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Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

VOLUME I

Report

Remedial Investigation
Farwell Landfill
Cattaraugus County, New York

February 1999
Revised October 1999
REVISED FEBRUARY 17, 2000
REVISED FEBRUARY 23, 2000 - letter attached

DPL

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
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(315) 655-8161 • fax (315) 655-4180

February 23, 2000

Mr. David Locey
Environmental Engineer
NYSDEC Region 9
270 Michigan Avenue
Buffalo, NY 14203-2999

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Re: Farwell Landfill Site #905024
Cattaraugus County
S&W No 90180.0

Dear Mr. Locey:

We have received the Department's comments regarding the Remedial Investigation/Feasibility Study (RI/FS) Reports for the Farwell Landfill site. The following are our responses to each of your comments, presented in the same order as your February 17, 2000 letter.

I. GENERAL

1. Comment: The assumption that Ischua Creek is a long term hydraulic barrier should be subject to further verification, following the selection of a site remedy.

Response: Further verification can be provided following the selection of a site remedy. We remain confident that the creek's hydraulic influence can be verified.

2. Comment: NYSDEC reiterates that the issue of whether the groundwater below the site is either a principal or primary aquifer is not entirely relevant to site remediation. In any case, the groundwater beneath the site is a natural resource.

Response: Noted.

II. REMEDIAL INVESTIGATION REPORT

1. Comment: The background section (Section 1.1) of the RI Report should address the following:

- Were the three landfill areas isolated from each other in any manner during construction or closure?
- Was waste disposed of below the water table?

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The three landfill areas should be marked on the site map (Figure 1-2), and a figure added to show the layout of the existing leachate collection system.

Response: The landfills were generally not isolated during construction or closure, although a number of features are in place which provide some degree of separation between the Phase I, II and III areas. For example, the liner of the Phase III B area, adjacent to the Phase I and II area, runs approximately 10 feet up the side slope of Phase I and II. Further, a french drain is in place along the base of the Phase I and II slope.

It is believed that wastes were generally deposited above the water table, although it cannot be completely ruled out that some groundwater may have contacted the waste, particularly towards the center of the landfill footprint where there may have been some mounding of groundwater during its active life. In general, groundwater contact with waste is thought to be very limited. The attached Figure 1-2 identifies the Phase I, II and III areas. County figures showing the layout of the existing leachate collection system were forwarded previously

2. Comment: The risk assessment doesn't discuss the current water usage from the site's well (toilet, sink, and washing vehicles). The current usage may represent a complete exposure pathway, and perhaps the well should be taken out of service entirely.

Response: The potential exposure from the current water use patterns is considered to be very small, based on the general infrequency that water is actually used by the small group of County employees that have access to the site. Since no single individual typically spends more than a few hours a week at the site, there is only a limited exposure opportunity. Of the exposure scenarios posed above, washing vehicles is probably the most routine site water use. However, this would only occur once each day, on the average, as vehicles are rinsed with cold water. Considering the rather limited on-site water use and the limited site access to a small group of employees, taking the well out of service is unlikely to produce a significant risk reduction.

3. Comment: Figure 3-11, Water Well Survey Results, should be made easier to read, to clearly show which properties were given surveys and those who responded.

Response: This figure was revised as requested, and forwarded to you previously.

4. Comment: Figure 4-1 should not include wells that were not sampled as part of this RI.

Response: A revised Figure 4-1 is attached.

5. Comment: The first and second pages of Table 4-2 should be labeled "Total (Unfiltered)" and "Dissolved (Filtered)", respectively.

Response: A revised table is attached.

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6. Comment: Table 4-8 (VOCs in Sediment) does not include the methylene chloride and acetone (qualified as blank contaminants) for samples KW-1, LFP-1, and RRP-1. The table should include a footnote defining the "B" qualifier. The Appendix does not include the VOC results (I Forms) for samples DW-1 and FW-1, or the chain of custody forms.

