to purge all monitoring wells on the Site:

- Bladder Pump

All 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP, were purged using a 1.88-inch diameter Teflon bladder/stainless steel body pump and utilizing polyethylene tubing. The pump was suspended in the monitoring well using new nylon rope.

- Peristaltic Pump

Monitoring well CL-09-WP was purged using a peristaltic pump utilizing new internal silicone tubing within the pump itself and Teflon intake tubing. This pump was utilized due to the shallow depth of this monitoring well and the high water elevation.

- Airlift Pump

Because of the need to purge a large volume of water from 8-inch diameter monitoring well OW-6B, this monitoring well was purged using a 3-inch diameter stainless steel airlift pump utilizing polyethylene tubing. The pump was suspended in the well using new nylon rope.

All polyethylene and Teflon tubing used during purging was re-dedicated to the respective monitoring wells.

Purging was conducted in accordance with the approved RD/RA Work Plan. Field parameters of pH, conductivity, and temperature were recorded after each volume was removed. Purging continued until stabilization of these field parameters occurred. Additionally, purging was continued until a goal of less than 10 nephelometric units (NTUs) could be achieved. If less than 10 NTUs could not be achieved, the original goal of 50 NTUs was used. Calibration of field instruments was performed daily. New disposable latex gloves were used before and between all purging events. A summary of purge data is presented in Table 2.

3.3 Groundwater Sampling

Groundwater samples were collected from all wells purged for the analysis of beryllium, cadmium, chromium, lead, and manganese. All groundwater samples, with the exception of groundwater samples collected from monitoring well OW-6B and CL-03-WP, exhibited a turbidity of 10 NTUs or less.

Groundwater samples were collected using the following methods:

- Bladder pump

Groundwater samples were collected from all 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP using the same bladder pump in which the well was purged with.

- Peristaltic pump

A groundwater sample was collected from monitoring well CL-09-WP using the same peristaltic pump and Teflon intake tubing used for purging.

- Teflon bailer

A groundwater sample was collected from the larger diameter monitoring well OW-6B using a disposable Teflon bailer and new nylon rope.

Sample personnel wore new disposable latex gloves before and between all sample events. Samples were immediately preserved with nitric acid and placed on ice in laboratory supplied coolers. One duplicate sample, one matrix spike/matrix spike duplicate sample and one equipment blank were collected for quality control purposes. All samples were sent under proper laboratory protocols and chain-of-custody procedures to Quanterra Environmental Services of North Canton, Ohio.

A sample key, sample field data, and methods used to collect the groundwater samples are presented in Table 3.

4.0 SURFACE WATER SAMPLING PROCEDURES

One surface water sample was collected from the Coke Pond for the analysis of aluminum, chromium, copper, lead, nickel and zinc. A grab sample was collected directly from the Coke Pond into the sample container and immediately preserved with nitric acid and placed on ice. All laboratory and chain of custody protocols followed during the groundwater sample collection were followed during the surface water sample collection.

5.0 DECONTAMINATION

All equipment, including the airlift pump, bladder pumps, and water level tape were cleaned prior to use. Cleaning consisted of brushing particulates free with an Alconox solution, rinsing thoroughly with deionized water, and allowing to air dry. All pumps were disassembled prior to decontamination and wrapped with aluminum foil prior to storage or transport.

6.0 WASTE MATERIAL HANDLING

All purge water was temporarily stored on-Site in polyethylene tanks until final disposal to the City of Cedartown POTW.

JS/kt/16

c.c. David Johnson - City of Cedartown

Hadley Bedbury - Maxus Energy
Gordon Tate - Superior Consultants

TABLE 1

GROUNDWATER ELEVATION SUMMARY
QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE

Monitoring Well	*Reference Elevation*	*Water Level Elevations (1)*					
		January 1995	*April 1995*	*July 1995*	*October 1995*	*January 1996*	*April 1996*
OW-1	823.80	786.26	787.35	778.35	784.60	786.15	787.60
OW-2	827.50	780.05	779.81	772.92	779.48	781.15	782.47
OW-3	803.29	773.79	779.08	764.97	773.81	776.87	778.90
OW-4	801.52	763.10	764.98	759.17	765.45	766.45	768.47
OW-5	797.92	774.64	776.58	773.42	774.56	774.99	776.34
OW-6B	805.12	785.35	791.00	779.94	786.62	789.14	792.84
OW-7R	809.30	784.48	788.75	783.52	784.70	787.35	790.98
CL-03-WP	836.41	786.54	791.47	781.31	785.41	789.95	790.89
CL-04-WP	796.81	761.33	764.30	756.59	763.50	767.81	766.61
CL-05-WP	853.34	780.22	783.40	777.99	778.23	782.22	786.69
CL-06-WP	861.02	776.80	773.38	-- (2)	776.18	777.78	775.16
CL-07-WP	824.90	801.09	801.42	792.75	792.75	792.81	800.44
CL-09-WP	803.18	788.74	794.96	785.03	790.28	793.95	796.62

Notes:

(1) Elevations are feet above mean sea level.
(2) Dry.

TABLE 2

WELL PURGING DATA SUMMARY
ROUND SIX QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
APRIL 1996

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
OW-1	787.60	4.1	1	4	6.4	236	64	282	Bladder pump
			2	8	7.0	240	64	45	
			3	12	6.6	239	63	29	
			4	16	7.2	247	64	7	
OW-2	782.47	2.4	1	2.5	7.0	266	64	3	Bladder pump
			2	5.0	7.1	269	64	4	
			3	7.5	7.0	266	63	1	
OW-3	778.90	23.4	1	25	8.1	125	65	5	Bladder pump
			2	50	7.0	181	61	5	
			3	75	7.1	180	62	5	
			4	100	7.1	184	62	5	
OW-4	768.47	4.6	1	5	6.4	993	64	6	Bladder pump
			2	10	6.9	1004	65	5	
			3	15	6.7	1020	65	3	
OW-5	776.34	10.1	1	10	7.8	181	70	12	Bladder pump
			2	20	8.3	180	69	7	
			3	30	8.2	184	68	5	
OW-6B	792.84	103.3	1	100	6.3	102	61	88	Airlift pump
			2	200	6.4	110	62	75	
			3	300	6.5	95	63	68 (5)	

TABLE 2

WELL PURGING DATA SUMMARY
ROUND SIX QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
APRIL 1996

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
OW-7R	790.98	10.5	1	10	7.3	28	63	12	Bladder pump
			2	20	6.8	15	65	11	
			3	30	6.6	21	65	9	
CL-03-WP	790.89	9.0	1	9	7.8	150	64	28	Bladder pump
			2	18	8.0	144	61	25	
			3	27	7.8	150	62	12	
			4	36	7.8	150	61	8	
CL-04-WP	766.61	1.7	1	2	7.9	112	72	80	Bladder pump
			2	4	8.0	113	72	83	
			3	6	8.1	118	74	87	
			4	8	7.9	108	73	75	
			5	10	7.8	104	73	4	
CL-05-WP	786.69	8.1	1	8	7.5	239	64	32	Bladder pump
			2	16	7.4	250	67	23	
			3	25	7.8	235	68	22	
CL-06-WP	775.16	0.4	1	0.5	7.8	225	65	9	Bladder pump
			2	1.0	7.9	215	65	8	
			3	1.5	7.9	220	65	7	
CL-07-WP	800.44 (6)	1.3	1	1.5	7.1	481	65	52	Bladder pump

TABLE 2

WELL PURGING DATA SUMMARY
ROUND SIX QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
APRIL 1996

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volu ne Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
CL-09-WP	796.62	4.2	1	4	7.1	210	73	5	Peristaltic pump
			2	8	7.2	204	73	3	
			3	12	7.2	175	74	2	

Notes:

(1) Elevations are feet above mean sea level.
(2) micromhos
(3) Degrees Fahrenheit
(4) Nephelometric units
(5) Sample observed to contain rust particles.
(6) Well was purged dry and recharged sufficiently to sample.

TABLE 3

SAMPLE KEY/FIELD KEY
ROUND SIX QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
APRIL 1996

Sample Number	*Source*	*Turbidity*	*Parameters*	*Method*	*Comments*
GW-3482-JOS-042296-01	Bladder pump	--	(1)	--	Rinsate blank prior to use in CL-04-WP
GW-3482-JOS-042296-02	CL-04-WP	4	(1)	(2)	GW-3482-JOS-042296-03 (duplicate)
GW-3482-JOS-042296-04	OW-5	5	(1)	(2)	
GW-3482-JOS-042396-05	OW-1	7	(1)	(2)	
GW-3482-JOS-042396-06 MS/MSD	OW-2	1	(1)	(2)	Matrix spike/Matrix spike duplicate
GW-3482-JOS-042396-07	CL-06-WP	7	(1)	(2)	
GW-3482-JOS-042396-08	CL-05-WP	22	(1)	(2)	
GW-3482-JOS-042396-09	CL-03-WP	8	(1)	(2)	
GW-3482-JOS-042396-10	OW-3	5	(1)	(2)	
GW-3482-JOS-042496-11	OW-7R	9	(1)	(2)	
GW-3482-JOS-042496-12	OW-6B	68	(1)	(3)	
GW-3482-JOS-042496-13	OW-4	3	(1)	(2)	
GW-3482-JOS-042496-14	CL-09-WP	2	(1)	(4)	
GW-3482-JOS-042496-15	CL-07-WP	52	(1)	(2)	
SW-3482-JOS-042496-01	Coke Pond	--	(5)	--	Surface water grab sample

Notes:

(1) Beryllium, cadmium, chromium, lead, manganese
(2) Bladder pump
(3) Disposable Teflon bailer
(4) Peristaltic pump
(5) Aluminum, chromium, copper, lead, nickel, zinc

CRA
1351 Oakbrook Drive
Suite #150
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(770) 441-0027

MEMO

TO: Mike Mateyk

REFERENCE NO: 3482

FROM: John Schwaller/kt/2

DATE: July 27, 1996

RE: Round Seven Groundwater and Surface Water Sampling
Cedartown Municipal Landfill Site - Cedartown, Georgia

1.0 INTRODUCTION

The following technical memorandum summarizes the field activities associated with the seventh round of groundwater and surface water sampling at the Cedartown Municipal Landfill Site (CML Site). All activities were conducted in accordance with the approved Remedial Design/Remedial Action (RD/RA) Work Plan. The scope of work of this sampling activity included:

i) well inspections;
ii) water level measurements;
iii) purging 10 of 13 monitoring wells;
iv) sampling 10 of 10 perimeter monitoring wells for beryllium, cadmium, chromium, lead, and manganese analysis; and
v) sampling of the Coke Pond for aluminum, chromium, copper, lead, nickel, and zinc analysis.

Interior monitoring wells CL-05-WP, CL-06-WP, and CL-07-WP were not sampled during this round as they are scheduled to be sampled only twice during this year in accordance with the approved RD/RA work plan.

This round of sample collection occurred during the periods July 8 through July 11, 1996.

Groundwater samples collected from monitoring wells OW-1 and CL-03-WP were broken during transport; therefore, groundwater samples were recollected from these monitoring wells on July 26, 1996.

The following sections in this memorandum describe the field activities.

2.0 WELL INSPECTION

All monitoring wells scheduled to be sampled were initially located and found to be in good condition.

3.0 GROUNDWATER SAMPLING PROCEDURES

3.1 Water Level Measurements

Prior to purging and sampling each monitoring well, the water level was measured using an electric sounding device. All measurements were taken from the northern side of the well casing. Water level measurements were recorded to the nearest 0.01 foot. The water level indicator was decontaminated prior to each use as described in Section 5.0 of this memorandum. Water level measurements and elevations are presented in Table 1.

3.2 Purging

All monitoring wells were purged prior to sampling using a low-flow purging technique. The following presents the types of methods used to purge all monitoring wells on the Site:

- Bladder Pump

All 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP, were purged using a 1.88-inch diameter Teflon bladder/stainless steel body pump and utilizing polyethylene tubing. The pump was suspended in the monitoring well using new nylon rope.

- Peristaltic Pump

Monitoring well CL-09-WP was purged using a peristaltic pump utilizing new internal silicone tubing within the pump itself and Teflon intake tubing. This pump was utilized due to the shallow depth of this monitoring well and the high water elevation.

- Airlift Pump

Because of the need to purge a large volume of water from 8-inch diameter monitoring well OW-6B, this monitoring well was purged using

a 3-inch diameter stainless steel airlift pump utilizing polyethylene tubing. The pump was suspended in the well using new nylon rope.

All polyethylene and Teflon tubing used during purging was re-dedicated to the respective monitoring wells.

Purging was conducted in accordance with the approved RD/RA Work Plan. Field parameters of pH, conductivity, and temperature were recorded after each volume was removed. Purging continued until stabilization of these field parameters occurred. Additionally, purging was continued until a goal of less than 10 nephelometric units (NTUs) could be achieved. If less than 10 NTUs could not be achieved, the original goal of 50 NTUs was used. Calibration of field instruments was performed daily. New disposable latex gloves were used before and between all purging events. A summary of purge data is presented in Table 2.

3.3 Groundwater Sampling

Groundwater samples were collected from all wells purged for the analysis of beryllium, cadmium, chromium, lead, and manganese. All groundwater samples, with the exception of the groundwater sample collected from monitoring well OW-6B exhibited a turbidity of 10 NTUs or less.

Groundwater samples were collected using the following methods:

- Bladder pump

Groundwater samples were collected from all 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP using the same bladder pump in which the well was purged with.

- Peristaltic pump

A groundwater sample was collected from monitoring well CL-09-WP using the same peristaltic pump and Teflon intake tubing used for purging.

- Teflon bailer

A groundwater sample was collected from the larger diameter monitoring well OW-6B using a disposable Teflon bailer and new nylon rope.

Sample personnel wore new disposable latex gloves before and between all sample events. Samples were immediately preserved with nitric acid and placed on ice in laboratory supplied coolers. One duplicate sample, one matrix spike/matrix spike duplicate sample and one equipment blank were collected for quality control purposes. All samples were sent under proper laboratory protocols and chain-of-custody procedures to Quanterra Environmental Services of North Canton, Ohio.

A sample key, sample field data, and methods used to collect the groundwater samples are presented in Table 3.

4.0 SURFACE WATER SAMPLING PROCEDURES

One surface water sample was collected from the Coke Pond for the analysis of aluminum, chromium, copper, lead, nickel and zinc. A grab sample was collected directly from the Coke Pond into the sample container and immediately preserved with nitric acid and placed on ice. All laboratory and chain of custody protocols followed during the groundwater sample collection were followed during the surface water sample collection.

5.0 DECONTAMINATION

All equipment, including the airlift pump, bladder pumps, and water level tape were cleaned prior to use. Cleaning consisted of brushing particulates free with an Alconox solution, rinsing thoroughly with deionized water, and allowing to air dry. All pumps were disassembled prior to decontamination and wrapped with aluminum foil prior to storage or transport.

6.0 WASTE MATERIAL HANDLING

All purge water was temporarily stored on-Site in polyethylene tanks until final disposal to the City of Cedartown POTW.

c.c. David Johnson - City of Cedartown
Bill Hutton - Maxus Energy
Gordon Tate - Superior Consultants

TABLE 1

GROUNDWATER ELEVATION SUMMARY
QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE

Monitoring Well	*Reference Elevation*	*Water Level Elevations (1)*						
		January 1995	*April 1995*	*July 1995*	*October 1995*	*January 1996*	*April 1996*	*July 1996*
OW-1	823.80	786.26	787.35	778.35	784.60	786.15	787.60	781.59
OW-2	827.50	780.05	779.81	772.92	779.48	781.15	782.47	776.69
OW-3	803.29	773.79	779.08	764.97	773.81	776.87	778.90	768.90
OW-4	801.52	763.10	764.98	759.17	765.45	766.45	768.47	762.06
OW-5	797.92	774.64	776.58	773.42	774.56	774.99	776.34	774.43
OW-6B	805.12	785.35	791.00	779.94	786.62	789.14	792.84	783.82
OW-7R	809.30	784.48	788.75	783.52	784.70	787.35	790.98	787.35
CL-03-WP	836.41	786.54	791.47	781.31	785.41	789.95	790.89	785.33
CL-04-WP	796.81	761.33	764.30	756.59	763.50	767.81	766.61	760.41
CL-05-WP	853.34	780.22	783.40	777.99	778.23	782.22	786.69	-- (3)
CL-06-WP	861.02	776.80	773.38	-- (2)	776.18	777.78	775.16	-- (3)
CL-07-WP	824.90	801.09	801.42	792.75	792.75	792.81	800.44	-- (3)
CL-09-WP	803.18	788.74	794.96	785.03	790.28	793.95	796.62	788.73

Notes:

(1) Elevations are feet above mean sea level.
(2) Dry.
(3) Not sampled.

TABLE 2

WELL PURGING DATA SUMMARY
ROUND SEVEN QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
JULY 1996

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
OW-1 (5)	781.59	3.0	1	3	7.2	325	67	56	Bladder pump
			2	6	7.1	348	65	8	
			3	9	7.0	345	67	1.5	
OW-2	776.69	1.5	1	1.5	7.2	338	68	2	Bladder pump
			2	3.0	7.2	311	66	2	
			3	5.0	7.0	327	66	1.4	
OW-3	768.90	21.7	1	22	6.9	375	69	3	Bladder pump
			2	44	6.6	526	68	2	
			3	66	6.5	497	70	2.3	
OW-4	762.06	3.6	1	4	6.9	2180	72	7.5	Bladder pump
			2	8	6.9	1930	68	6.0	
			3	12	6.8	1890	68	2.5	
OW-5	774.43	9.8	1	10	8.3	195	71	4	Bladder pump
			2	20	7.8	195	70	2.5	
			3	30	7.7	191	70	2.5	
OW-6B	783.82	63.5	1	64	7.2	133	67	105	Airlift pump
			2	128	6.6	120	68	104	
			3	192	7.1	115	70	92 (6)	

TABLE 2

WELL PURGING DATA SUMMARY
ROUND SEVEN QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
JULY 1996

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
OW-7R	787.35	9.9	1	10	5.5	44	70	4	Bladder pump
			2	20	5.3	46	70	2.5	
			3	30	5.4	45	73	2.0	
CL-03-WP (5)	785.33	8.0	1	8	7.7	163	68	26	Bladder pump
			2	16	7.6	165	69	15	
			3	24	7.7	165	68	8	
CL-04-WP	760.41	0.8	1	1	7.0	363	70	>100	Bladder pump
			2	2	6.7	331	72	20	
			3	4	6.5	273	68	2.5	
CL-09-WP	788.73	2.9	1	3	6.9	350	72	5	Peristaltic pump
			2	6	6.8	330	71	2	
			3	9	6.7	307	70	2	

Notes:

(1) Elevations are feet above mean sea level.
(2) micromhos
(3) Degrees Fahrenheit
(4) Nephelometric units
(5) Monitoring well was resampled on July 26, 1996.
(6) Sample observed to contain rust particles.

TABLE 3

SAMPLE KEY
ROUND SEVEN QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
JULY 1996

Sample Number	*Source*	*Turbidity (NTUs) (1)*	*Parameters*	*Method*	*Comments*
GW-3482-070996-JOS-01	CL-04-WP	2.5	(2)	(3)	
GW-3482-070996-JOS-02	OW-4	2.5	(2)	(3)	
GW-3482-071096-JOS-03	Bladder Pump	--	(2)	--	Rinsate blank prior to use in OW-5
GW-3482-071096-JOS-04	OW-5	2.0	(2)	(3)	
GW-3482-071096-JOS-05 MS/MSD	OW-7R	2.0	(2)	(3)	Matrix spike/Matrix spike duplicate
GW-3482-071096-JOS-06	OW-2	1.4	(2)	(3)	GW-3482-071096-JOS-07 (duplicate)
GW-3482-072696-JOS-01 (4)	OW-1	1.5	(2)	(3)	
GW-3482-071096-JOS-09	CL-09-WP	2.0	(2)	(5)	
GW-3482-072696-JOS-02 (4)	CL-03-WP	8.0	(2)	(3)	
GW-3482-071196-JOS-11	OW-3	2.3	(2)	(3)	
GW-3482-071196-JOS-12	OW-6B	92	(2)	(6)	
SW-3482-071196-JOS-01	Coke Pond	--	(7)	--	Surface water grab sample

Notes:

(1) Nephelometric units.
(2) Beryllium, cadmium, chromium, lead, manganese.
(3) Bladder pump.
(4) Monitoring well was resampled on July 26, 1996.
(5) Peristaltic pump.
(6) Disposable Teflon bailer.
(7) Aluminum, chromium, copper, lead, nickel, zinc.

CRA
1351 Oakbrook Drive
Suite #150
Norcross, Georgia 30093
(770) 441-0027

MEMO

TO: Mike Matevk

REFERENCE NO: 3482

FROM: John Schwaller/kt/4

DATE: November 1, 1996

RE: Round Eight Groundwater and Surface Water Sampling
Cedartown Municipal Landfill Site - Cedartown, Georgia

1.0 INTRODUCTION

The following technical memorandum summarizes the field activities associated with the eighth round of groundwater and surface water sampling at the Cedartown Municipal Landfill Site (CML Site). All activities were conducted in accordance with the approved Remedial Design/Remedial Action (RD/RA) Work Plan. The scope of work of this sampling activity included:

i) well inspections;
ii) water level measurements;
iii) purging 10 of 13 monitoring wells;
iv) sampling 10 of 10 perimeter monitoring wells for beryllium, cadmium, chromium, lead, and manganese analysis; and
v) sampling of the Coke Pond for aluminum, chromium, copper, lead, nickel, and zinc analysis.

No groundwater sample was collected from interior monitoring well CL-05-WP as this monitoring well was sampled twice this year in accordance with the approved RD/RA work plan. Interior monitoring wells CL-06-WP and CL-07-WP remained dry, therefore a sample could not be collected.

This round of sample collection occurred during the periods October 23 through October 28, 1996. CRA staff was assisted by City of Cedartown personnel in the sample collection activities. This is an effort to train the City of Cedartown personnel in order to transfer future sample collection responsibilities to the City of Cedartown.

The following sections in this memorandum describe the field activities.

2.0 WELL INSPECTION

All monitoring wells scheduled to be sampled were initially located and found to be in good condition.

3.0 GROUNDWATER SAMPLING PROCEDURES

3.1 Water Level Measurements

Prior to purging and sampling each monitoring well, the water level was measured using an electric sounding device. All measurements were taken from the northern side of the well casing. Water level measurements were recorded to the nearest 0.01 foot. The water level indicator was decontaminated prior to each use as described in Section 5.0 of this memorandum. Water level measurements and elevations are presented in Table 1.

3.2 Purging

All monitoring wells were purged prior to sampling using a low-flow purging technique. The following presents the types of methods used to purge all monitoring wells on the Site:

- Bladder Pump

All 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP, were purged using a 1.88-inch diameter Teflon bladder/stainless steel body pump and utilizing polyethylene tubing. The pump was suspended in the monitoring well using new nylon rope.

- Peristaltic Pump

Monitoring well CL-09-WP was purged using a peristaltic pump utilizing new internal silicone tubing within the pump itself and Teflon intake tubing. This pump was utilized due to the shallow depth of this monitoring well and the high water elevation.

- Airlift Pump

Because of the need to purge a large volume of water from 8-inch diameter monitoring well OW-6B, this monitoring well was purged using a 3-inch diameter stainless steel airlift pump utilizing polyethylene tubing. The pump was suspended in the well using new nylon rope.

All polyethylene and Teflon tubing used during purging was re-dedicated to the respective monitoring wells.

Purging was conducted in accordance with the approved RD/RA Work Plan. Field parameters of pH, conductivity, and temperature were recorded after each volume was removed. Purging continued until stabilization of these field parameters occurred. Additionally, purging was continued until a goal of less than 10 nephelometric units (NTUs) could be achieved. If less than 10 NTUs could not be achieved, an attempt to achieve the original goal of 50 NTUs was made. Calibration of field instruments was performed daily. New disposable latex gloves were used before and between all purging events. A summary of purge data is presented in Table 2.

3.3 Groundwater Sampling

Groundwater samples were collected from all wells purged for the analysis of beryllium, cadmium, chromium, lead, and manganese. All groundwater samples, with the exception of the groundwater sample collected from monitoring well OW-6B exhibited a turbidity of 10 NTUs or less.

Groundwater samples were collected using the following methods:

- Bladder pump

Groundwater samples were collected from all 2-inch diameter monitoring wells, with the exception of monitoring well CL-09-WP using the same bladder pump in which the well was purged with.

- Peristaltic pump

A groundwater sample was collected from monitoring well CL-09-WP using the same peristaltic pump and Teflon intake tubing used for purging.

- Teflon bailer

A groundwater sample was collected from the larger diameter monitoring well OW-6B using a disposable Teflon bailer and new nylon rope.

Sample personnel wore new disposable latex gloves before and between all sample events. Samples were immediately preserved with nitric acid and placed on ice in laboratory supplied coolers. One duplicate sample, one matrix spike/matrix spike duplicate sample and one equipment blank were collected for quality control purposes. All samples were sent under proper laboratory protocols and chain-of-custody procedures to Quanterra Environmental Services of North Canton, Ohio.

A sample key, sample field data, and methods used to collect the groundwater samples are presented in Table 3.

4.0 SURFACE WATER SAMPLING PROCEDURES

One surface water sample was collected from the Coke Pond for the analysis of aluminum, chromium, copper, lead, nickel and zinc. A grab sample was collected directly from the Coke Pond into the sample container and immediately preserved with nitric acid and placed on ice. All laboratory and chain of custody protocols followed during the groundwater sample collection were followed during the surface water sample collection.

5.0 DECONTAMINATION

All equipment, including the airlift pump, bladder pumps, and water level tape were cleaned prior to use. Cleaning consisted of brushing particulates free with an Alconox solution, rinsing thoroughly with deionized water, and allowing to

air dry. All pumps were disassembled prior to decontamination and wrapped with aluminum foil prior to storage or transport.

6.0 WASTE MATERIAL HANDLING

All purge water was temporarily stored on-Site in polyethylene tanks until final disposal to the City of Cedartown POTW.

c.c. David Johnson - City of Cedartown
Bill Hutton - Maxus Energy
Gordon Tate - Superior Consultants

TABLE 1

GROUNDWATER ELEVATION SUMMARY
QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE

Monitoring Well	*Reference Elevation*	*Water Level Elevations (1)*			
		January 1995	*April 1995*	*July 1995*	*October 1995*
OW-1	823.80	786.26	787.35	778.35	784.60
OW-2	827.50	780.05	779.81	772.92	779.48
OW-3	803.29	773.79	779.08	764.97	773.81
OW-4	801.52	763.10	764.98	759.17	765.45
OW-5	797.92	774.64	776.58	773.42	774.56
OW-6B	805.12	785.35	791.00	779.94	786.62
OW-7R	809.30	784.48	788.75	783.52	784.70
CL-03-WP	836.41	786.54	791.47	781.31	785.41
CL-04-WP	796.81	761.33	764.30	756.59	763.50
CL-05-WP	853.34	780.22	783.40	777.99	778.23
CL-06-WP	861.02	776.80	773.38	-- (2)	776.18
CL-07-WP	824.90	801.09	801.42	792.75	792.75
CL-09-WP	803.18	788.74	794.96	785.03	790.28

Notes:

(1) Elevations are feet above mean sea level.
(2) Dry.
(3) Not sampled.

TABLE 1

GROUNDWATER ELEVATION SUMMARY
QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE

Monitoring Well	*Reference Elevation*	*Water Level Elevations (1)*			
		January 1996	*April 1996*	*July 1996*	*October 1996*
OW-1	823.80	786.15	787.60	781.59	781.25
OW-2	827.50	781.15	782.47	776.69	776.61
OW-3	803.29	776.87	778.90	768.90	768.36
OW-4	801.52	766.45	768.47	762.06	761.92
OW-5	797.92	774.99	776.34	774.43	774.25
OW-6B	805.12	789.14	792.84	783.82	783.12
OW-7R	809.30	787.35	790.98	787.35	786.14
CL-03-WP	836.41	789.95	790.89	785.33	785.01
CL-04-WP	796.81	767.81	766.61	760.41	758.04
CL-05-WP	853.34	782.22	786.69	-- (3)	-- (3)
CL-06-WP	861.02	777.78	775.16	-- (3)	-- (3)
CL-07-WP	824.90	792.81	800.44	-- (3)	-- (3)
CL-09-WP	803.18	793.95	796.62	788.73	788.42

Notes:

(1) Elevations are feet above mean sea level.
(2) Dry.
(3) Not sampled.

TABLE 2

WELL PURGING DATA SUMMARY
ROUND EIGHT QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
OCTOBER 1996

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
OW-1	781.25	3.1	1	3	7.2	632	59	250	Bladder pump
			2	6	7.0	600	59	30	
			3	9	7.1	610	59	10	
OW-2	776.61	1.5	5	8	--	--	--	7	Bladder pump
OW-3	768.36	21.6	1	22	--	490	71	3	Bladder pump
			2	44	--	520	73	4	
			3	66	--	460	69	3	
OW-4	761.92	3.6	1	4	6.9	2030	63	28	Bladder pump
			2	8	7.1	1880	61	10	
			3	12	7.2	1860	59	7	
OW-5	774.25	9.8	1	10	6.5	421	71	4	Bladder pump
			2	20	7.1	447	70	2	
			3	30	7.3	408	69	2	
OW-6B	783.12	63.0	1	64	6.6	343	68	300	Airlift pump
			2	128	6.7	340	68	280	
			3	192	6.8	345	68	78 (5)	

TABLE 2

WELL PURGING DATA SUMMARY
ROUND EIGHT QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
OCTOBER 1996

Well Number	*Water Level (ft. AMSL) (1)*	*Initial Well Volume (gallons)*	*Volume Number*	*Total Gallons Purged*	*pH*	*Conductivity (µS/cm) (2)*	*Temperature (°F) (3)*	*Turbidity (NTUs) (4)*	*Method*
OW-7R	786.14	9.7	1	10	--	32	59	11	Bladder pump
			2	20	--	30	62	12	
			3	30	--	34	67	4	
CL-03-WP	785.01	8.1	1	8	--	487	59	37	Bladder pump
			2	16	--	459	60	20	
			3	24	--	446	62	8	
CL-04-WP	758.04	0.4	5	2	6.1	340	63	8	Bladder pump
CL-09-WP	788.42	2.8	1	3	6.4	369	64	--	Peristaltic pump
			2	6	6.6	389	67	2	
			3	10	6.3	410	71	1	

Notes:

(1) Elevations are feet above mean sea level.
(2) micromhos
(3) Degrees Fahrenheit
(4) Nephelometric units
(5) Sample observed to contain rust particles.
-- - No measurement taken.

TABLE 3

SAMPLE KEY
ROUND EIGHT QUARTERLY SAMPLING PROGRAM
CEDARTOWN MUNICIPAL LANDFILL SITE
OCTOBER 1996

Sample Number	*Source*	*Turbidity (NTUs) (1)*	*Parameters*	*Method*	*Comments*
GW-3482-102396-JOS-01	CL-04-WP	8	(2)	(3)	
GW-3482-102396-JOS-02 MS/MSD	CL-09-WP	1	(2)	(4)	Matrix spike/Matrix spike duplicate
GW-3482-102396-JOS-03	OW-5	2	(2)	(3)	GW-3482-102396-JOS-04 (duplicate)
GW-3482-102396-JOS-05	OW-4	7	(2)	(3)	
GW-3482-102496-JOS-06	OW-2	7	(2)	(3)	
GW-3482-102496-JOS-07	OW-7R	4	(2)	(3)	
GW-3482-102496-JOS-08	Bladder Pump	--	(2)	--	Rinsate blank prior to use in OW-3
GW-3482-102496-JOS-09	OW-3	3	(2)	(3)	
GW-3482102596-JOS-10	OW-1	10	(2)	(3)	
GW-3482-102596-JOS-11	CL-03-WP	8	(2)	(3)	
GW-3482-102896-JOS-12	OW-6B	78	(2)	(5)	
SW-3482-102896-JOS-01	Coke Pond	--	(6)	--	Surface water grab sample

Notes:

(1) Nephelometric units.
(2) Beryllium, cadmium, chromium, lead, manganese.
(3) Bladder pump.
(4) Peristaltic pump.
(5) Disposable Teflon bailer.
(6) Aluminum, chromium, copper, lead, nickel, zinc.

G

APPENDIX G

ANALYTICAL REPORTS

Quanterra Incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

216 497-9396 Telephone
216 497-0772 Fax

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUNICIPAL LANDFILL

JOANNE STAUBITZ

CONESTOGA-ROVERS & ASSOC.,LTD.

QUANTERRA INCORPORATED

Daniel J. Wright
Project Manager

January 18, 1995

Quanterra
Environmental Services

PROJECT NARRATIVE

The following report contains the analytical results for seven water samples submitted to Quanterra-North Canton by Conestoga-Rovers and Associates, Inc. from the Cedartown Municipal Landfill Site, project number 3482. The samples were received January 9, 1995, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. Results were provided by facsimile transmission to Joanne Staubitz on January 16, 1995. A summary of QC data for these analyses is included at the end of the report.

Quanterra
Environmental Services

ANALYTICAL METHODS SUMMARY

Parameters	Methods
Beryllium	SW846 6010A
Cadmium	SW846 6010A
Chromium	SW846 6010A
Manganese	SW846 6010A
Lead	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, September, 1986 and subsequent revisions

Quanterra
Environmental Services

SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

WO #	LABORATORY ID	SAMPLE IDENTIFICATION	
A266T	A5A090036-001	W-3482-JOS-010595-01	1-5-95 1615
A266V	A5A090036-002	W-3482-JOS-010595-02	1-5-95 1700
A266W	A5A090036-003	W-3482-JOS-010695-03	1-6-95 1000
A266X	A5A090036-004	W-3482-JOS-010695-04	1-6-95 1200
A2671	A5A090036-005	W-3482-JOS-010695-05	1-6-95 1300
A2672	A5A090036-006	W-3482-JOS-010695-06	1-6-95 1430
A2674	A5A090036-007	W-3482-JOS-010695-07	1-6-95 1500

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

W-3482-JOS-010595-01 1-5-95 1615

WO #: A266T
LAB #: A5A090036-001
MATRIX: WATER

DATE SAMPLED: 1/05/95
DATE RECEIVED: 1/09/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	501100
Cadmium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	5011((
Chromium	ND	10.0	ug/L	SW846 6010A	1/11- 1/12/95	5011(_(
Manganese	587	10.0	ug/L	SW846 6010A	1/11- 1/12/95	5011((
Lead	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	5011((

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

W-3482-JOS-010595-02 1-5-95 1700

WO #: A266V
LAB #: A5A090036-002
MATRIX: WATER

DATE SAMPLED: 1/05/95
DATE RECEIVED: 1/09/95

- - - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	501102
Cadmium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	501102
Chromium	ND	10.0	ug/L	SW846 6010A	1/11- 1/12/95	501102
Manganese	45.1	10.0	ug/L	SW846 6010A	1/11- 1/12/95	501102
Lead	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	501102

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

W-3482-JOS-010695-03 1-6-95 1000

WO #: A266W
LAB #: A5A090036-003
MATRIX: WATER

DATE SAMPLED: 1/06/9
DATE RECEIVED: 1/09/95

- - - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATC
Beryllium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	501102
Cadmium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	5011
Chromium	ND	10.0	ug/L	SW846 6010A	1/11- 1/12/95	5011
Manganese	ND	10.0	ug/L	SW846 6010A	1/11- 1/12/95	5011
Lead	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	5011

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

W-3482-JOS-010695-04 1-6-95 1200

WO #: A266X
LAB #: A5A090036-004
MATRIX: WATER

DATE SAMPLED: 1/06/95
DATE RECEIVED: 1/09/95

- - - - - - - - - - - - - - - - - - **REQUESTED METALS** - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	501102C
Cadmium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	501102C
Chromium	ND	10.0	ug/L	SW846 6010A	1/11- 1/12/95	501102C
Manganese	2,290	10.0	ug/L	SW846 6010A	1/11- 1/12/95	5011020
Lead	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	501102C

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

W-3482-JOS-010695-05 1-6-95 1300

WO #: A2671
LAB #: A5A090036-005
MATRIX: WATER

DATE SAMPLED: 1/06/95
DATE RECEIVED: 1/09/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	501102C
Cadmium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	5011(C
Chromium	ND	10.0	ug/L	SW846 6010A	1/11- 1/12/95	5011(_C
Manganese	**2,270**	10.0	ug/L	SW846 6010A	1/11- 1/12/95	5011(C
Lead	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	5011(C

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

W-3482-JOS-010695-06 1-6-95 1430

WO #: A2672
LAB #: A5A090036-006
MATRIX: WATER

DATE SAMPLED: 1/06/95
DATE RECEIVED: 1/09/95

- - - - - - - - - - - - - - - - - - **REQUESTED METALS** - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	501102C
Cadmium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	501102C
Chromium	ND	10.0	ug/L	SW846 6010A	1/11- 1/12/95	501102C
Manganese	**10.8**	**10.0**	**ug/L**	**SW846 6010A**	**1/11- 1/12/95**	**5011020**
Lead	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	501102C

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

W-3482-JOS-010695-07 1-6-95 1500

WO #: A2674
LAB #: A5A090036-007
MATRIX: WATER

DATE SAMPLED: 1/06/9
DATE RECEIVED: 1/09/95

- **REQUESTED METALS** -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATC
Beryllium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	501102
Cadmium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	5011
Chromium	ND	10.0	ug/L	SW846 6010A	1/11- 1/12/95	5011
Manganese	**14.4**	10.0	ug/L	SW846 6010A	1/11- 1/12/95	5011
Lead	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95	5011

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The matrix spike and matrix spike duplicate (MS/MSD) contained in this quality control report were generated as part of the laboratory QA/QC program requirements. These requirements include the analysis of a MS/MSD on a one in twenty basis. Therefore, the associated batch number indicated on the MS/MSD report may not reflect the same batch number as those of the samples contained in the analytical report.

Quanterra
Environmental Services

CHECK SAMPLE REPORT

LAB #: A5A090036

- METALS -

COMPOUND	SPIKE PERCENT RECOVERY	Q/C LIMITS	PREPARATION - ANALYSIS DATE
	BATCH:5011020		
Beryllium	102	(80-118)	1/11- 1/12/95
Cadmium	100	(80-108)	1/11- 1/12/
Chromium	100	(83-114)	1/11- 1/12/
Manganese	102	(81-112)	1/11- 1/12/95
Lead	98	(80-120)	1/11- 1/12/95

Quanterra
Environmental Services

INTRA-LAB BLANK REPORT

LAB #: A5A090036

METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION ANALYSIS DATE
		BATCH:5011020			
Beryllium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95
Cadmium	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95
Chromium	ND	10.0	ug/L	SW846 6010A	1/11- 1/12/95
Manganese	ND	10.0	ug/L	SW846 6010A	1/11- 1/12/95
Lead	ND	5.0	ug/L	SW846 6010A	1/11- 1/12/95

NOTE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

MATRIX SPIKE REPORT

LAB #: A4L220064-001

METALS

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION - ANALYSIS DATE
		BATCH:5003045 MATRIX: WATER				
Silver	95	98	(61-126)	3.3	(0-20)	1/03- 1/04/95
Aluminum	102	107	(56-147)	5.2	(0-20)	1/03- 1/04/ 5
Arsenic	96	97	(80-120)	1.3	(0-20)	1/03- 1/04/ 5
Barium	97	100	(79-116)	2.5	(0-20)	1/03- 1/04/95
Beryllium	99	103	(76-117)	4.2	(0-20)	1/03- 1/04/95
Cadmium	91	96	(70-109)	5.8	(0-20)	1/03- 1/04/ 5
Chromium	95	100	(74-117)	5.0	(0-20)	1/03- 1/04/95
Copper	95	98	(77-112)	2.7	(0-20)	1/03- 1/04/95
Iron	100	110	(45-146)	9.3	(0-20)	1/03- 1/04/ 5
Mercury	90	87	(31-160)	3.4	(0-20)	1/03/95
Manganese	104	121	(57-131)	15	(0-20)	1/03- 1/04/95
Sodium	105	103	(40-144)	1.7	(0-20)	1/03- 1/04/95
Nickel	93	98	(73-109)	5.4	(0-20)	1/03- 1/0[illegible]
Lead	88	92	(72-114)	4.6	(0-20)	1/03- 1/[illegible]
Antimony	89	93	(73-112)	4.0	(0-20)	1/03- 1/04/95
Selenium	94	94	(80-120)	0.32	(0-20)	1/03- 1/04/ 5
Thallium	91	92	(80-120)	1.1	(0-20)	1/03- 1/04/ 5
Zinc	95	100	(67-118)	5.1	(0-20)	1/03- 1/04/95

NOTE:

culations are performed before rounding to avoid round-off errors in calculated results

Quanterra Environmental Services

MATRIX SPIKE REPORT

LAB #: A4L300002-001

*** DISSOLVED METALS ***

- METALS -

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION ANALYSIS DAT
		BATCH:5005026 MATRIX: WATER				
Silver	101	99	(61-126)	2.6	(0-20)	1/05- 1/08/9
Arsenic	110	108	(80-120)	2.0	(0-20)	1/05- 1/08/9
Barium	105	102	(79-116)	2.6	(0-20)	1/05- 1/08/9
Beryllium	111	108	(76-117)	2.7	(0-20)	1/05- 1/08/9
Calcium	108	115	(40-146)	6.1	(0-20)	1/05- 1/08/9
Cadmium	103	101	(70-109)	2.3	(0-20)	1/05- 1/08/9
Cobalt	103	100	(75-110)	2.4	(0-20)	1/05- 1/08/9
Chromium	104	101	(74-117)	2.4	(0-20)	1/05- 1/08/9
Copper	102	99	(77-112)	2.8	(0-20)	1/05- 1/08/9
Mercury	115	116	(31-160)	0.60	(0-20)	1/05- 1/07/9
Potassium	116	113	(67-123)	2.8	(0-20)	1/05- 1/08/9
Magnesium	102	103	(71-112)	0.73	(0-20)	1/05- 1/[illegible]/9
Manganese	106	104	(57-131)	2.1	(0-20)	1/05- 1/ 9
Sodium	105	98	(40-144)	7.0	(0-20)	1/05- 1 9
Nickel	103	101	(73-109)	2.0	(0-20)	1/05- 1/08/9
Lead	103	101	(80-120)	2.5	(0-20)	1/05- 1/08/9
Antimony	101	99	(73-112)	2.3	(0-20)	1/05- 1/08/9
Selenium	107	104	(80-120)	2.4	(0-20)	1/05- 1/08/9
Tin	113	101	(73-123)	12	(0-20)	1/05- 1/16/9
Vanadium	103	100	(79-112)	2.7	(0-20)	1/05- 1/08/9
Zinc	110	108	(67-118)	1.9	(0-20)	1/05- 1/08/9
		BATCH:5011024 MATRIX: WATER				
Iron	104	110	(45-146)	6.2	(0-20)	1/11- 1/16/9
Potassium	0	0	(67-123)	0	(0-10) +	1/11- 0/00/0

NOTE:

+ THE CORRECTIVE ACTION CRITERIA IS BASED UPON THE ABSOLUTE DIFFERENCE OF THE MATRIX SPIKE AND MATRIX SPIKE DUPLICATE RECOVERIES.

Calculations are performed before rounding to avoid round-off errors in calculated results

CR.

CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive, Suite 150
Norcross, GA 30093
404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory): Southern Environmental Services

REFERENCE NUMBER: 3482

PROJECT NAME: Cedartown Municipal Landfill Site

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: John [illegible]

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Lead	Cadmium	Beryllium	Chromium	Manganese					REMARKS
	1-5-95	10:15	W-3482-JS-010595-01	G.W.	1	X	X	X	X	X					
	1-5-95	17:00	W-3482-JS-010595-02	G.W.	1	↓	↓	↓	↓	↓					
	1-6-95	10:[illegible]	W-3482-JS-[illegible]-03	GW	1										
	1-6-95	12:[illegible]	W-3482-JS-[illegible]-04	G.W	1										
	1-6-95	[illegible]	W-3482-JS-[illegible]-05	GW	1										
	1-6-95	14:30	W-3482-JS-[illegible]-06	GW	1										
	1-6-95	[illegible]	W-3482-JS-[illegible]-07	GW	1										

TOTAL NUMBER OF CONTAINERS: 7

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	DATE/TIME
① [signature]	DATE: [illegible] TIME: 12:[illegible]	②	DATE: TIME:
②	DATE: TIME:	③	DATE: TIME:
③	DATE: TIME:	④	DATE: TIME:

METHOD OF SHIPMENT: FED-EX

AIR BILL NUMBER: 2687611894

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: John Jennwellic; Dave Pretenski

RECEIVED FOR LABORATORY BY: Kris M Brooks

DATE: 1-9-95 TIME: 11:30A

№ 00453

1007(FORMS) — DEC 8 93 — REV'D

CR

CONE...OGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory): QUANTEK ENVIRONMENTAL SERVICES

REFERENCE NUMBER: 3482

PROJECT NAME: CEDAR TOWN FUNCTIONAL LANDFILL SITE

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: JOHN SENDALLIK

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	LEAD	CADMIUM	Beryllium	Chromium	Manganese					REMARKS
	1-5-95	1615	W-3482-JDS-010595-01	G.W.	1	X	X	X	X	X					
	1-5-95	1700	W-3482-JDS-010595-02	G.W.	1	↓	↓	↓	↓	↓					
	1-6-95	1000	W-3482-JDS-010695-03	G.W.	1	↓	↓	↓	↓	↓					
	1-6-95	1200	W-3482-JDS-010695-04	G.W.	1	↓	↓	↓	↓	↓					
	1-6-95	1300	W-3482-JDS-010695-05	G.W.	1	↓	↓	↓	↓	↓					
	1-6-95	1430	W-3482-JDS-010695-06	G.W.	1	↓	↓	↓	↓	↓					
	1-6-95	1500	W-3482-JDS-010695-07	G.W.	1	↓	↓	↓	↓	↓					
			TOTAL NUMBER OF CONTAINERS		7										

RELINQUISHED BY: ① [signature]	DATE: 1-9-95 TIME: 12:00	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: FED-EX AIR BILL NUMBER: 2-8761185-4

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: JOHN SENDALLIK, DAVE GRYTOWSKI

RECEIVED FOR LABORATORY BY: Rio M Brooks

DATE: 1-9-95 TIME: 11.30a

Nº 00453

1007(FORM... 3 6 93 — REV.D — (AF-01)

Quanterra Incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

216 497-9396 Telephone
216 497-0772 Fax

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUNICIPAL LANDFILL

JOANNE STAUBITZ

CONESTOGA-ROVERS & ASSOC.,LTD.

QUANTERRA INCORPORATED

Daniel J. Wright
Project Manager

February 7, 1995

PROJECT NARRATIVE

The following report contains the analytical results for seven water samples submitted to Quanterra-North Canton by Conestoga Rovers & Associates, LTD. from the Cedartown Municipal Landfill Site, project number 3482. The samples were received January 12, 1995, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. A summary of QC data for these analyses is included at the end of the report.

QUALITY CONTROL SECTION

CONESTOGA-ROVERS & ASSOC.,LTD.

W-3482-JOS-011195-12 1-11-95 0930

WO #: A27HV
LAB #: A5A120021-005
MATRIX: WATER

DATE SAMPLED: 1/11/95
DATE RECEIVED: 1/12/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
Cadmium	ND	5.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
Chromium	ND	10.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
Manganese	67.6	10.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
Lead	4.4	3.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

SW-3482-JOS-011195-13 1-11-95 1030

WO #: A27HX
LAB #: A5A120021-006
MATRIX: WATER

DATE SAMPLED: 1/11/9
DATE RECEIVED: 1/12/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATC
Aluminum	ND	200	ug/L	SW846 6010A	1/13- 1/25/95	501301
Chromium	ND	10.0	ug/L	SW846 6010A	1/13- 1/25/95	5013 1
Copper	17.8	5.0	ug/L	SW846 6010A	1/13- 1/25/95	5013 1
Nickel	ND	40.0	ug/L	SW846 6010A	1/13- 1/25/95	5013 1
Zinc	ND	20.0	ug/L	SW846 6010A	1/13- 1/25/95	5013 1
Lead	ND	3.00	ug/L	SW846 6010A	1/13- 1/25/95	501301

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

CONESTOGA-ROVERS & ASSOC.,LTD.

W-3482-JOS-010995-08 1-9-95 1600

WO #: A27HG
LAB #: A5A120021-001
MATRIX: WATER

DATE SAMPLED: 1/09/95
DATE RECEIVED: 1/12/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	1/13- 1/24/95	5013018
Cadmium	ND	5.0	ug/L	SW846 6010A	1/13- 1/24/95	5013018
Chromium	ND	10.0	ug/L	SW846 6010A	1/13- 1/24/95	5013018
Manganese	19.2	10.0	ug/L	SW846 6010A	1/13- 1/24/95	5013018
Lead	ND	3.0	ug/L	SW846 6010A	1/13- 1/24/95	5013018

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

CONESTOGA-ROVERS & ASSOC.,LTD.

W-3482-JOS-011095-09 (MS/MSD) 1-10-95 1200

WO #: A27HL
LAB #: A5A120021-002
MATRIX: WATER

DATE SAMPLED: 1/10/95
DATE RECEIVED: 1/12/95

- - - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	1/13- 1/24/95	50130:
Cadmium	ND	5.0	ug/L	SW846 6010A	1/13- 1/24/95	5013018
Chromium	ND	10.0	ug/L	SW846 6010A	1/13- 1/24/95	5013018
Manganese	2,830	10.0	ug/L	SW846 6010A	1/13- 1/24/95	50130:
Lead	ND	3.0	ug/L	SW846 6010A	1/13- 1/24/95	5013018

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

ANALYTICAL METHODS SUMMARY

Parameters	Methods
Aluminum	SW846 6010A
Beryllium	SW846 6010A
Cadmium	SW846 6010A
Chromium	SW846 6010A
Copper	SW846 6010A
Manganese	SW846 6010A
Nickel	SW846 6010A
Zinc	SW846 6010A
Lead	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, September, 1986 and subsequent revisions

SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

WO #	LABORATORY ID	SAMPLE IDENTIFICATION
A27HG	A5A120021-001	W-3482-JOS-010995-08 1-9-95 1600
A27HL	A5A120021-002	W-3482-JOS-011095-09 (MS/MSD) 1-10-95 1200
A27HQ	A5A120021-003	W-3482-JOS-011095-10 1-10-95 1700
A27HR	A5A120021-004	W-3482-JOS-011095-11 1-10-95 1800
A27HV	A5A120021-005	W-3482-JOS-011195-12 1-11-95 0930
A27HX	A5A120021-006	SW-3482-JOS-011195-13 1-11-95 1030
A27J1	A5A120021-007	W-3482-JOS-011195-14 1-11-95 1100

QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with laboratory protocol.

CHECK SAMPLE REPORT

LAB #: A5A120021

- METALS -

COMPOUND	SPIKE PERCENT RECOVERY	Q/C LIMITS	PREPARATION - ANALYSIS DATE
	BATCH:5013018		
Aluminum	90	(86-121)	1/13- 1/24/9
Beryllium	97	(80-118)	1/13- 1/24/9
Cadmium	96	(80-108)	1/13- 1/24/95
Chromium	96	(83-114)	1/13- 1/24/9
Copper	92	(84-110)	1/13- 1/24/9
Manganese	98	(81-112)	1/13- 1/24/95
Nickel	91	(81-110)	1/13- 1/25/95
Lead	93	(80-120)	1/13- 1/24/9
Zinc	91	(79-112)	1/13- 1/23/9

CONESTOGA-ROVERS & ASSOC.,LTD.

W-3482-JOS-011195-14 1-11-95 1100

WO #: A27J1
LAB #: A5A120021-007
MATRIX: WATER

DATE SAMPLED: 1/11/95
DATE RECEIVED: 1/12/95

- - - - - - - - - - - - - - - REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
Cadmium	ND	5.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
Chromium	423	10.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
Manganese	662	10.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
Lead	ND	3.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

INTRA-LAB BLANK REPORT

LAB #: A5A120021

METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION ANALYSIS DATE
		BATCH:5013018			
Aluminum	ND	200	ug/L	SW846 6010A	1/13- 1/24/95
Beryllium	ND	5.0	ug/L	SW846 6010A	1/13- 1/24/95
Cadmium	ND	5.0	ug/L	SW846 6010A	1/13- 1/24/95
Chromium	ND	10.0	ug/L	SW846 6010A	1/13- 1/24/95
Copper	ND	5.0	ug/L	SW846 6010A	1/13- 1/24/95
Manganese	ND	10.0	ug/L	SW846 6010A	1/13- 1/24/95
Nickel	ND	40.0	ug/L	SW846 6010A	1/13- 1/25/95
Lead	ND	3.0	ug/L	SW846 6010A	1/13- 1/24/95
Zinc	ND	20.0	ug/L	SW846 6010A	1/13- 1/23/95

NOTE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

MATRIX SPIKE REPORT

LAB #: A5A120021-002

- METALS -

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION - ANALYSIS DA E
	BATCH:5013018 MATRIX: WATER					
Beryllium	96	96	(76-117)	0.27	(0-20)	1/13- 1/24/ 5
Cadmium	95	94	(70-109)	0.16	(0-20)	1/13- 1/24/ 5
Chromium	95	95	(74-117)	0	(0-20)	1/13- 1/24/95
Manganese	98	105	(57-131)	7.6	(0-20)	1/13- 1/24/ 5
Lead	92	93	(80-120)	0.050	(0-20)	1/13- 1/24/ 5

NOTE:

Calculations are performed before rounding to avoid round-off errors in calculated results

CONESTOGA-ROVERS & ASSOC.,LTD.

W-3482-JOS-011095-10 1-10-95 1700

WO #: A27HQ
LAB #: A5A120021-003
MATRIX: WATER

DATE SAMPLED: 1/10/95
DATE RECEIVED: 1/12/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
Cadmium	ND	5.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
Chromium	ND	10.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
Manganese	114	10.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
Lead	ND	3.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

CONESTOGA-ROVERS & ASSOC.,LTD.

W-3482-JOS-011095-11 1-10-95 1800

WO #: A27HR
LAB #: A5A120021-004
MATRIX: WATER

DATE SAMPLED: 1/10/95
DATE RECEIVED: 1/12/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	1/13- 1/25/95	50130 3
Cadmium	ND	5.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
Chromium	ND	10.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018
Manganese	1,270	10.0	ug/L	SW846 6010A	1/13- 1/25/95	50130 3
Lead	ND	3.0	ug/L	SW846 6010A	1/13- 1/25/95	5013018

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

CR

CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory N: DURNTERRA

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN MUNICIPAL LANDFILL

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: John Schwaller

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	LEAD	MANGANESE	ALUMINUM	COPPER	NICKEL	ZINC	REMARKS
	1/5/95	1600	W-3482-JOS-010995-08	G.W.	1	X	X	X	X	X					all w/ NITRIC
	1/10/95	1200	W-3482-JOS-011095-09MS/MSD	GW	2	X	X	X	X	X					
	1/10/95	1700	W-3482-JOS-011095-10	GW	1	X	X	X	X	X					
	1/10/95	1800	W-3482-JOS-011095-11	GW	1	X	X	X	X	X					
	1/11/95	0930	W-3482-JOS-011195-12	GW	1	X	X	X	X	X					
	1/11/95	1030	W-3482-JOS-011195-13	GW	1			X			X	X	X	X	
	1/11/95	1100	W-3482-JOS-011195-14	GW	1	X	X	X	X	X					
			TOTAL NUMBER OF CONTAINERS		8										

RELINQUISHED BY: ① [signature]	DATE: 1/11/95 TIME: 1600	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: FED EX d/N AIR BILL NUMBER: 3482597694

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: John Schwaller, Dave Brytowski

RECEIVED FOR LABORATORY BY: Kathy Graves

DATE: 950112 TIME: 10:20am

№ 00454

1007(FORMS) — DEC 6, 93 — REV.D — (AF-01)

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory N: DURATEK

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN MUNICIPAL LANDFILL

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: John Schwaller

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	LEAD	MANGANESE	ALUMINUM	COPPER	NICKEL	ZINC	REMARKS
	1/5/95	1600	W-3482-JOS-010995-08	G.W.	1	X	X	X	X	X					all w/ NITRIC
	1/10/95	1200	W-3482-JOS-011095-09MS/MSD	GW	2	X	X	X	X	X					
	1/10/95	1700	W-3482-JOS-011095-10	GW	1	X	X	X	X	X					
	1/10/95	1800	W-3482-JOS-011095-11	GW	1	X	X	X	X	X					
	1/11/95	0930	W-3482-JOS-011195-12	GW	1	X	X	X	X	X					
	1/11/95	1030	SW-3482-JOS-011195-13	GW	1			X			X	X	X	X	
	1/11/95	1100	W-3482-JOS-011195-14	GW	1	X	X	X	X	X					
			TOTAL NUMBER OF CONTAINERS		8										

RELINQUISHED BY: ① [signature]	DATE: 1/11/95 TIME: 16:[illegible]	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: FED EX d/n AIR BILL NUMBER: 3482597694

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: John Schwaller, Dave Brytowski

RECEIVED FOR LABORATORY BY: Kathy Graves

DATE: 950112 TIME: 10.20am

№ 00454

7(FO[illegible] DE[illegible] 13 — [illegible] — ([illegible]

QUALITY CONTROL SECTION

Quanterra
Environmental
Services

QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant.

Quanterra
Environmental
Services

INTRA-LAB BLANK REPORT

LAB #: ASD270017

METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE
		BATCH:5121006			
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95
Manganese	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/02/95

NOTE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory): DUNN TERRA

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN MUN. LANDFILL

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: JOHN SCHWALLIE

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	Lead	Manganese					REMARKS
	4/25/95	1130	GW-3482-JOS 042595 016	GW	1	X	X	X	X	X					Preserved w/ HNO_3 -
		1730	GW-3482-JOS 042595 017		1										
		1700	GW-3482-JOS 042595 018		1										
		1530	GW-3482-JOS 042595 019		1										
		1800	GW-3482-JOS 042595 020		1										
	4/26/95	1500	GW-3482-JOS 042695 021		1										
		1530	GW-3482-JOS 042695 022		1										
		1800	GW-3482-JOS 042695 024		1										

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY: ① [signature]	DATE 4/26/95 TIME 1800	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: FED-EX O/N

AIR BILL NUMBER: 5202184341

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Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: JOHN SCHWALLIE, DAVID BRZYTOWSKI

RECEIVED FOR LABORATORY BY: [signature]

DATE: 950427 TIME: 9:45am

00610

Quanterra Incorporated
4101 Shuttle Drive, NW
North Canton, Ohio 44720

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216 497.0772 Fax

Quanterra
Environmental Services

RECEIVED

MAY 19 1995

ANALYTICAL REPORT

PROJECT NO. 1482

CEDARTOWN MUNICIPAL LANDFILL

JOANNE STAUBITZ

CONESTOGA-ROVERS & ASSOC., LTD.

QUANTERRA INCORPORATED

Daniel J. Wright
Project Manager

May 18, 1995

Quanterra
Environmental
Services

SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

NO.	LABORATORY ID	SAMPLE IDENTIFICATION
A4A9Q	A5E020030-001	GW-3482-JOS-042795-026
A4A9R	A5E020030-002	GW-3482-JOS-042895-023
A4A9T	A5E020030-003	SW-3482-JOS-042895-002
A4A9V	A5E020030-004	GW-3482-JOS-042895-027

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-042795-026

WO #: A4A9Q
LAB #: ASE020030-001
MATRIX: WATER

DATE SAMPLED: 4/27/95
DATE RECEIVED: 5/01/95

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	5/08- 5/12/95	5128079
Cadmium	ND	5.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079
Chromium	173	10.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079
Manganese	888	10.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079
Lead	4.6	3.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079

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Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

SW-3482-JOS-042895-002

WO #: A4A9T
LAB #: ASE020030-003
MATRIX: WATER

DATE SAMPLED: 4/28/95
DATE RECEIVED: 5/01/95

- REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Aluminum	ND	200	ug/L	SW846 6010A	5/08- 5/11/95	5128079
Chromium	ND	10.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079
Copper	ND	5.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079
Nickel	ND	40.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079
Zinc	ND	20.0	ug/L	SW846 6010A	5/08- 5/12/95	5128079
Lead	ND	3.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Incorporated
4101 Shuttel Drive, NW
North Canton, Ohio 44720

216 497-9396 Telephone
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ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUNICIPAL LANDFILL

JOANNE STAUBITZ

CONESTOGA-ROVERS & ASSOC.,LTD.

QUANTERRA INCORPORATED

Daniel J. Wright
Project Manager

February 7, 1995

PROJECT NARRATIVE

The following report contains the analytical results for one water sample submitted to Quanterra-North Canton by Conestoga Rovers & Associates, LTD. from the Cedartown Municipal Landfill Site, project number 3482. The sample was received January 25, 1995, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The sample presented in this report was analyzed for the parameters listed on the following page in accordance with the methods indicated. Preliminary results were provided by facsimile transmission to Joanne Staubitz and John Schwaller on February 3, 1995. A summary of QC data for this analysis is included at the end of the report.

SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

WO #	LABORATORY ID	SAMPLE IDENTIFICATION
A2EJW	A5A250014-001	W-3482-JOS-012395-15 1-23-95 1730

QUALITY CONTROL SECTION

QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The matrix spike and matrix spike duplicate (MS/MSD) contained in this quality control report were generated as part of the laboratory QA/QC program requirements. These requirements include the analysis of a MS/MSD on a one in twenty basis. Therefore, the associated batch number indicated on the MS/MSD report may not reflect the same batch number as those of the samples contained in the analytical report.

"DIL" in the Quality Control Section means that due to high analyte concentration in the sample, the matrix spiking analytes added to the sample are diluted out and cannot be quantitated.

INTRA-LAB BLANK REPORT

LAB #: A5A250014

- METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION ANALYSIS DAT
		BATCH:5025088			
Beryllium	ND	5.0	ug/L	SW846 6010A	1/25- 1/26/9
Cadmium	ND	5.0	ug/L	SW846 6010A	1/25- 1/26/9
Chromium	ND	10.0	ug/L	SW846 6010A	1/25- 1/26/9
Manganese	ND	10.0	ug/L	SW846 6010A	1/25- 1/26/9
Lead	ND	5.0	ug/L	SW846 6010A	1/25- 1/30/9

NOTE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

METALS SPIKE REPORT

WATER - ICP

- -METALS- -

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION-ANALYSIS DATE	W/O#
Silver	101	99	(61-126)	2	(0-20)	1/05-1/08/95	A23R5
Aluminum	112	108	(56-147)	4	(0-20)	1/03-1/09/95	A23CV
Arsenic	110	108	(51-146)	2	(0-20)	1/05-1/08/95	A23R5
Boron	93	100	(73-110)	7	(0-20)	1/10-1/17/95	A23CV
Barium	105	102	(79-116)	3	(0-20)	1/05-1/08/95	A23R5
Beryllium	111	108	(76-117)	3	(0-20)	1/05-1/08/95	A23R5
Calcium	103	115	(40-146)	6	(0-20)	1/05-1/08/95	A23R5
Cadmium	103	101	(70-109)	2	(0-20)	1/05-1/08/95	A23R5
Cobalt	103	100	(75-110)	3	(0-20)	1/05-1/08/95	A23R5
Chromium	104	101	(74-117)	3	(0-20)	1/05-1/08/95	A23R5
Copper	102	99	(77-112)	3	(0-20)	1/05-1/08/95	A23R5
Iron	96	95	(45-146)	1	(0-20)	1/03-1/09/95	A23R5
Potassium	116	113	(67-123)	3	(0-20)	1/05-1/08/95	A23R5
Magnesium	102	103	(71-112)	1	(0-20)	1/05-1/08/95	A23R5
Manganese	106	104	(57-131)	2	(0-20)	1/05-1/08/95	A23R5
Molybdenum	111	106	(90-114)	5	(0-20)	1/03-1/09/95	A23CV
Sodium	105	98	(40-144)	7	(0-20)	1/05-1/12/95	A23R5
Nickel	103	101	(73-109)	2	(0-20)	1/05-1/08/95	A23R5
Lead	103	101	(72-114)	2	(0-20)	1/05-1/08/95	A23R5
Antimony	101	99	(73-112)	2	(0-20)	1/05-1/08/95	A23R5
Selenium	107	104	(30-175)	3	(0-20)	1/05-1/08/95	A23R5
Tin	113	101	(73-123)	11	(0-20)	1/05-1/08/95	A23R5
Strontium	105	101	(83-112)	4	(0-20)	12/27-12/28/94	A1THD
Titanium	102	103	(80-111)	1	(0-20)	1/20-1/21/93	B2186
Thallium	94	99	(57-121)	5	(0-20)	1/03-1/09/95	A23CV
Tungsten	99	109	(72-112)	10	(0-20)	9/07-9/08/93	F3784
Vanadium	103	100	(79-112)	3	(0-20)	1/05-1/08/95	A23R5
Zinc	110	108	(67-118)	2	(0-20)	1/05-1/08/95	A23R5
Osmium	107	111	(80-120)	4	(0-20)	12/22/94-1/03/95	A1T6V

Quanterra Incorporated
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[illegible] Canton, Ohio 44720

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[illegible] Fax

Quanterra
Environmental Services

Rec'd CRA

MAY [illegible]

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUNICIPAL LANDFILL

JOANNE STAUBITZ

CONESTOGA-ROVERS & ASSOC., LTD.

QUANTERRA INCORPORATED

Daniel J. Wright
Project Manager

May 5, 1995

Quanterra
Environmental
Services

ANALYTICAL METHODS SUMMARY

Parameters	Methods
Beryllium	SW846 6010A
Cadmium	SW846 6010A
Chromium	SW846 6010A
Manganese	SW846 6010A
Lead	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste. Physical/Chemical Methods". Third Edition. September. 1986 and subsequent revisions

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-042595-016 (MS/MSD)

WO #: A47MP
LAB #: ASD270017-001
MATRIX: WATER

DATE SAMPLED: 4/25/95
DATE RECEIVED: 4/27/95

- REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Manganese	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
[illegible]	ND	3.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-042595-018

WO #: A47MV
LAB #: A5D270017-003
MATRIX: WATER

DATE SAMPLED: 4/25/95
DATE RECEIVED: 4/27/95

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95	512100
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95	512100
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95	512100
Manganese	83.6	10.0	ug/L	SW846 6010A	5/01- 5/02/95	512100
Lead	4.8	3.0	ug/L	SW846 6010A	5/01- 5/02/95	512100

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC., LTD.

GW-3482-JOS-042595-020

WO #: A47N0
LAB #: ASD270017-005
MATRIX: WATER

DATE SAMPLED: 4/25/95
DATE RECEIVED: 4/27/95

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95	512100
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95	512100
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95	512100
Manganese	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95	512100
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/02/95	512100

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-042695-022

WO #: A47N3
LAB #: ASD270017-007
MATRIX: WATER

DATE SAMPLED: 4/26/95
DATE RECEIVED: 4/27/95

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Manganese	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
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ANALYTICAL METHODS SUMMARY

Parameters	Methods
Beryllium	SW846 6010A
Cadmium	SW846 6010A
Chromium	SW846 6010A
Manganese	SW846 6010A
Lead	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods". Third Edition, September, 1986 and subsequent revisions

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Environmental Services

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MAY [illegible] 1995

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUNICIPAL LANDFILL

JOANNE STAUBITZ

CONESTOGA-ROVERS & ASSOC., LTD.

QUANTERRA INCORPORATED

Daniel J. Wright
Project Manager

May 5, 1995

METALS SPIKE REPORT

WATER - ICP

- - - - - - - - - - - - - - - - - - - -METALS- - - - - - - - - - - - - - - - - - - -

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION-ANALYSIS DATE	W/O#
Silver	101	99	(61-126)	2	(0-20)	1/05-1/08/95	A23R5
Aluminum	112	108	(56-147)	4	(0-20)	1/03-1/09/95	A23CV
Arsenic	110	108	(51-146)	2	(0-20)	1/05-1/08/95	A23R5
Boron	93	100	(73-110)	7	(0-20)	1/10-1/17/95	A23CV
Barium	105	102	(79-116)	3	(0-20)	1/05-1/08/95	A23R5
Beryllium	111	108	(76-117)	3	(0-20)	1/05-1/08/95	A23R5
Calcium	103	115	(40-146)	6	(0-20)	1/05-1/08/95	A23R5
Cadmium	103	101	(70-109)	2	(0-20)	1/05-1/08/95	A23R5
Cobalt	103	100	(75-110)	3	(0-20)	1/05-1/08/95	A23R5
Chromium	104	101	(74-117)	3	(0-20)	1/05-1/08/95	A23R5
Copper	102	99	(77-112)	3	(0-20)	1/05-1/08/95	A23R5
Iron	96	95	(45-146)	1	(0-20)	1/03-1/09/95	A23R5
Potassium	116	113	(67-123)	3	(0-20)	1/05-1/08/95	A23R5
Magnesium	102	103	(71-112)	1	(0-20)	1/05-1/08/95	A23R5
Manganese	106	104	(57-131)	2	(0-20)	1/05-1/08/95	A23R5
Molybdenum	111	106	(90-114)	5	(0-20)	1/03-1/09/95	A23CV
Sodium	105	98	(40-144)	7	(0-20)	1/05-1/12/95	A23R5
Nickel	103	101	(73-109)	2	(0-20)	1/05-1/08/95	A23R5
Lead	103	101	(72-114)	2	(0-20)	1/05-1/08/95	A23R5
Antimony	101	99	(73-112)	2	(0-20)	1/05-1/08/95	A23R5
Selenium	107	104	(30-175)	3	(0-20)	1/05-1/08/95	A23R5
Tin	113	101	(73-123)	11	(0-20)	1/05-1/08/95	A23R5
Strontium	105	101	(83-112)	4	(0-20)	12/27-12/28/94	A1THD
Titanium	102	103	(80-111)	1	(0-20)	1/20-1/21/93	B2186
Thallium	94	99	(57-121)	5	(0-20)	1/03-1/09/95	A23CV
Tungsten	99	109	(72-112)	10	(0-20)	9/07-9/08/93	F3784
Vanadium	103	100	(79-112)	3	(0-20)	1/05-1/08/95	A23R5
Zinc	110	108	(67-118)	2	(0-20)	1/05-1/08/95	A23R5
Osmium	107	111	(80-120)	4	(0-20)	12/22/94-1/03/95	A1T6V

INTRA-LAB BLANK REPORT

LAB #: A5A250014

- METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION ANALYSIS DATE
		BATCH:5025088			
Beryllium	ND	5.0	ug/L	SW846 6010A	1/25- 1/26/95
Cadmium	ND	5.0	ug/L	SW846 6010A	1/25- 1/26/95
Chromium	ND	10.0	ug/L	SW846 6010A	1/25- 1/26/95
Manganese	ND	10.0	ug/L	SW846 6010A	1/25- 1/26/95
Lead	ND	5.0	ug/L	SW846 6010A	1/25- 1/30/95

NOTE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The matrix spike and matrix spike duplicate (MS/MSD) contained in this quality control report were generated as part of the laboratory QA/QC program requirements. These requirements include the analysis of a MS/MSD on a one in twenty basis. Therefore, the associated batch number indicated on the MS/MSD report may not reflect the same batch number as those of the samples contained in the analytical report.

"DIL" in the Quality Control Section means that due to high analyte concentration in the sample, the matrix spiking analytes added to the sample are diluted out and cannot be quantitated.

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-042595-020

WO #: A47N0
LAB #: A5D270017-005
MATRIX: WATER

DATE SAMPLED: 4/25/95
DATE RECEIVED: 4/27/95

- REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95	512100
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95	512100
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95	512100
Manganese	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95	512100
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/02/95	512100

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-042695-022

WO #: A47N3
LAB #: ASD270017-007
MATRIX: WATER

DATE SAMPLED: 4/26/95
DATE RECEIVED: 4/27/95

- REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Manganese	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/02/95	5121006

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

QUALITY CONTROL SECTION

SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

WO #	LABORATORY ID	SAMPLE IDENTIFICATION
A2EJW	A5A250014-001	W-3482-JOS-012395-15 1-23-95 1730

PROJECT NARRATIVE

The following report contains the analytical results for one water sample submitted to Quanterra-North Canton by Conestoga Rovers & Associates, LTD. from the Cedartown Municipal Landfill Site, project number 3482. The sample was received January 25, 1995, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The sample presented in this report was analyzed for the parameters listed on the following page in accordance with the methods indicated. Preliminary results were provided by facsimile transmission to Joanne Staubitz and John Schwaller on February 3, 1995. A summary of QC data for this analysis is included at the end of the report.

Quanterra Incorporated
4101 Shuttel Drive, NW
North Canton, Ohio 44720

216 497-9396 Telephone
216 497-0772 Fax

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUNICIPAL LANDFILL

JOANNE STAUBITZ

CONESTOGA-ROVERS & ASSOC.,LTD.

QUANTERRA INCORPORATED

Daniel J. Wright
Project Manager

February 7, 1995

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

SW-3482-JOS-042895-002

WO #: A4A9T
LAB #: A5E020030-003
MATRIX: WATER

DATE SAMPLED: 4/28/95
DATE RECEIVED: 5/01/95

- REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Aluminum	ND	200	ug/L	SW846 6010A	5/08- 5/11/95	5128079
Chromium	ND	10.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079
Copper	ND	5.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079
Nickel	ND	40.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079
Zinc	ND	20.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079
Lead	ND	3.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-042795-026

WO #: A4A9Q
LAB #: ASE020030-001
MATRIX: WATER

DATE SAMPLED: 4/27/95
DATE RECEIVED: 5/01/95

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	5/08- 5/12/95	5128079
Cadmium	ND	5.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079
Chromium	173	10.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079
Manganese	888	10.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079
Lead	4.6	3.0	ug/L	SW846 6010A	5/08- 5/11/95	5128079

W: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

WO #	LABORATORY ID	SAMPLE IDENTIFICATION
A4A9Q	A5E020030-001	GW-3482-JOS-042795-026
A4A9R	A5E020030-002	GW-3482-JOS-042895-023
A4A9T	A5E020030-003	GW-3482-JOS-042895-002
A4A9V	A5E020030-004	GW-3482-JOS-042895-027

Quanterra Incorporated
4101 Shuttle Drive, NW
North Canton, Ohio 44720

216 497.0396 Telephone
216 497.0772 Fax

Quanterra
Environmental Services

RECEIVED

MAY 19 1995

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUNICIPAL LANDFILL

JOANNE STAUBITZ

CONESTOGA-ROVERS & ASSOC., LTD.