Response: Methylene chloride and acetone were purposely not included on Table 4-8 for those three samples because data validation determined that those compounds should be considered below detection levels. In general, the data summary tables included in Volume I of the RI report reflected the outcome of the data validation, so that any results that were flagged "U" by the validation process were considered non-detects.

The attached Table 4-8 has been revised to include a definition of the "B" qualifier. We will pull the I Forms and Chains of Custody from our files and provide them under separate cover.

7. Comment: Table 4-8 is incorrectly referenced in the text (Page 4-6) as Table 4-7, and concentrations are incorrectly described in the text as ppm (they should be ppb).

Response: Noted.

8. Comment: Page 5-7 cites a groundwater flow velocity of 1 foot per day, whereas in Section 3 and Table 3-2 the geometric mean velocity is considerably less.

Response: The velocity of 1 foot per day was intended to be a conservative estimate, in view of the possibility that specific overburden units might transmit water at a rate somewhat higher than the geometric mean, which was only 0.1 to 0.2 feet per day.

III. FEASIBILITY STUDY REPORT

1. Comment: Page 4-4, Section 4.2 discusses capping options only for Phases I and II of the landfill. However, NYSDEC maintains that the three areas of the landfill may not be entirely isolated from one another beneath the existing cap. Even if there was isolation of the three areas, NYSDEC would expect that the Phase III cap would need to be properly maintained. The Proposed Remedial Action Plan (PRAP) therefore includes repairs to the existing cap over the entire landfill area.

Response: The County is agreeable to a maintenance and repair program. for the Phase III area cap.

2. Comment: The report mistakenly refers to itself as a "preliminary" FS (Pages 1-1, 3-1).

Response: Noted. The report should be considered a final FS.

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3. Comment: It is incorrectly stated that one of the objectives of the FS was to determine the nature of the source within the landfill. This was actually an objective of the RI.

Response: Noted.

4. Comment: It is stated that a thorny shrub perimeter would restrict access to the <u>two</u> landfill ponds on site, when there is in fact only one landfill pond. In any case, the RI Report states that the pond was not significantly affected so there is no concern for public exposure to it. It is assumed that the shrub barrier is intended primarily to protect the landfill cap from damage by trespassers.

Response: You are correct that there is only one true landfill pond, that it is not significantly impacted, and that the shrub barrier's primary function is to protect the cap.

5. Comment: On Table 2-1 note that the revised groundwater standard for benzene is 1.0 micrograms per liter.

Response: Noted.

If the responses expressed in this letter, along with the attached revised tables and figures, are acceptable to the Department the letter and attachments can be appended to the previously submitted reports. Those reports, along with this letter and attachments, would then be considered final documents for inclusion in the established document repositories.

If you have any further questions please feel free to call.

Very truly yours,

Daniel P. Ours, C.P.G.
Project Hydrogeologist

DPO/mef

Attachment

cc: Doug Baldwin, Cattaraugus County
David Rivet, Cattaraugus County
Craig Slater, Esq. Harter, Secrest, & Emery
Paul McGarvey, Stearns & Wheler

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REMEDIAL INVESTIGATION

FARWELL LANDFILL

CATTARAUGUS COUNTY, NEW YORK

Prepared for

CATTARAUGUS COUNTY, NEW YORK

Prepared by

STEARNS & WHELER, LLC
Environmental Engineers and Scientists
One Remington Park Drive
Cazenovia, New York 13035

February 1999
Revised October 1999

Project No. 80189FA

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CHAPTER 1

INTRODUCTION

1.1 PROJECT BACKGROUND

The Farwell Landfill is situated on a 205-acre parcel of land owned by Cattaraugus County. The landfill itself occupies 13 acres along the slopes of the Ischua Creek valley, in the Town of Ischua, NY (Figure 1-1). The landfill is owned by the Cattaraugus County Department of Public Works, which began landfill operations in 1974. The landfill was built and operated under plans and permits approved and issued by the New York State Department of Environmental Conservation (NYSDEC). Active disposal of municipal solid wastes, resource recovery ash, and NYSDEC-approved non-hazardous industrial wastes took place in the unlined Phase I and II areas of the site until 1984, when these areas reached capacity. The Phase III section of the landfill was constructed with a compacted soil liner and leachate collection system, and operated from 1984 to 1987. The Phase III area accepted only commercial, permitted industrial, and C&D waste, and also incinerator ash, which was used primarily as daily cover material.