QUANTERRA INCORPORATED

Daniel J. Wright
Project Manager

May 18, 1995

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory): DUNN FERRA

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN MUN. LANDFILL

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: JOHN SCHWALLER

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	Lead	Manganese					REMARKS
	4/25/95	1130	GW-3482-JOS 042595 016	GW	1	X	X	X	X	X					Preserved w/ HNO_3 -
		1730	GW-3482-JOS 042595 017		1										
		1700	GW-3482-JOS 042595 018		1										
		1530	GW-3482-JOS 042595 019		1										
		1800	GW-3482-JOS 042595 020		1										
	4/26/95	1500	GW-3482-JOS 042695 021		1										
		1530	GW-3482-JOS 042695 022		1										
		1800	GW-3482-JOS 042695 024		1										

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY: ① [signature]	DATE 4/26/95 TIME 1500	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: FED-EX O/N

AIR BILL NUMBER: 5202184341

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: JOHN SCHWALLER, DAVID BRZYTOWSKI

RECEIVED FOR LABORATORY BY: [signature]

DATE: 950427 TIME: 9:45am

00610

Quanterra
Environmental
Services

INTRA-LAB BLANK REPORT

LAB #: ASD270017

METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE
		BATCH:5121006			
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/02/95
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95
Manganese	ND	10.0	ug/L	SW846 6010A	5/01- 5/02/95
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/02/95

NOTE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant.

Quanterra Environmental Services

MATRIX SPIKE REPORT

LAB #: A5E030038-001

METALS

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION - ANALYSIS DATE
		BATCH:5130016 MATRIX:		WATER		
Beryllium	99	102	(76-117)	3.4	(0-20)	5/10- 5/17/95
Cadmium	97	100	(70-109)	3.3	(0-20)	5/10- 5/17/95
Chromium	97	100	(74-117)	3.6	(0-20)	5/10- 5/17/95
Manganese	106	133	(57-131)	23	(0-20)	5/10- 5/17/95
Lead	95	98	(80-120)	3.3	(0-20)	5/10- 5/17/95

NOTE:

Calculations are performed before rounding to avoid round-off errors in calculated results

Quanterra Environmental Services

INTRA-LAB BLANK REPORT

LAB #: A5E030038

METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE
		BATCH:5130016			
Beryllium	ND	5.0	ug/L	SW846 6010A	5/10- 5/16/95
Cadmium	ND	5.0	ug/L	SW846 6010A	5/10- 5/19/95
Chromium	ND	10.0	ug/L	SW846 6010A	5/10- 5/19/95
Manganese	ND	10.0	ug/L	SW846 6010A	5/10- 5/16/95
Lead	ND	3.0	ug/L	SW846 6010A	5/10- 5/17/95

NOTE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): DUNN TEKRA

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN MCW LANDFILL

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: John Schwaller

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Sampling	Calcium	Chromium	Lead	Manganese					REMARKS
	5/1/95	1630	GW-3482-JDS-0501 95-028 MS/MSD	GW	2	X	X	X	X	X					Acidified w/ NNO_3^-
	5/2/95	0830	GW-3482-JDS-0502 95-029	GW	1	✓	✓	✓	✓	✓					✓
	5/1/95	1100	RB-1	W	1	✓	✓	✓	✓	✓					

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
① [signature]	5-2-95	1600	②		
②			③		
③			④		

METHOD OF SHIPMENT: FED EX O/N

AIR BILL NUMBER: 5202184363

White	Fully Executed Copy
Yellow	Receiving Laboratory Copy
Pink	Sampler Copy
Goldenrod	Chemist Copy

SAMPLE TEAM: JOHN SCHWALLER, D. OKOTWSKI

RECEIVED FOR LABORATORY BY: Kathy Graves

DATE: 950503 TIME: 1120am

00604

Quanterra Incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

216 497-9396 Telephone
216 497-0772 Fax

Quanterra
Environmental Services

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUNICIPAL LANDFILL

JOANNE STAUBITZ

CONESTOGA-ROVERS & ASSOC.,LTD.

QUANTERRA INCORPORATED

Daniel J. Wright
Project Manager

June 30, 1995

Quanterra
Environmental Services

PROJECT NARRATIVE

The following report contains the analytical results for one water sample submitted to Quanterra-North Canton by Conestoga-Rovers and Associates, Inc. from the Cedartown Municipal Landfill Site, project number 3482. The sample was received June 8, 1995, according to documented sample acceptance procedures.

Quanterra, Inc. utilizes only USEPA approved methods and instrumentation in all analytical work. The sample presented in this report was analyzed for the parameters listed on the following page in accordance with the methods indicated. Results were provided by facsimile transmission to Joanne Staubitz on June 23, 1995. A summary of QC data for this analysis is included at the end of the report.

Quanterra
Environmental Services

ANALYTICAL METHODS SUMMARY

Parameters	Methods
Beryllium	SW846 6010A
Cadmium	SW846 6010A
Chromium	SW846 6010A
Manganese	SW846 6010A
Lead	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, September, 1986 and subsequent revisions

Quanterra
Environmental
Services

QUALITY CONTROL SECTION

Quanterra
Environmental Services

QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The matrix spike and matrix spike duplicate (MS/MSD) contained in this quality control report were generated as part of the laboratory QA/QC program requirements. These requirements include the analysis of a MS/MSD on a one in twenty basis. Therefore, the associated batch number indicated on the MS/MSD report may not reflect the same batch number as those of the samples contained in the analytical report.

Quanterra
Environmental Services

CHECK SAMPLE REPORT

LAB #: A5F080013

METALS

COMPOUND	SPIKE PERCENT RECOVERY	Q/C LIMITS	PREPARATION - ANALYSIS DATE
	BATCH:5160011		
Beryllium	105	(80-118)	6/09- 6/15/95
Cadmium	105	(80-108)	6/09- 6/15/95
Chromium	102	(83-114)	6/09- 6/15/95
Manganese	104	(81-112)	6/09- 6/15/95
Lead	106	(80-120)	6/09- 6/15/95

Quanterra
Environmental Services

SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

WO #	LABORATORY ID	SAMPLE IDENTIFICATION	DATE/TIME SAMPLE
A4WN0	A5F080013-001	GW-3482-JOS-060795-01	6/07/95 17:30

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-060795-01

WO #: A4WN0
LAB #: A5F080013-001
MATRIX: WATER

DATE SAMPLED: 6/07/95
TIME SAMPLED: 17:30
DATE RECEIVED: 6/08/95

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	6/09- 6/15/95	51600[illegible]1
Cadmium	ND	5.0	ug/L	SW846 6010A	6/09- 6/15/95	51600[illegible]1
Chromium	ND	10.0	ug/L	SW846 6010A	6/09- 6/15/95	5160011
Manganese	4,410	10.0	ug/L	SW846 6010A	6/09- 6/15/95	51600 1
Lead	3.2	3.0	ug/L	SW846 6010A	6/09- 6/15/95	51600 1

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

INTRA-LAB BLANK REPORT

LAB #: A5F080013

- METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE
		BATCH:5160011			
Beryllium	ND	5.0	ug/L	SW846 6010A	6/09- 6/15/95
Cadmium	ND	5.0	ug/L	SW846 6010A	6/09- 6/15/95
Chromium	ND	10.0	ug/L	SW846 6010A	6/09- 6/19/95
Manganese	ND	10.0	ug/L	SW846 6010A	6/09- 6/15/95
Lead	ND	3.0	ug/L	SW846 6010A	6/09- 6/15/95

NOTE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

MATRIX SPIKE REPORT

LAB #: A5F050006-001

METALS

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION - ANALYSIS DATE
		BATCH:5160011 MATRIX:		WATER		
Silver	104	94	(61-126)	11	(0-20)	6/09- 6/15/95
Arsenic	120	110	(44-140)	8.7	(0-20)	6/09- 6/14/95
Barium	109	96	(79-116)	13	(0-20)	6/09- 6/15/95
Beryllium	114	99	(76-117)	14	(0-20)	6/09- 6/15/95
Cadmium	105	93	(80-120)	12	(0-20)	6/09- 6/15/95
Cobalt	106	96	(75-110)	10	(0-20)	6/09- 6/15/95
Chromium	109	98	(74-117)	11	(0-20)	6/09- 6/15/95
Copper	107	96	(77-112)	11	(0-20)	6/09- 6/15/95
Nickel	109	97	(73-109)	11	(0-20)	6/09- 6/15/95
Lead	106	93	(80-120)	12	(0-20)	6/09- 6/15/95
Antimony	108	99	(73-112)	8.8	(0-20)	6/09- 6/15/95
Selenium	79	72	(10-121)	8.5	(0-20)	6/09- 6/12/95
Thallium	107	96	(80-120)	11	(0-20)	6/09- 6/15/95
Vanadium	108	97	(79-112)	12	(0-20)	6/09- 6/15/95
Zinc	110	100	(67-118)	9.4	(0-20)	6/09- 6/15/95

NOTE:

Calculations are performed before rounding to avoid round-off errors in calculated results

Quanterra
Environmental Services

METALS SPIKE REPORT

WATER - ICP

- - - - - - - - - - - - - - - - - - - -METALS- - - - - - - - - - - - - - - - - - - -

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION-ANALYSIS DATE	W/O#
Silver	101	96	(61-126)	5	(0-20)	6/02-6/07/95	A4P8T
Aluminum	84	86	(56-147)	2	(0-20)	5/22-5/24/95	A4L9E
Arsenic	95	94	(51-146)	1	(0-20)	5/26-6/01/95	A4LM1
Boron	90	90	(73-110)	0	(0-20)	3/20-3/24/95	A3EM4
Barium	100	95	(79-116)	5	(0-20)	6/02-6/07/95	A4P8T
Beryllium	105	100	(76-117)	5	(0-20)	6/02-6/07/95	A4P8T
Calcium	99	87	(40-146)	13	(0-20)	6/02-6/07/95	A4P8T
Cadmium	106	101	(70-109)	5	(0-20)	6/02-6/07/95	A4P8T
Cobalt	103	98	(75-110)	5	(0-20)	6/02-6/07/95	A498T
Chromium	105	101	(74-117)	4	(0-20)	6/02-6/07/95	A4P8T
Copper	101	97	(77-112)	4	(0-20)	6/02-6/07/95	A4P8T
Iron	98	86	(45-146)	13	(0-20)	6/02-6/07/95	A4P8T
Potassium	91	85	(67-123)	7	(0-20)	6/02-6/07/95	A4P8T
Magnesium	99	93	(71-112)	6	(0-20)	6/02-6/07/95	A4P8T
Manganese	104	97	(57-131)	7	(0-20)	6/02-6/07/95	A4P8T
Molybdenum	96	96	(90-114)	0	(0-20)	3/20-3/21/95	A3E8E
Sodium	93	95	(40-144)	2	(0-20)	6/02-6/07/95	A4P8T
Nickel	104	99	(73-109)	5	(0-20)	6/02-6/07/95	A4P8T
Lead	103	96	(72-114)	7	(0-20)	6/02-6/07/95	A4P8T
Antimony	105	100	(73-112)	5	(0-20)	6/02-6/07/95	A4P8T
Selenium	97	97	(30-175)	0	(0-20)	5/26-6/01/95	A4LM1
Tin	113	104	(73-123)	8	(0-20)	5/22-5/25/95	A4M6D
Strontium	95	90	(83-112)	5	(0-20)	6/05-6/08/95	A4Q72
Titanium	93	94	(80-111)	1	(0-20)	3/20-3/24/95	A3E8E
Thallium	95	90	(57-121)	5	(0-20)	6/02-6/07/95	A4P8T
Tungsten	90	97	(72-112)	7	(0-20)	3/03-3/06/95	A31JC
Vanadium	104	98	(79-112)	6	(0-20)	6/02-6/07/95	A4P8T
Zinc	100	109	(67-118)	9	(0-20)	6/02-6/07/95	A4P8T
Osmium	92	98	(80-120)	6	(0-20)	3/16-3/29/95	A399A
Lithium	96	96	(80-120)	0	(0-20)	3/22-3/29/95	A3DEK

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): QUANTERA

REFERENCE NUMBER: 3452

PROJECT NAME: CORRECTIONVILLE MUN. LANDFILL

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: John Schwalla

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Cadmium	Barium	Chromium	Lead	Manganese					REMARKS
	6-7-95	1730	GW-3452 TS-060795-01	GW	2	X	X	X	X	X					w/ HNO_3
															STANDARD T/A
TOTAL NUMBER OF CONTAINERS					2										

RELINQUISHED BY: ① [signature]	DATE: 6-7-95 TIME: 2100	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: FED EX B/N AIR BILL NUMBER:

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: J. Schwalla

RECEIVED FOR LABORATORY BY: Kathy Graves
DATE: 95/06/09 TIME: 11:00 AM

70633

Quanterra Incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

216 497-9396 Telephone
216 497-0772 Fax

Quanterra
Environmental Services

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUN. LANDFILL

Joanne Staubitz

CONESTOGA-ROVERS & ASSOC.,LTD.

QUANTERRA INCORPORATED

Daniel J. Wright
Project Manager

August 9, 1995

Quanterra
Environmental Services

PROJECT NARRATIVE

The following report contains the analytical results for four water samples submitted to Quanterra-North Canton by Conestoga Rovers & Associates, Inc. from the Cedartown Municipal Landfill Site, project number 3482. The samples were received July 21 1995, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. Preliminary results were provided by facsimile transmission to JoAnne Staubitz on August 3, 1995. A summary of QC data for these analyses is included at the end of the report.

Quanterra
Environmental Services

ANALYTICAL METHODS SUMMARY

Parameters	Methods
Total recoverable metals	SW846 6010A
ICP Trace (Inductively Coupled Plasma)	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and Final Update I (7/92).

Quanterra
Environmental Services

SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

WO #	LABORATORY ID	SAMPLE IDENTIFICATION
C0CE2	A5G240121-001	GW-3482-JOS-071995-01
C0CE6	A5G240121-002	GW-3482-JOS-071995-02
C0CE8	A5G240121-003	GW-3482-JOS-071995-03
C0CE9	A5G240121-004	GW-3482-JOS-071995-04

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-071995-01

WO #: C0CE2
LAB #: A5G240121-001
MATRIX: WATER

DATE SAMPLED: 7/19/95
DATE RECEIVED: 7/21/95

- **REQUESTED METALS** -

PARAMETER	RESULT ug/L	REPORTING LIMIT	DILUTION FACTOR	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	1.00	SW846 6010A	7/25- 8/01/95	5206005
Beryllium	ND	5.0	1.00	SW846 6010A	7/25- 8/01/95	5206005
Cadmium	ND	5.0	1.00	SW846 6010A	7/25- 8/01/95	5206005
Chromium	ND	10.0	1.00	SW846 6010A	7/25- 8/01/95	5206005
Manganese	**232**	**10.0**	**1.00**	**SW846 6010A**	**7/25- 8/01/95**	**5206005**

NOTE: AS RECEIVED
ND **NOT DETECTED AT THE STATED REPORTING LIMIT**

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOB-071995-02

WO #: C0CE6
LAB #: A5G240121-002
MATRIX: WATER

DATE SAMPLED: 7/19/95
DATE RECEIVED: 7/21/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT ug/L	REPORTING LIMIT	DILUTION FACTOR	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	1.00	SW846 6010A	7/25- 8/01/95	5206005
Beryllium	ND	5.0	1.00	SW846 6010A	7/25- 8/01/95	5206[illegible]5
Cadmium	ND	5.0	1.00	SW846 6010A	7/25- 8/01/95	5206[illegible]5
Chromium	ND	10.0	1.00	SW846 6010A	7/25- 8/01/95	5206[illegible]5
Manganese	**220**	**10.0**	**1.00**	**SW846 6010A**	**7/25- 8/01/95**	**5206[illegible]5**

NOTE: AS RECEIVED
ND **NOT DETECTED AT THE STATED REPORTING LIMIT**

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-071995-03

WO #: C0CE8
LAB #: A5G240121-003
MATRIX: WATER

DATE SAMPLED: 7/19/95
DATE RECEIVED: 7/21/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT ug/L	REPORTING LIMIT	DILUTION FACTOR	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	1.00	SW846 6010A	7/25- 8/01/95	5206005
Beryllium	ND	5.0	1.00	SW846 6010A	7/25- 8/01/95	5206005
Cadmium	ND	5.0	1.00	SW846 6010A	7/25- 8/01/95	5206005
Chromium	ND	10.0	1.00	SW846 6010A	7/25- 8/01/95	5206005
Manganese	72.6	10.0	1.00	SW846 6010A	7/25- 8/01/95	5206005

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-071995-04

WO #: C0CE9
LAB #: A5G240121-004
MATRIX: WATER

DATE SAMPLED: 7/19/9
DATE RECEIVED: 7/21/95

- - - - - - - - - - - - - - - - - - **REQUESTED METALS** - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT ug/L	REPORTING LIMIT	DILUTION FACTOR	METHOD	PREPARATION - ANALYSIS DATE	QC BATC
Lead	ND	3.0	1.00	SW846 6010A	7/25- 8/01/95	520600
Beryllium	ND	5.0	1.00	SW846 6010A	7/25- 8/01/95	5206
Cadmium	ND	5.0	1.00	SW846 6010A	7/25- 8/01/95	5206
Chromium	ND	10.0	1.00	SW846 6010A	7/25- 8/01/95	5206
Manganese	**2,380**	**10.0**	**1.00**	**SW846 6010A**	**7/25- 8/01/95**	**5206**

NOTE: AS RECEIVED
ND **NOT DETECTED AT THE STATED REPORTING LIMIT**

Quanterra
Environmental
Services

QUALITY CONTROL SECTION

Quanterra
Environmental Services

QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The matrix spike and matrix spike duplicate (MS/MSD) contained in this quality control report were generated as part of the laboratory QA/QC program requirements. These requirements include the analysis of a MS/MSD on a one in twenty basis. Therefore, the associated batch number indicated on the MS/MSD report may not reflect the same batch number as those of the samples contained in the analytical report.

Quanterra
Environmental Services

CHECK SAMPLE REPORT

LAB #: A5G240121

METALS

COMPOUND	SPIKE PERCENT RECOVERY	Q/C LIMITS	PREPARATION - ANALYSIS DATE	DILUTION FACTOR
	BATCH:5206005			
Beryllium	108	(80-120)	7/25- 7/27/95	1.00
Cadmium	108	(80-120)	7/25- 7/27/95	1.00
Chromium	100	(80-120)	7/25- 7/27/95	1.00
Manganese	103	(80-120)	7/25- 7/27/95	1.00
Lead	100	(80-120)	7/25- 8/01/95	1.00

Quanterra Environmental Services

METHOD BLANK REPORT

LAB #: A5G240121

METALS

PARAMETER	RESULT ug/L	REPORTING LIMIT	DIL FACTOR	METHOD	PREPARATION - ANALYSIS DATE
		BATCH:5206005			
Beryllium	ND	5.0	1.00	SW846 6010A	7/25- 7/27/95
Cadmium	ND	5.0	1.00	SW846 6010A	7/25- 7/27/95
Chromium	ND	10.0	1.00	SW846 6010A	7/25- 7/27/95
Manganese	ND	10.0	1.00	SW846 6010A	7/25- 7/27/95
Lead	ND	3.0	1.00	SW846 6010A	7/25- 8/01/95

NOTE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

METALS SPIKE REPORT

WATER - ICP

- - - - - - - - - - - - - - - - - - - -METALS- - - - - - - - - - - - - - - - - - - -

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION-ANALYSIS DATE	W/O#
Silver	101	96	(61-126)	5	(0-20)	6/02-6/07/95	A4P[illegible]
Aluminum	84	86	(56-147)	2	(0-20)	5/22-5/24/95	A4L9P
Arsenic	95	94	(51-146)	1	(0-20)	5/26-6/01/95	A4L[illegible]
Boron	90	90	(73-110)	0	(0-20)	3/20-3/24/95	A3E[illegible]
Barium	100	95	(79-116)	5	(0-20)	6/02-6/07/95	A4P8T
Beryllium	105	100	(76-117)	5	(0-20)	6/02-6/07/95	A4P[illegible]
Calcium	99	87	(40-146)	13	(0-20)	6/02-6/07/95	A4P8T
Cadmium	106	101	(70-109)	5	(0-20)	6/02-6/07/95	A4P8T
Cobalt	103	98	(75-110)	5	(0-20)	6/02-6/07/95	A49[illegible]
Chromium	105	101	(74-117)	4	(0-20)	6/02-6/07/95	A4P8T
Copper	101	97	(77-112)	4	(0-20)	6/02-6/07/95	A4P[illegible]
Iron	98	86	(45-146)	13	(0-20)	6/02-6/07/95	A4[illegible]
Potassium	91	85	(67-123)	7	(0-20)	6/02-6/07/95	A4P8T
Magnesium	99	93	(71-112)	6	(0-20)	6/02-6/07/95	A4P[illegible]
Manganese	104	97	(57-131)	7	(0-20)	6/02-6/07/95	A4P[illegible]
Molybdenum	96	96	(90-114)	0	(0-20)	3/20-3/21/95	A3E8H
Sodium	93	95	(40-144)	2	(0-20)	6/02-6/07/95	A4P[illegible]
Nickel	104	99	(73-109)	5	(0-20)	6/02-6/07/95	A4P[illegible]
Lead	103	96	(72-114)	7	(0-20)	6/02-6/07/95	A4P[illegible]
Antimony	105	100	(73-112)	5	(0-20)	6/02-6/07/95	A4P[illegible]
Selenium	97	97	(30-175)	0	(0-20)	5/26-6/01/95	A4LM[illegible]
Tin	113	104	(73-123)	8	(0-20)	5/22-5/25/95	A4M[illegible]
Strontium	95	90	(83-112)	5	(0-20)	6/05-6/08/95	A4Q7
Titanium	93	94	(80-111)	1	(0-20)	3/20-3/24/95	A3E8H
Thallium	95	90	(57-121)	5	(0-20)	6/02-6/07/95	A4P8[illegible]
Tungsten	90	97	(72-112)	7	(0-20)	3/03-3/06/95	A31J[illegible]
Vanadium	104	98	(79-112)	6	(0-20)	6/02-6/07/95	A4P8T
Zinc	100	109	(67-118)	9	(0-20)	6/02-6/07/95	A4P8[illegible]
Osmium	92	98	(80-120)	6	(0-20)	3/16-3/29/95	A399A
Lithium	96	96	(80-120)	0	(0-20)	3/22-3/29/95	A3DEK

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): Quanterra

REFERENCE NUMBER: 3482

PROJECT NAME: CLARKTOWN MUN. LANDFILL

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: JOHN SCHWALLER

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Barium	Chromium	Manganese	Lead					REMARKS
	7/19/95	1230	GW-3482-JS-071995-01	G.W.	1	X	X	X	X	X					PRES. w/ HNO_3
	↓	1400	GW-3482-JS-071995-02	↓	1	↓	↓	↓	↓	↓					
		1630	GW-3482-JS-071995-03		1										
		1600	GW-3482-JS-071995-04		1										

TOTAL NUMBER OF CONTAINERS: 4

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
① [signature]	7/20/95	1930	②		
②			③		
③			④		

METHOD OF SHIPMENT: FED-EX O/N

AIR BILL NUMBER: 5202185041

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: JOHN SCHWALLER

RECEIVED FOR LABORATORY BY: Stacy Decker

DATE: 7-21-95 TIME: 9:20 AM.

0066i

Quanterra Environmental Services

Quanterra Incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

216 497-9396 Telephone
216 497-0772 Fax

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUN. LANDFILL

Joanne Staubitz

CONESTOGA-ROVERS & ASSOC.,LTD.

QUANTERRA INCORPORATED

Daniel J. Wright
Project Manager

August 21, 1995

Quanterra
Environmental Services

PROJECT NARRATIVE

The following report contains the analytical results for seven water samples submitted to Quanterra-North Canton by Conestoga-Rovers & Associates, Inc. from the Cedartown Municipal Landfill Site, project number 3482. The samples were received July 22, 1995, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. Results were provided by facsimile transmission to Joanne Staubitz on August 15, 1995. A summary of QC data for these analyses is included at the end of the report.

ANALYTICAL METHODS SUMMARY

Quanterra Environmental Services

Parameters	Methods
Total recoverable metals	SW846 6010A
ICP Trace (Inductively Coupled Plasma)	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and Final Update I (7/92).

Quanterra
Environmental Services

SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

WO #	LABORATORY ID	SAMPLE IDENTIFICATION
C0CDE	A5G240120-001	GW-3482-JOS-072095-05 (MS/MSD)
C0CDH	A5G240120-002	GW-3482-JOS-072095-06
C0CDJ	A5G240120-003	GW-3482-JOS-072095-07
C0CDM	A5G240120-004	GW-3482-JOS-072195-08
C0CDP	A5G240120-005	RB-1
C0CDQ	A5G240120-006	GW-3482-JOS-072195-09
C0CDR	A5G240120-007	SW-3482-JOS-072195-01

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-072095-05 (MS/MSD)

WO #: C0CDE
LAB #: A5G240120-001
MATRIX: WATER

DATE SAMPLED: 7/20/95
DATE RECEIVED: 7/22/95

- - - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	7/25- 8/09/95	52060C
Beryllium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	520600
Cadmium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Chromium	ND	10.0	ug/L	SW846 6010A	7/25- 8/11/95	520600
Manganese	3,050	10.0	ug/L	SW846 6010A	7/25- 8/11/95	520600

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-072095-06

WO #: C0CDH
LAB #: A5G240120-002
MATRIX: WATER

DATE SAMPLED: 7/20/95
DATE RECEIVED: 7/22/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	7/25- 8/09/95	5206005
Beryllium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Cadmium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Chromium	ND	10.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Manganese	1,170	10.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-072095-07

WO #: C0CDJ
LAB #: A5G240120-003
MATRIX: WATER

DATE SAMPLED: 7/20/95
DATE RECEIVED: 7/22/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	7/25- 8/09/95	520600
Beryllium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	520600
Cadmium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	520600
Chromium	ND	10.0	ug/L	SW846 6010A	7/25- 8/11/95	520600
Manganese	ND	10.0	ug/L	SW846 6010A	7/25- 8/11/95	520600

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-072195-08

WO #: COCDM
LAB #: A5G240120-004
MATRIX: WATER

DATE SAMPLED: 7/21/95
DATE RECEIVED: 7/22/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	3.0	3.0	ug/L	SW846 6010A	7/25- 8/09/95	5206005
Beryllium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Cadmium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Chromium	ND	10.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Manganese	1,910	10.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

RB-1

WO #: C0CDP
LAB #: A5G240120-005
MATRIX: WATER

DATE SAMPLED: 7/21/95
DATE RECEIVED: 7/22/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	7/25- 8/09/95	520600
Beryllium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	520600
Cadmium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	520600
Chromium	ND	10.0	ug/L	SW846 6010A	7/25- 8/11/95	520600
Manganese	ND	10.0	ug/L	SW846 6010A	7/25- 8/11/95	520600

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-072195-09

WO #: C0CDQ
LAB #: A5G240120-006
MATRIX: WATER

DATE SAMPLED: 7/21/95
DATE RECEIVED: 7/22/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	7/25- 8/09/95	5206005
Beryllium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Cadmium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Chromium	ND	10.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Manganese	15.0	10.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

SW-3482-JOS-072195-01

WO #: COCDR
LAB #: A5G240120-007
MATRIX: WATER

DATE SAMPLED: 7/21/95
DATE RECEIVED: 7/22/95

- - - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	22.2	3.0	ug/L	SW846 6010A	7/25- 8/09/95	520600
Aluminum	1,870	200	ug/L	SW846 6010A	7/25- 8/11/95	52060C
Chromium	ND	10.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Copper	18.0	5.0	ug/L	SW846 6010A	7/25- 8/11/95	52060C
Nickel	ND	40.0	ug/L	SW846 6010A	7/25- 8/11/95	52060C
Zinc	85.0	20.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

QUALITY CONTROL SECTION

Quanterra
Environmental Services

QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The matrix spike and matrix spike duplicate (MS/MSD) contained in this quality control report were generated as part of the laboratory QA/QC program requirements. These requirements include the analysis of a MS/MSD on a one in twenty basis. Therefore, the associated batch number indicated on the MS/MSD report may not reflect the same batch number as those of the samples contained in the analytical report.

"DIL" in the quality control section means that due to high analyte concentration in the sample, the spiking analytes addded to the sample are diluted out and cannot be quantitated.

Quanterra
Environmental Services

CHECK SAMPLE REPORT

LAB #: A5G240120

- METALS -

COMPOUND	SPIKE PERCENT RECOVERY	Q/C LIMITS	PREPARATION - ANALYSIS DATE
	BATCH:5206005		
Aluminum	100	(80-120)	7/25- 7/27/95
Beryllium	108	(80-120)	7/25- 7/27/95
Cadmium	108	(80-120)	7/25- 7/27/95
Chromium	100	(80-120)	7/25- 7/27/95
Copper	106	(80-120)	7/25- 7/27/95
Manganese	103	(80-120)	7/25- 7/27/95
Nickel	104	(80-120)	7/25- 7/27/95
Lead	100	(80-120)	7/25- 8/01/95
Zinc	105	(80-120)	7/25- 7/27/95

Quanterra
Environmental Services

METHOD BLANK REPORT

LAB #: ASG240120

METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE
		BATCH:5206005			
Aluminum	ND	200	ug/L	SW846 6010A	7/25- 8/11/95
Beryllium	ND	5.0	ug/L	SW846 6010A	7/25- 7/27/95
Cadmium	ND	5.0	ug/L	SW846 6010A	7/25- 7/27/95
Chromium	ND	10.0	ug/L	SW846 6010A	7/25- 7/27/95
Copper	ND	5.0	ug/L	SW846 6010A	7/25- 7/27/95
Manganese	ND	10.0	ug/L	SW846 6010A	7/25- 7/27/95
Nickel	ND	40.0	ug/L	SW846 6010A	7/25- 7/27/95
Lead	ND	3.0	ug/L	SW846 6010A	7/25- 8/01/95
Zinc	ND	20.0	ug/L	SW846 6010A	7/25- 8/01/95

NOTE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

MATRIX SPIKE REPORT

LAB #: A5G240120-001

- METALS -

COMPOUND		SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION - ANALYSIS DATE
			BATCH:5206005 MATRIX:		WATER		
Beryllium		100	100	(80-120)	0	(0-20)	7/25- 8/11/95
Cadmium		106	106	(80-120)	0	(0-20)	7/25- 8/11/95
Chromium		104	106	(80-120)	0.95	(0-20)	7/25- 8/11/95
Manganese	DIL						7/25- 8/11/95
Lead		108	110	(80-120)	1.1	(0-20)	7/25- 8/09/95

NOTE:
DIL Diluted out

Calculations are performed before rounding to avoid round-off errors in calculated results

Quanterra
Environmental Services

METALS SPIKE REPORT

WATER - ICP

- -METALS- -

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION-ANALYSIS DATE	W/O#
Silver	101	96	(61-126)	5	(0-20)	6/02-6/07/95	A4P8T
Aluminum	84	86	(56-147)	2	(0-20)	5/22-5/24/95	A4L9P
Arsenic	95	94	(51-146)	1	(0-20)	5/26-6/01/95	A4LM1
Boron	90	90	(73-110)	0	(0-20)	3/20-3/24/95	A3EM4
Barium	100	95	(79-116)	5	(0-20)	6/02-6/07/95	A4P8T
Beryllium	105	100	(76-117)	5	(0-20)	6/02-6/07/95	A4P8T
Calcium	99	87	(40-146)	13	(0-20)	6/02-6/07/95	A4P8T
Cadmium	106	101	(70-109)	5	(0-20)	6/02-6/07/95	A4P8T
Cobalt	103	98	(75-110)	5	(0-20)	6/02-6/07/95	A498T
Chromium	105	101	(74-117)	4	(0-20)	6/02-6/07/95	A4P8T
Copper	101	97	(77-112)	4	(0-20)	6/02-6/07/95	A4P8T
Iron	98	86	(45-146)	13	(0-20)	6/02-6/07/95	A4P8T
Potassium	91	85	(67-123)	7	(0-20)	6/02-6/07/95	A4P8T
Magnesium	99	93	(71-112)	6	(0-20)	6/02-6/07/95	A4P8T
Manganese	104	97	(57-131)	7	(0-20)	6/02-6/07/95	A4P8T
Molybdenum	96	96	(90-114)	0	(0-20)	3/20-3/21/95	A3E8H
Sodium	93	95	(40-144)	2	(0-20)	6/02-6/07/95	A4P8T
Nickel	104	99	(73-109)	5	(0-20)	6/02-6/07/95	A4P8T
Lead	103	96	(72-114)	7	(0-20)	6/02-6/07/95	A4P8T
Antimony	105	100	(73-112)	5	(0-20)	6/02-6/07/95	A4P8T
Selenium	97	97	(30-175)	0	(0-20)	5/26-6/01/95	A4LM1
Tin	113	104	(73-123)	8	(0-20)	5/22-5/25/95	A4M6D
Strontium	95	90	(83-112)	5	(0-20)	6/05-6/08/95	A4Q72
Titanium	93	94	(80-111)	1	(0-20)	3/20-3/24/95	A3E8H
Thallium	95	90	(57-121)	5	(0-20)	6/02-6/07/95	A4P8T
Tungsten	90	97	(72-112)	7	(0-20)	3/03-3/06/95	A31JQ
Vanadium	104	98	(79-112)	6	(0-20)	6/02-6/07/95	A4P8T
Zinc	100	109	(67-118)	9	(0-20)	6/02-6/07/95	A4P8T
Osmium	92	98	(80-120)	6	(0-20)	3/16-3/29/95	A399A
Lithium	96	96	(80-120)	0	(0-20)	3/22-3/29/95	A3DEK

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): QUANTERRA

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN MUN. LANDFILL

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: JOHN SCHWALLER

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	Manganese	Lead	Aluminum	Copper	Nickel	Zinc	REMARKS
						PARAMETERS									ALL PRES. w/ HNO_3^-
	7/20/95	1030	GW-3482-JDS-072095-05 MS/MSD	GW	2										(* 05 MS/MSD)
	↓	1330	GW-3482-JDS-072095-06	↓	1										
	↓	1730	GW-3482-JDS-072095-07	↓	1										
	7/21/95	1115	GW-3482-JDS-072195-08	↓	1										
	↓	0830	RB-1	D.I.	1										
	↓	1500	GW-3482-JDS-072195-09	GW	1										
	↓	1600	SW-3482-JDS-072195-01	SW	1			X		X	X	X	X	X	
			TOTAL NUMBER OF CONTAINERS		8										

RELINQUISHED BY: ① [signature]	DATE: 7/21/95 TIME: 1730	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④ Jessica M. Hughes	DATE: 7/22/95 TIME: 2:00pm

METHOD OF SHIPMENT: FED-EX O/N AIR BILL NUMBER: 5202135293

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: JOHN SCHWALLER

RECEIVED FOR LABORATORY BY:

DATE: TIME:

00662

.07(FC... - Dec 93 — rev D — (8241)

Quanterra Environmental Services

Quanterra Incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

216 497-9396 Telephone
216 497-0772 Fax

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUNICIPAL LANDFILL

Joanne Staubitz

CONESTOGA-ROVERS & ASSOC.,LTD.

QUANTERRA INCORPORATED

Daniel J. Wright
Project Manager

August 21, 1995

Quanterra
Environmental Services

PROJECT NARRATIVE

The following report contains the analytical results for two water samples submitted to Quanterra-North Canton by Conestoga Rovers & Associates, LTD. from the Cedartown Municipal Landfill Site, project number 3482. The samples were received July 25, 1995, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. Preliminary results were provided by facsimile transmission to Joanne Staubitz on August 16, 1995. A summary of QC data for these analyses is included at the end of the report.

ANALYTICAL METHODS SUMMARY

Quanterra Environmental Services

Parameters	Methods
Inductively Coupled Plasma (ICP)	SW846 6010A
Trace Inductively Coupled Plasma (Trace ICP)	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and Final Update I (7/92).

SAMPLE SUMMARY

Quanterra Environmental Services

The analytical results of the samples listed below are presented on the following pages.

WO #	LABORATORY ID	SAMPLE IDENTIFICATION	DATE/TIME SAMPLED	
C0CH2	A5G250102-001	GW-3482-JOS-072295-010	7/22/95	20:00
C0CH4	A5G250102-002	GW-3482-JOS-072395-011	7/23/95	14:00

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-072295-010

WO #: COCH2
LAB #: A5G250102-001
MATRIX: WATER

DATE SAMPLED: 7/22/95
TIME SAMPLED: 20:00
DATE RECEIVED: 7/25/95

- **REQUESTED METALS** -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	8/02- 8/11/95	5213105
Beryllium	ND	5.0	ug/L	SW846 6010A	8/02- 8/11/95	5213105
Cadmium	ND	5.0	ug/L	SW846 6010A	8/02- 8/11/95	5213105
Chromium	ND	10.0	ug/L	SW846 6010A	8/02- 8/11/95	5213105
Manganese	1,160	10.0	ug/L	SW846 6010A	8/02- 8/14/95	5213105

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-072395-011

WO #: C0CH4
LAB #: A5G250102-002
MATRIX: WATER

DATE SAMPLED: 7/23/95
TIME SAMPLED: 14:00
DATE RECEIVED: 7/25/95

- - - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	8/02- 8/11/95	5213105
Beryllium	ND	5.0	ug/L	SW846 6010A	8/02- 8/11/95	5213105
Cadmium	ND	5.0	ug/L	SW846 6010A	8/02- 8/11/95	5213105
Chromium	ND	10.0	ug/L	SW846 6010A	8/02- 8/11/95	5213105
Manganese	91.0	10.0	ug/L	SW846 6010A	8/02- 8/14/95	5213105

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

QUALITY CONTROL SECTION

Quanterra
Environmental Services

QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The matrix spike and matrix spike duplicate (MS/MSD) contained in this quality control report were generated as part of the laboratory QA/QC program requirements. These requirements include the analysis of a MS/MSD on a one in twenty basis. Therefore, the associated batch number indicated on the MS/MSD report may not reflect the same batch number as those of the samples contained in the analytical report.

Quanterra
Environmental Services

METHOD BLANK REPORT

LAB #: A5G250102

METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE
		BATCH:5213105			
Beryllium	ND	5.0	ug/L	SW846 6010A	8/02- 8/09/95
Cadmium	ND	5.0	ug/L	SW846 6010A	8/02- 8/09/95
Chromium	ND	10.0	ug/L	SW846 6010A	8/02- 8/09/95
Manganese	ND	10.0	ug/L	SW846 6010A	8/02- 8/09/95
Lead	ND	3.0	ug/L	SW846 6010A	8/02- 8/11/95

NOTE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): QUANTERRA

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN MUN. LANDFILL

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: JOHN SCHWALLER

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	Manganese	Lead					REMARKS
	7/22/95	2000	GW-3482-JOS-072295-010	GW	1	X	X	X	X	X					all pres. w/ HNO3
	7/23/95	1400	GW-3482-JOS-072395-011	GW	1	X	X	X	X	X					
TOTAL NUMBER OF CONTAINERS					2										

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
① [signature]	7/24/95	1200	②		
②			③		
③			④		

METHOD OF SHIPMENT: FED-EX o/n

AIR BILL NUMBER: ~~5202185052~~

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: JOHN SCHWALLER

RECEIVED FOR LABORATORY BY: [signature]
DATE: 7/25/95 TIME: 9:40 am

00663

1007(FORMS) DEC # 93 — REV.D (AE.01)

Quanterra Incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

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ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUN. LANDFILL SITE

Joanne Staubitz

CONESTOGA-ROVERS & ASSOC.,LTD.

QUANTERRA INCORPORATED

Daniel J. Wright
Project Manager

November 15, 1995

Quanterra Incorporated
4101 Shuffel Drive, NW
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Quanterra
Environmental Services

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUNICIPAL LANDFILL

JOANNE STAUBITZ

CONESTOGA-ROVERS & ASSOC.,LTD.

QUANTERRA INCORPORATED

Daniel J. Wright
Project Manager

June 30, 1995

Quanterra
Environmental Services

PROJECT NARRATIVE

The following report contains the analytical results for one water sample submitted to Quanterra-North Canton by Conestoga-Rovers and Associates, Inc. from the Cedartown Municipal Landfill Site, project number 3482. The sample was received June 8, 1995, according to documented sample acceptance procedures.

Quanterra, Inc. utilizes only USEPA approved methods and instrumentation in all analytical work. The sample presented in this report was analyzed for the parameters listed on the following page in accordance with the methods indicated. Results were provided by facsimile transmission to Joanne Staubitz on June 23, 1995. A summary of QC data for this analysis is included at the end of the report.

Quanterra
Environmental Services

ANALYTICAL METHODS SUMMARY

Parameters	Methods
Beryllium	SW846 6010A
Cadmium	SW846 6010A
Chromium	SW846 6010A
Manganese	SW846 6010A
Lead	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, September, 1986 and subsequent revisions

QUALITY CONTROL SECTION

Quanterra
Environmental Services

QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The matrix spike and matrix spike duplicate (MS/MSD) contained in this quality control report were generated as part of the laboratory QA/QC program requirements. These requirements include the analysis of a MS/MSD on a one in twenty basis. Therefore, the associated batch number indicated on the MS/MSD report may not reflect the same batch number as those of the samples contained in the analytical report.

Quanterra
Environmental Services

CHECK SAMPLE REPORT

LAB #: A5F080013

METALS

COMPOUND	SPIKE PERCENT RECOVERY	Q/C LIMITS	PREPARATION - ANALYSIS DATE
	BATCH:5160011		
Beryllium	105	(80-118)	6/09- 6/15/95
Cadmium	105	(80-108)	6/09- 6/15/95
Chromium	102	(83-114)	6/09- 6/15/95
Manganese	104	(81-112)	6/09- 6/15/95
Lead	106	(80-120)	6/09- 6/15/95

Quanterra
Environmental Services

SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

WO #	LABORATORY ID	SAMPLE IDENTIFICATION	DATE/TIME SAMPLE
A4WN0	A5F080013-001	GW-3482-JOS-060795-01	6/07/95 17:30

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-060795-01

WO #: A4WN0
LAB #: A5F080013-001
MATRIX: WATER

DATE SAMPLED: 6/07/95
TIME SAMPLED: 17:30
DATE RECEIVED: 6/08/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Beryllium	ND	5.0	ug/L	SW846 6010A	6/09- 6/15/95	51600
Cadmium	ND	5.0	ug/L	SW846 6010A	6/09- 6/15/95	51600
Chromium	ND	10.0	ug/L	SW846 6010A	6/09- 6/15/95	516001
Manganese	4,410	10.0	ug/L	SW846 6010A	6/09- 6/15/95	51600
Lead	3.2	3.0	ug/L	SW846 6010A	6/09- 6/15/95	51600

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

INTRA-LAB BLANK REPORT

LAB #: A5F080013

METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION ANALYSIS DATE
		BATCH:5160011			
Beryllium	ND	5.0	ug/L	SW846 6010A	6/09- 6/15/95
Cadmium	ND	5.0	ug/L	SW846 6010A	6/09- 6/15/95
Chromium	ND	10.0	ug/L	SW846 6010A	6/09- 6/19/95
Manganese	ND	10.0	ug/L	SW846 6010A	6/09- 6/15/95
Lead	ND	3.0	ug/L	SW846 6010A	6/09- 6/15/95

NOTE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

MATRIX SPIKE REPORT

LAB #: A5F050006-001

METALS

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION - ANALYSIS DATE
		BATCH:5160011 MATRIX:		WATER		
Silver	104	94	(61-126)	11	(0-20)	6/09- 6/15/95
Arsenic	120	110	(44-140)	8.7	(0-20)	6/09- 6/14/95
Barium	109	96	(79-116)	13	(0-20)	6/09- 6/15/95
Beryllium	114	99	(76-117)	14	(0-20)	6/09- 6/15/95
Cadmium	105	93	(80-120)	12	(0-20)	6/09- 6/15/95
Cobalt	106	96	(75-110)	10	(0-20)	6/09- 6/15/95
Chromium	109	98	(74-117)	11	(0-20)	6/09- 6/15/95
Copper	107	96	(77-112)	11	(0-20)	6/09- 6/15/95
Nickel	109	97	(73-109)	11	(0-20)	6/09- 6/15/95
Lead	106	93	(80-120)	12	(0-20)	6/09- 6/15/95
Antimony	108	99	(73-112)	8.8	(0-20)	6/09- 6/15/95
Selenium	79	72	(10-121)	8.5	(0-20)	6/09- 6/12/95
Thallium	107	96	(80-120)	11	(0-20)	6/09- 6/15/95
Vanadium	108	97	(79-112)	12	(0-20)	6/09- 6/15/95
Zinc	110	100	(67-118)	9.4	(0-20)	6/09- 6/15/95

NOTE:

Calculations are performed before rounding to avoid round-off errors in calculated results

Quanterra
Environmental Services

METALS SPIKE REPORT

WATER - ICP

- -METALS- -

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION-ANALYSIS DATE	W/O#
Silver	101	96	(61-126)	5	(0-20)	6/02-6/07/95	A4P8
Aluminum	84	86	(56-147)	2	(0-20)	5/22-5/24/95	A4L9
Arsenic	95	94	(51-146)	1	(0-20)	5/26-6/01/95	A4LM
Boron	90	90	(73-110)	0	(0-20)	3/20-3/24/95	A3EM
Barium	100	95	(79-116)	5	(0-20)	6/02-6/07/95	A4P8
Beryllium	105	100	(76-117)	5	(0-20)	6/02-6/07/95	A4P8
Calcium	99	87	(40-146)	13	(0-20)	6/02-6/07/95	A4P8
Cadmium	106	101	(70-109)	5	(0-20)	6/02-6/07/95	A4P8
Cobalt	103	98	(75-110)	5	(0-20)	6/02-6/07/95	A498
Chromium	105	101	(74-117)	4	(0-20)	6/02-6/07/95	A4P8
Copper	101	97	(77-112)	4	(0-20)	6/02-6/07/95	A4P8
Iron	98	86	(45-146)	13	(0-20)	6/02-6/07/95	A4P8
Potassium	91	85	(67-123)	7	(0-20)	6/02-6/07/95	A4P8
Magnesium	99	93	(71-112)	6	(0-20)	6/02-6/07/95	A4P8
Manganese	104	97	(57-131)	7	(0-20)	6/02-6/07/95	A4P8
Molybdenum	96	96	(90-114)	0	(0-20)	3/20-3/21/95	A3E8
Sodium	93	95	(40-144)	2	(0-20)	6/02-6/07/95	A4P8
Nickel	104	99	(73-109)	5	(0-20)	6/02-6/07/95	A4P8
Lead	103	96	(72-114)	7	(0-20)	6/02-6/07/95	A4P8
Antimony	105	100	(73-112)	5	(0-20)	6/02-6/07/95	A4P8
Selenium	97	97	(30-175)	0	(0-20)	5/26-6/01/95	A4LM
Tin	113	104	(73-123)	8	(0-20)	5/22-5/25/95	A4M6
Strontium	95	90	(83-112)	5	(0-20)	6/05-6/08/95	A4Q7
Titanium	93	94	(80-111)	1	(0-20)	3/20-3/24/95	A3E8
Thallium	95	90	(57-121)	5	(0-20)	6/02-6/07/95	A4P8
Tungsten	90	97	(72-112)	7	(0-20)	3/03-3/06/95	A31J
Vanadium	104	98	(79-112)	6	(0-20)	6/02-6/07/95	A4P8
Zinc	100	109	(67-118)	9	(0-20)	6/02-6/07/95	A4P8
Osmium	92	98	(80-120)	6	(0-20)	3/16-3/29/95	A399
Lithium	96	96	(80-120)	0	(0-20)	3/22-3/29/95	A3DE

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): QUANTERA

REFERENCE NUMBER: 3452

PROJECT NAME: CERRETTONI MUN. LANDFILL

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: John Scarella

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Cadmium	Beryllium	Chromium	Lead	Manganese					REMARKS
	6-7-95	1730	GW-3452 BS-060795-01	GW	2	X	X	X	X	X					w/ HNO_3
															STANDARD T/A

TOTAL NUMBER OF CONTAINERS 2

RELINQUISHED BY: ① [signature]	DATE: 6-7-95 TIME: 2100	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: FED EX B/N

AIR BILL NUMBER:

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: J. Scarella

RECEIVED FOR LABORATORY BY: Kathy Graves

DATE: 7/10/95 TIME: 1100

0633

Quanterra Incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

216 497-9396 Telephone
216 497-0772 Fax

Quanterra
Environmental Services

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUN. LANDFILL

Joanne Staubitz

CONESTOGA-ROVERS & ASSOC.,LTD.

QUANTERRA INCORPORATED

Daniel J. Wright
Project Manager

August 9, 1995

Quanterra
Environmental Services

PROJECT NARRATIVE

The following report contains the analytical results for four water samples submitted to Quanterra-North Canton by Conestoga Rovers & Associates, Inc. from the Cedartown Municipal Landfill Site, project number 3482. The samples were received July 21 1995, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. Preliminary results were provided by facsimile transmission to JoAnne Staubitz on August 3, 1995. A summary of QC data for these analyses is included at the end of the report.

Quanterra
Environmental Services

ANALYTICAL METHODS SUMMARY

Parameters	Methods
Total recoverable metals	SW846 6010A
ICP Trace (Inductively Coupled Plasma)	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and Final Update I (7/92).

Quanterra
Environmental Services

SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

WO #	LABORATORY ID	SAMPLE IDENTIFICATION
C0CE2	A5G240121-001	GW-3482-JOS-071995-01
C0CE6	A5G240121-002	GW-3482-JOS-071995-02
C0CE8	A5G240121-003	GW-3482-JOS-071995-03
C0CE9	A5G240121-004	GW-3482-JOS-071995-04

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOB-071995-01

WO #: C0CE2
LAB #: A5G240121-001
MATRIX: WATER

DATE SAMPLED: 7/19/95
DATE RECEIVED: 7/21/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT ug/L	REPORTING LIMIT	DILUTION FACTOR	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	1.00	SW846 6010A	7/25- 8/01/95	5206005
Beryllium	ND	5.0	1.00	SW846 6010A	7/25- 8/01/95	5206005
Cadmium	ND	5.0	1.00	SW846 6010A	7/25- 8/01/95	5206005
Chromium	ND	10.0	1.00	SW846 6010A	7/25- 8/01/95	5206005
Manganese	232	10.0	1.00	SW846 6010A	7/25- 8/01/95	5206005

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

COMESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-071995-02

WO #: C0CE6
LAB #: A5G240121-002
MATRIX: WATER

DATE SAMPLED: 7/19/95
DATE RECEIVED: 7/21/95

REQUESTED METALS

PARAMETER	RESULT ug/L	REPORTING LIMIT	DILUTION FACTOR	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	1.00	SW846 6010A	7/25- 8/01/95	520600
Beryllium	ND	5.0	1.00	SW846 6010A	7/25- 8/01/95	5206[illegible]
Cadmium	ND	5.0	1.00	SW846 6010A	7/25- 8/01/95	5206[illegible]
Chromium	ND	10.0	1.00	SW846 6010A	7/25- 8/01/95	5206[illegible]
Manganese	220	10.0	1.00	SW846 6010A	7/25- 8/01/95	5206[illegible]

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOB-071995-03

WO #: C0CEB
LAB #: A5G240121-003
MATRIX: WATER

DATE SAMPLED: 7/19/95
DATE RECEIVED: 7/21/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT ug/L	REPORTING LIMIT	DILUTION FACTOR	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	1.00	SW846 6010A	7/25- 8/01/95	520600
Beryllium	ND	5.0	1.00	SW846 6010A	7/25- 8/01/95	520600
Cadmium	ND	5.0	1.00	SW846 6010A	7/25- 8/01/95	520600
Chromium	ND	10.0	1.00	SW846 6010A	7/25- 8/01/95	520600
Manganese	72.6	10.0	1.00	SW846 6010A	7/25- 8/01/95	520600

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-071995-04

WO #: C0CE9
LAB #: A5G240121-004
MATRIX: WATER

DATE SAMPLED: 7/19/9
DATE RECEIVED: 7/21/95

- - - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT µg/L	REPORTING LIMIT	DILUTION FACTOR	METHOD	PREPARATION - ANALYSIS DATE	QC BATC
Lead	ND	3.0	1.00	SW846 6010A	7/25- 8/01/95	520600
Beryllium	ND	5.0	1.00	SW846 6010A	7/25- 8/01/95	5206
Cadmium	ND	5.0	1.00	SW846 6010A	7/25- 8/01/95	5206
Chromium	ND	10.0	1.00	SW846 6010A	7/25- 8/01/95	5206
Manganese	2,380	10.0	1.00	SW846 6010A	7/25- 8/01/95	5206

NOTE: AS RECEIVED
ND **NOT DETECTED AT THE STATED REPORTING LIMIT**

QUALITY CONTROL SECTION

Quanterra
Environmental Services

QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The matrix spike and matrix spike duplicate (MS/MSD) contained in this quality control report were generated as part of the laboratory QA/QC program requirements. These requirements include the analysis of a MS/MSD on a one in twenty basis. Therefore, the associated batch number indicated on the MS/MSD report may not reflect the same batch number as those of the samples contained in the analytical report.

Quanterra Environmental Services

CHECK SAMPLE REPORT

LAB #: A5G240121

- METALS -

COMPOUND	SPIKE PERCENT RECOVERY	Q/C LIMITS	PREPARATION - ANALYSIS DATE	DILUTIO FACTOR
	BATCH:5206005			
Beryllium	108	(80-120)	7/25- 7/27/95	1.0
Cadmium	108	(80-120)	7/25- 7/27/95	1
Chromium	100	(80-120)	7/25- 7/27/95	1
Manganese	103	(80-120)	7/25- 7/27/95	1.0
Lead	100	(80-120)	7/25- 8/01/95	1.0

Quanterra
Environmental Services

METHOD BLANK REPORT

LAB #: A5G240121

METALS

PARAMETER	RESULT ug/L	REPORTING LIMIT	DIL FACTOR	METHOD	PREPARATION - ANALYSIS DATE
		BATCH:5206005			
Beryllium	ND	5.0	1.00	SW846 6010A	7/25- 7/27/95
Cadmium	ND	5.0	1.00	SW846 6010A	7/25- 7/27/95
Chromium	ND	10.0	1.00	SW846 6010A	7/25- 7/27/95
Manganese	ND	10.0	1.00	SW846 6010A	7/25- 7/27/95
Lead	ND	3.0	1.00	SW846 6010A	7/25- 8/01/95

NOTE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

METALS SPIKE REPORT

WATER - ICP

- -METALS- -

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION-ANALYSIS DATE	W/O#
Silver	101	96	(61-126)	5	(0-20)	6/02-6/07/95	A4P[illegible]
Aluminum	84	86	(56-147)	2	(0-20)	5/22-5/24/95	A4L9P
Arsenic	95	94	(51-146)	1	(0-20)	5/26-6/01/95	A4L[illegible]
Boron	90	90	(73-110)	0	(0-20)	3/20-3/24/95	A3E[illegible]
Barium	100	95	(79-116)	5	(0-20)	6/02-6/07/95	A4P8T
Beryllium	105	100	(76-117)	5	(0-20)	6/02-6/07/95	A4P[illegible]
Calcium	99	87	(40-146)	13	(0-20)	6/02-6/07/95	A4P8T
Cadmium	106	101	(70-109)	5	(0-20)	6/02-6/07/95	A4P8T
Cobalt	103	98	(75-110)	5	(0-20)	6/02-6/07/95	A49[illegible]
Chromium	105	101	(74-117)	4	(0-20)	6/02-6/07/95	A4P8T
Copper	101	97	(77-112)	4	(0-20)	6/02-6/07/95	A[illegible]
Iron	98	86	(45-146)	13	(0-20)	6/02-6/07/95	A[illegible]
Potassium	91	85	(67-123)	7	(0-20)	6/02-6/07/95	A4P8T
Magnesium	99	93	(71-112)	6	(0-20)	6/02-6/07/95	A4P[illegible]
Manganese	104	97	(57-131)	7	(0-20)	6/02-6/07/95	A4P[illegible]
Molybdenum	96	96	(90-114)	0	(0-20)	3/20-3/21/95	A3E8[illegible]
Sodium	93	95	(40-144)	2	(0-20)	6/02-6/07/95	A4P[illegible]
Nickel	104	99	(73-109)	5	(0-20)	6/02-6/07/95	A4P[illegible]
Lead	103	96	(72-114)	7	(0-20)	6/02-6/07/95	A4P[illegible]
Antimony	105	100	(73-112)	5	(0-20)	6/02-6/07/95	A4P[illegible]
Selenium	97	97	(30-175)	0	(0-20)	5/26-6/01/95	A4L[illegible]
Tin	113	104	(73-123)	8	(0-20)	5/22-5/25/95	A4M[illegible]
Strontium	95	90	(83-112)	5	(0-20)	6/05-6/08/95	A4Q7
Titanium	93	94	(80-111)	1	(0-20)	3/20-3/24/95	A3E8H
Thallium	95	90	(57-121)	5	(0-20)	6/02-6/07/95	A4P8
Tungsten	90	97	(72-112)	7	(0-20)	3/03-3/06/95	A31J[illegible]
Vanadium	104	98	(79-112)	6	(0-20)	6/02-6/07/95	A4P8T
Zinc	100	109	(67-118)	9	(0-20)	6/02-6/07/95	A4P8
Osmium	92	98	(80-120)	6	(0-20)	3/16-3/29/95	A399A
Lithium	96	96	(80-120)	0	(0-20)	3/22-3/29/95	A3DEK

CR
CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory: QUANTERRA

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN MUN. LANDFILL

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: JOHN SCHWALLER

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	Manganese	Lead					REMARKS
	7/19/95	1230	GW-3482-JS-071995-01	G.W.	1	X	X	X	X	X					PRES. w/ HNO_3
	↓	1400	GW-3482-JS-071995-02	↓	1	↓	↓	↓	↓	↓					
		1630	GW-3482-JS-071995-03		1										
		1600	GW-3482-JS-071995-04		1										
			TOTAL NUMBER OF CONTAINERS		4										

RELINQUISHED BY: ① [signature]	DATE: 7/20/95 TIME: 1630	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: FED-EX O/N AIR BILL NUMBER: 5202185041

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: JOHN SCHWALLER

RECEIVED FOR LABORATORY BY: Stacy Beckler
DATE: 7-21-95 TIME: 9:20 AM.

0066i

100/(FORMS) DEC 6 93 REVD (AE 01)

Quanterra Incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

216 497-9396 Telephone
216 497-0772 Fax

Quanterra
Environmental Services

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUN. LANDFILL

Joanne Staubitz

CONESTOGA-ROVERS & ASSOC.,LTD.

QUANTERRA INCORPORATED

Daniel J. Wright
Project Manager

August 21, 1995

Quanterra
Environmental Services

PROJECT NARRATIVE

The following report contains the analytical results for seven water samples submitted to Quanterra-North Canton by Conestoga-Rovers & Associates, Inc. from the Cedartown Municipal Landfill Site, project number 3482. The samples were received July 22, 1995, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. Results were provided by facsimile transmission to Joanne Staubitz on August 15, 1995. A summary of QC data for these analyses is included at the end of the report.

ANALYTICAL METHODS SUMMARY

Quanterra Environmental Services

Parameters	Methods
Total recoverable metals	SW846 6010A
ICP Trace (Inductively Coupled Plasma)	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and Final Update I (7/92).

Quanterra
Environmental Services

SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

WO #	LABORATORY ID	SAMPLE IDENTIFICATION
C0CDE	A5G240120-001	GW-3482-JOS-072095-05 (MS/MSD)
C0CDH	A5G240120-002	GW-3482-JOS-072095-06
C0CDJ	A5G240120-003	GW-3482-JOS-072095-07
C0CDM	A5G240120-004	GW-3482-JOS-072195-08
C0CDP	A5G240120-005	RB-1
C0CDQ	A5G240120-006	GW-3482-JOS-072195-09
C0CDR	A5G240120-007	SW-3482-JOS-072195-01

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-072095-05 (MS/MSD)

WO #: C0CDE
LAB #: A5G240120-001
MATRIX: WATER

DATE SAMPLED: 7/20/95
DATE RECEIVED: 7/22/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	7/25- 8/09/95	52060C
Beryllium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	520600
Cadmium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Chromium	ND	10.0	ug/L	SW846 6010A	7/25- 8/11/95	520600
Manganese	3,050	10.0	ug/L	SW846 6010A	7/25- 8/11/95	520600

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-072095-06

WO #: COCDH
LAB #: A5G240120-002
MATRIX: WATER

DATE SAMPLED: 7/20/95
DATE RECEIVED: 7/22/95

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	7/25- 8/09/95	5206005
Beryllium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Cadmium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Chromium	ND	10.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Manganese	1,170	10.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-072095-07

WO #: C0CDJ
LAB #: A5G240120-003
MATRIX: WATER

DATE SAMPLED: 7/20/95
DATE RECEIVED: 7/22/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	7/25- 8/09/95	520600[illegible]
Beryllium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	520600
Cadmium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	520600[illegible]
Chromium	ND	10.0	ug/L	SW846 6010A	7/25- 8/11/95	520600[illegible]
Manganese	ND	10.0	ug/L	SW846 6010A	7/25- 8/11/95	520600[illegible]

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-072195-08

WO #: COCDM
LAB #: A5G240120-004
MATRIX: WATER

DATE SAMPLED: 7/21/95
DATE RECEIVED: 7/22/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	3.0	3.0	ug/L	SW846 6010A	7/25- 8/09/95	5206005
Beryllium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Cadmium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Chromium	ND	10.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Manganese	1,910	10.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

RB-1

WO #: COCDP
LAB #: A5G240120-005
MATRIX: WATER

DATE SAMPLED: 7/21/95
DATE RECEIVED: 7/22/95

- - - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	7/25- 8/09/95	520600
Beryllium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	520600
Cadmium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	520600
Chromium	ND	10.0	ug/L	SW846 6010A	7/25- 8/11/95	520600
Manganese	ND	10.0	ug/L	SW846 6010A	7/25- 8/11/95	520600

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-072195-09

WO #: C0CDQ
LAB #: A5G240120-006
MATRIX: WATER

DATE SAMPLED: 7/21/95
DATE RECEIVED: 7/22/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	7/25- 8/09/95	5206005
Beryllium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Cadmium	ND	5.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Chromium	ND	10.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005
Manganese	15.0	10.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

SW-3482-JOS-072195-01

WO #: C0CDR
LAB #: A5G240120-007
MATRIX: WATER

DATE SAMPLED: 7/21/95
DATE RECEIVED: 7/22/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	22.2	3.0	ug/L	SW846 6010A	7/25- 8/09/95	520600
Aluminum	1,870	200	ug/L	SW846 6010A	7/25- 8/11/95	52060C
Chromium	ND	10.0	ug/L	SW846 6010A	7/25- 8/11/95	520600
Copper	18.0	5.0	ug/L	SW846 6010A	7/25- 8/11/95	52060C
Nickel	ND	40.0	ug/L	SW846 6010A	7/25- 8/11/95	52060C
Zinc	85.0	20.0	ug/L	SW846 6010A	7/25- 8/11/95	5206005

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

QUALITY CONTROL SECTION

Quanterra
Environmental Services

QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The matrix spike and matrix spike duplicate (MS/MSD) contained in this quality control report were generated as part of the laboratory QA/QC program requirements. These requirements include the analysis of a MS/MSD on a one in twenty basis. Therefore, the associated batch number indicated on the MS/MSD report may not reflect the same batch number as those of the samples contained in the analytical report.

"DIL" in the quality control section means that due to high analyte concentration in the sample, the spiking analytes addded to the sample are diluted out and cannot be quantitated.

Quanterra
Environmental Services

CHECK SAMPLE REPORT

LAB #: A5G240120

METALS

COMPOUND	SPIKE PERCENT RECOVERY	Q/C LIMITS	PREPARATION - ANALYSIS DATE
	BATCH:5206005		
Aluminum	100	(80-120)	7/25- 7/27/95
Beryllium	108	(80-120)	7/25- 7/27/95
Cadmium	108	(80-120)	7/25- 7/27/95
Chromium	100	(80-120)	7/25- 7/27/95
Copper	106	(80-120)	7/25- 7/27/95
Manganese	103	(80-120)	7/25- 7/27/95
Nickel	104	(80-120)	7/25- 7/27/95
Lead	100	(80-120)	7/25- 8/01/95
Zinc	105	(80-120)	7/25- 7/27/95

Quanterra
Environmental Services

METALS SPIKE REPORT

WATER - ICP

- - - - - - - - - - - - - - - - - - - -METALS- - - - - - - - - - - - - - - - - - - -

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION-ANALYSIS DATE	W/O#
Silver	101	96	(61-126)	5	(0-20)	6/02-6/07/95	A4P8T
Aluminum	84	86	(56-147)	2	(0-20)	5/22-5/24/95	A4L9P
Arsenic	95	94	(51-146)	1	(0-20)	5/26-6/01/95	A4LM1
Boron	90	90	(73-110)	0	(0-20)	3/20-3/24/95	A3EM4
Barium	100	95	(79-116)	5	(0-20)	6/02-6/07/95	A4P8T
Beryllium	105	100	(76-117)	5	(0-20)	6/02-6/07/95	A4P8T
Calcium	99	87	(40-146)	13	(0-20)	6/02-6/07/95	A4P8T
Cadmium	106	101	(70-109)	5	(0-20)	6/02-6/07/95	A4P8T
Cobalt	103	98	(75-110)	5	(0-20)	6/02-6/07/95	A498T
Chromium	105	101	(74-117)	4	(0-20)	6/02-6/07/95	A4P8T
Copper	101	97	(77-112)	4	(0-20)	6/02-6/07/95	A4P8T
Iron	98	86	(45-146)	13	(0-20)	6/02-6/07/95	A4P8T
Potassium	91	85	(67-123)	7	(0-20)	6/02-6/07/95	A4P8T
Magnesium	99	93	(71-112)	6	(0-20)	6/02-6/07/95	A4P8T
Manganese	104	97	(57-131)	7	(0-20)	6/02-6/07/95	A4P8T
Molybdenum	96	96	(90-114)	0	(0-20)	3/20-3/21/95	A3E8H
Sodium	93	95	(40-144)	2	(0-20)	6/02-6/07/95	A4P8T
Nickel	104	99	(73-109)	5	(0-20)	6/02-6/07/95	A4P8T
Lead	103	96	(72-114)	7	(0-20)	6/02-6/07/95	A4P8T
Antimony	105	100	(73-112)	5	(0-20)	6/02-6/07/95	A4P8T
Selenium	97	97	(30-175)	0	(0-20)	5/26-6/01/95	A4LM1
Tin	113	104	(73-123)	8	(0-20)	5/22-5/25/95	A4M6D
Strontium	95	90	(83-112)	5	(0-20)	6/05-6/08/95	A4Q72
Titanium	93	94	(80-111)	1	(0-20)	3/20-3/24/95	A3E8H
Thallium	95	90	(57-121)	5	(0-20)	6/02-6/07/95	A4P8T
Tungsten	90	97	(72-112)	7	(0-20)	3/03-3/06/95	A31JQ
Vanadium	104	98	(79-112)	6	(0-20)	6/02-6/07/95	A4P8T
Zinc	100	109	(67-118)	9	(0-20)	6/02-6/07/95	A4P8T
Osmium	92	98	(80-120)	6	(0-20)	3/16-3/29/95	A399A
Lithium	96	96	(80-120)	0	(0-20)	3/22-3/29/95	A3DEK

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): QUANTERRA

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN MUN. LANDFILL

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: JOHN SCHWALLER

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	Manganese	Lead	Aluminum	Copper	Nickel	Zinc	REMARKS: ALL PRES. w/ HNO_3^-
	7/20/95	1030	GW-3482-JDS-072095-05MS/MSD	GW	2	↓	↓	↓	↓	↓					(*05 MS/MSD)
	↓	1330	GW-3482-JDS-072095-06	↓	1										
		1730	GW-3482-JDS-072095-07		1										
	7/21/95	1115	GW-3482-JDS-072195-08		1										
	↓	0830	RB-1	D.I.	1										
		1500	GW-3482-JDS-072195-09	GW	1										
		1600	SW-3482-JDS-072195-01	SW	1			X		X	X	X	X	X	
			TOTAL NUMBER OF CONTAINERS		8										

RELINQUISHED BY: ① [signature]	DATE: 7/21/95 TIME: 1730	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④ Jessica M. Hughes	DATE: 7/22/95 TIME: 2:00pm

METHOD OF SHIPMENT: FED-EX O/N AIR BILL NUMBER: 5202135293

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: JOHN SCHWALLER

RECEIVED FOR LABORATORY BY:

DATE: TIME:

00662

.007(FC... — Dec. 93 — rev D — ...)

Quanterra Incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

216 497-9396 Telephone
216 497-0772 Fax

Quanterra
Environmental Services

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUNICIPAL LANDFILL

Joanne Staubitz

CONESTOGA-ROVERS & ASSOC.,LTD.

QUANTERRA INCORPORATED

Daniel J. Wright
Project Manager

August 21, 1995

Quanterra
Environmental Services

PROJECT NARRATIVE

The following report contains the analytical results for two water samples submitted to Quanterra-North Canton by Conestoga Rovers & Associates, LTD. from the Cedartown Municipal Landfill Site, project number 3482. The samples were received July 25, 1995, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. Preliminary results were provided by facsimile transmission to Joanne Staubitz on August 16, 1995. A summary of QC data for these analyses is included at the end of the report.

ANALYTICAL METHODS SUMMARY

Quanterra Environmental Services

Parameters	Methods
Inductively Coupled Plasma (ICP)	SW846 6010A
Trace Inductively Coupled Plasma (Trace ICP)	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and Final Update I (7/92).

SAMPLE SUMMARY

Quanterra Environmental Services

The analytical results of the samples listed below are presented on the following pages.

WO #	LABORATORY ID	SAMPLE IDENTIFICATION	DATE/TIME SAMPLED	
C0CH2	A5G250102-001	GW-3482-JOS-072295-010	7/22/95	20:00
C0CH4	A5G250102-002	GW-3482-JOS-072395-011	7/23/95	14:00

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-072295-010

WO #: C0CH2
LAB #: A5G250102-001
MATRIX: WATER

DATE SAMPLED: 7/22/95
TIME SAMPLED: 20:00
DATE RECEIVED: 7/25/95

- - - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	8/02- 8/11/95	5213105
Beryllium	ND	5.0	ug/L	SW846 6010A	8/02- 8/11/95	5213105
Cadmium	ND	5.0	ug/L	SW846 6010A	8/02- 8/11/95	5213105
Chromium	ND	10.0	ug/L	SW846 6010A	8/02- 8/11/95	5213105
Manganese	1,160	10.0	ug/L	SW846 6010A	8/02- 8/14/95	5213105

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-072395-011

WO #: C0CH4
LAB #: A5G250102-002
MATRIX: WATER

DATE SAMPLED: 7/23/95
TIME SAMPLED: 14:00
DATE RECEIVED: 7/25/95

- - - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	8/02- 8/11/95	5213105
Beryllium	ND	5.0	ug/L	SW846 6010A	8/02- 8/11/95	5213105
Cadmium	ND	5.0	ug/L	SW846 6010A	8/02- 8/11/95	5213105
Chromium	ND	10.0	ug/L	SW846 6010A	8/02- 8/11/95	5213105
Manganese	91.0	10.0	ug/L	SW846 6010A	8/02- 8/14/95	5213105

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

QUALITY CONTROL SECTION

Quanterra
Environmental Services

QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The matrix spike and matrix spike duplicate (MS/MSD) contained in this quality control report were generated as part of the laboratory QA/QC program requirements. These requirements include the analysis of a MS/MSD on a one in twenty basis. Therefore, the associated batch number indicated on the MS/MSD report may not reflect the same batch number as those of the samples contained in the analytical report.