In 1984, an Order on Consent (84-106) was issued to Cattaraugus County by NYSDEC, requiring that the Farwell Landfill be brought into compliance with newly enacted 6 NYCRR Part 360 solid waste facility management regulations. This prompted the installation of several additional groundwater monitoring wells around the landfill to supplement wells that had already been in place for a number of years. The County also developed closure and capping plans for the landfill. The final closure and capping of the facility was completed in 1990, according to an NYSDEC-approved closure and capping plan. The cap includes a 12- to 18-inch thick compacted soil cover, with a maximum permeability of 10^{-7} cm/sec, overlain by a 6-inch layer of topsoil layer with a vegetative cover.

In 1986, the County installed a leachate collection system around the Phase I and II portions of the landfill. The system consists of gravel-filled trenches with plastic pipe. Lateral trenches extend into the landfill and lead to a 6-inch plastic header pipe along the southern side of the landfill. Leachate is conveyed eastward through a leachate main, collecting into two 10,000-gallon storage tanks at the eastern portion of the site. Each tank is equipped with secondary containment and a leak detection system. In addition, a 4-inch plastic leachate collection pipe was installed in 1986 along the eastern edge of the landfill, extending to the northwest beyond the northern face of the landfill. This lateral provides additional leachate collection capability for the eastern portion of the site and connects to the main leading to the storage tanks. The system for the old portion includes a gravel trench along the west side between the old portion and Phase III.

The leachate collection system for the Phase III area, installed as part of that portion's original construction, includes four gravel beds that contain Schedule 80 PVC pipe, located on top of the liner. The system extends into the waste disposal area and connects to a 6-inch main. The leachate collection systems for the "old" (Phase I and II) and "expansion" (Phase III) areas operate as separate systems, although all leachate collected from them is currently stored as a mixture in the two storage tanks.

Leachate is pumped from the tanks as needed and transported off site to a permitted wastewater treatment facility. County records show that from 1994 through 1998, an average volume of 398,400 gallons of leachate has been collected by the system each year (Table 1-1).

In 1989, an Order on Consent (89-71) was signed by the County and NYSDEC to investigate groundwater contamination and to set forth a 30-year post-closure monitoring program. An extensive network of wells (Figure 1-2) currently monitors the landfill. Water quality data from the monitoring wells and the creek is available from the 1970s to the present. Monitoring wells have been installed around the site in various phases since the 1970s, including 11 that were installed in the 1980s, an additional 4 in 1990, and 3 more in 1998.

In 1996, County representatives were notified by the NYSDEC that the landfill was being classified as a Class 2 Inactive Hazardous Waste Site. The NYSDEC issued this classification due to the alleged dumping of potentially hazardous waste at the landfill, specifically trichloroethene (TCE), which was reportedly disposed of in a sludge form mixed with sawdust by Alcas Cutlery Corporation between 1975 and 1980. Although it is believed that roughly 8.5 tons of the sludge/sawdust mixture was disposed of over this period, it is not known how much TCE was included in the mix.

TCE and several other aliphatic hydrocarbon compounds have been identified in groundwater samples at the Farwell Landfill. The principal contaminants of concern are those that are present above established groundwater standards. These include TCE, cis- and trans- isomers of dichloroethene (DCE), and vinyl chloride (VC). However, additional impacts are apparent by various other compounds, including trichloroethane (TCA) and dichloroethane (DCA). Cattaraugus County retained Stearns & Wheler to complete a comprehensive remedial investigation which will be used to help determine an appropriate site remedy.