Quanterra
Environmental Services

CHECK SAMPLE REPORT

LAB #: A5G250102

- METALS -

COMPOUND	SPIKE PERCENT RECOVERY	Q/C LIMITS	PREPARATION - ANALYSIS DATE
	BATCH:5213105		
Beryllium	100	(80-120)	8/02- 8/09/95
Cadmium	98	(80-120)	8/02- 8/09/95
Chromium	102	(80-120)	8/02- 8/09/95
Manganese	102	(80-120)	8/02- 8/09/95
Lead	101	(80-120)	8/02- 8/09/95

Quanterra
Environmental Services

METHOD BLANK REPORT

LAB #: A5G250102

METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE
		BATCH:5213105			
Beryllium	ND	5.0	ug/L	SW846 6010A	8/02- 8/09/95
Cadmium	ND	5.0	ug/L	SW846 6010A	8/02- 8/09/95
Chromium	ND	10.0	ug/L	SW846 6010A	8/02- 8/09/95
Manganese	ND	10.0	ug/L	SW846 6010A	8/02- 8/09/95
Lead	ND	3.0	ug/L	SW846 6010A	8/02- 8/11/95

NOTE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

METALS SPIKE REPORT

WATER - ICP

- - - - - - - - - - - - - - - - - - - -METALS- - - - - - - - - - - - - - - - - - - -

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION-ANALYSIS DATE	W/O#
Silver	101	96	(61-126)	5	(0-20)	6/02-6/07/95	A4P8T
Aluminum	84	86	(56-147)	2	(0-20)	5/22-5/24/95	A4L9P
Arsenic	95	94	(51-146)	1	(0-20)	5/26-6/01/95	A4LM
Boron	90	90	(73-110)	0	(0-20)	3/20-3/24/95	A3EM4
Barium	100	95	(79-116)	5	(0-20)	6/02-6/07/95	A4P8
Beryllium	105	100	(76-117)	5	(0-20)	6/02-6/07/95	A4P8
Calcium	99	87	(40-146)	13	(0-20)	6/02-6/07/95	A4P8T
Cadmium	106	101	(70-109)	5	(0-20)	6/02-6/07/95	A4P8
Cobalt	103	98	(75-110)	5	(0-20)	6/02-6/07/95	A498
Chromium	105	101	(74-117)	4	(0-20)	6/02-6/07/95	A4P8T
Copper	101	97	(77-112)	4	(0-20)	6/02-6/07/95	A4
Iron	98	86	(45-146)	13	(0-20)	6/02-6/07/95	A
Potassium	91	85	(67-123)	7	(0-20)	6/02-6/07/95	A4P8
Magnesium	99	93	(71-112)	6	(0-20)	6/02-6/07/95	A4P8
Manganese	104	97	(57-131)	7	(0-20)	6/02-6/07/95	A4P8
Molybdenum	96	96	(90-114)	0	(0-20)	3/20-3/21/95	A3E8
Sodium	93	95	(40-144)	2	(0-20)	6/02-6/07/95	A4P8
Nickel	104	99	(73-109)	5	(0-20)	6/02-6/07/95	A4P8T
Lead	103	96	(72-114)	7	(0-20)	6/02-6/07/95	A4P8
Antimony	105	100	(73-112)	5	(0-20)	6/02-6/07/95	A4P8
Selenium	97	97	(30-175)	0	(0-20)	5/26-6/01/95	A4LM1
Tin	113	104	(73-123)	8	(0-20)	5/22-5/25/95	A4M6
Strontium	95	90	(83-112)	5	(0-20)	6/05-6/08/95	A4Q7
Titanium	93	94	(80-111)	1	(0-20)	3/20-3/24/95	A3E8H
Thallium	95	90	(57-121)	5	(0-20)	6/02-6/07/95	A4P8
Tungsten	90	97	(72-112)	7	(0-20)	3/03-3/06/95	A31JQ
Vanadium	104	98	(79-112)	6	(0-20)	6/02-6/07/95	A4P8T
Zinc	100	109	(67-118)	9	(0-20)	6/02-6/07/95	A4P8
Osmium	92	98	(80-120)	6	(0-20)	3/16-3/29/95	A399A
Lithium	96	96	(80-120)	0	(0-20)	3/22-3/29/95	A3DE

CR

CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory: QUANTERRA

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN MUN. LANDFILL

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: JOHN SCHWALLER

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	Manganese	LEAD					REMARKS
	7/22/95	2000	GW-3482-JOS-072295-010	GW	1	X	X	X	X	X					ALL PRES. W/ HNO_3
	7/23/95	1400	GW-3482-JOS-072395-011	GW	1	X	X	X	X	X					
			TOTAL NUMBER OF CONTAINERS		2										

RELINQUISHED BY: ① [signature]	DATE: 7/24/95 TIME: 1200	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: FED-EX o/n

AIR BILL NUMBER: ~~5202195052~~

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: JOHN SCHWALLER

RECEIVED FOR LABORATORY BY: [signature]

DATE: 7/25/95 TIME: 9:40 am

00663

1007(FORMS) — DEC 6 93 — REV.D — (AE-01)

Quanterra Environmental Services

Quanterra Incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

216 497-9396 Telephone
216 497-0772 Fax

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUN. LANDFILL SITE

Joanne Staubitz

CONESTOGA-ROVERS & ASSOC.,LTD.

QUANTERRA INCORPORATED

Daniel J. Wright
Project Manager

November 15, 1995

Quanterra
Environmental Services

PROJECT NARRATIVE

The following report contains the analytical results for fourteen water samples submitted to Quanterra-North Canton by Conestoga-Rovers and Associates, Inc. from the Cedartown Municipal Landfill Site, project number 3482. The samples were received October 28, 1995, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. Results were provided by facsimile transmission to Joanne Staubitz on November 3, 1995. A summary of QC data for these analyses is included at the end of the report.

ANALYTICAL METHODS SUMMARY

Quanterra Environmental Services

A5J280118

Parameters	Methods
Inductively Coupled Plasma (ICP) Metals	SW846 6010A
Trace Inductively Coupled Plasma (ICP) Metals	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and Final Update I (7/92).

SAMPLE SUMMARY

Quanterra Environmental Services

The analytical results of the samples listed below are presented on the following pages.

WO #	LABORATORY ID	SAMPLE IDENTIFICATION	DATE/TIME SAMPLED	
C1MKV	A5J280118-001	GW-3482-JOS-102395-01	10/23/95	16:00
C1MKW	A5J280118-002	GW-3482-JOS-102395-02	10/23/95	17:45
C1MKX	A5J280118-003	GW-3482-JOS-102495-03 (MS/MSD)	10/24/95	13:00
C1ML0	A5J280118-004	GW-3482-JOS-102495-04	10/24/95	16:40
C1ML2	A5J280118-005	GW-3482-JNP-102595-05	10/25/95	10:37
C1ML3	A5J280118-006	GW-3482-JNP-102595-06	10/25/95	11:00
C1ML4	A5J280118-007	GW-3482-JNP-102595-07	10/25/95	13:45
C1ML5	A5J280118-008	GW-3482-JOS-102595-08	10/25/95	14:30
C1ML6	A5J280118-009	GW-3482-JOS-102595-09	10/25/95	16:00
C1ML7	A5J280118-010	SW-3482-JOS-102595-01	10/25/95	17:00
C1ML8	A5J280118-011	GW-3482-JOS-102695-10	10/26/95	10:30
C1ML9	A5J280118-012	GW-3482-JOS-102695-11	10/26/95	11:30
C1MLA	A5J280118-013	GW-3482-JOS-102695-12	10/26/95	12:00
C1MLC	A5J280118-014	GW-3482-JOS-102695-13	10/26/95	17:00

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-102395-01

WO #: C1MKV
LAB #: A5J280118-001
MATRIX: WATER

DATE SAMPLED: 10/23/95
TIME SAMPLED: 16:00
DATE RECEIVED: 10/28/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Manganese	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	53041

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-102395-02

WO #: C1MKW
LAB #: A5J280118-002
MATRIX: WATER

DATE SAMPLED: 10/23/95
TIME SAMPLED: 17:45
DATE RECEIVED: 10/28/95

- - - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Manganese	285	10.0	ug/L	SW846 6010A	10/31-11/01/95	530411

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-102495-03 (MS/MSD)

WO #: C1MKX
LAB #: A5J280118-003
MATRIX: WATER

DATE SAMPLED: 10/24/9
TIME SAMPLED: 13:00
DATE RECEIVED: 10/28/9

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATC
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	5304 1
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	5304 1
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	5304 1
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	5304 1
Manganese	227	10.0	ug/L	SW846 6010A	10/31-11/01/95	5304 1

NOTE AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-102495-04

WO #: C1ML0
LAB #: A5J280118-004
MATRIX: WATER

DATE SAMPLED: 10/24/95
TIME SAMPLED: 16:40
DATE RECEIVED: 10/28/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	5304117
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	5304117
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	5304117
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	5304117
Manganese	3,260	10.0	ug/L	SW846 6010A	10/31-11/01/95	5304117

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JMP-102595-05

WO #: C1ML2
LAB #: A5J280118-005
MATRIX: WATER

DATE SAMPLED: 10/25/95
TIME SAMPLED: 10:37
DATE RECEIVED: 10/28/95

- - - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	53041[illegible]
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	53041[illegible]
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	53041[illegible]
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	53041 7
Manganese	5,740	10.0	ug/L	SW846 6010A	10/31-11/01/95	53041 7

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JNP-102595-06

WO #: C1ML3
LAB #: A5J280118-006
MATRIX: WATER

DATE SAMPLED: 10/25/95
TIME SAMPLED: 11:00
DATE RECEIVED: 10/28/95

- **REQUESTED METALS** -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	5304117
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	5304117
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	5304117
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	5304117
Manganese	5,610	10.0	ug/L	SW846 6010A	10/31-11/01/95	5304117

NOTE AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JMP-102595-07

WO #: C1ML4
LAB #: A5J280118-007
MATRIX: WATER

DATE SAMPLED: 10/25/95
TIME SAMPLED: 13:45
DATE RECEIVED: 10/28/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	5304117
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Manganese	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	53041

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-102595-08

WO #: C1ML5
LAB #: A5J280118-008
MATRIX: WATER

DATE SAMPLED: 10/25/95
TIME SAMPLED: 14:30
DATE RECEIVED: 10/28/95

- **REQUESTED METALS** -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	5304117
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	5304117
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	5304117
Chromium	17.5	10.0	ug/L	SW846 6010A	10/31-11/01/95	5304117
Manganese	13.9	10.0	ug/L	SW846 6010A	10/31-11/01/95	5304117

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

COMESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-102595-09

WO #: C1ML6
LAB #: A5J280118-009
MATRIX: WATER

DATE SAMPLED: 10/25/95
TIME SAMPLED: 16:00
DATE RECEIVED: 10/28/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Manganese	30.6	10.0	ug/L	SW846 6010A	10/31-11/01/95	53041

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

SW-3482-JOS-102595-01

WO #: C1ML7
LAB #: A5J280118-010
MATRIX: WATER

DATE SAMPLED: 10/25/95
TIME SAMPLED: 17:00
DATE RECEIVED: 10/28/95

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Aluminum	ND	200	ug/L	SW846 6010A	10/31-11/01/95	530411
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Copper	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Nickel	ND	40.0	ug/L	SW846 6010A	10/31-11/01/95	530411
Zinc	ND	20.0	ug/L	SW846 6010A	10/31-11/01/95	530411

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-102695-10

WO #: C1ML8
LAB #: A5J280118-011
MATRIX: WATER

DATE SAMPLED: 10/26/95
TIME SAMPLED: 10:30
DATE RECEIVED: 10/28/95

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	53041
Manganese	1,430	10.0	ug/L	SW846 6010A	10/31-11/01/95	53041

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-102695-11

WO #: C1ML9
LAB #: A5J280118-012
MATRIX: WATER

DATE SAMPLED: 10/26/95
TIME SAMPLED: 11:30
DATE RECEIVED: 10/28/95

- **REQUESTED METALS** -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	5304117
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	5304117
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	5304117
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	5304117
Manganese	16.7	10.0	ug/L	SW846 6010A	10/31-11/01/95	5304117

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-102695-12

WO #: C1MLA
LAB #: A5J280118-013
MATRIX: WATER

DATE SAMPLED: 10/26/95
TIME SAMPLED: 12:00
DATE RECEIVED: 10/28/95

- **REQUESTED METALS** -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	53041[illegible]
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	53041[illegible]
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	53041[illegible]
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	53041[illegible]
Manganese	4,990	10.0	ug/L	SW846 6010A	10/31-11/01/95	53041[illegible]

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-102695-13

WO #: C1MLC
LAB #: A5J280118-014
MATRIX: WATER

DATE SAMPLED: 10/26/95
TIME SAMPLED: 17:00
DATE RECEIVED: 10/28/95

- REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/95	5304117
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	5304117
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/95	5304117
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/95	5304117
Manganese	96.7	10.0	ug/L	SW846 6010A	10/31-11/01/95	5304117

NOTE AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

QUALITY CONTROL SECTION

Quanterra
Environmental Services

QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The matrix spike and matrix spike duplicate (MS/MSD) contained in this quality control report were generated as part of the laboratory QA/QC program requirements. These requirements include the analysis of a MS/MSD on a one in twenty basis. Therefore, the associated batch number indicated on the MS/MSD report may not reflect the same batch number as those of the samples contained in the analytical report.

The AD/RPD for the manganese MS/MSD performed on sample A5J280118-003 was outside laboratory acceptance criteria. Remaining elements spiked from the same spiking solution and from the same prep were within laboratory acceptance criteria. Matrix effect was demonstrated and associated results were accepted.

Quanterra
Environmental Services

CHECK SAMPLE REPORT

LAB #: A5J280118

METALS

COMPOUND	SPIKE PERCENT RECOVERY	Q/C LIMITS	PREPARATION - ANALYSIS DATE
	BATCH:5304117		
Aluminum	107	(80-120)	10/31-11/01/95
Beryllium	99	(80-120)	10/31-11/01/95
Cadmium	104	(80-120)	10/31-11/01/95
Chromium	100	(80-120)	10/31-11/01/95
Copper	102	(80-120)	10/31-11/01/95
Manganese	101	(80-120)	10/31-11/01/95
Nickel	102	(80-120)	10/31-11/01/95
Lead	104	(80-120)	10/31-11/01/95
Zinc	116	(80-120)	10/31-11/01/95

Quanterra Environmental Services

METHOD BLANK REPORT

LAB #: A5J280118

METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION ANALYSIS DAT
		BATCH:5304117			
Aluminum	ND	200	ug/L	SW846 6010A	10/31-11/01/9
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/9
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/9
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/9
Copper	ND	5.0	ug/L	SW846 6010A	10/31-11/01/9
Manganese	ND	10.0	ug/L	SW846 6010A	10/31-11/01/9
Nickel	ND	40.0	ug/L	SW846 6010A	10/31-11/01/9
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/9
Zinc	ND	20.0	ug/L	SW846 6010A	10/31-11/01/9

NOTE

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

MATRIX SPIKE REPORT

LAB #: A5J280118-003

- METALS -

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION - ANALYSIS DATE
		BATCH:5304117 MATRIX:		WATER		
Beryllium	86	100	(80-120)	15	(0-20)	10/31-11/01/95
Cadmium	92	106	(80-120)	15	(0-20)	10/31-11/01/95
Chromium	87	102	(80-120)	16	(0-20)	10/31-11/01/95
Manganese	86	109	(80-120)	23	(0-20)	10/31-11/01/95
Lead	85	99	(80-120)	16	(0-20)	10/31-11/01/95

NOTE:

Calculations are performed before rounding to avoid round-off errors in calculated results

CRA

CONES... A-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory N: QUANTERRA

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN MUN. LANDFILL SITE

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: JOHN SCHWALLER

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	Lead	Manganese	Aluminum	Copper	Nickel	Zinc	REMARKS
	10/23/95	1600	GW-3482-JOS-102395-01	GW	1	X	X	X	X	X					All pres. w/ HNO_3
	10/23/95	1745	GW-3482-JOS-102395-02	GW	1										
	10/24/95	1300	GW-3482-JOS-102495-03MS/MSD	GW	2										
	10/24/95	1640	GW-3482-JOS-102495-04	GW	1										
	10/25/95	1037	GW-3482-JNP-102595-05	GW	1										
	10/25/95	1100	GW-3482-JNP-102595-06	GW	1										
	10/25/95	1345	GW-3482-JNP-102595-07	GW	1										
	10/25/95	1430	GW-3482-JOS-102595-08	GW	1										
	10/25/95	1600	GW-3482-JOS-102595-09	GW	1										
	10/25/95	1700	SW-3482-JOS-102595-01	SW	1			X	X		X	X	X	X	
	10/26/95	1030	GW-3482-JOS-102695-10	GW	1	X	X	X	X	X					
	10/26/95	1130	GW-3482-JOS-102695-11	GW	1	X	X	X	X	X					
	10/26/95	1200	GW-3482-JOS-102695-12	GW	1	X	X	X	X	X					
	10/26/95	1700	GW-3482-JOS-102695-13	GW	1	X	X	X	X	X					

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
① [signature]	10/27/95	1200	②		
②			③		
③			④		

METHOD OF SHIPMENT: FED-EX O/N

AIR BILL NUMBER: 316 8906 106

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: JOHN SCHWALLER, NEIL PICKARD

RECEIVED FOR LABORATORY BY: [signature] DATE: 951028 TIME: 1000A

Nº 00400

1007(FORMS) — DEC 6, 93 — REV.D — (AF-01)

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): QUANTERRA

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN MUN. LANDFILL SITE

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: JOHN SCHWALLER

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	Lead	Manganese	[illegible]	[illegible]	[illegible]	[illegible]	REMARKS
	10/23/95	1600	GW-3482-JOS-102395-01	GW	1	X	X	X	X	X					all pres. w/ HNO_3
	10/23/95	1745	GW-3482-JOS-102395-02	GW	1										
	10/24/95	1300	GW-3482-JOS-102495-03MS/MSD	GW	2										
	10/24/95	1640	GW-3482-JOS-102495-04	GW	1										
	10/25/95	1037	GW-3482-JOS-102595-05	GW	1										
	10/25/95	1100	GW-3482-JOS-102595-06	GW	1										
	10/25/95	1345	GW-3482-JOS-102595-07	GW	1										
	10/25/95	1430	GW-3482-JOS-102595-08	GW	1										
	10/25/95	1600	GW-3482-JOS-102595-09	GW	1										
	10/25/95	1700	SW-3482-JOS-102595-01	SW	1			X	X		X	X	X	X	
	10/26/95	1030	GW-3482-JOS-102695-10	GW	1	X	X	X	X	X					
	10/26/95	1130	GW-3482-JOS-102695-11	GW	1	X	X	X	X	X					
	10/26/95	12[illegible]	[illegible]	[illegible]	1	X	X	X	X	X					
	10/26/95	1700	[illegible]	[illegible]	1	X	X	X	X	X					

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY: ① [signature]	DATE: 10/27/95 TIME: 1200	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: FED-EX O/N

AIR BILL NUMBER: 316 8706 106

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: JOHN SCHWALLER, NEIL PICKARD

RECEIVED FOR LABORATORY BY: [signature]

DATE: 951028 TIME: 1000A

Nº 00400

1007(FORMS) — DEC 6, 93 — REV.D — (AF-01)

Quanterra Incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

216 497-9396 Telephone
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Quanterra
Environmental Services

3482

Recd CRA

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUNICIPAL LANDFILL

Joanne Staubitz

Conestoga-Rovers & Assoc.,Ltd.

QUANTERRA INCORPORATED

Daniel J. Wright
Project Manager

January 24, 1996

Quanterra
Environmental Services

CASE NARRATIVE

The following report contains the analytical results for fourteen water samples submitted to Quanterra-North Canton by Conestoga-Rovers and Associates, Inc. from the Cedartown Municipal Landfill Site, project number 3482. The samples were received January 6, 1996, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated.

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The matrix spike and matrix spike duplicate (MS/MSD) contained in the metals section of the quality control report were generated as part of the laboratory QA/QC program requirements. These requirements include the analysis of a MS/MSD on a one in twenty basis. Therefore, the associated batch number indicated on the MS/MSD report may not reflect the same batch number as those of the samples contained in the analytical report.

ANALYTICAL METHODS SUMMARY

Quanterra Environmental Services

A6A060116

Parameters	Methods
Inductively Coupled Plasma (ICP) Metals	SW846 6010A
Trace Inductively Coupled Plasma (ICP) Metals	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

Quanterra Environmental Services

The analytical results of the samples listed below are presented on the following pages.

WO #	LABORATORY ID	SAMPLE IDENTIFICATION		DATE/TIME SAMPLED	
C2K2L	A6A060116-001	GW-3482-JOS-010296-01		1/02/96	15:45
C2K2M	A6A060116-002	GW-3482-JOS-010296-02		1/02/96	17:3[illegible]
C2K2N	A6A060116-003	GW-3482-JOS-010296-03		1/02/96	18:0
C2K2P	A6A060116-004	GW-3482-JOS-010296-04	(MS/MSD)	1/02/96	17:20
C2K2Q	A6A060116-005	GW-3482-JOS-010396-05		1/03/96	10:30
C2K2R	A6A060116-006	GW-3482-JOS-010396-06		1/03/96	11:3
C2K2T	A6A060116-007	GW-3482-JOS-010396-07		1/03/96	14:0
C2K2V	A6A060116-008	GW-3482-JOS-010396-08		1/03/96	13:00
C2K2W	A6A060116-009	GW-3482-JOS-010396-09		1/03/96	15:0[illegible]
C2K30	A6A060116-010	GW-3482-JOS-010396-10		1/03/96	16:0
C2K31	A6A060116-011	GW-3482-JOS-010496-11		1/04/96	11:00
C2K32	A6A060116-012	GW-3482-JOS-010496-12		1/04/96	11:45
C2K33	A6A060116-013	GW-3482-JOS-010496-13		1/04/96	15:0
C2K34	A6A060116-014	SW-3482-JOS-010396-01		1/03/96	17:0

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-010296-01

WO #: C2K2L
LAB #: A6A060116-001
MATRIX: WATER

DATE SAMPLED: 1/02/96
TIME SAMPLED: 15:45
DATE RECEIVED: 1/06/96

- - - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
Beryllium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
Cadmium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
Chromium	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
Manganese	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

COMESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-010296-02

WO #: C2K2M
LAB #: A6A060116-002
MATRIX: WATER

DATE SAMPLED: 1/02/96
TIME SAMPLED: 17:30
DATE RECEIVED: 1/06/9

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	1/08- 1/09/96	6008
Beryllium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008
Cadmium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	600812
Chromium	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008
Manganese	3,700	10.0	ug/L	SW846 6010A	1/08- 1/09/96	600812

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-010296-03

WO #: C2K2N
LAB #: A6A060116-003
MATRIX: WATER

DATE SAMPLED: 1/02/96
TIME SAMPLED: 18:00
DATE RECEIVED: 1/06/96

- **REQUESTED METALS** -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	1/08- 1/09/96	600812
Beryllium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	600812
Cadmium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	600812
Chromium	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	600812
Manganese	3,840	10.0	ug/L	SW846 6010A	1/08- 1/09/96	600812

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

COMESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-010296-04 (MS/MSD)

WO #: C2K2P
LAB #: A6A060116-004
MATRIX: WATER

DATE SAMPLED: 1/02/96
TIME SAMPLED: 17:2^
DATE RECEIVED: 1/06/9

- - - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	1/08- 1/09/96	6008 2
Beryllium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008.2
Cadmium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	600812
Chromium	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008 2
Manganese	10.1	10.0	ug/L	SW846 6010A	1/08- 1/09/96	600812

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-010396-05

WO #: C2K2Q
LAB #: A6A060116-005
MATRIX: WATER

DATE SAMPLED: 1/03/96
TIME SAMPLED: 10:30
DATE RECEIVED: 1/06/96

- **REQUESTED METALS** -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	1/08- 1/09/96	600812
Beryllium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	600812
Cadmium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	600812
Chromium	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	600812
Manganese	252	10.0	ug/L	SW846 6010A	1/08- 1/09/96	600812

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-010396-06

WO #: C2K2R
LAB #: A6A060116-006
MATRIX: WATER

DATE SAMPLED: 1/03/96
TIME SAMPLED: 11:30
DATE RECEIVED: 1/06/9

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	4.2	3.0	ug/L	SW846 6010A	1/08- 1/09/96	6008
Beryllium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008
Cadmium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	60081
Chromium	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008
Manganese	152	10.0	ug/L	SW846 6010A	1/08- 1/09/96	60081

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-010396-07

WO #: C2K2T
LAB #: A6A060116-007
MATRIX: WATER

DATE SAMPLED: 1/03/96
TIME SAMPLED: 14:00
DATE RECEIVED: 1/06/96

- - - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
Beryllium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
Cadmium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
Chromium	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
Manganese	15.4	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-010396-08

WO #: C2K2V
LAB #: A6A060116-008
MATRIX: WATER

DATE SAMPLED: 1/03/96
TIME SAMPLED: 13:0
DATE RECEIVED: 1/06/9

- - - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	1/08- 1/09/96	6008 2
Beryllium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008.2
Cadmium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	600812
Chromium	10.7	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008 2
Manganese	23.9	10.0	ug/L	SW846 6010A	1/08- 1/09/96	600812

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-010396-09

WO #: C2K2W
LAB #: A6A060116-009
MATRIX: WATER

DATE SAMPLED: 1/03/96
TIME SAMPLED: 15:00
DATE RECEIVED: 1/06/96

- - - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	1/08- 1/09/96	600812
Beryllium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	600812
Cadmium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	600812
Chromium	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	600812
Manganese	468	10.0	ug/L	SW846 6010A	1/08- 1/09/96	600812

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-010396-10

WO #: C2K30
LAB #: A6A060116-010
MATRIX: WATER

DATE SAMPLED: 1/03/96
TIME SAMPLED: 16:00
DATE RECEIVED: 1/06/9

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	1/08- 1/09/96	6008 2
Beryllium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008_2
Cadmium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	600812
Chromium	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008 2
Manganese	3,490	10.0	ug/L	SW846 6010A	1/08- 1/09/96	600812

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-010496-11

WO #: C2K31
LAB #: A6A060116-011
MATRIX: WATER

DATE SAMPLED: 1/04/96
TIME SAMPLED: 11:00
DATE RECEIVED: 1/06/96

- - - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
Beryllium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
Cadmium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
Chromium	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128
Manganese	4,480	10.0	ug/L	SW846 6010A	1/08- 1/09/96	6008128

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-010496-12

WO #: C2K32
LAB #: A6A060116-012
MATRIX: WATER

DATE SAMPLED: 1/04/96
TIME SAMPLED: 11:45
DATE RECEIVED: 1/06/

- **REQUESTED METALS** -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	1/08- 1/09/96	600
Beryllium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	600
Cadmium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	60081
Chromium	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	600
Manganese	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	60081

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

GW-3482-JOS-010496-13

WO #: C2K33
LAB #: A6A060116-013
MATRIX: WATER

DATE SAMPLED: 1/04/96
TIME SAMPLED: 15:00
DATE RECEIVED: 1/06/96

- - - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	1/08- 1/09/96	600812
Beryllium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	600812
Cadmium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	600812
Chromium	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	600812
Manganese	1,660	10.0	ug/L	SW846 6010A	1/08- 1/09/96	600812

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

COMESTOGA-ROVERS & ASSOC.,LTD.

SW-3482-JOS-010396-01

WO #: C2K34
LAB #: A6A060116-014
MATRIX: WATER

DATE SAMPLED: 1/03/96
TIME SAMPLED: 17:0^
DATE RECEIVED: 1/06/9

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	1/08- 1/09/96	6008
Aluminum	ND	200	ug/L	SW846 6010A	1/08- 1/09/96	6008
Chromium	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96	600812
Copper	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96	6008
Nickel	ND	40.0	ug/L	SW846 6010A	1/08- 1/09/96	600812
Zinc	ND	20.0	ug/L	SW846 6010A	1/08- 1/09/96	6008

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

QUALITY CONTROL SECTION

QUALITY ASSURANCE/QUALITY CONTROL PROGRAM ELEMENTS

Quanterra Incorporated conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. QC samples provide a mechanism for assessing the overall quality of the analytical batch and can be used to indicate the usability of the analytical data. These QC samples include but are not limited to check samples, method blanks, matrix spikes and surrogate spikes.

The QUALITY CONTROL BATCH (QC Batch) is a set of up to 20 field samples of similar matrix that behave similarly and are processed using the same procedures, reagents, and standards within the same time period. All samples must be associated with a QC batch. Laboratory-generated QC samples that are used to generated QC data are not included in the count of 20 field samples. Additional QC that are requested must be included in the count as field samples. Included in each QC Batch is a Method Blank (MB), Laboratory Control Sample (LCS), and Matrix Spike/Matrix Spike Duplicate (MS/MSD). Alternatively, a matrix spike and sample duplicate (MS/DU) may be used in place of the MS/MSD when described by the method or requested by the client. Also, a LCS/LCSD is prepared if there is insufficient sample in a batch to perform a MS/MSD. For methods that require independent preparation prior to analysis, the QC Batch is defined at the preparation stage. For methods that do not require independent preparation, the QC Batch is defined at the instrument.

The LABORATORY CONTROL SAMPLE (LCS) is a laboratory generated sample beginning with a known and well-characterized matrix that is fortified with target analytes and used to monitor the laboratory's day to day as well as ongoing performance of the applicable analytical methods. The LCS, when spiked with the representative target analytes, is used to monitor the accuracy of the analytical process. Ongoing monitoring of the LCS results provides evidence that the laboratory is performing the method within acceptable accuracy and precision guidelines.

If any analyte is outside established control limits, the system is out of control and corrective action **must** occur. Corrective action may include reanalysis of the LCS extract or digestate, or repreparation or reanalysis of all samples associated with that QC batch. Repreparation and reanalysis of the LCS cannot be performed independently from the field samples in the associated QC batch.

The METHOD BLANK (MB) is a quality control sample that consists of all reagents specific to the method that is carried through every aspect of the procedure including preparation, cleanup and analysis. The method blank is used to identify any interferences or contamination of the analytical system that may lead to the reporting of elevated analyte concentrations or false positive data.

All analytes of interest in the method blank must be below the reporting limit (RL) except for the following common laboratory contaminants.

Volatiles (GC or GC/MS)	Semi-Volatiles (GC/MS)	Metals (ICP or GFAA)
Methylene Chloride	Phthalate Esters	Copper
Acetone		Zinc
2-Butanone (MEK)		Iron
		Lead*

**TJA Trace ICP or GFAA only*

These commonly detected laboratory contaminants may be present if the concentration of the analyte is less than five times the RL for organic methods and less than two times the RL for inorganic methods. If there is no target analyte greater than the RL in the samples associated with an unacceptable MB, the data may be reported.

MATRIX SPIKES (MSs) are environmental samples to which known concentrations of target analytes (the same analytes of interest used in the LCS and described in the method SOP) have been added. MATRIX SPIKE DUPLICATES (MSDs) are second aliquots of the same samples (spike identically as the MS) prepared and analyzed along with the sample and matrix spike. The MS/MSD results are used to determine the effect of a matrix on the precision and accuracy of the analytical process. Due to the potential variability of the matrix of each sample, the MS/MSD results have immediate bearing only on the specific sample spiked and not all samples in the QC Batch.

If an analyte is out of control in the MS/MSD it must be in control in the LCS for the QC batch to be accepted. In cases where it is not possible to calculate the MS/MSD recoveries due to dilutions or interferences, the data is reported as "NC" (i.e., not calculated).

SURROGATE SPIKES are used by the laboratory to indicate method bias introduced by the sample matrix during the preparation and analysis of a specific method. Surrogates are normally organic compounds similar to those being analyzed for the GC or GC/MS. If surrogate recoveries fail to meet laboratory acceptance criteria it does not necessarily indicate poor laboratory control but may in fact be attributed to a sample matrix effect. In the event that surrogates fail criteria, a repreparation and reanalysis is performed to determine the presence of a matrix effect.

All surrogate recoveries must be within established control limits, except for Pesticides/PCBs, PAHs, TPHs, and Herbicides which applies a tiered acceptance approach (one out of two surrogates must be in control). If the surrogate recoveries that are outside control limits cannot be attributed to laboratory error, the decision to reanalyze or flag the data should be made in consultation with the client. Provided all other QC acceptance criteria are met, it is only necessary to reprepare/reanalyze a sample one time to demonstrate that a poor surrogate recovery is due to matrix effect.

Quanterra
Environmental Services

CHECK SAMPLE REPORT

LAB #: A6A060116

METALS

COMPOUND	SPIKE PERCENT RECOVERY	Q/C LIMITS	PREPARATION - ANALYSIS DATE
	BATCH:6008128		
Aluminum	101	(80-120)	1/08- 1/09/96
Beryllium	110	(80-120)	1/08- 1/09/96
Cadmium	104	(80-120)	1/08- 1/09/96
Chromium	106	(80-120)	1/08- 1/09/96
Copper	103	(80-120)	1/08- 1/09/96
Manganese	101	(80-120)	1/08- 1/09/96
Nickel	101	(80-120)	1/08- 1/09/96
Lead	101	(80-120)	1/08- 1/09/96
Zinc	106	(80-120)	1/08- 1/09/96

Quanterra
Environmental Services

METHOD BLANK REPORT

LAB #: A6A060116

METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE
		BATCH:6008128			
Aluminum	ND	200	ug/L	SW846 6010A	1/08- 1/09/96
Beryllium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/ 5
Cadmium	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/ 5
Chromium	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/ 5
Copper	ND	5.0	ug/L	SW846 6010A	1/08- 1/09/96
Manganese	ND	10.0	ug/L	SW846 6010A	1/08- 1/09/96
Nickel	ND	40.0	ug/L	SW846 6010A	1/08- 1/09/96
Lead	ND	3.0	ug/L	SW846 6010A	1/08- 1/09/96
Zinc	ND	20.0	ug/L	SW846 6010A	1/08- 1/

NOTE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

MATRIX SPIKE REPORT

LAB #: A6A060116-004

- METALS -

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION - ANALYSIS DATE
		BATCH:6008128 MATRIX:		WATER		
Beryllium	94	94	(80-120)	0.36	(0-20)	1/08- 1/09/96
Cadmium	100	100	(80-120)	0.10	(0-20)	1/08- 1/09/96
Chromium	95	95	(80-120)	0.15	(0-20)	1/08- 1/09/96
Manganese	98	97	(80-120)	0.51	(0-20)	1/08- 1/09/96
Lead	96	96	(80-120)	0.56	(0-20)	1/08- 1/09/96

NOTE:

Calculations are performed before rounding to avoid round-off errors in calculated results

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): QUANTERRA

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN MUNICIPAL LANDFILL

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: JOHN SCHWALLER

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	LEAD	Manganese	Aluminum	Copper	Nickel	Zinc	REMARKS
	1/2/96	1545	GW-3482-JOS-010296-01	GW	1	X	X	X	X	X					
	↓	1730	GW-3482-JOS-010296-02	GW	1										
		1800	GW-3482-JOS-010296-03	GW	1										
		1720	GW-3482-JOS-010296-04MS/MSD	GW	2										
	1/3/96	1030	GW-3482-JOS-010396-05	GW	1										
	↓	1130	GW-3482-JOS-010396-06	GW	1										
		1400	GW-3482-JOS-010396-07	GW	1										
		1300	GW-3482-JOS-010396-08	GW	1										
		1500	GW-3482-JOS-010396-09	GW	1										
		1600	GW-3482-JOS-010396-10	GW	1										
	1/4/96	1100	GW-3482-JOS-010496-11	GW	1										
	↓	1145	GW-3482-JOS-010496-12	GW	1										
		1500	GW-3482-JOS-010496-13	GW	1										
		1700	SW-3482-JOS-010396-01	SW	1			X	X		X	X	X	X	
			TOTAL NUMBER OF CONTAINERS												

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
① [signature]	1/5/96	0700	②		
②			③		
③			④		

METHOD OF SHIPMENT: FED-EX O/N

AIR BILL NUMBER: 124 9058 115

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: JOHN SCHWALLER, NEIL PICKARD

RECEIVED FOR LABORATORY BY: Kathy Graves

DATE: 1/6/96 TIME: 1010A

Quanterra Incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

330 497-9396 Telephone
330 497-0772 Fax

Quanterra
Environmental Services

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUNICIPAL LANDFILL
Lot#: A6D260120

Joanne Staubitz

Conestoga-Rovers & Assoc.,Ltd.

QUANTERRA INCORPORATED

Michele M Dzlug / FOR
Brian M. Greenwell
Project Manager

May 10, 1996

Quanterra
Environmental Services

CASE NARRATIVE

The following report contains the analytical results for sixteen water samples submitted to Quanterra-North Canton by Conestoga-Rovers and Associates, Inc. from the Cedartown Municipal Landfill Site, project number 3482. The samples were received April 26, 1996, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. Results were provided by facsimile transmission to Joanne Staubitz on May 8, 1996.

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The matrix spike and matrix spike duplicate (MS/MSD) contained in the metals section of the quality control report were generated as part of the laboratory QA/QC program requirements. These requirements include the analysis of an MS/MSD on a one in twenty basis. Therefore, the associated batch number indicated on the MS/MSD report may not reflect the same batch number as those of the samples contained in the analytical report.

Quanterra
Environmental Services

ANALYTICAL METHODS SUMMARY
A6D260120

Parameters	Methods
Inductively Coupled Plasma (ICP) Metals	SW846 6010A
Trace Inductively Coupled Plasma (ICP) Metals	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

Quanterra
Environmental Services

SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

WO #	LABORATORY ID	SAMPLE IDENTIFICATION	DATE/TIME SAMPLE	
C3T7X	A6D260120-001	GW-3482-JOS-042296-01	4/22/96	16:00
C3T80	A6D260120-002	GW-3482-JOS-042296-02	4/22/96	16:30
C3T81	A6D260120-003	GW-3482-JOS-042296-03	4/22/96	17:15
C3T82	A6D260120-004	GW-3482-JOS-042296-04	4/22/96	18:30
C3T83	A6D260120-005	GW-3482-JOS-042396-05	4/23/96	9:30
C3T85	A6D260120-006	GW-3482-JOS-042396-06 (MS/MSD)	4/23/96	9:30
C3T87	A6D260120-007	GW-3482-JOS-042396-07	4/23/96	13:00
C3T89	A6D260120-008	GW-3482-JOS-042396-08	4/23/96	13:45
C3T8D	A6D260120-009	GW-3482-JOS-042396-09	4/23/96	18:00
C3T8E	A6D260120-010	GW-3482-JOS-042396-10	4/23/96	18:15
C3T8F	A6D260120-011	GW-3482-JOS-042496-11	4/24/96	11:00
C3T8G	A6D260120-012	GW-3482-JOS-042496-12	4/24/96	11:30
C3T8J	A6D260120-013	GW-3482-JOS-042496-13	4/24/96	15:30
C3T8K	A6D260120-014	GW-3482-JOS-042496-14	4/24/96	16:00
C3T8L	A6D260120-015	GW-3482-JOS-042496-15	4/24/96	18:30
C3T8M	A6D260120-016	SW-3482-JOS-042496-01	4/24/96	18:00

Quanterra
Environmental Services

Conestoga-Rovers & Assoc.,Ltd.