1.2 OBJECTIVES

The objectives of this remedial investigation (RI) were developed following a preliminary review of existing information on site hydrogeology and groundwater quality. This review (Stearns & Wheler, 1997) found evidence that the contaminants of concern are naturally degrading, or "attenuating," in groundwater. However, a number of data gaps were identified that would need to be answered as part of a formal RI. Based on these needs, the following remedial investigation objectives were formulated:

1. Characterize the site hydrogeology to allow an assessment of fate and migration of identified contaminants. This would require expanded monitoring well coverage downgradient of the site.

2. Verify the hydraulic relationship between Ischua Creek and the shallow groundwater system. Particularly, determine whether the creek acts as a hydraulic boundary that accepts shallow groundwater discharge from the landfill. This would resolve the critical issue relating to the possible flow of site groundwater across the creek.

3. Determine whether natural attenuation is a plausible site remedy by studying groundwater chemistry for evidence that attenuation is occurring. This would require additional chemical parameters beyond those typically required of RIs.

4. Determine whether the groundwater system directly below the landfill meets NYSDEC's definition of a principal aquifer, as set forth in the Upstate New York Groundwater Management Program. This would help establish whether a heightened level of groundwater protection might be appropriate.

5. Perform a qualitative risk assessment of the potential for ground and surface water pathways to expose on- and off-site receptors to chemical components from the site.

CHAPTER 2

METHODS

In order to achieve the above objectives, three additional monitoring wells were installed to create sampling points on the eastern side of Ischua Creek and expand sampling coverage downgradient of the landfill. Groundwater, surface water, and sediments were then sampled from 25 locations up and downgradient of the landfill.

2.1 MONITORING WELL INSTALLATION

During August 1998, three monitoring wells were installed at the landfill site. A well couplet, MW-18S and -18D, was installed east of Ischua creek, in the right-of-way along Farwell Road. The well couplet includes one overburden well in the glaciofluvial unit and one bedrock well. An additional overburden well (MW-19) was installed about 500 feet from the landfill, located southeast of MW-14S and MW-14I. Each overburden well was installed using a combination of two different methods.

A. **Hollow Stem Augers.** 4.25-inch hollow stem augers were advanced using a CME-75 truck-mounted drilling rig. At each location soil samples were collected at standard (5-foot) intervals using a 2-inch split-spoon sampling device driven by a 140-pound hammer. The samples were visually examined, described in boring logs, placed in jars, labeled, and stored for future examination. Soil samples from the screened depth were selected from each well boring and sent to a laboratory to be analyzed for total organic carbon.

B. **Spin Casing.** To facilitate drilling where cobbles were encountered, 4-inch spin casing was also used. The casing was advanced using bentonite mud as a drilling fluid. A wash rotary bit was often inserted in the casing to clean out rock and gravel debris.

The bedrock well (MW 18-D) was installed using spin casing. A telescoping method was used with 6-inch, 5-inch, and 4-inch casing being utilized until the bedrock surface was reached. Steel casing was keyed approximately 4 feet into the bedrock and grouted in place. After the grout cured, the bedrock was cored an additional 16 feet so that the well penetrated 20 feet into the bedrock. Cores were collected and stored for future examination.

Beginning on August 23, 1999, an additional bedrock well (MW-20D) was installed at a location approximately 200 feet south of the landfill access road. This well was installed following the installation of the first three wells discussed above, in order to assess the potential for impacts to bedrock groundwater southeast of the site in the direction of groundwater flow.

C. **Monitoring Well Construction.** Monitoring wells were constructed using the following materials:

2-inch ID PVC riser
2-inch ID 0.01-inch slot PVC screen
Bentonite pellets
Grout
#00 choker sand
#0 sand pack
6-, 5-, and 4-inch steel casing was used in the bedrock well (MW-18D)

Well construction information is illustrated with well logs in Appendix A.