GW-3482-JOS-042296-01

WO # : C3T7X
LAB # : A6D260120-001
MATRIX: WATER

DATE SAMPLED : 4/22/9
TIME SAMPLED : 16:0
DATE RECEIVED: 4/26/96

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/06/96	612211
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	612211
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6121 1
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	612211
Manganese	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6121 1

NOTE AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

Conestoga-Rovers & Assoc.,Ltd.

GW-3482-JOS-042296-02

WO # : C3T80
LAB # : A6D260120-002
MATRIX: WATER

DATE SAMPLED : 4/22/96
TIME SAMPLED : 16:30
DATE RECEIVED: 4/26/96

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Manganese	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

Conestoga-Rovers & Assoc.,Ltd.

GW-3482-JOS-042296-03

WO # : C3T81
LAB # : A6D260120-003
MATRIX: WATER

DATE SAMPLED : 4/22/9
TIME SAMPLED : 17:1
DATE RECEIVED: 4/26/9

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATC
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/06/96	61221
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	61221
Manganese	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

Conestoga-Rovers & Assoc.,Ltd.

GW-3482-JOS-042296-04

WO # : C3T82
LAB # : A6D260120-004
MATRIX: WATER

DATE SAMPLED : 4/22/96
TIME SAMPLED : 18:30
DATE RECEIVED: 4/26/96

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/06/96	612211
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	612211
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	612211
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	612211
Manganese	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	612211

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

Conestoga-Rovers & Assoc.,Ltd.

GW-3482-JOS-042396-05

WO # : C3T83
LAB # : A6D260120-005
MATRIX: WATER

DATE SAMPLED : 4/23/9
TIME SAMPLED : 9:3
DATE RECEIVED: 4/26/9

- - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BAT
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/06/96	61221
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	61221
Manganese	**4,180**	**10.0**	**ug/L**	**SW846 6010A**	**5/01- 5/06/96**	**6122**

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

Conestoga-Rovers & Assoc.,Ltd.

GW-3482-JOS-042396-06 (MS/MSD)

WO # : C3T85
LAB # : A6D260120-006
MATRIX: WATER

DATE SAMPLED : 4/23/96
TIME SAMPLED : 9:30
DATE RECEIVED: 4/26/96

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/06/96	612211
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	612211
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	612211
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	612211
Manganese	**305**	**10.0**	**ug/L**	**SW846 6010A**	**5/01- 5/06/96**	**612211**

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

Conestoga-Rovers & Assoc.,Ltd.

GW-3482-JOS-042396-07

WO # : C3T87
LAB # : A6D260120-007
MATRIX: WATER

DATE SAMPLED : 4/23/96
TIME SAMPLED : 13:00
DATE RECEIVED: 4/26/96

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	61221 5
Chromium	**10.3**	**10.0**	**ug/L**	**SW846 6010A**	**5/01- 5/06/96**	**6122115**
Manganese	**204**	**10.0**	**ug/L**	**SW846 6010A**	**5/01- 5/06/96**	**61221 5**

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

Conestoga-Rovers & Assoc.,Ltd.

GW-3482-JOS-042396-08

WO # : C3T89
LAB # : A6D260120-008
MATRIX: WATER

DATE SAMPLED : 4/23/96
TIME SAMPLED : 13:45
DATE RECEIVED: 4/26/96

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Manganese	**1,750**	**10.0**	**ug/L**	**SW846 6010A**	**5/01- 5/06/96**	**6122115**

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

Conestoga-Rovers & Assoc.,Ltd.

GW-3482-JOS-042396-09

WO # : C3T8D
LAB # : A6D260120-009
MATRIX: WATER

DATE SAMPLED : 4/23/9
TIME SAMPLED : 18:0
DATE RECEIVED: 4/26/96

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/06/96	6122
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	612211
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	612211
Manganese	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

Conestoga-Rovers & Assoc.,Ltd.

GW-3482-JOS-042396-10

WO # : C3T8E
LAB # : A6D260120-010
MATRIX: WATER

DATE SAMPLED : 4/23/96
TIME SAMPLED : 18:15
DATE RECEIVED: 4/26/96

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Manganese	**4,920**	**10.0**	**ug/L**	**SW846 6010A**	**5/01- 5/06/96**	**6122115**

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

Conestoga-Rovers & Assoc.,Ltd.

GW-3482-JOS-042496-11

WO # : C3T8F
LAB # : A6D260120-011
MATRIX: WATER

DATE SAMPLED : 4/24/96
TIME SAMPLED : 11:00
DATE RECEIVED: 4/26/96

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Manganese	**252**	**10.0**	**ug/L**	**SW846 6010A**	**5/01- 5/06/96**	**6122115**

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

Conestoga-Rovers & Assoc.,Ltd.

GW-3482-JOS-042496-12

WO # : C3T8G
LAB # : A6D260120-012
MATRIX: WATER

DATE SAMPLED : 4/24/96
TIME SAMPLED : 11:30
DATE RECEIVED: 4/26/96

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	**3.6**	**3.0**	**ug/L**	**SW846 6010A**	**5/01- 5/06/96**	**6122115**
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Manganese	**70.0**	**10.0**	**ug/L**	**SW846 6010A**	**5/01- 5/06/96**	**6122115**

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

Conestoga-Rovers & Assoc.,Ltd.

GW-3482-JOS-042496-13

WO # : C3T8J
LAB # : A6D260120-013
MATRIX: WATER

DATE SAMPLED : 4/24/96
TIME SAMPLED : 15:30
DATE RECEIVED: 4/26/96

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Manganese	**5,120**	**10.0**	**ug/L**	**SW846 6010A**	**5/01- 5/06/96**	**6122115**

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

Conestoga-Rovers & Assoc.,Ltd.

GW-3482-JOS-042496-14

WO # : C3T8K
LAB # : A6D260120-014
MATRIX: WATER

DATE SAMPLED : 4/24/96
TIME SAMPLED : 16:00
DATE RECEIVED: 4/26/96

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Manganese	**15.6**	**10.0**	**ug/L**	**SW846 6010A**	**5/01- 5/06/96**	**6122115**

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

Conestoga-Rovers & Assoc.,Ltd.

GW-3482-JOS-042496-15

WO # : C3T8L
LAB # : A6D260120-015
MATRIX: WATER

DATE SAMPLED : 4/24/96
TIME SAMPLED : 18:30
DATE RECEIVED: 4/26/96

- REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	11.3	3.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	61221 5
Chromium	398	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Manganese	274	10.0	ug/L	SW846 6010A	5/01- 5/06/96	61221 5

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

Conestoga-Rovers & Assoc.,Ltd.

SW-3482-JOS-042496-01

WO # : C3T8M
LAB # : A6D260120-016
MATRIX: WATER

DATE SAMPLED : 4/24/96
TIME SAMPLED : 18:00
DATE RECEIVED: 4/26/96

REQUESTED METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Aluminum	ND	200	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Copper	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Nickel	ND	40.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115
Zinc	23.4	20.0	ug/L	SW846 6010A	5/01- 5/06/96	6122115

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

QUALITY CONTROL SECTION

Quanterra
Environmental Services

QUALITY CONTROL ELEMENTS OF SW-846 METHODS

Quanterra Incorporated conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. Quanterra requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples. These QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTOL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). Failure of the RPDs to fall within the laboratory-generated acceptance windows requires the repreparation and reanalysis of all samples in the QC batch.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) except for the common laboratory contaminants indicated below.

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals
Methylene chloride	Phthalate Esters	Copper
Acetone		Iron
2-Butanone		Zinc
		Lead*

* *for analyses run on TJA Trace ICP or GFAA only*

The listed volatile and semivolatile compounds may be present in concentrations up to 5 times the reporting limits. All other organic analyte concentrations must be below the reporting limits. The listed metals may be present in concentrations up to 2 times the reporting limit or must be twenty fold less than the results of the environmental samples. Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. When evaluating the MS/MSD data, special attention is given to the RPD values. When these values fail to meet acceptance criteria, the data is reviewed to determine the cause. If, in the analyst's judgment, sample matrix effects are indicated, no corrective action is performed. Otherwise, the MS/MSD and the environmental sample used to prepare them are reprepared and reanalyzed.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample is spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

The Pesticide/PCB, PAH, TPH and Herbicide analytical methods require that one of two surrogate compounds meet acceptance criteria. All other organic analytical methods require every surrogate recovery to be within the established control limit. If the LCS or the Method Blank surrogates fail to meet recovery criteria, the entire batch of samples is reprepared and reanalyzed. If the surrogates in an environmental sample do not meet the recovery criteria, only the sample is reprepared and reanalyzed to confirm the matrix effect.

Quanterra
Environmental Services

CHECK SAMPLE REPORT

LAB #: A6D260120

- METALS -

COMPOUND	SPIKE PERCENT RECOVERY	Q/C LIMITS	PREPARATION - ANALYSIS DATE
	BATCH:6122115		
Aluminum	101	(80-120)	5/01- 5/06/96
Beryllium	96	(80-120)	5/01- 5/06/96
Cadmium	104	(80-120)	5/01- 5/06/96
Chromium	104	(80-120)	5/01- 5/06/96
Copper	95	(80-120)	5/01- 5/06/96
Manganese	98	(80-120)	5/01- 5/06/96
Nickel	100	(80-120)	5/01- 5/06/96
Lead	103	(80-120)	5/01- 5/06/96
Zinc	102	(80-120)	5/01- 5/06/96

Quanterra
Environmental Services

METHOD BLANK REPORT

LAB #: A6D260120

METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION ANALYSIS DAT
		BATCH:6122115			
Aluminum	ND	200	ug/L	SW846 6010A	5/01- 5/06/
Beryllium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/96
Cadmium	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/
Chromium	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/
Copper	ND	5.0	ug/L	SW846 6010A	5/01- 5/06/
Manganese	ND	10.0	ug/L	SW846 6010A	5/01- 5/06/96
Nickel	ND	40.0	ug/L	SW846 6010A	5/01- 5/
Lead	ND	3.0	ug/L	SW846 6010A	5/01- 5/06/96
Zinc	ND	20.0	ug/L	SW846 6010A	5/01- 5/06/

NOTE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra Environmental Services

MATRIX SPIKE REPORT

LAB #: A6D260120-006

METALS

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE/DUP PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION - ANALYSIS DATE
		BATCH:6122115 MATRIX:		WATER		
Beryllium	96	96	(80-120)	0.56	(0-20)	5/01- 5/06/96
Cadmium	104	104	(80-120)	0.63	(0-20)	5/01- 5/06/96
Chromium	103	103	(80-120)	0.54	(0-20)	5/01- 5/06/96
Manganese	100	97	(80-120)	1.9	(0-20)	5/01- 5/06/96
Lead	102	103	(80-120)	0.43	(0-20)	5/01- 5/06/96

NOTE:

...ulations are performed before rounding to avoid round-off errors in calculated results

Quanterra
Environmental Services

METALS SPIKE REPORT

WATER - ICP

METALS

COMPOUND	SPIKE PERCENT RECOVERY	SPIKE DUPE PERCENT RECOVERY	Q/C LIMITS	RPD	RPD LIMITS	PREPARATION - ANALYSIS DATE	SAMPLE ID
Silver	98	99	(80-120)	1.2	20	04/09/-04/09/96	C3KQ3
Aluminum	106	109	(80-120)	2.7	20	04/03-04/08/96	C3H6H
Arsenic	113	114	(80-120)	1.3	20	04/03-04/08/96	C3GCK
Boron	93	96	(80-120)	3.0	20	03/22-03/26/96	C3CLH
Barium	101	101	(80-120)	0.0	20	04/03-04/08/96	C3H6H
Beryllium	103	102	(80-120)	0.4	20	04/03-04/08/96	C3H6H
Calcium	101	97	(80-120)	1.3	20	04/03-04/08/96	C3H6H
Cadmium	110	109	(80-120)	0.9	20	04/03-04/09/96	C3H6H
Cobalt	101	100	(80-120)	1.2	20	04/03-04/08/96	C3H6H
Chromium	89	92	(80-120)	4.0	20	04/09-04/09/96	C3KQ3
Copper	84	88	(80-120)	5.4	20	04/09-04/09/96	C3KQ3
Iron	94	93	(80-120)	0.1	20	04/03-04/08/96	C3H6H
Potassium	100	100	(80-120)	0.1	20	04/03-04/08/96	C3H6H
Magnesium	105	104	(80-120)	0.8	20	04/03-04/09/96	C3G75
Manganese	98	93	(80-120)	1.2	20	04/03-04/08/96	C3H6H
Molybdenum	112	111	(80-120)	1.1	20	03/22-03/24/96	C3CLH
Sodium	101	101	(80-120)	0.5	20	04/03-04/08/96	C3H6H
Nickel	101	99	(80-120)	2.3	20	04/03-04/08/96	C3H6H
Lead	102	103	(80-120)	1.3	20	04/01-04/01/96	C3G5V
Antimony	105	102	(80-120)	2.9	20	04/03-04/08/96	C3H6H
Selenium	116	118	(80-120)	1.6	20	04/03-04/08/96	C3GCK
Tin	105	104	(80-120)	0.4	20	03/06-03/11/96	C3729
Thallium	101	104	(80-120)	2.8	20	04/03-04/09/96	C3H6H
Vanadium	101	101	(80-120)	0.4	20	04/03-04/08/96	C3H6H
Zinc	98	98	(80-120)	0.2	20	04/03-04/08/96	C3H6H

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): QUANTERRA

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN MUN. LANDFILL

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: JOHN SCHWALLER

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	PARAMETERS: ALUMINUM	CHROMIUM	COPPER	LEAD	NICKEL	ZINC				REMARKS
	4/24/96	1500	SW-3482-JOS-042496-01	SW	1										
			1 TEMP. BLANK												
TOTAL NUMBER OF CONTAINERS					1	17 TOTAL									

RELINQUISHED BY:	DATE: / TIME:	RECEIVED BY:	DATE: / TIME:
① [signature]		②	
②		③	
③		④	

METHOD OF SHIPMENT: FED-EX O/N

AIR BILL NUMBER:

White - Fully Executed Copy
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Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: [signature] DAVE GRZYBOWSKI

RECEIVED FOR LABORATORY BY: Doris Nerren

DATE: 4-26-96 TIME: 11:00 AM

00263

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): QUANTERRA

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN MUNICIPAL LANDFILL

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: JOHN SCHWALLER

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	Manganese	Lead	Mercury	Copper	Nickel	Zinc	REMARKS
	4/22/96	1600	GW-3482-JOS-042296-01	G.W.	1	X	X	X	X	X					
	4/22/96	1630	GW-3482-JOS-042296-02		1										
		1715	GW-3482-JOS-042296-03		1										
		1830	GW-3482-JOS-042296-04		1										
	4/23/96	0930	GW-3482-JOS-042396-05		1										
		0930	GW-3482-JOS-042396-06 MS/MSD		2										
		1300	GW-3482-JOS-042396-07		1										
		1345	GW-3482-JOS-042396-08		1										
		1500	GW-3482-JOS-042396-09		1										
		1815	GW-3482-JOS-042396-10		1										
	4/24/96	1100	GW-3482-JOS-042496-11		1										
		1130	GW-3482-JOS-042496-12		1										
		1530	GW-3482-JOS-042496-13		1										
		1600	GW-3482-JOS-042496-14		1										
		1830	GW-3482-JOS-042496-15		1										
	TOTAL NUMBER OF CONTAINERS				16										

RELINQUISHED BY: ① [signature]	DATE: 4/25/96 TIME: 1000	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: FED EX AIR BILL NUMBER:

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - [illegible] Copy
Goldenrod - [illegible]st Copy

SAMPLE TEAM: [signature] Dave [illegible]

RECEIVED FOR LABORATORY BY: John Nerren
DATE: 4-26-96 TIME: 11:00 AM

Quanterra Incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

330 497-9396 Telephone
330 497-0772 Fax

Quanterra
Environmental Services

Rec'd CRA

AUG 13 1996

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUNICIPAL LANDFILL
Lot#: A6G130114

Joanne Staubitz

Conestoga-Rovers & Assoc.,Ltd.

QUANTERRA INCORPORATED

Brian M. Greenwell
Project Manager

August 2, 1996

Quanterra
Environmental Services

CASE NARRATIVE

The following report contains the analytical results for eleven water samples submitted to Quanterra-North Canton by Conestoga-Rovers & Associates, Inc. from the Cedartown Municipal Landfill Site, project number 3482. The samples were received July 13, 1996, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated.. Results were provided by facsimile transmission to Joanne Staubitz on July 22, 1996.

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan All data have been found to be compliant with the exception of those items noted.

Samples "GW-3482-071096-JOS-08" and "GW-3482-071196-JOS-10" were received with sample container lids off. No sample was available for analysis and therefore, are not included in this report

Quanterra
Environmental Services

ANALYTICAL METHODS SUMMARY

A6G130114

PARAMETER	METHOD
Inductively Coupled Plasma (ICP) Metals	MCAWW 200.7
Trace Inductively Coupled Plasma (ICP) Metals	MCAWW 200.7

References:

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

Quanterra
Environmental Services

SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

WO #	LOT-SAMPLE #	SAMPLE IDENTIFICATION	DATE/TIME SAMPLE
C4RP7	A6G130114-001	GW-3482-070996-JOS-01	07/09/96 17:1
C4RPD	A6G130114-002	GW-3482-070996-JOS-02	07/09/96 18:45
C4RPG	A6G130114-003	GW-3482-071096-JOS-03	07/10/96 09:00
C4RPJ	A6G130114-004	GW-3482-071096-JOS-04	07/10/96 10:3
C4RPL	A6G130114-005	GW-3482-071096-JOS-05 (MS/MSD)	07/10/96 10:4
C4RPT	A6G130114-006	GW-3482-071096-JOS-06	07/10/96 14:40
C4RPX	A6G130114-007	GW-3482-071096-JOS-07	07/10/96 15:0
C4RQ1	A6G130114-008	GW-3482-071096-JOS-09	07/10/96 17:0
C4RQ2	A6G130114-009	GW-3482-071196-JOS-11	07/11/96 11:00
C4RQ4	A6G130114-010	GW-3482-071196-JOS-12	07/11/96 12:45
C4RQ7	A6G130114-011	SW-3482-071196-JOS-01	07/11/96 15:0

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Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-070996-JOS-01

TOTAL Metals

Lot-Sample #.: A6G130114 - 001 **Work Order #.:** C4RP7 **Matrix.....:** WATER
Date Sampled.: 07/09/96 17:15 **Date Received:** 07/13/96 10:00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Lead	ND	3.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Beryllium	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Chromium	ND	10.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Manganese	ND	10.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

ND Parameter was not detected at or above the stated reporting limit.

CONESTOGA-ROVERS & ASSOC.,LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-070996-JOS-02

TOTAL Metals

Lot-Sample #.: A6G130114 - 002 **Work Order #.:** C4RPD **Matrix.....:** WATER
Date Sampled.: 07/09/96 18:45 **Date Received:** 07/13/96 10:00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Lead	ND	3.0	ug/L	SW846 6010A	07/16-07/17/96	619816
		Dilution Fact: 1				
Beryllium	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Chromium	ND	10.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Manganese	**3330**	**10.0**	**ug/L**	**SW846 6010A**	**07/16-07/17/96**	**6198167**
		Dilution Fact: 1				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

ND Parameter was not detected at or above the stated reporting limit.

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-071096-JOS-03

TOTAL Metals

Lot-Sample #.: A6G130114 - 003 **Work Order #.:** C4RPG **Matrix.....:** WATER
Date Sampled.: 07/10/96 09:00 **Date Received:** 07/13/96 10:00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Lead	ND	3.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Beryllium	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Chromium	42.9	10.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Manganese	15.0	10.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

ND Parameter was not detected at or above the stated reporting limit.

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-071096-JOS-04

TOTAL Metals

Lot-Sample #.: A6G130114 - 004 **Work Order #.:** C4RPJ **Matrix.....:** WATER
Date Sampled.: 07/10/96 10:30 **Date Received:** 07/13/96 10:00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Lead	ND	3.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Beryllium	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Chromium	ND	10.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Manganese	ND	10.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

ND Parameter was not detected at or above the stated reporting limit.

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-071096-JOS-05 (MS/MSD)

TOTAL Metals

Lot-Sample #.: A6G130114 - 005 **Work Order #.:** C4RPL **Matrix.....:** WATER
Date Sampled.: 07/10/96 10:40 **Date Received:** 07/13/96 10:00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Lead	ND	3.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Beryllium	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Chromium	ND	10.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Manganese	**225**	**10.0**	**ug/L**	**SW846 6010A**	**07/16-07/17/96**	**6198167**
		Dilution Fact: 1				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results

ND Parameter was not detected at or above the stated reporting limit.

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-071096-JOS-06

TOTAL Metals

Lot-Sample #.: A6G130114 - 006 **Work Order #.:** C4RPT **Matrix.....:** WATER
Date Sampled.: 07/10/96 14:40 **Date Received:** 07/13/96 10:00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Lead	ND	3.0	ug/L	SW846 6010A	07/16-07/17/96	619816
		Dilution Fact: 1				
Beryllium	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	619816
		Dilution Fact: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	619816
		Dilution Fact: 1				
Chromium	ND	10.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Manganese	**778**	**10.0**	**ug/L**	**SW846 6010A**	**07/16-07/17/96**	**6198167**
		Dilution Fact: 1				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

ND Parameter was not detected at or above the stated reporting limit.

CONESTOGA-ROVERS & ASSOC.,LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-071096-JOS-07

TOTAL Metals

Lot-Sample #.: A6G130114 - 007 **Work Order #.:** C4RPX **Matrix.....:** WATER
Date Sampled.: 07/10/96 15:00 **Date Received:** 07/13/96 10:00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Lead	ND	3.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Beryllium	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Chromium	ND	10.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Manganese	**782**	**10.0**	**ug/L**	**SW846 6010A**	**07/16-07/17/96**	**6198167**
		Dilution Fact: 1				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

ND Parameter was not detected at or above the stated reporting limit.

CONESTOGA-ROVERS & ASSOC.,LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-071096-JOS-09

TOTAL Metals

Lot-Sample #.: A6G130114 - 008 **Work Order #.:** C4RQ1 **Matrix.....:** WATER
Date Sampled.: 07/10/96 17:00 **Date Received:** 07/13/96 10:00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Lead	ND	3.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Beryllium	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Chromium	ND	10.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Manganese	**21.4**	**10.0**	**ug/L**	**SW846 6010A**	**07/16-07/17/96**	**6198167**
		Dilution Fact: 1				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

ND Parameter was not detected at or above the stated reporting limit.

CONESTOGA-ROVERS & ASSOC.,LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-071196-JOS-11

TOTAL Metals

Lot-Sample #.: A6G130114 - 009 **Work Order #.:** C4RQ2 **Matrix.....:** WATER
Date Sampled.: 07/11/96 11:00 **Date Received:** 07/13/96 10:00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Lead	ND	3.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Beryllium	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Chromium	ND	10.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Manganese	**5300**	**10.0**	**ug/L**	**SW846 6010A**	**07/16-07/17/96**	**6198167**
		Dilution Fact: 1				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

ND Parameter was not detected at or above the stated reporting limit.

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-071196-JOS-12

TOTAL Metals

Lot-Sample #.: A6G130114 - 010 **Work Order #.:** C4RQ4 **Matrix.....:** WATER
Date Sampled.: 07/11/96 12:45 **Date Received:** 07/13/96 10:00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH
Lead	ND	3.0	ug/L	SW846 6010A	07/16-07/17/96	619816
		Dilution Fact: 1				
Beryllium	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	619816
		Dilution Fact: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	619816
		Dilution Fact: 1				
Chromium	ND	10.0	ug/L	SW846 6010A	07/16-07/17/96	619816
		Dilution Fact: 1				
Manganese	**124**	**10.0**	**ug/L**	**SW846 6010A**	**07/16-07/17/96**	**6198167**
		Dilution Fact: 1				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

ND Parameter was not detected at or above the stated reporting limit.

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: SW-3482-071196-JOS-01

TOTAL Metals

Lot-Sample #.: A6G130114 - 011 **Work Order #.:** C4RQ7 **Matrix.....:** WATER
Date Sampled.: 07/11/96 15:00 **Date Received:** 07/13/96 10:00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Aluminum	ND	200	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Lead	ND	3.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Chromium	ND	10.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Copper	ND	5.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Nickel	ND	40.0	ug/L	SW846 6010A	07/16-07/17/96	6198167
		Dilution Fact: 1				
Zinc	**24.7**	**20.0**	**ug/L**	**SW846 6010A**	**07/16-07/17/96**	**6198167**
		Dilution Fact: 1				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results

ND Parameter was not detected at or above the stated reporting limit

Quanterra
Environmental
Services

QUALITY CONTROL SECTION

Quanterra
Environmental Services

QUALITY CONTROL ELEMENTS OF SW-846 METHODS

Quanterra Incorporated conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. Quanterra requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples. These QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. The only exception is that if the LCS recoveries are biased high and the associated sample is ND for the parameter(s) of interest, the batch is acceptable. Consultation with the client should take place.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs) Failure of the RPDs to fall within the laboratory-generated acceptance windows requires the repreparation and reanalysis of all samples in the QC batch.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations All target analytes must be below the reporting limits (RL) except for the common laboratory contaminants indicated below.

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals
Methylene chloride	Phthalate Esters	Copper
Acetone		Iron
2-Butanone		Zinc
		Lead*

**for analyses run on TJA Trace ICP or GFAA only*

The listed volatile and semivolatile compounds may be present in concentrations up to 5 times the reporting limits. All other organic analyte concentrations must be below the reporting limits. The listed metals may be present in concentrations up to 2 times the reporting limit or must be twenty folds less than the results of the environmental samples. Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. When evaluating the MS/MSD data, special attention is given to the RPD values. When these values fail to meet acceptance criteria, the data is reviewed to determine the cause. If, in the analyst's judgment, sample matrix effects are indicated, no corrective action is performed. Otherwise, the MS/MSD and the environmental sample used to prepare them are reprepared and reanalyzed.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample are spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

The Pesticide/PCB, PAH, TPH and Herbicide analytical methods require that one of two surrogate compounds meet acceptance criteria. All other organic analytical methods require every surrogate recovery to be within the established control limit. The acceptance criteria does not apply to samples that are diluted. If the dilution is more than 5X, the recoveries will be reported as diluted out. All other surrogate recoveries will be reported. If the LCS or the Method Blank surrogates fail to meet recovery criteria (except for dilutions), the entire batch of samples is reprepared and reanalyzed. If the surrogates in an environmental sample do not meet the recovery criteria, only the sample is reprepared and reanalyzed to confirm the matrix effect

Quanterra
Environmental Services

LABORATORY CONTROL SAMPLE EVALUATION REPORT

Metals

Client Lot #: A6G130114 **Matrix:** WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #: 6198167					
Chromium	106	(80-120)	SW846 6010A	07/16-07/17/96	C4T7T10A
	Dilution Factor: 1				
Manganese	103	(80-120)	SW846 6010A	07/16-07/17/96	C4T7T106
	Dilution Factor: 1				
Lead	102	(80-120)	SW846 6010A	07/16-07/17/96	C4T7T107
	Dilution Factor: 1				
Beryllium	104	(80-120)	SW846 6010A	07/16-07/17/96	C4T7T108
	Dilution Factor: 1				
Cadmium	105	(80-120)	SW846 6010A	07/16-07/17/96	C4T7T109
	Dilution Factor: 1				
Nickel	104	(80-120)	SW846 6010A	07/16-07/17/96	C4T7T11A
	Dilution Factor: 1				
Zinc	113	(80-120)	SW846 6010A	07/16-07/17/96	C4T7T11C
	Dilution Factor: 1				
Aluminum	108	(80-120)	SW846 6010A	07/16-07/17/96	C4T7T118
	Dilution Factor: 1				
Copper	98	(80-120)	SW846 6010A	07/16-07/17/96	C4T7T119
	Dilution Factor: 1				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quanterra
Environmental Services

METHOD BLANK REPORT

Metals

Client Lot #: A6G130114 **Matrix:** WATER

Work Order #: C4T7T **Prep Date:** 07/16/96 **Prep Batch #:** 6198167

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	ANALYSIS DATE	DI FA
Manganese	ND	0.015	mg/L	SW846 6010A	07/17/96	1
Lead	ND	0.0030	mg/L	SW846 6010A	07/17/96	1
Beryllium	ND	3.0	ug/L	SW846 6010A	07/17/96	1
Cadmium	ND	5.0	ug/L	SW846 6010A	07/17/96	1
Chromium	ND	10.0	ug/L	SW846 6010A	07/17/96	1
Aluminum	ND	200	ug/L	SW846 6010A	07/17/96	1
Copper	ND	0.010	mg/L	SW846 6010A	07/17/96	1
Nickel	ND	40.0	ug/L	SW846 6010A	07/17/96	1
Zinc	ND	20.0	ug/L	SW846 6010A	07/17/96	1

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

ND Parameter was not detected at or above the stated reporting limit.

Quanterra
Environmental Services

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #: A6G130114 **MS Sample:** A6G130114-005 **Matrix:** WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	BATCH #
Manganese	100	(80-120)			SW846 6010A	07/16-07/17/96	6198167
	101	(80-120)	0.86	(0-20)	SW846 6010A	07/16-07/17/96	6198167
		Dilution Factor: 1					
Lead	100	(80-120)			SW846 6010A	07/16-07/17/96	6198167
	101	(80-120)	0.90	(0-20)	SW846 6010A	07/16-07/17/96	6198167
		Dilution Factor: 1					
Beryllium	104	(80-120)			SW846 6010A	07/16-07/17/96	6198167
	104	(80-120)	0.46	(0-20)	SW846 6010A	07/16-07/17/96	6198167
		Dilution Factor: 1					
Cadmium	106	(80-120)			SW846 6010A	07/16-07/17/96	6198167
	107	(80-120)	1.2	(0-20)	SW846 6010A	07/16-07/17/96	6198167
		Dilution Factor: 1					
Chromium	110	(80-120)			SW846 6010A	07/16-07/17/96	6198167
	110	(80-120)	0.17	(0-20)	SW846 6010A	07/16-07/17/96	6198167
		Dilution Factor: 1					

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results

Quanterra
Environmental Services

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #: A6G130114 **MS Sample:** A6G130114-005 **Matrix:** WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	BATCH #
Manganese	100	(80-120)			SW846 6010A	07/16-07/17/96	6198167
	101	(80-120)	0.86	(0-20)	SW846 6010A	07/16-07/17/96	6198167
		Dilution Factor: 1					
Lead	100	(80-120)			SW846 6010A	07/16-07/17/96	6198167
	101	(80-120)	0.90	(0-20)	SW846 6010A	07/16-07/17/96	6198167
		Dilution Factor: 1					
Beryllium	104	(80-120)			SW846 6010A	07/16-07/17/96	6198167
	104	(80-120)	0.46	(0-20)	SW846 6010A	07/16-07/17/96	6198167
		Dilution Factor: 1					
Cadmium	106	(80-120)			SW846 6010A	07/16-07/17/96	6198167
	107	(80-120)	1.2	(0-20)	SW846 6010A	07/16-07/17/96	6198167
		Dilution Factor: 1					
Chromium	110	(80-120)			SW846 6010A	07/16-07/17/96	6198167
	110	(80-120)	0.17	(0-20)	SW846 6010A	07/16-07/17/96	6198167
		Dilution Factor: 1					

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Nam: QUANTERRA

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN MUNICIPAL LANDFILL SITE

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: John Schwaller

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Beryllium	Cadmium	Chromium	Lead	Manganese	Aluminum	Copper	Nickel	Zinc	REMARKS
	7/10/96	1715	GW-3482-070996-JS-01	GW	1	X	X	X	X	X					STANDARD T/A
	↓	1845	GW-3482-070996-JS-02	GW	1										
	7/10/96	0700	GW-3482-071096-JS-03	↓	1										
	↓	1030	GW-3482-071096-JS-04	↓	1										
	↓	1040	GW-3482-071096-JS-05MS/MSD	↓	2										
	↓	1440	GW-3482-071096-JS-06	↓	1										
	↓	1500	GW-3482-071096-JS-07	↓	1										
	↓	1500	GW-3482-071096-JS-08	↓	1										
	↓	1700	GW-3482-071096-JS-09	↓	1										
	7/11/96	0945	GW-3482-071196-JS-10	↓	1										
	↓	1100	GW-3482-071196-JS-11	↓	1										
	↓	1245	GW-3482-071196-JS-12	↓	1										
	↓	1500	SW-3482-071196-JS-01	SW	1			X	X		X	X	X	X	
			TEMP BLANK	W	1										
			TOTAL NUMBER OF CONTAINERS		15										

RELINQUISHED BY: ① [signature]	DATE: TIME:	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: FED-EX O/N

AIR BILL NUMBER:

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: JOHN SCHWALLER, MIKE REINHARDT

RECEIVED FOR LABORATORY BY: [signature]

DATE: 7.13.96 TIME: 10:00

№ 0333

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): QUANTERRA

REFERENCE NUMBER: 3482

PROJECT NAME: Conoco Inc

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: Tom Schnauer

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	BX	VOA	CL	Mn	Pb					REMARKS
	7/26/96		GW-3482-GS 072696-01	GW	2	X	X	X	X	X					OW-1
	7/26/96		GW-3482-GS-072696-02	GW	2	X	X	X	X	X					CL-03-WP
			Trip Blank		1										

Post-it® Fax Note 7671 | Date 7/29/96 | # of pages ▶ 1
To J. STAUBITZ | From T. SCHNAUER
Co./Dept. | Co.
Phone # | Phone #
Fax # | Fax #

Non-spiked client sample container breakage

TOTAL NUMBER OF CONTAINERS: 5

RELINQUISHED BY: ① [signature]	DATE: 7/26/96 TIME:	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: Fed-Ex o/n

AIR BILL NUMBER:

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Client Copy

SAMPLE TEAM: J. Schnauer

RECEIVED FOR LABORATORY BY: N! 0828

DATE: TIME:

100(FORM) — DEC 8 93 — REV 2 — (AE-01)

Quanterra Incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

330 497-9396 Telephone
330 497-0772 Fax

Quanterra
Environmental Services

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN
Lot#: A6G270104

Joanne Staubitz

Conestoga-Rovers & Assoc.,Ltd.

QUANTERRA INCORPORATED

Brian M. Greenwell
Project Manager

August 14, 1996

Quanterra

Environmental Services

CASE NARRATIVE

The following report contains the analytical results for two water samples submitted to Quanterra-North Canton by Conestoga-Rovers & Associates, Inc. from the Cedartown Facility, project number 3482. The samples were received July 27, 1996, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated..

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with laboratory protocol.

Quanterra Environmental Services

ANALYTICAL METHODS SUMMARY

A6G270104

PARAMETER	METHOD
Inductively Coupled Plasma (ICP) Metals	SW846 6010A
Trace Inductively Coupled Plasma (ICP) Metals	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

Quanterra
Environmental Services

SAMPLE SUMMARY

The analytical results of the samples listed below are presented on the following pages.

WO #	LOT-SAMPLE #	SAMPLE IDENTIFICATION	DATE/TIME SAMPLE
C51EM	A6G270104-001	GW-3482-JOS-072696-01	07/26/96 00:0
C51EN	A6G270104-002	GW-3482-JOS-072696-02	07/26/96 00:0

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COMESTOGA-ROVERS & ASSOC.,LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-JOS-072696-01

TOTAL Metals

Lot-Sample #.: A6G270104 - 001 Work Order #.: C51EM Matrix.....: WATER
Date Sampled.: 07/26/96 00:00 Date Received: 07/27/96

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Lead	ND	3.0	ug/L	SW846 6010A	08/01-08/02/96	6214121
		Dilution Fact: 1				
Beryllium	ND	5.0	ug/L	SW846 6010A	08/01-08/02/96	6214121
		Dilution Fact: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	08/01-08/02/96	6214121
		Dilution Fact: 1				
Chromium	10.4	10.0	ug/L	SW846 6010A	08/01-08/02/96	6214121
		Dilution Fact: 1				
Manganese	16.4	10.0	ug/L	SW846 6010A	08/01-08/02/96	6214121
		Dilution Fact: 1				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

ND Parameter was not detected at or above the stated reporting limit.