After installation, each well was developed manually using disposable bailers until 10 volumes of water were removed. To determine volume of water to be removed, the following formulae were used:

((DTW-TDW) x 0.164) x 10 = gallons of water to be removed from a 2-inch diameter well
((DTW-TDW) x 0.64) x 10 = gallons of water to be removed from a 4-inch diameter well

where:
DTW is depth to water
TDW is total depth of the well

2.2 SAMPLING AND ANALYTICAL PROGRAM

Groundwater, surface water, and sediments were sampled in September 1998. Twenty wells were sampled, including the newly installed wells (MW-18S, MW-18D, MW-19) and selected existing wells from around the landfill. In addition to the well samples, five locations were sampled for surface water and sediments, and one sample was taken from a leachate collection tank.

A. **Groundwater.** After the depth to water and total depth of the well were measured, each well was purged of three volumes of water or until the well went dry, to ensure that the water sampled was representative of formation water, and not that of stagnant casing water. Purging was done in two ways, depending on the DTW. In general, wells with a DTW of less than 20 feet were purged with submersible pumps. (Because of a damaged casing, MW-17S was purged using 0.25-inch dedicated stainless steel bailers.) In instances when the DTW was greater than 25 feet, disposable bailers were used. To avoid cross-contamination, all non-dedicated equipment was thoroughly cleaned with deionized water between well locations. Once the purging of wells was completed, samples were collected for the following analytes:

- Target Compound List (TCL) volatile organic compounds
- total and dissolved Target Analyte List (TAL) metals
- 6 NYCRR Part 360 parameters: chloride, alkalinity, biological oxygen demand BOD, total organic carbon (TOC), sulfate, ammonia, and chemical oxygen demand (COD)
- dissolved oxygen, carbon dioxide, methane, and hydrogen sulfide

Due to the impact that turbidity can have on metals concentrations, both filtered and unfiltered samples were collected. Filtering was performed in the field using high capacity disposable filters and peristaltic pumps. Additionally, field parameters were measured, which included pH, Eh, temperature, specific conductance, and dissolved oxygen.

B. **Surface Water and Sediment.** Surface water was collected from five locations:

1. **Dutch Hill Road Bridge.** This bridge crosses Ischua Creek upstream of the landfill approximately 2 miles north from Farwell Road off of Route 16. Water was swift moving and shallow and the stream bed was rocky.

2. **Farwell Road Bridge.** This bridge crosses Ischua Creek adjacent to the landfill. The stream channel deepens and the stream bed is soft. A staff gauge was established here to record creek water level.

3. **Landfill Pond.** Located directly on the landfill. Designed with a thick clay liner, it is roughly 20 feet higher than the underlying groundwater and does not appear to be connected hydraulically with the groundwater.

4. **Railroad Pond.** Located on the west side of Ischua Creek and east of the landfill. The pond's base is very soft and marsh-like. Water is stagnant, and the pond is dry in some locations. Samples were collected from near-shore area.

5. **Kent Road Bridge.** This bridge crosses Ischua Creek downstream from the landfill approximately 2 miles south of Farwell Road off of Route 16. Water is moderately deep and the bottom is rocky. This segment of the creek traverses an agricultural area. Much of the shoreline is adjacent to pastures.

Surface water sampling in the creek was performed by facing the mouth of the sample bottle in a downstream direction until water filled the bottle. Sediments were sampled from each surface water sampling location. Samples were collected using a stainless steel spatula and placing them in designated glass jars.

C. **Leachate Samples.** Leachate samples were collected from the leachate collection tanks using disposable bailers. The samples were analyzed for the same analytes listed previously.

Chain-of-custody procedures were observed for the documentation and exchange of samples. The data were validated according to NYSASP requirements. Laboratory analysis and validation reports are presented in Appendix B. The results of the sampling program are discussed in Chapter 4.

2.3 WATER WELL SURVEY

A survey of private drinking water wells was completed within 1/4 mile and 1 mile of the landfill, in the presumed upgradient and downgradient directions, respectively. The survey consisted of a mailed questionnaire requesting information regarding the depth, age, and construction of any supply wells, as well as information regarding yield and water quality. A total of 29 surveys were mailed. Of these, 10 completed surveys were returned, and 2 were returned unopened by the post office and marked as "undeliverable as addressed". The remaining 17 surveys were not returned. Results of the survey are presented in Chapter 3 and Appendix C.

2.4 HYDROGEOCHEMICAL ASSESSMENT

The sampling and analytical scope of the RI was tailored to allow an assessment of natural attenuation as a possible site remedy. Where conditions are chemically favorable, natural attenuation, coupled with a strategic groundwater monitoring program, can provide an ongoing, long-term demonstration that landfill contaminants do not seriously affect the surrounding environment. Specific chemical parameters that are effective indicators of attenuation processes were evaluated along with chemical contaminant trends over time. The general hydrogeochemical overview and a discussion of natural attenuation are provided in Chapter 5.

2.5 RISK ASSESSMENT

A qualitative risk assessment was completed, which evaluated the potential for groundwater and surface water pathways to expose on-site and off-site receptors to chemical components from the site. Those transport scenarios determined to have a functioning waste source, a transport mechanism, and human or wildlife receptor acting together were considered "complete". The risk assessment is presented in Chapter 6.

2.6 FISH AND WILDLIFE SURVEY

A fish and wildlife impact analysis (NYSDEC, October 1994) was also completed. The analysis included the following elements:

- preparation of topographic maps, cover-type maps, and drainage maps
- description of fish and wildlife resources
- description of fish and wildlife resource values
- identification of applicable fish and wildlife regulatory criteria

The fish and wildlife survey is presented in Chapter 7.

CHAPTER 3

STUDY AREA CHARACTERISTICS

3.1 ENVIRONMENTAL SETTING

The Farwell Landfill is located approximately 5 miles north of State Route 17 off of State Route 16 along Farwell Road. Farwell Road passes along the southern side of the site, while the northern and eastern sides are bounded by Ischua Creek. The facility lies along the slopes of the Ischua Creek Valley, approximately 400 feet west of the creek, in the Town of Ischua, NY. The area is predominantly rural hills and valleys. Relief in the region is high, with the elevations of many hilltops exceeding 2,000 feet above sea level.

Cattaraugus County consists of 1,335.9 square miles and has a population of 84,234 (1990 census), equaling approximately 63 residents per square mile. The Town of Ischua is located in the central-eastern portion of the County, with a population of 847 (1990 census), equaling about 26 residents per square mile. In the immediate vicinity of the landfill, there are roughly 13 residents per square mile.

3.2 GEOLOGY

The Farwell Landfill is located in the southern New York State Uplands, near the southern limit of Pleistocene glaciation in southwestern New York State. The surficial geology in the area consists of an assortment of glacial deposits emplaced during the advance and retreat of glacial ice during the last ice age roughly 15,000-12,000 years ago.

Previous site investigation has identified a number of specific stratigraphic units at the Farwell Landfill (Malcolm Pirnie, 1986, 1990). Locally, an upper ablation till layer was identified as the uppermost stratigraphic unit across much of the site. This upper till is greater than 100 feet thick towards the west, and thins towards the east across the site. The till is believed to be approximately 70 to 80 feet thick directly under the landfill; further east near Ischua Creek, the till becomes thinner. Alluvial sand and gravel overlie the till adjacent to and under the creek. It was determined that the alluvial deposits are not located under the landfill (Malcolm Pirnie, 1986), based on well borings advanced around the eastern edge of the landfill (Figure 3-1). The alluvial unit was also not identified east of the creek from borings completed as part of this RI (Wells MW-18S and -18D), indicating that the alluvial unit is present only in close proximity to the creek on both sides. East of Ischua Creek, the upper till unit was identified in borings completed as part of this RI, suggesting that the till is continuous under the alluvial deposits below the creek.

The upper till is underlain by what has been previously described as a sand and gravel "glaciofluvial" unit (Malcolm Pirnie, 1986) under the eastern and southern portions of the landfill, (Phase I and II areas). Based on boring logs and cross sections from previous investigations (Malcolm Pirnie, 1986, 1990), the top of the glaciofluvial layer is around 70 to 80 feet below grade directly below the landfill, and is approximately 20 to 30 feet deep towards the east near Ischua Creek. This layer is only about 10 feet thick.