CONESTOGA-ROVERS & ASSOC.,LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-JOS-072696-02

TOTAL Metals

Lot-Sample #.: A6G270104 - 002 **Work Order #.:** C51EN **Matrix.....:** WATER
Date Sampled.: 07/26/96 00:00 **Date Received:** 07/27/96

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Lead	ND	3.0	ug/L	SW846 6010A	08/01-08/02/96	6214121
		Dilution Fact: 1				
Beryllium	ND	5.0	ug/L	SW846 6010A	08/01-08/02/96	6214121
		Dilution Fact: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	08/01-08/02/96	6214121
		Dilution Fact: 1				
Chromium	ND	10.0	ug/L	SW846 6010A	08/01-08/02/96	6214121
		Dilution Fact: 1				
Manganese	**32.3**	**10.0**	**ug/L**	**SW846 6010A**	**08/01-08/02/96**	**6214121**
		Dilution Fact: 1				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

ND Parameter was not detected at or above the stated reporting limit.

QUALITY CONTROL SECTION

Quanterra

Environmental Services

QUALITY CONTROL ELEMENTS OF SW-846 METHODS

Quanterra Incorporated conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. Quanterra requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples. These QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. The only exception is that if the LCS recoveries are biased high and the associated sample is ND for the parameter(s) of interest, the batch is acceptable. Consultation with the client should take place.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). Failure of the RPDs to fall within the laboratory-generated acceptance windows requires the repreparation and reanalysis of all samples in the QC batch.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) except for the common laboratory contaminants indicated below:

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals
Methylene chloride	Phthalate Esters	Copper
Acetone		Iron
2-Butanone		Zinc
		Lead*

** for analyses run on TJA Trace ICP or GFAA only*

The listed volatile and semivolatile compounds may be present in concentrations up to 5 times the reporting limits. All other organic analyte concentrations must be below the reporting limits. The listed metals may be present in concentrations up to 2 times the reporting limit or must be twenty folds less than the results of the environmental samples. Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. When evaluating the MS/MSD data, special attention is given to the RPD values. When these values fail to meet acceptance criteria, the data is reviewed to determine the cause. If, in the analyst's judgment, sample matrix effects are indicated, no corrective action is performed. Otherwise, the MS/MSD and the environmental sample used to prepare them are reprepared and reanalyzed.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample are spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

The Pesticide/PCB, PAH, TPH and Herbicide analytical methods require that one of two surrogate compounds meet acceptance criteria. All other organic analytical methods require every surrogate recovery to be within the established control limit. The acceptance criteria does not apply to samples that are diluted If the dilution is more than 5X, the recoveries will be reported as diluted out. All other surrogate recoveries will be reported. If the LCS or the Method Blank surrogates fail to meet recovery criteria (except for dilutions), the entire batch of samples is reprepared and reanalyzed. If the surrogates in an environmental sample do not meet the recovery criteria, only the sample is reprepared and reanalyzed to confirm the matrix effect.

Quanterra
Environmental Services

LABORATORY CONTROL SAMPLE EVALUATION REPORT

Metals

Client Lot #: A6G270104 **Matrix:** WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #: 6214121					
Chromium	108	(80-120)	SW846 6010A	08/01-08/02/96	C52VP10T
	Dilution Factor: 1				
Beryllium	102	(80-120)	SW846 6010A	08/01-08/02/96	C52VP11G
	Dilution Factor: 1				
Cadmium	109	(80-120)	SW846 6010A	08/01-08/02/96	C52VP11H
	Dilution Factor: 1				
Manganese	102	(80-120)	SW846 6010A	08/01-08/02/96	C52VP110
	Dilution Factor: 1				
Lead	105	(80-120)	SW846 6010A	08/01-08/02/96	C52VP118
	Dilution Factor: 1				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quanterra

Environmental Services

METHOD BLANK REPORT

TOTAL Metals

Client Lot #: A6G270104 **Matrix:** WATER

Work Order #: C52VP **Prep Date:** 08/01/96 **Prep Batch #:** 6214121

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	ANALYSIS DATE	DIL FAC
Lead	ND	3.0	ug/L	SW846 6010A	08/02/96	1
Beryllium	ND	5.0	ug/L	SW846 6010A	08/02/96	1
Cadmium	ND	5.0	ug/L	SW846 6010A	08/02/96	1
Chromium	ND	10.0	ug/L	SW846 6010A	08/02/96	1
Manganese	ND	10.0	ug/L	SW846 6010A	08/02/96	1

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

ND Parameter was not detected at or above the stated reporting limit.

Quanterra

Environmental Services

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #: A6G270104 **MS Sample:** A6G270112-001 **Matrix:** WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	BATCH #
Manganese	97	(80-120)			SW846 6010A	08/01-08/02/96	6214121
	102	(80-120)	4.6	(0-20)	SW846 6010A	08/01-08/02/96	6214121
		Dilution Factor: 1					
Chromium	103	(80-120)			SW846 6010A	08/01-08/02/96	6214121
	108	(80-120)	4.7	(0-20)	SW846 6010A	08/01-08/02/96	6214121
		Dilution Factor: 1					
Beryllium	97	(80-120)			SW846 6010A	08/01-08/02/96	6214121
	103	(80-120)	5.0	(0-20)	SW846 6010A	08/01-08/02/96	6214121
		Dilution Factor: 1					
Cadmium	103	(80-120)			SW846 6010A	08/01-08/02/96	6214121
	108	(80-120)	4.8	(0-20)	SW846 6010A	08/01-08/02/96	6214121
		Dilution Factor: 1					
Lead	100	(80-120)			SW846 6010A	08/01-08/02/96	6214121
	105	(80-120)	4.6	(0-20)	SW846 6010A	08/01-08/02/96	6214121
		Dilution Factor: 1					

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): QUANTERRA

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: John Schwaller

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Be	Cd	Cr	Mn	Pb					REMARKS
	7/26/96		GW-3482-JS-072696-01	GW	2	X	X	X	X	X					
	7/26/96		GW-3482-JS-072696-02	GW	2	X	X	X	X	X					
			TEMP BLANK		1										
			TOTAL NUMBER OF CONTAINERS		5										

RELINQUISHED BY: ① [signature] DATE: 7/26/96 TIME:
RECEIVED BY: ② DATE: TIME:

RELINQUISHED BY: ② DATE: TIME:
RECEIVED BY: ③ DATE: TIME:

RELINQUISHED BY: ③ DATE: TIME:
RECEIVED BY: ④ DATE: TIME:

METHOD OF SHIPMENT: FED-EX O/N

AIR BILL NUMBER:

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: J. SCHWALLER

RECEIVED FOR LABORATORY BY: Kris Brodie
DATE: 72796 TIME: 10:15 A

Nº 0828

Quanterra Incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

330 497-9396 Telephone
330 497-0772 Fax

Quanterra
Environmental Services

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUN. LANDFILL

Lot #: A6J260108

Joanne Staubitz

Conestoga-Rovers & Assoc.,Ltd.

QUANTERRA INCORPORATED

Michele M. Daley /FOR
David S. Heakin
Project Manager

November 14, 1996

Quanterra
Environmental Services

CASE NARRATIVE

The following report contains the analytical results for eleven water samples submitted to Quanterra-North Canton by Conestoga-Rovers & Associates, Inc. from the Cedartown Municipal Landfill Site, project number 3482. The samples were received October 26, 1996, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated.

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with laboratory protocol.

ANALYTICAL METHODS SUMMARY

Quanterra Environmental Services

A6J260108

PARAMETER	ANALYTICAL METHOD
Inductively Coupled Plasma (ICP) Metals	SW846 6010A
Trace Inductively Coupled Plasma (ICP) Metals	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

Quanterra Environmental Services

SAMPLE SUMMARY

A6J260108

WO #	SAMPLE#	CLIENT SAMPLE ID	DATE	TIM
C6G9R	001	GW-3482-102396-JOS-01	10/23/96	0
C6G9T	002	GW-3482-102396-JOS-02 (MS/MSD)	10/23/96	00
C6G9V	003	GW-3482-102396-JOS-03	10/23/96	00
C6G9W	004	GW-3482-102396-JOS-04	10/23/96	0
C6G9X	005	GW-3482-102396-JOS-05	10/23/96	0
C6GA0	006	GW-3482-102496-JOS-06	10/24/96	00:
C6GA1	007	GW-3482-102496-JOS-07	10/24/96	0
C6GA2	008	GW-3482-102496-JOS-08	10/24/96	0
C6GA3	009	GW-3482-102496-JOS-09	10/24/96	00:
C6GA4	010	GW-3482-102596-JOS-10	10/25/96	0
C6GA5	011	GW-3482-102596-JOS-11	10/25/96	0

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

CONESTOGA-ROVERS & ASSOC.,LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-102396-JOS-01

TOTAL Metals

Lot-Sample #...: A6J260108-001 **Matrix.....:** WATER
Date Sampled...: 10/23/96 00:00 **Date Received..:** 10/26/96

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 6305106						
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9R105
		Dilution Factor: 1				
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9R101
		Dilution Factor: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9R102
		Dilution Factor: 1				
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9R103
		Dilution Factor: 1				
Manganese	**19.7**	**10.0**	**ug/L**	**SW846 6010A**	**10/31-11/01/96**	**C6G9R104**
		Dilution Factor: 1				

CONESTOGA-ROVERS & ASSOC.,LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-102396-JOS-02 (MS/MSD)

TOTAL Metals

Lot-Sample #...: A6J260108-002 Matrix.....: WATER
Date Sampled...: 10/23/96 00:00 Date Received..: 10/26/96

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 6305106						
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9T1uE
		Dilution Factor: 1				
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9T1 1
		Dilution Factor: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9T1 4
		Dilution Factor: 1				
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9T1 7
		Dilution Factor: 1				
Manganese	**23.4**	**10.0**	**ug/L**	**SW846 6010A**	**10/31-11/01/96**	**C6G9T1 A**
		Dilution Factor: 1				

CONESTOGA-ROVERS & ASSOC.,LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-102396-JOS-03

TOTAL Metals

Lot-Sample #...: A6J260108-003 **Matrix.....:** WATER
Date Sampled...: 10/23/96 00:00 **Date Received..:** 10/26/96

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 6305106						
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9V105
		Dilution Factor: 1				
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9V101
		Dilution Factor: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9V102
		Dilution Factor: 1				
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9V103
		Dilution Factor: 1				
Manganese	ND	10.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9V104
		Dilution Factor: 1				

Quanterra
Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-102396-JOS-04

TOTAL Metals

Lot-Sample #...: A6J260108-004 **Matrix.....:** WATER
Date Sampled...: 10/23/96 00:00 **Date Received..:** 10/26/96

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 6305106						
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9W105
		Dilution Factor: 1				
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9W1
		Dilution Factor: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9W1
		Dilution Factor: 1				
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9W1
		Dilution Factor: 1				
Manganese	ND	10.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9W1
		Dilution Factor: 1				

COBRSTOGA-ROVERS & ASSOC.,LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-102396-JOS-05

TOTAL Metals

Lot-Sample #...: A6J260108-005 **Matrix.....:** WATER
Date Sampled...: 10/23/96 00:00 **Date Received..:** 10/26/96

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 6305106						
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9X105
		Dilution Factor: 1				
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9X101
		Dilution Factor: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9X102
		Dilution Factor: 1				
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/96	C6G9X103
		Dilution Factor: 1				
Manganese	**1930**	**10.0**	**ug/L**	**SW846 6010A**	**10/31-11/01/96**	**C6G9X104**
		Dilution Factor: 1				

CONESTOGA-ROVERS & ASSOC.,LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-102496-JOS-06

TOTAL Metals

Lot-Sample #...: A6J260108-006 **Matrix.....:** WATER
Date Sampled...: 10/24/96 00:00 **Date Received..:** 10/26/96

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 6305106						
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/96	C6GA01
		Dilution Factor: 1				
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/96	C6GA01
		Dilution Factor: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/96	C6GA01
		Dilution Factor: 1				
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/96	C6GA01
		Dilution Factor: 1				
Manganese	**682**	**10.0**	**ug/L**	**SW846 6010A**	**10/31-11/01/96**	**C6GA01**
		Dilution Factor: 1				

CONESTOGA-ROVERS & ASSOC.,LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-102496-JOS-07

TOTAL Metals

Lot-Sample #...: A6J260108-007 **Matrix.....:** WATER
Date Sampled...: 10/24/96 00:00 **Date Received..:** 10/26/96

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 6305106						
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/96	C6GA1105
		Dilution Factor: 1				
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/96	C6GA1101
		Dilution Factor: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/96	C6GA1102
		Dilution Factor: 1				
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/96	C6GA1103
		Dilution Factor: 1				
Manganese	**191**	**10.0**	**ug/L**	**SW846 6010A**	**10/31-11/01/96**	**C6GA1104**
		Dilution Factor: 1				

CONESTOGA-ROVERS & ASSOC.,LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-102496-JOS-08

TOTAL Metals

Lot-Sample #...: A6J260108-008 **Matrix.....:** WATER
Date Sampled...: 10/24/96 00:00 **Date Received..:** 10/26/96

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 6305106						
Lead	ND	3.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA21u5
Beryllium	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA2[illegible] 1
Cadmium	ND	5.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA2[illegible] 2
Chromium	ND	10.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA2[illegible] 3
Manganese	ND	10.0 Dilution Factor: 1	ug/L	SW846 6010A	10/31-11/01/96	C6GA2[illegible] 4

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-102496-JOS-09

TOTAL Metals

Lot-Sample #...: A6J260108-009 **Matrix.....:** WATER
Date Sampled...: 10/24/96 00:00 **Date Received..:** 10/26/96

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 6305106						
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/96	C6GA310
		Dilution Factor: 1				
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/96	C6GA310
		Dilution Factor: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/96	C6GA3102
		Dilution Factor: 1				
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/96	C6GA310
		Dilution Factor: 1				
Manganese	**4520**	**10.0**	**ug/L**	**SW846 6010A**	**10/31-11/01/96**	**C6GA3104**
		Dilution Factor: 1				

CONESTOGA-ROVERS & ASSOC.,LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-102596-JOS-10

TOTAL Metals

Lot-Sample #...: A6J260108-010 **Matrix.....:** WATER
Date Sampled...: 10/25/96 00:00 **Date Received..:** 10/26/96

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 6305106						
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/96	C6GA41U5
		Dilution Factor: 1				
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/96	C6GA4[illegible]
		Dilution Factor: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/96	C6GA4[illegible]
		Dilution Factor: 1				
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/96	C6GA4[illegible]
		Dilution Factor: 1				
Manganese	**2490**	**10.0**	**ug/L**	**SW846 6010A**	**10/31-11/01/96**	**C6GA4[illegible]**
		Dilution Factor: 1				

CONESTOGA-ROVERS & ASSOC.,LTD.

Quanterra Environmental Services

Client Sample ID: GW-3482-102596-JOS-11

TOTAL Metals

Lot-Sample #...: A6J260108-011 **Matrix.....:** WATER
Date Sampled...: 10/25/96 00:00 **Date Received..:** 10/26/96

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 6305106						
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/96	C6GA5105
		Dilution Factor: 1				
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/96	C6GA5101
		Dilution Factor: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/96	C6GA5102
		Dilution Factor: 1				
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/96	C6GA5103
		Dilution Factor: 1				
Manganese	**24.9**	**10.0**	**ug/L**	**SW846 6010A**	**10/31-11/01/96**	**C6GA5104**
		Dilution Factor: 1				

Quanterra
Environmental
Services

QUALITY CONTROL SECTION

Quanterra
Environmental Services

QUALITY CONTROL ELEMENTS OF SW-846 METHODS

Quanterra Incorporated conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental and field QC samples of a similar matrix (water, soil) that are processed using the same reagents and standards. Quanterra requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples. These QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. The only exception is that if the LCS recoveries are biased high and the associated sample is ND for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). Failure of the RPDs to fall within the laboratory-generated acceptance windows requires the repreparation and reanalysis of all samples in the QC batch. The only exception is that if the MS/MSD RPDs are within acceptance criteria, the batch is acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except for the common laboratory contaminants indicated below.

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals
Methylene chloride	Phthalate Esters	Copper
Acetone		Iron
2-Butanone		Zinc
		Lead*

* *for analyses run on TJA Trace ICP or GFAA only*

QUALITY CONTROL ELEMENTS OF SW-846 METHODS (continued)

The listed volatile and semivolatile compounds may be present in concentrations up to 5 times the reporting limits. The listed metals may be present in concentrations up to 2 times the reporting limit or must be twenty fold less than the results of the environmental samples. Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. When these values fail to meet acceptance criteria, the data is reviewed to determine the cause. If in the analyst's judgment, sample matrix effects are indicated and the LCS or LCSD is within acceptance criteria, no correction action is performed. Otherwise, the MS/MSD and the environmental sample used to prepare them are reprepared and reanalyzed.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. The MS/DU is evaluated in the same manner as the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, all organic environmental and QC sample are spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

The acceptance criteria do not apply to samples that are diluted. If the dilution is more than 5X, the recoveries will be reported as diluted out. All other surrogate recoveries will be reported. If the LCS, LCSD, or the Method Blank surrogates fail to meet recovery criteria (except for dilutions), the entire batch of samples is reprepared and reanalyzed.

If the surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank and the associated sample(s) are ND, the batch is acceptable. If the surrogate recoveries are outside criteria for environmental or MS/MSD samples, the batch may be acceptable based on the analyst's judgment that sample matrix effects are indicated.

The Pesticide/PCB, PAH, TPH and Herbicide analytical methods require that one of two surrogate compounds meet acceptance criteria.

Quanterra
Environmental Services

LABORATORY CONTROL SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: A6J260108 **Matrix.....:** WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
LCS Lot-Sample#: A6J310000-106 **Prep Batch #...:** 6305106					
Chromium	105	(80 - 120)	SW846 6010A	10/31-11/01/96	C6JC910A
		Dilution Factor: 1			
Manganese	101	(80 - 120)	SW846 6010A	10/31-11/01/96	C6JC9106
		Dilution Factor: 1			
Lead	103	(80 - 120)	SW846 6010A	10/31-11/01/96	C6JC9107
		Dilution Factor: 1			
Beryllium	98	(80 - 120)	SW846 6010A	10/31-11/01/96	C6JC9108
		Dilution Factor: 1			
Cadmium	106	(80 - 120)	SW846 6010A	10/31-11/01/96	C6JC9109
		Dilution Factor: 1			

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quanterra Environmental Services

METHOD BLANK REPORT

TOTAL Metals

Client Lot #...: A6J260108 **Matrix.....:** WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER
MB Lot-Sample #: A6J310000-106 **Prep Batch #...:** 6305106						
Lead	ND	3.0	ug/L	SW846 6010A	10/31-11/01/96	C6JC91
		Dilution Factor: 1				
Beryllium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/96	C6JC9103
		Dilution Factor: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	10/31-11/01/96	C6JC9104
		Dilution Factor: 1				
Chromium	ND	10.0	ug/L	SW846 6010A	10/31-11/01/96	C6JC9105
		Dilution Factor: 1				
Manganese	ND	10.0	ug/L	SW846 6010A	10/31-11/01/96	C6JC9101
		Dilution Factor: 1				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quanterra Environmental Services

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: A6J260108 **Matrix.....:** WATER
Date Sampled...: 10/23/96 00:00 **Date Received..:** 10/26/96

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MS Lot-Sample #: A6J260108-002 **Prep Batch #...:** 6305106							
Lead	102	(80 - 120)			SW846 6010A	10/31-11/01/96	C6G9T10F
	101	(80 - 120)	1.7	(0-20)	SW846 6010A	10/31-11/01/96	C6G9T10G
		Dilution Factor: 1					
Beryllium	100	(80 - 120)			SW846 6010A	10/31-11/01/96	C6G9T102
	98	(80 - 120)	1.4	(0-20)	SW846 6010A	10/31-11/01/96	C6G9T103
		Dilution Factor: 1					
Cadmium	113	(80 - 120)			SW846 6010A	10/31-11/01/96	C6G9T105
	104	(80 - 120)	7.9	(0-20)	SW846 6010A	10/31-11/01/96	C6G9T106
		Dilution Factor: 1					
Chromium	104	(80 - 120)			SW846 6010A	10/31-11/01/96	C6G9T108
	102	(80 - 120)	1.4	(0-20)	SW846 6010A	10/31-11/01/96	C6G9T109
		Dilution Factor: 1					
Manganese	100	(80 - 120)			SW846 6010A	10/31-11/01/96	C6G9T10C
	99	(80 - 120)	0.67	(0-20)	SW846 6010A	10/31-11/01/96	C6G9T10D
		Dilution Factor: 1					

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): [illegible]

REFERENCE NUMBER: 7452

PROJECT NAME: [illegible] LANDFILL

SAMPLER'S SIGNATURE: [illegible] PRINTED NAME: [illegible]

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Bl	Cd	Cr	Mn	Pb					REMARKS
	10/23/96		GW-3452-102396-SS-01	GW	1	X	X	X	X	X					
			GW-3452-102396-SS-02 (MS/MSD)		2										
			GW-3452-102396-SS-03		1										
			GW-3452-102396-SS-04		1										
			GW-3452-102396-SS-05		1										
	10/24/96		GW-3452-102496-SS-06		1										
			GW-3452-102496-SS-07		1										
			GW-3452-102496-SS-08		1										
			GW-3452-102496-SS-09		1										
	10/25/96		GW-3452-102596-SS-10		1										
			GW-3452-102596-SS-11		1										

TOTAL NUMBER OF CONTAINERS: 12

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
①	10/25/96		②		
②			③		
③			④		

METHOD OF SHIPMENT: FED-EX O/N

AIR BILL NUMBER:

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - [illegible]mist Copy

SAMPLE TEAM: J. SCHWARTZ

RECEIVED FOR LABORATORY BY: [illegible]

DATE: 961026 TIME: 10:40A

№ 0858

FORM [illegible]

Quanterra Incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

330 497-9396 Telephone
330 497-0772 Fax

Quanterra
Environmental Services

Rec'd CRA
NOV 21 1996

ANALYTICAL REPORT

PROJECT NO. 3482

CEDARTOWN MUNICIPAL LANDFILL

Lot #: A6J300121

Joanne Staubitz

Conestoga-Rovers & Assoc.,Ltd.

QUANTERRA INCORPORATED

David S. Heakin
Project Manager

November 19, 1996

Quanterra
Environmental Services

CASE NARRATIVE

The following report contains the analytical results for two water samples submitted to Quanterra-North Canton by Conestoga-Rovers & Associates, Inc. from the Cedartown Municipal Landfill Site, project number 3482. The samples were received October 30, 1996, according to documented sample acceptance procedures.

Quanterra utilizes only USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameters listed on the following page in accordance with the methods indicated. Results were provided by facsimile transmission to Joanne Staubitz on November 12, 1996.

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with laboratory protocol.

Quanterra
Environmental Services

ANALYTICAL METHODS SUMMARY

A6J300121

PARAMETER	ANALYTICAL METHOD
Inductively Coupled Plasma (ICP) Metals	SW846 6010A
Trace Inductively Coupled Plasma (ICP) Metals	SW846 6010A

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

Quanterra
Environmental Services

SAMPLE SUMMARY

A6J300121

WO #	SAMPLE#	CLIENT SAMPLE ID	DATE	TIME
C6HWF	001	GW-3482-102896-JOS-12	10/28/96	00:00
C6HWK	002	SW-3482-102896-JOS-01	10/28/96	00:00

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: GW-3482-102896-JOS-12

TOTAL Metals

Lot-Sample #...: A6J300121-001 **Matrix.....:** WATER
Date Sampled...: 10/28/96 00:00 **Date Received..:** 10/30/96

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 6309255						
Lead	ND	3.0	ug/L	SW846 6010A	11/05-11/06/96	C6HWF105
		Dilution Factor: 1				
Beryllium	ND	5.0	ug/L	SW846 6010A	11/05-11/06/96	C6HWF101
		Dilution Factor: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	11/05-11/06/96	C6HWF102
		Dilution Factor: 1				
Chromium	**16.2**	**10.0**	**ug/L**	**SW846 6010A**	**11/05-11/06/96**	**C6HWF103**
		Dilution Factor: 1				
Manganese	**296**	**10.0**	**ug/L**	**SW846 6010A**	**11/05-11/06/96**	**C6HWF104**
		Dilution Factor: 1				

Quanterra Environmental Services

CONESTOGA-ROVERS & ASSOC.,LTD.

Client Sample ID: SW-3482-102896-JOS-01

TOTAL Metals

Lot-Sample #...: A6J300121-002 **Matrix.....:** WATER
Date Sampled...: 10/28/96 00:00 **Date Received..:** 10/30/96

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 6309255						
Aluminum	ND	200	ug/L	SW846 6010A	11/05-11/06/96	C6HWK102
		Dilution Factor: 1				
Lead	ND	3.0	ug/L	SW846 6010A	11/05-11/06/96	C6HWK101
		Dilution Factor: 1				
Chromium	ND	10.0	ug/L	SW846 6010A	11/05-11/06/96	C6HWK103
		Dilution Factor: 1				
Copper	ND	5.0	ug/L	SW846 6010A	11/05-11/06/96	C6HWK10[illegible]
		Dilution Factor: 1				
Nickel	ND	40.0	ug/L	SW846 6010A	11/05-11/06/96	C6HWK10[illegible]
		Dilution Factor: 1				
Zinc	22.1	20.0	ug/L	SW846 6010A	11/05-11/06/96	C6HW
		Dilution Factor: 1				

QUALITY CONTROL SECTION

Quanterra
Environmental Services

QUALITY CONTROL ELEMENTS OF SW-846 METHODS

Quanterra Incorporated conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental and field QC samples of a similar matrix (water, soil) that are processed using the same reagents and standards. Quanterra requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples. These QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. The only exceptuon is that if the LCS recoveries are biased high and the associated sample is ND for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). Failure of the RPDs to fall within the laboratory-generated acceptance windows requires the repreparation and reanalysis of all samples in the QC batch. The only exceptuon is that if the MS/MSD RPDs are within acceptance criteria, the batch is acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except for the common laboratory contaminants indicated below.

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals
Methylene chloride	Phthalate Esters	Copper
Acetone		Iron
2-Butanone		Zinc
		Lead*

* *for analyses run on TJA Trace ICP or GFAA only*

QUALITY CONTROL ELEMENTS OF SW-846 METHODS (continued)

The listed volatile and semivolatile compounds may be present in concentrations up to 5 times the reporting limits. The listed metals may be present in concentrations up to 2 times the reporting limit or must be twenty fold less than the results of the environmental samples. Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. When these values fail to meet acceptance criteria, the data is reviewed to determine the cause. If in the analyst's judgment, sample matrix effects are indicated and the LCS or LCSD is within acceptance criteria, no correction action is performed. Otherwise, the MS/MSD and the environmental sample used to prepare them are reprepared and reanalyzed.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. The MS/DU is evaluated in the same manner as the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, all organic environmental and QC sample are spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

The acceptance criteria do not apply to samples that are diluted. If the dilution is more than 5X, the recoveries will be reported as diluted out. All other surrogate recoveries will be reported. If the LCS, LCSD, or the Method Blank surrogates fail to meet recovery criteria (except for dilutions), the entire batch of samples is reprepared and reanalyzed.

If the surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank and the associated sample(s) are ND, the batch is acceptable. If the surrogate recoveries are outside criteria for environmental or MS/MSD samples, the batch may be acceptable based on the analyst's judgment that sample matrix effects are indicated.

The Pesticide/PCB, PAH, TPH and Herbicide analytical methods require that one of two surrogate compounds meet acceptance criteria.

Quanterra
Environmental Services

LABORATORY CONTROL SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: A6J300121 **Matrix.....:** WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
LCS Lot-Sample#: A6K040000-255 **Prep Batch #...:** 6309255					
Cadmium	98	(80 - 120)	SW846 6010A	11/05-11/06/96	C6LT110F
		Dilution Factor: 1			
Chromium	99	(80 - 120)	SW846 6010A	11/05-11/06/96	C6LT110G
		Dilution Factor: 1			
Manganese	99	(80 - 120)	SW846 6010A	11/05-11/06/96	C6LT112N
		Dilution Factor: 1			
Nickel	95	(80 - 120)	SW846 6010A	11/05-11/06/96	C6LT112P
		Dilution Factor: 1			
Zinc	96	(80 - 120)	SW846 6010A	11/05-11/06/96	C6LT112U
		Dilution Factor: 1			
ead	96	(80 - 120)	SW846 6010A	11/05-11/06/96	C6LT112V
		Dilution Factor: 1			
Aluminum	94	(80 - 120)	SW846 6010A	11/05-11/06/96	C6LT1131
		Dilution Factor: 1			
Beryllium	94	(80 - 120)	SW846 6010A	11/05-11/06/96	C6LT1133
		Dilution Factor: 1			
Copper	92	(80 - 120)	SW846 6010A	11/05-11/06/96	C6LT1136
		Dilution Factor: 1			

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quanterra Environmental Services

METHOD BLANK REPORT

TOTAL Metals

Client Lot #...: A6J300121 **Matrix.....:** WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MB Lot-Sample #: A6K040000-255 **Prep Batch #...:** 6309255						
Aluminum	ND	200	ug/L	SW846 6010A	11/05-11/06/96	C6LT111
		Dilution Factor: 1				
Lead	ND	3.0	ug/L	SW846 6010A	11/05-11/06/96	C6LT111
		Dilution Factor: 1				
Beryllium	ND	5.0	ug/L	SW846 6010A	11/05-11/06/96	C6LT111
		Dilution Factor: 1				
Cadmium	ND	5.0	ug/L	SW846 6010A	11/05-11/06/96	C6LT1106
		Dilution Factor: 1				
Chromium	ND	10.0	ug/L	SW846 6010A	11/05-11/06/96	C6LT1107
		Dilution Factor: 1				
Copper	ND	5.0	ug/L	SW846 6010A	11/05-11/06/96	C6LT111D
		Dilution Factor: 1				
Manganese	ND	10.0	ug/L	SW846 6010A	11/05-11/06/96	C6LT1
		Dilution Factor: 1				
Nickel	ND	40.0	ug/L	SW846 6010A	11/05-11/06/96	C6LT110
		Dilution Factor: 1				
Zinc	ND	20.0	ug/L	SW846 6010A	11/05-11/06/96	C6LT111
		Dilution Factor: 1				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quanterra Environmental Services

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: A6J300121 **Matrix.....:** WATER
Date Sampled...: 10/26/96 10:00 **Date Received..:** 10/29/96

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MS Lot-Sample #: A6J290120-001 **Prep Batch #...:** 6309255							
Beryllium	96	(80 - 120)			SW846 6010A	11/05-11/06/96	C6H7F133
	96	(80 - 120)	0.04	(0-20)	SW846 6010A	11/05-11/06/96	C6H7F134
		Dilution Factor: 1					
Cadmium	98	(80 - 120)			SW846 6010A	11/05-11/06/96	C6H7F10U
	98	(80 - 120)	0.29	(0-20)	SW846 6010A	11/05-11/06/96	C6H7F10V
		Dilution Factor: 1					
Chromium	102	(80 - 120)			SW846 6010A	11/05-11/06/96	C6H7F10W
	101	(80 - 120)	1.0	(0-20)	SW846 6010A	11/05-11/06/96	C6H7F10X
		Dilution Factor: 1					
Copper	98	(80 - 120)			SW846 6010A	11/05-11/06/96	C6H7F13D
	96	(80 - 120)	2.1	(0-20)	SW846 6010A	11/05-11/06/96	C6H7F13E
		Dilution Factor: 1					
Lead	97	(80 - 120)			SW846 6010A	11/05-11/06/96	C6H7F12N
	97	(80 - 120)	0.19	(0-20)	SW846 6010A	11/05-11/06/96	C6H7F12P
		Dilution Factor: 1					
Manganese	102	(80 - 120)			SW846 6010A	11/05-11/06/96	C6H7F123
	102	(80 - 120)	0.67	(0-20)	SW846 6010A	11/05-11/06/96	C6H7F124
		Dilution Factor: 1					
Nickel	95	(80 - 120)			SW846 6010A	11/05-11/06/96	C6H7F126
	94	(80 - 120)	0.46	(0-20)	SW846 6010A	11/05-11/06/96	C6H7F127
		Dilution Factor: 1					
Zinc	104	(80 - 120)			SW846 6010A	11/05-11/06/96	C6H7F12K
	101	(80 - 120)	2.6	(0-20)	SW846 6010A	11/05-11/06/96	C6H7F12L
		Dilution Factor: 1					

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
1351 Oakbrook Drive Suite 150
Norcross, GA 30093 404-441-0027

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): QUANTERRA

REFERENCE NUMBER: 3482

PROJECT NAME: CEDARTOWN MUN. LANDFILL

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: JOHN SCHWARZER

SEQ. NO.	DATE	TIME	SAMPLE NUMBER	SAMPLE TYPE	NO. OF CONTAINERS	Be	Cd	Cr	Hg	Pb	Al	Cu	Ni	Zinc	REMARKS
	10/28/96		GW-3482-102896-JOS-12	GW	1	X	X	X	X	X					
	↓		SW-3482-102896-JOS-01	SW	1			X		X	X	X	X	X	

TOTAL NUMBER OF CONTAINERS 2

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
① [signature]	10/29/96	0860	②		
②			③		
③			④		

METHOD OF SHIPMENT: FED-EX G/N AIR BILL NUMBER: J60 5432056

White - Fully Executed Copy
Yellow - Receiving Laboratory Copy
Pink - Sampler Copy
Goldenrod - Chemist Copy

SAMPLE TEAM: J. SCHWARZER

RECEIVED FOR LABORATORY BY: [signature]
DATE: 10-30-96 TIME: 10:55

№ 0373

MEMO

TO: Joanne Staubitz

REFERENCE NO: 3482

FROM: Lou Almeida/dm/7

DATE: February 13, 1995

RE: Data Quality Assurance Evaluation
Groundwater Samples
Cedartown Municipal Landfill Site
Cedartown, Georgia

1.0 OVERVIEW

Six groundwater samples, one surface water sample and one associated quality control sample were collected from the Cedartown Municipal Landfill Site (Site) in Cedartown, Georgia between January 9 and 23, 1995. The groundwater samples were submitted for the analysis of beryllium, cadmium, chromium, manganese and lead. The surface water sample was submitted for the analysis of aluminum, chromium, copper, nickel, lead and zinc.

This memo presents an analytical assessment and validation of results obtained by Quanterra, Inc. (Quanterra) from the analysis of these groundwater and surface water sample. Analytical results were received in two reports provided by Quanterra and were reviewed to determine conformance with the requirements stipulated in the Contract Documents, the relevant methods and Quanterra's quality control criteria.

Quanterra completed sample analyses in accordance with the Contract Document-specified analytical method SW-846 6010A, as outlined in the United States Environmental Protection Agency (USEPA) document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, July 1992. The document entitled, "National Functional Guidelines for Inorganic Data Review", (Revised 1994) was used in the assessment and validation of the data.

Evaluation of the data was based on information supplied by finished data sheets, blank data and recovery data for matrix spike and check samples.

Details of the data assessment are outlined in the following sections.

2.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) REVIEW

2.1 SAMPLE HOLDING TIME

The sample holding time criterion, as specified in the Contract Documents and in the applicable method, was used as the basis of the review of sample holding times. Sample holding times were determined using sample collection dates noted in the chain-of-custody documents and sample preparation/analysis dates reported by Quanterra. The sample holding time criterion, as outlined in the Contract Documents and the method, is 6 months from the sample collection date to the sample analysis date.

Samples submitted for analysis were analyzed prior to expiration of the holding time criterion. Therefore, data qualifications were not necessary on this basis.

2.2 METHOD BLANK ANALYSES

In order to assess potential sample contamination attributable to laboratory conditions, laboratory method blank samples were analyzed along with the groundwater samples.

Target analytes were not detected in any method blanks, indicating no sample contamination attributable to laboratory conditions. Consequently, no qualifications were necessary on this basis.

2.3 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ANALYSES

Matrix spike (MS) analyses provide insight into sample matrix effects on digestion and/or measurement methodology. Matrix spike duplicate (MSD) analyses provide data with which to assess laboratory precision.

Reported MS/MSD recoveries fell within Contract Document-established control limits (75-125 percent), with one exception. The matrix spike duplicate recovery for manganese in one sample (Quanterra lab #A5E030038-001) was slightly above control criteria. Similarly, the relative percent difference (RPD) between the duplicate recoveries was slightly above control criteria. Normally, no action is taken based solely on MS/MSD data, in terms of qualification, as these data alone do not give a complete indication of overall accuracy and precision. However, in conjunction with other QC data, the need for qualifications can be assessed.

In the case of the sample where the MSD and RPD criteria were exceeded, the associated check sample data indicated acceptable accuracy and field duplicate results indicated acceptable precision. Therefore, data qualifications were not deemed necessary in this case.

2.4 LABORATORY CHECK SAMPLES (LCS)

Laboratory check sample results are reviewed in order to further monitor laboratory accuracy. One LCS sample was analyzed in conjunction with the water samples.

LCS sample recoveries fell within laboratory-established limits, without exception. Therefore, data qualifications were not required on this basis.

2.5 FIELD DUPLICATE RESULTS

Field duplicate results are reviewed in order to assess combined field sampling and laboratory precision. The duplicate results for detected analytes were reviewed and a relative percent difference (RPD) between duplicate

results calculated. One field duplicate was collected from monitoring well location OW-6B.

The RPD value indicated acceptable combined field sampling and laboratory precision. Qualifications were not required on this basis.