The glaciofluvial deposit has been described as the primary water-bearing unit at the Farwell site. Boring logs indicate that the glaciofluvial unit is fairly horizontal in orientation; the differences in its depth at different locations are attributable to the slope of the ground surface. A lower till unit was identified under the glaciofluvial unit (Malcolm Pirnie, 1986), and is estimated to be roughly 40 to 70 feet thick below the landfill. The overburden layers rest upon sedimentary bedrock from the Late Devonian Conneaut and Canadaway groups. The bedrock consists of highly fractured fine-grained sandstone interbedded with thin layers of shale.

The glaciofluvial deposit evidently becomes thinner towards the north and west, towards the Phase III area, and is believed to pinch out up the valley wall. The hydrogeologic investigation for the Phase III expansion area concluded that the "confined aquifer" (i.e., the glaciofluvial unit) was not encountered in the vicinity of Phase III, and also that bedrock was encountered at relatively shallow depths northwest of the landfill (Malcolm Pirnie, 1986). This indicates that all of the overburden deposits become thinner up the valley walls.

Drilling activities completed as part of this RI suggest less physical distinction between the till and glaciofluvial units than originally described. The glaciofluvial unit, previously described as a coarse sand and gravel unit of relatively high permeability, was found to be only subtly different from the till layers above and below it, based on visual examination of soil grains. Further, based on boring logs from previous investigations, there is no obvious change in the soil sampling blow counts during the drilling process that suggests a significant compositional change from "till" to "glaciofluvial." Thus, the previous cross-sectional depiction of the Farwell Landfill site may have assigned a greater distinction between geologic units than is actually present based on grain size and sorting. Indeed, most of the till observed during the drilling program of this RI contained visible amounts of sand and gravel, along with fine silt and clay, and is probably best described as a silty or sandy till. The glaciofluvial deposit was identified as only subtly different, being primarily a silty sand and gravel formation at the two drilling locations for this RI. For the sake of consistency and clarity, the term "glaciofluvial" will be maintained in this report when discussing that particular unit. However, based on the above observations, it appears more likely that this particular unit is merely a sandy inclusion within the glacial till.

There is certainly vertical heterogeneity at the Farwell site, but field data from this investigation suggest that separate hydrogeologic units are not clearly defined based on grain size. It follows, then, that preferential zones for groundwater flow may not have as significant an influence over groundwater movement as previously supposed. Indeed, hydraulic and chemical data both indicate that mixing of groundwater does, in fact, occur between the overburden units. It will be discussed in the following section that area topography probably exerts as great an influence over the groundwater flow pattern as does aquifer heterogeneity.

3.3 HYDROGEOLOGY

Table 3-1 summarizes the depth to groundwater and total depth for the site's wells, plus the stratigraphic unit monitored by each well. Groundwater elevation data is based on levels recorded during the September 1998 sampling event. Groundwater elevations recorded in site wells over the past several years suggest that some hydraulic communication does occur between different stratigraphic units. Figures 3-2 and 3-3 show that water levels in well couplets along the downgradient perimeter of the landfill, well beyond the edge of fill materials, fluctuate in virtually identical fashion, indicating that the wells are influenced by the same recharge mechanisms. This indicates that groundwater flows vertically between the different overburden units described above. Also, the head difference between shallow and deep wells at the immediate edge of the landfill is greater than the head difference in well couplets further downgradient and closer to the creek. For example, there is several feet of difference in groundwater elevation between wells in the MW-10 and MW-11 couplets (Figure 3-4), compared to only a few inches in well couplets MW-14, -15, -16, and –17. The data show the vertical gradient is downward in well couplets MW-10 and –11, at the landfill's edge, whereas flow appears to be largely horizontal in well couplets MW-14, -15, -16, and –17 near the creek. This flow pattern indicates a classical groundwater discharge situation in the vicinity of the creek. Figure 3-5 depicts how lines of equal hydraulic potential bend as groundwater flow converges towards a creek. Near the landfill, the hydraulic potential is downward, so shallow wells have a higher groundwater elevation than deeper wells. As groundwater approaches the creek, this situation changes, and at some point along the flow path, the groundwater flow becomes horizontal. Very close to the creek, however, the flow becomes upward and discharges into the creek from below. Figure 3-5 also illustrates the point made previously that groundwater in both shallow and deep wells in couplets MW-14, -15, -16, and –17 is influenced by the same recharge source.