3.0 CONCLUSION

The data provided by Quanterra demonstrated 100 percent completeness and are acceptable for use without qualification.

H

APPENDIX H

DATA VALIDATION MEMORANDA

MEMO

TO: Joanne Staubitz

REFERENCE NO: 3482

FROM: Lou Almeida/dm/6

DATE: February 3, 1995

RE: Data Quality Assurance Evaluation
Groundwater Samples
Cedartown Municipal Landfill Site
Cedartown, Georgia

1.0 OVERVIEW

Six groundwater samples and one associated quality control sample were collected from the Cedartown Municipal Landfill Site (Site) in Cedartown, Georgia on January 5 and 6, 1995. The groundwater samples were submitted for the analysis of beryllium, cadmium, chromium, manganese and lead.

This memo presents an analytical assessment and validation of results obtained by Quanterra, Inc. (Quanterra) from the analysis of these groundwater samples. Analytical results were received in a report provided by Quanterra and were reviewed to determine conformance with the requirements stipulated in the Contract Documents, the relevant methods and Quanterra's quality control criteria.

Quanterra completed sample analyses in accordance with the Contract Document-specified analytical method SW-846 6010A, as outlined in the United States Environmental Protection Agency (USEPA) document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, July 1992. The document entitled, "National Functional Guidelines for Inorganic Data Review", (Revised 1994) was used in the assessment and validation of the data.

Evaluation of the data was based on information supplied by finished data sheets, blank data, field duplicate results, and recovery data for matrix spike and check samples.

Details of the data assessment are outlined in the following sections.

2.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) REVIEW

2.1 SAMPLE HOLDING TIME

The sample holding time criterion, as specified in the Contract Documents and in the applicable method, was used as the basis of the review of sample holding times. Sample holding times were determined using sample collection dates noted in the chain-of-custody documents and sample preparation/analysis dates reported by Quanterra. The sample holding time criterion, as outlined in the Contract Documents and the method, is 6 months from the sample collection date to the sample analysis date.

Samples submitted for analysis were analyzed prior to expiration of the holding time criterion. Therefore, data qualifications were not necessary on this basis.

2.2 METHOD BLANK ANALYSES

In order to assess potential sample contamination attributable to laboratory conditions, laboratory method blank samples were analyzed along with the groundwater samples.

Target analytes were not detected in any method blanks, indicating no sample contamination attributable to laboratory conditions. Consequently, no qualifications were necessary on this basis.

2.3 MATRIX SPIKE (MS) ANALYSES

Matrix spike (MS) analyses provide insight into sample matrix effects on digestion and/or measurement methodology.

Reported MS recoveries fell within Contract Document-established control limits (75-125 percent), indicating acceptable accuracy. Data qualifications were not required on this basis.

2.4 LABORATORY CHECK SAMPLES (LCS)

Laboratory check sample results are reviewed in order to further monitor laboratory accuracy. One LCS sample was analyzed in conjunction with the groundwater samples.

LCS sample recoveries fell within laboratory-established limits, without exception. Therefore, data qualifications were not required on this basis.

2.5 FIELD DUPLICATE RESULTS

Field duplicate results are reviewed in order to assess combined field sampling and laboratory precision. The positive duplicate results were reviewed and a relative percent difference (RPD) between duplicate results was calculated. One field duplicate was collected from monitoring well location OW-4.

The RPD value indicated acceptable combined field sampling and laboratory performance. Qualifications were not required on this basis.

3.0 CONCLUSION

The data provided by Quanterra demonstrated 100 percent completeness and are acceptable for use without qualification.

2.3 MATRIX SPIKE (MS) ANALYSES

Matrix spike (MS) analyses provide insight into sample matrix effects on digestion and/or measurement methodology.

Reported MS recoveries fell within Contract Document-established control limits (75-125 percent), indicating acceptable accuracy. Data qualifications were not required on this basis.

2.4 LABORATORY CHECK SAMPLES (LCS)

Laboratory check sample results are reviewed in order to further monitor laboratory accuracy. One LCS sample was analyzed in conjunction with the groundwater and surface water samples.

LCS sample recoveries fell within laboratory-established limits, without exception. Therefore, data qualifications were not required on this basis.

2.5 RINSATE BLANK RESULTS

In order to assess the efficiency of decontamination procedures occurring in the field, one rinsate blank was collected and submitted for metals analysis.

Manganese (67.6 µg/L) and lead (4.4 µg/L) were detected in the rinsate blank. Lead was not detected in the associated sample. Qualification of the associated manganese result was not required as the sample result exceeded five times the blank result.

3.0 CONCLUSION

The data provided by Quanterra demonstrated 100 percent completeness and are acceptable for use without data qualification.

MEMO

TO: Joanne Staubitz

REFERENCE NO: 3482

FROM: Lou Almeida/dm/9

DATE: June 2, 1995

RE: Data Quality Assurance Evaluation
Groundwater Samples
Cedartown Municipal Landfill Site
Cedartown, Georgia

1.0 OVERVIEW

Thirteen groundwater samples, one surface water sample and one associated quality control sample were collected from the Cedartown Municipal Landfill Site (Site) located in Cedartown, Georgia between April 25, 1995 and April 28, 1995. The groundwater samples were submitted for the analysis of beryllium, cadmium, chromium, manganese and lead. The surface water sample was submitted for the analysis of aluminum, chromium, copper, lead, nickel and zinc.

This memo presents an analytical assessment and validation of results obtained by Quanterra, Inc. (Quanterra) from the analysis of these water samples. Analytical results were received in reports provided by Quanterra and were reviewed to determine conformance with the requirements stipulated in the Contract Documents, the relevant methods and Quanterra's quality control criteria.

Quanterra completed sample analyses in accordance with the Contract Document-specified analytical method SW-846 6010A, as outlined in the United States Environmental Protection Agency (USEPA) document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, July 1992. The document entitled, "National Functional Guidelines for Inorganic Data Review", (Revised 1994) was used in the assessment and validation of the data.

Evaluation of the data was based on information supplied by completed data sheets, blank data, field duplicate results, and recovery data for matrix spike/matrix spike duplicates and check samples.

Details of the data assessment are outlined in the following sections.

2.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) REVIEW

2.1 SAMPLE HOLDING TIME

The sample holding time criterion, as specified in the Contract Documents and in the applicable method, was used as the basis of the review of sample holding times. Sample holding times were determined using sample collection dates noted in the chain-of-custody documents and sample preparation/analysis dates reported by Quanterra. The sample holding time criterion, as outlined in the Contract Documents and the method, is 6 months from the sample collection date to the sample analysis date.

Samples submitted for analysis were analyzed prior to expiration of the holding time criterion. Therefore, data qualifications were not necessary on this basis.

2.2 METHOD BLANK ANALYSES

In order to assess potential sample contamination attributable to laboratory conditions, laboratory method blank samples were analyzed along with the water samples.

Target analytes were not detected in any method blanks, indicating no sample contamination attributable to laboratory conditions. Consequently, no qualifications were necessary on this basis.

MEMO

TO: Joanne Staubitz

REFERENCE NO: 3482

FROM: Lou Almeida/kw/11

DATE: July 31, 1995

RE: Data Quality Assurance Evaluation
Groundwater Sample
Cedartown Municipal Landfill Site
Cedartown, Georgia

1.0 OVERVIEW

One groundwater sample (sample ID GW-3482-JS-060795-01) was collected from the Cedartown Municipal Landfill Site (Site) in Cedartown, Georgia on June 7, 1995. The groundwater sample was submitted for the analysis of beryllium, cadmium, chromium, manganese and lead.

This memo presents an analytical assessment and validation of results received in a report (No. A5F080013) obtained from Quanterra, Inc. (Quanterra) from the analysis of this groundwater sample. Analytical results were received in a report provided by Quanterra and were reviewed to determine conformance with the requirements stipulated in the Contract Documents, the relevant methods and Quanterra's quality control criteria.

Quanterra completed sample analyses in accordance with the Contract Document-specified analytical method SW-846 6010A, as outlined in the United States Environmental Protection Agency (USEPA) document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, July 1992. The document entitled, "National Functional Guidelines for Inorganic Data Review", (Revised 1994) was used in the assessment and validation of the data.

Evaluation of the data was based on information supplied by finished data sheets, blank data, and recovery data for matrix spike and check samples.

Details of the data assessment are outlined in the following sections.

2.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) REVIEW

2.1 SAMPLE HOLDING TIME

The sample holding time criterion, as specified in the Contract Documents and in the applicable method, was used as the basis of the review of sample holding times. The sample holding time was determined using the sample collection date noted in the chain-of-custody document and the sample preparation/analysis date reported by Quanterra. The sample holding time criterion, as outlined in the Contract Documents and the method, is 180 days from the sample collection date to the sample analysis date.

The sample submitted for analysis was analyzed prior to expiration of the holding time criterion. Therefore, data qualifications were not necessary on this basis.

2.2 METHOD BLANK ANALYSES

Method blank samples were used to determine the effects on analytical results due to contamination from laboratory procedures. Target parameters were not detected in any of the blanks analyzed in conjunction with the analyzed sample. Data qualifications were not required on the basis of blank analyses.

2.3 LABORATORY CHECK SAMPLE (LCS) ANALYSIS

Laboratory check samples were analyzed in order to monitor laboratory performance throughout the sample preparation and analysis period. LCS sample recoveries are to fall within the control limits of 80 to 120 percent. All LCS recoveries fell within control limits. Data qualifications were not required on this basis.

2.4 MATRIX SPIKE (MS) ANALYSES

Matrix spike (MS) analyses provide insight into sample matrix effects on digestion and/or measurement methodology.

Reported MS recoveries fell within control limits of 75 to 125 percent, indicating acceptable method accuracy. Data qualifications were not required on this basis.

3.0 CONCLUSION

The data provided by Quanterra demonstrated 100 percent completeness and are acceptable for use without qualification.

MEMO

TO: Joanne Staubitz

REFERENCE NO: 3482

FROM: Lou Almeida/dm/10

DATE: June 29, 1995

RE: Data Quality Assurance Evaluation
Groundwater Sample
Cedartown Municipal Landfill Site
Cedartown, Georgia

1.0 OVERVIEW

One groundwater sample was collected from the Cedartown Municipal Landfill Site (Site) in Cedartown, Georgia on April 27, 1995. The groundwater sample was submitted for the analysis of beryllium, cadmium, chromium, manganese and lead.

This memo presents an analytical assessment and validation of results obtained by Quanterra, Inc. (Quanterra) from the analysis of this groundwater sample. Analytical results were received in a report provided by Quanterra and were reviewed to determine conformance with the requirements stipulated in the Contract Documents, the relevant methods and Quanterra's quality control criteria.

Quanterra completed sample analyses in accordance with the Contract Document-specified analytical method SW-846 6010A, as outlined in the United States Environmental Protection Agency (USEPA) document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, July 1992. The document entitled, "National Functional Guidelines for Inorganic Data Review", (Revised 1994) was used in the assessment and validation of the data. Quanterra provided analytical results consistent with Level IV data reporting requirements.

Evaluation of the data was based on information supplied by finished data sheets, initial and continuing calibration data, blank data, field duplicate results, and recovery data for matrix spike and check samples.

Details of the data assessment are outlined in the following sections.

2.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) REVIEW

2.1 SAMPLE HOLDING TIME

The sample holding time criterion, as specified in the Contract Documents and in the applicable method, was used as the basis of the review of sample holding times. Sample holding times were determined using sample collection dates noted in the chain-of-custody documents and sample preparation/analysis dates reported by Quanterra. The sample holding time criterion, as outlined in the Contract Documents and the method, is 180 days from the sample collection date to the sample analysis date.

The sample submitted for analysis was analyzed prior to expiration of the holding time criterion. Therefore, data qualifications were not necessary on this basis.

2.2 INITIAL CALIBRATION

Initial calibration data were used in order to demonstrate the analytical instrument used for inorganic analyses was capable of generating acceptable quantitation data. Calibration criteria for Inductively Coupled Plasma (ICP) require that ICP standard solutions be run at the beginning and end of each sample analysis period and that the analyte recoveries fall within control limits of 90 to 110 percent. All initial calibration acceptance criteria were met; therefore, data qualifications were not necessary on this basis.

2.3 CONTINUING CALIBRATION CRITERIA

To ensure that the analytical instrument used for inorganic analyses was capable of producing quantitative results over the specified analysis period, periodic checks upon the instrument's calibration were performed on a daily basis. Continuing calibration criteria for the inorganic parameters required that the continuing calibration standard results must fall within the specified control limits of 90 to 110 percent. The percent recoveries for all inorganic parameters met the establish control criteria for all parameters.

2.4 METHOD BLANK ANALYSES

Method blank samples were used to determine the effects on analytical results due to contamination from laboratory procedures. Initial and continuing calibration blanks are to be analyzed during the initial calibration of the instrument and immediately after every initial and continuing calibration verification. All initial and continuing calibration blanks were analyzed at the appropriate times and frequencies. Data qualifications were not required on the basis of blank analyses. Related sample results were reported as less than the instrument detection limit or greater than five times the blank results.

2.5 ICP INTERFERENCE CHECK SAMPLES

ICP interference check samples were analyzed in order to verify interelement and background correction factors. ICP check samples should be run at the beginning and end of each sample analysis run or a minimum of twice per eight hour analysis period. ICP interference check sample recoveries are to fall within the control limits of plus or minus 20 percent of the true value for all parameters. All ICP interference check sample criteria were met. Data qualifications were not required on this basis.

2.6 LABORATORY CHECK SAMPLE (LCS) ANALYSIS

Laboratory check samples were analyzed in order to monitor laboratory performance throughout the sample preparation and analysis period. LCS sample recoveries are to fall within the control limits of 80 to 120 percent. All LCS recoveries fell within control limits. Data qualifications were not required on this basis.

2.7 MATRIX SPIKE (MS) ANALYSES

Matrix spike (MS) analyses provide insight into sample matrix effects on digestion and/or measurement methodology.

Reported MS recoveries fell within control limits of 75 to 125 percent, indicating acceptable method accuracy. Data qualifications were not required on this basis.

3.0 CONCLUSION

The data provided by Quanterra demonstrated 100 percent completeness and are acceptable for use without qualification.

MEMO

TO: Joanne Staubitz

REFERENCE NO: 3482

FROM: Lou Almeida/ev/13

DATE: August 28, 1995

C.C.: John Schwaller

RE: Data Quality Assurance Evaluation
Groundwater Sample
Cedartown Municipal Landfill Site
Cedartown, Georgia

1.0 OVERVIEW

Eleven groundwater samples and one surface water sample were collected from the Cedartown Municipal Landfill Site (Site) in Cedartown, Georgia between July 19 and July 23, 1995. The groundwater samples were submitted for the analysis of beryllium, cadmium, chromium, manganese and lead. The surface water sample was submitted for the analysis of chromium, lead, aluminum, copper, nickel and zinc.

This memo presents an analytical assessment and validation of results obtained from Quanterra, Inc. (Quanterra) from the analysis of these water samples. Analytical results were received in three reports provided by Quanterra and were reviewed to determine conformance with the requirements stipulated in the Contract Documents, the relevant methods and Quanterra's quality control criteria.

Quanterra completed sample analyses in accordance with the Contract Document-specified analytical method SW-846 6010A, as outlined in the United States Environmental Protection Agency (USEPA) document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, July 1992. The document entitled, "National Functional Guidelines for Inorganic Data Review", (Revised 1994) was used in the assessment and validation of the data.

Evaluation of the data was based on information supplied by finished data sheets, blank data, field duplicate data, and recovery data for matrix spike and check samples.

Details of the data assessment are outlined in the following sections.

2.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) REVIEW

2.1 SAMPLE HOLDING TIME

The sample holding time criterion, as specified in the Contract Documents and in the applicable method, was used as the basis of the review of sample holding times. The sample holding time was determined using the sample collection date noted in the chain-of-custody document and the sample preparation/analysis date reported by Quanterra. The sample holding time criterion, as outlined in the Contract Documents and the method, is 180 days from the sample collection date to the sample analysis date.

The samples submitted for analysis was analyzed prior to expiration of the holding time criterion. Therefore, data qualifications were not necessary on this basis.

2.2 METHOD BLANK ANALYSES

Method blank samples were used to determine the effects on analytical results due to contamination from laboratory procedures. Target parameters were not detected in any of the blanks analyzed in conjunction with the analyzed samples. Data qualifications were not required on the basis of blank analyses.

2.3 LABORATORY CHECK SAMPLE (LCS) ANALYSIS

Laboratory check samples were analyzed in order to monitor laboratory performance throughout the sample preparation and analysis period. LCS sample recoveries are to fall within the control limits of 80 to 120 percent. All LCS recoveries fell within control limits. Data qualifications were not required on this basis.

2.4 MATRIX SPIKE (MS) ANALYSES

Matrix spike (MS) analyses provide insight into sample matrix effects on digestion and/or measurement methodology.

Reported MS recoveries fell within control limits of 75 to 125 percent, indicating acceptable method accuracy. Data qualifications were not required on this basis.

2.5 RINSATE BLANK ANALYSES

One rinsate blank sample was collected in order to assess the efficiency of field decontamination procedures conducted at the site.

The rinsate blank was free of all target parameters indicating that effective field decontamination procedures had been conducted at the site. Data qualifications were not required on this basis.

2.6 FIELD DUPLICATE ANALYSES

In order to assess combined field sampling and laboratory precision, a field duplicate sample was collected and submitted for analysis. The field duplicate results were reviewed and a relative percent difference (RPD) was calculated between detected results. Upon review, the RPD data obtained indicated

acceptable combined field sampling and laboratory precision. Data qualifications were not required on this basis.

3.0 CONCLUSION

The data provided by Quanterra demonstrated 100 percent completeness and are acceptable for use without qualification.

MEMO

TO: Joanne Staubitz REFERENCE NO: 3482

FROM: Ellen Stilwell/ev/19 DATE: May 28, 1996

RE: Data Quality Assurance Evaluation
Quarterly Groundwater and Surface Water Sampling
Cedartown Municipal Landfill Site
Cedartown, Georgia

1.0 OVERVIEW

Thirteen groundwater samples and one surface water sample were collected from the Cedartown Municipal Landfill Site (Site) in Cedartown, Georgia between April 22 and April 24, 1996. The groundwater samples were submitted for the analysis of beryllium, cadmium, chromium, manganese and lead. The surface water sample was submitted for the analysis of aluminum, chromium, copper, lead, nickel and zinc.

This memo presents an analytical assessment and validation of results received in a report (No. A6D260120) obtained from Quanterra, Inc. (Quanterra) from the analysis of these water samples. Analytical results were received in a report provided by Quanterra and were reviewed to determine conformance with the requirements stipulated in the Contract Documents, the relevant methods and Quanterra's quality control criteria.

Quanterra completed sample analyses in accordance with the Contract Document-specified analytical method SW-846 6010A, as outlined in the United States Environmental Protection Agency (USEPA) document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, Final Update IIB, January 1995. The document entitled, "National Functional Guidelines for Inorganic Data Review", (Revised 1994) was used in the assessment and validation of the data.

Evaluation of the data was based on information supplied by finished data sheets, blank data, and recovery data for matrix spike and check samples.

Details of the data assessment are outlined in the following sections.

2.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) REVIEW

2.1 SAMPLE HOLDING TIME

The sample holding time criterion, as specified in the Contract Documents and in the applicable method, was used as the basis of the review of sample holding times. The sample holding time was determined using the sample collection dates noted in the chain-of-custody document and the sample preparation/analysis dates reported by Quanterra. The sample holding time criterion, as outlined in the Contract Documents and the method, is 180 days from the sample collection date to the sample analysis date.

The samples submitted for analysis were analyzed prior to expiration of the holding time criterion. Therefore, data qualifications were not necessary on this basis.

2.2 METHOD BLANK ANALYSIS

A method blank sample was used to determine the effects on analytical results due to contamination from laboratory procedures. Target parameters were not detected in the blank analyzed in conjunction with the analyzed samples. Data qualifications were not required on the basis of blank analyses.

2.3 LABORATORY CHECK SAMPLE (LCS) ANALYSIS

A laboratory check sample was analyzed in order to monitor laboratory-performance throughout the sample preparation and analysis period. LCS sample recoveries are to fall within the control limits of 80 to 120 percent. All LCS recoveries fell within control limits. Data qualifications were not required on this basis.

MEMO

TO: Joanne Staubitz

REFERENCE NO: 3482

FROM: Lou Almeida/ev/15

DATE: November 29, 1995

RE: Data Quality Assurance Evaluation
Groundwater and Surface Water Sampling
Cedartown Municipal Landfill Site
Cedartown, Georgia

1.0 OVERVIEW

Thirteen groundwater samples and one surface water sample were collected from the Cedartown Municipal Landfill Site (Site) in Cedartown, Georgia between October 23 and October 26, 1995. The groundwater samples were submitted for the analysis of beryllium, cadmium, chromium, manganese and lead. The surface water sample was submitted for the analysis of aluminum, chromium, copper, lead, nickel and zinc.

This memo presents an analytical assessment and validation of results received in a report (No. ASJ280118) obtained from Quanterra, Inc. (Quanterra) from the analysis of these water samples. Analytical results were received in a report provided by Quanterra and were reviewed to determine conformance with the requirements stipulated in the Contract Documents, the relevant methods and Quanterra's quality control criteria.

Quanterra completed sample analyses in accordance with the Contract Document-specified analytical method SW-846 6010A, as outlined in the United States Environmental Protection Agency (USEPA) document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, July 1992. The document entitled, "National Functional Guidelines for Inorganic Data Review", (Revised 1994) was used in the assessment and validation of the data.

Evaluation of the data was based on information supplied by finished data sheets, blank data, and recovery data for matrix spike and check samples.

Details of the data assessment are outlined in the following sections.

2.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) REVIEW

2.1 SAMPLE HOLDING TIME

The sample holding time criterion, as specified in the Contract Documents and in the applicable method, was used as the basis of the review of sample holding times. The sample holding time was determined using the sample collection date noted in the chain-of-custody document and the sample preparation/analysis date reported by Quanterra. The sample holding time criterion, as outlined in the Contract Documents and the method, is 180 days from the sample collection date to the sample analysis date.

The samples submitted for analysis were analyzed prior to expiration of the holding time criterion. Therefore, data qualifications were not necessary on this basis.

2.2 METHOD BLANK ANALYSES

Method blank samples were used to determine the effects on analytical results due to contamination from laboratory procedures. Target parameters were not detected in any of the blanks analyzed in conjunction with the analyzed samples. Data qualifications were not required on the basis of blank analyses.

2.3 LABORATORY CHECK SAMPLE (LCS) ANALYSIS

Laboratory check samples were analyzed in order to monitor laboratory-performance throughout the sample preparation and analysis period. LCS sample recoveries are to fall within the control limits of 80 to

120 percent. All LCS recoveries fell within control limits. Data qualifications were not required on this basis.

2.4 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ANALYSES

Matrix spike (MS/MSD) analyses provide insight into sample matrix effects on digestion and/or measurement methodology.

Reported MS/MSD recoveries fell within laboratory established control limits of 80 to 120 percent, indicating acceptable method accuracy. Reported relative percent difference values (RPDs) between MS and MSD results fell below the laboratory-established maximum of 20 indicating acceptable method precision. Data qualifications were not required on this basis.

3.0 CONCLUSION

The data provided by Quanterra demonstrated 100 percent completeness and are acceptable for use without qualification.

MEMO

TO: Joanne Staubitz REFERENCE NO: 3482

FROM: Ellen Stilwell/ev/23 DATE: August 23, 1996

RE: Data Quality Assurance Evaluation
Quarterly Groundwater and Surface Water Sampling
Cedartown Municipal Landfill Site
Cedartown, Georgia

1.0 OVERVIEW

Twelve groundwater samples and one surface water sample were collected from the Cedartown Municipal Landfill Site (Site) in Cedartown, Georgia on July 10, July 11 and July 26, 1996. The groundwater samples were submitted for the analysis of beryllium, cadmium, chromium, manganese and lead. The surface water sample was submitted for the analysis of aluminum, chromium, copper, lead, nickel and zinc.

This memo presents an analytical assessment and validation of results received in two reports (Nos. A6G270104 and A6G130114) obtained from Quanterra, Inc. (Quanterra) from the analysis of these water samples. Analytical results were reviewed to determine conformance with the requirements stipulated in the Contract Documents, the relevant methods and Quanterra's quality control criteria.

Quanterra completed sample analyses in accordance with the Contract Document-specified analytical method SW-846 6010A, as outlined in the United States Environmental Protection Agency (USEPA) document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, Final Update IIB, January 1995. The document entitled, "National Functional Guidelines for Inorganic Data Review", (Revised 1994) was used in the assessment and validation of the data.

Evaluation of the data was based on information supplied by finished data sheets, blank data, and recovery data for matrix spike and check samples.

Details of the data assessment are outlined in the following sections.

2.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) REVIEW

2.1 SAMPLE HOLDING TIME

The sample holding time criterion, as specified in the Contract Documents and in the applicable method, was used as the basis of the review of sample holding times. The sample holding time was determined using the sample collection dates noted in the chain-of-custody document and the sample preparation/analysis dates reported by Quanterra. The sample holding time criterion, as outlined in the Contract Documents and the method, is 180 days from the sample collection date to the sample analysis date.

The samples submitted for analysis were analyzed prior to expiration of the holding time criterion. Therefore, data qualifications were not necessary on this basis.

2.2 METHOD BLANK ANALYSIS

Method blank samples are used to determine the effects on analytical results due to contamination from laboratory procedures. Target parameters were not detected in the blanks analyzed in conjunction with the analyzed samples. Data qualifications were not required on the basis of method blank analyses.

2.3 LABORATORY CHECK SAMPLE (LCS) ANALYSIS

Laboratory check samples are analyzed in order to monitor laboratory-performance throughout the sample preparation and analysis period. LCS sample recoveries are to fall within the control limits of 80 to 120 percent. All LCS recoveries fell within control limits. Data qualifications were not required on this basis.

MEMO

TO: Joanne Staubitz REFERENCE NO: 3482

FROM: Lou Almeida/ev/17 DATE: February 1, 1996

RE: Data Quality Assurance Evaluation
Quarterly Groundwater and Surface Water Sampling
Cedartown Municipal Landfill Site
Cedartown, Georgia

1.0 OVERVIEW

Thirteen groundwater samples and one surface water sample were collected from the Cedartown Municipal Landfill Site (Site) in Cedartown, Georgia between January 2 and January 4, 1996. The groundwater samples were submitted for the analysis of beryllium, cadmium, chromium, manganese and lead. The surface water sample was submitted for the analysis of aluminum, chromium, copper, lead, nickel and zinc.

This memo presents an analytical assessment and validation of results received in a report (No. A6A06116) obtained from Quanterra, Inc. (Quanterra) from the analysis of these water samples. Analytical results were received in a report provided by Quanterra and were reviewed to determine conformance with the requirements stipulated in the Contract Documents, the relevant methods and Quanterra's quality control criteria.

Quanterra completed sample analyses in accordance with the Contract Document-specified analytical method SW-846 6010A, as outlined in the United States Environmental Protection Agency (USEPA) document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, Final Update IIB, January 1995. The document entitled, "National Functional Guidelines for Inorganic Data Review", (Revised 1994) was used in the assessment and validation of the data.

Evaluation of the data was based on information supplied by finished data sheets, blank data, and recovery data for matrix spike and check samples.

Details of the data assessment are outlined in the following sections.

2.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) REVIEW

2.1 SAMPLE HOLDING TIME

The sample holding time criterion, as specified in the Contract Documents and in the applicable method, was used as the basis of the review of sample holding times. The sample holding time was determined using the sample collection date noted in the chain-of-custody document and the sample preparation/analysis date reported by Quanterra. The sample holding time criterion, as outlined in the Contract Documents and the method, is 180 days from the sample collection date to the sample analysis date.

The samples submitted for analysis were analyzed prior to expiration of the holding time criterion. Therefore, data qualifications were not necessary on this basis.

2.2 METHOD BLANK ANALYSES

Method blank samples were used to determine the effects on analytical results due to contamination from laboratory procedures. Target parameters were not detected in any of the blanks analyzed in conjunction with the analyzed samples. Data qualifications were not required on the basis of blank analyses.

2.3 LABORATORY CHECK SAMPLE (LCS) ANALYSIS

Laboratory check samples were analyzed in order to monitor laboratory-performance throughout the sample preparation and analysis period. LCS sample recoveries are to fall within the control limits of 80 to 120 percent. All LCS recoveries fell within control limits. Data qualifications were not required on this basis.

2.4 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ANALYSES

Matrix spike (MS/MSD) analyses provide insight into sample matrix effects on digestion and/or measurement methodology.

Reported MS/MSD recoveries fell within laboratory established control limits of 80 to 120 percent, indicating acceptable method accuracy. Reported relative percent difference values (RPDs) between MS and MSD results fell below the laboratory-established maximum of 20 indicating acceptable method precision. Data qualifications were not required on this basis.

2.5 RINSE BLANK ANALYSES

Rinse blank analyses were used to determine the efficiency of field decontamination procedures conducted during this sampling event. One rinse blank sample (GW-3482-JOS-010396-08) was collected and submitted for analyses.

Chromium (10.7 µg/L) and manganese (23.9 µg/L) were detected in the rinse blank. Qualifications were not required as chromium was not detected in the associated sample (GW-3482-JOS-010396-10) and manganese was detected at a level which exceeded ten times the blank result.

3.0 CONCLUSION

The data provided by Quanterra demonstrated 100 percent completeness and are acceptable for use without qualification.

2.4 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ANALYSIS

Matrix spike (MS/MSD) analyses provide insight into sample matrix effects on digestion and/or measurement methodology.

Reported MS/MSD recoveries fell within laboratory-established control limits of 80 to 120 percent, indicating acceptable method accuracy. Reported relative percent difference values (RPDs) between MS and MSD results fell below the laboratory-established maximum of 20, indicating acceptable method precision. Data qualifications are not required on this basis.

2.5 RINSE BLANK ANALYSIS

Rinse blank analyses are used to determine the efficiency of field decontamination procedures conducted during this sampling event. One rinse blank sample (GW-3482-102496-JOS-08) was collected and submitted for the analyses.

No target compounds were detected in the rinse blank, indicating that effective field decontamination procedures were performed during sampling. Therefore, no data qualifications are necessary on this basis.

2.6 FIELD DUPLICATE ANALYSIS

Field duplicate samples are used as an indication of field and analytical reproducibility. Field duplicate results are compared and assessed based on the RPD calculated for each pair of duplicate results. The RPD must not exceed 30% for water matrix samples.

The pair of samples collected as field duplicates did not contain any detectable levels of target analytes; thus, their usefulness in determining precision cannot be assessed.

3.0 CONCLUSION

The data provided by Quanterra demonstrated 100 percent completeness and are acceptable for use without qualification, based on the QA/QC criteria.

2.4 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ANALYSIS

Matrix spike (MS/MSD) analyses provide insight into sample matrix effects on digestion and/or measurement methodology.

Reported MS/MSD recoveries fell within laboratory-established control limits of 80 to 120 percent, indicating acceptable method accuracy. Reported relative percent difference values (RPDs) between MS and MSD results fell below the laboratory-established maximum of 20, indicating acceptable method precision. Data qualifications were not required on this basis.

2.5 RINSE BLANK ANALYSIS

Rinse blank analyses were used to determine the efficiency of field decontamination procedures conducted during this sampling event. One rinse blank sample (GW-3482-JOS-042296-01) was collected and submitted for analyses.

The rinsate blank was free of target analytes, indicating effective decontamination procedures occurred during sampling. Thus, no data qualifications were necessary on this basis.

2.6 FIELD DUPLICATE ANALYSIS

Field duplicate samples are used as an indication of field and analytical reproducibility. Field duplicate results are compared and assessed based on the RPD calculated for each pair of duplicate results.

The pair of samples collected as field duplicates did not contain any detectable levels of target analytes; thus, their usefulness in determining precision cannot be assessed.

3.0 CONCLUSION

The data provided by Quanterra demonstrated 100 percent completeness and are acceptable for use without qualification.

2.4 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ANALYSIS

Matrix spike (MS/MSD) analyses provide insight into sample matrix effects on digestion and/or measurement methodology.

Reported MS/MSD recoveries fell within laboratory-established control limits of 80 to 120 percent, indicating acceptable method accuracy. Reported relative percent difference values (RPDs) between MS and MSD results fell below the laboratory-established maximum of 20, indicating acceptable method precision. Data qualifications were not required on this basis.

2.5 RINSE BLANK ANALYSIS

Rinse blank analyses are used to determine the efficiency of field decontamination procedures conducted during this sampling event. One rinse blank sample (GW-3482-071096-JOS-03) was collected and submitted for analyses.

Chromium and manganese were detected in the rinse blank at levels of 42.9 µg/L and 15.0 µg/L, respectively. However, these metals were not detected above the reporting limits in the associated investigative sample. Therefore, no data qualifications were necessary on this basis.

2.6 FIELD DUPLICATE ANALYSIS

Field duplicate samples are used as an indication of field and analytical reproducibility. Field duplicate results are compared and assessed based on the RPD calculated for each pair of duplicate results. The RPD must not exceed 30% for water matrix samples.

A pair of samples was collected as field duplicates and the RPD for the compound manganese fell below the criteria, indicating acceptable field and laboratory precision. No other target analytes were detected in the pair of samples. Thus, data qualifications were not required on this basis.

3.0 CONCLUSION

The data provided by Quanterra demonstrated 100 percent completeness and are acceptable for use without qualification, based on the QA/QC criteria.

MEMO

TO: Joanne Toth

REFERENCE NO: 3482

FROM: Ellen Stilwell/ev/25

DATE: November 22, 1996

RE: Data Quality Assurance Evaluation
Quarterly Groundwater and Surface Water Sampling
Cedartown Municipal Landfill Site
Cedartown, Georgia

1.0 OVERVIEW

Twelve groundwater samples and one surface water sample were collected from the Cedartown Municipal Landfill Site (Site) in Cedartown, Georgia on October 23, October 24, October 25 and October 28, 1996. The groundwater samples were submitted for the analysis of beryllium, cadmium, chromium, manganese and lead. The surface water sample was submitted for the analysis of aluminum, chromium, copper, lead, nickel and zinc.

This memo presents an analytical assessment and validation of results received in two reports (Nos. A6J60108 and A6J300121) obtained from Quanterra, Inc. (Quanterra) from the analysis of these water samples. Analytical results were reviewed to determine conformance with the requirements stipulated in the Contract Documents, the relevant methods and Quanterra's quality control criteria.

Quanterra completed sample analyses in accordance with the Contract Document-specified analytical method SW-846 6010A, as outlined in the United States Environmental Protection Agency (USEPA) document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, Final Update IIB, January 1995. The document entitled, "National Functional Guidelines for Inorganic Data Review", (Revised 1994) was used in the assessment and validation of the data.

Evaluation of the data was based on information supplied by finished data sheets, blank data, and recovery data for matrix spike and check samples.

Details of the data assessment are outlined in the following sections.

2.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) REVIEW

2.1 SAMPLE HOLDING TIME

The sample holding time criterion, as specified in the Contract Documents and in the applicable method, was used as the basis of the review of sample holding times. The sample holding time was determined using the sample collection dates noted in the chain-of-custody document and the sample preparation/analysis dates reported by Quanterra. The sample holding time criterion, as outlined in the Contract Documents and the method, is 180 days from the sample collection date to the sample analysis date.

The samples submitted for analysis were analyzed prior to expiration of the holding time criterion. Therefore, data qualifications are not necessary on this basis.

2.2 METHOD BLANK ANALYSIS

Method blank samples are used to determine the effects on analytical results due to contamination from laboratory procedures. Target parameters were not detected in the blanks analyzed in conjunction with the analyzed samples. Data qualifications are not required on the basis of method blank analyses.

2.3 LABORATORY CHECK SAMPLE (LCS) ANALYSIS

Laboratory check samples are analyzed in order to monitor laboratory-performance throughout the sample preparation and analysis period. All LCS recoveries fell within the laboratory-established control limits of 80 to 120 percent. Data qualifications are not required on this basis.

APPENDIX I

LINEAR REGRESSION PROCEDURES

METHOD FOR LINEAR REGRESSION ANALYSIS
CEDARTOWN MUNICIPAL LANDFILL SITE
CEDARTOWN, GEORGIA

Linear Regression Line: $y(X_i) = a + bX_i$

where:
y= manganese concentration (mg/L)
x= time
a= true intercept
b= slope

PROCEDURE FOR DETERMINATION

To solve for the equation of the line, the slope of the line *b* can first be calculated with the following expression:

$$b = \frac{n\Sigma XY - \Sigma X\Sigma Y}{n\Sigma X^2 - (\Sigma X)^2}$$

With this value found for b, the equation can then be rearranged to solve for a,

$$a = \frac{1}{n}(\Sigma Y - b\Sigma X)$$

This can be simplified since $X = (\Sigma X)/n$ and $Y = (\Sigma Y)/n$ and the resulting expression can be used to slove for the linear regression line:

coefficients $$b = \frac{n\Sigma XY - \Sigma X\Sigma Y}{n\Sigma X^2 - (\Sigma X)^2}$$

$$a = Y - bX$$

. Thus, the equation $Y(X) = a + bX$