The glaciofluvial unit at the site has been described as "confined" in previous investigations. It is important to recall what the term "confined" really means. As defined in Freeze and Cherry (1979), a confined aquifer occurs between two relatively low permeability zones, or "aquitards." The water level in a well placed in a confined aquifer will be above the top of the aquifer.

There is a strongly held notion that confined aquifers are hydrologically isolated from the lower permeability units above and below them. That is, that groundwater will generally not "leak" into or out of a confined aquifer, or will do so only to a very small degree, creating zones of preferential groundwater flow. The existence of confining units and zones of preferential flow would seem to minimize significant vertical mixing. However, surface topography can have a profound influence over vertical groundwater flow patterns, and in many cases, topography is more important than the geology of the water-bearing formations. A landmark study of groundwater flow patterns (Freeze and Witherspoon, 1967) demonstrated the importance of topography on localized groundwater flow systems. The vertical groundwater flow direction can change substantially across a hilly area even in the absence of significant changes in soil or rock type (Figure 3-6a and 3-6b). Previous investigation (Malcolm Pirnie, 1986) has determined that west (upgradient) of the landfill, the vertical groundwater flow potential is upward. The upward flow condition is described as being indicative of a "hydraulic boundary" between the glaciofluvial confined unit and the overlying till. In contrast, this RI has identified downward flow potentials at the downgradient edge of the landfill. Considering the hilly nature of the study area, it is believed that topography plays at least as great a role in determining flow patterns as do compositional differences between water-bearing media. Thus, the "hydraulic boundary" description is misleading. When a high permeability layer is added to the conceptual flow model (Figure 3-6c), it is seen how different vertical flow directions could occur in different areas of a confined aquifer; at well couplet A, there is upward flow, and at well couplet B, there is downward flow. In either case, flow can and does occur between the different permeability units, so no real flow barriers exist. The topographical influence at the Farwell Landfill causes groundwater from under the landfill to ultimately discharge into Ischua Creek. This general discharge pattern is valid for both shallow and deep groundwater zones.

Groundwater elevation data can be contoured to produce figures that depict the horizontal groundwater flow component. Where groundwater discharges to a creek or stream, the contour lines will form a "V" that points upstream. One of the goals of this RI is to determine the relationship between Ischua Creek and site groundwater. Specifically, it needs to be determined whether the creek acts as a groundwater discharge area that prevents groundwater from the landfill from flowing past the creek. The vertical flow system discussed above cites evidence that groundwater flows into the creek from below (Figure 3-5). Horizontal groundwater contours further demonstrate that the creek does, in fact, act as a groundwater discharge zone.

A groundwater contour map (Figure 3-7) was created using water level measurements recorded from selected monitoring wells screened in the glaciofluvial unit. Groundwater elevation data from the glaciofluvial wells reflect the hydraulic potential at various locations in the glaciofluvial unit. When the lines of equal potential are contoured (Figure 3-7), it is apparent that horizontal flow potential in the glaciofluvial unit on both sides of Ischua Creek converges towards the creek. This convergence of horizontal flow, along with evidence that groundwater flows upward under the creek, verifies that the creek is a groundwater discharge area, and a flow boundary.

A similar groundwater contour pattern is evident based on data from deeper wells below the glaciofluvial unit (Figure 3-8). Using hydraulic potential data from wells installed in the deep till just above bedrock, and from wells that penetrated the upper bedrock, the contours indicate the horizontal flow potential for deeper groundwater clearly converges towards the creek from both sides.

Estimates of hydraulic conductivity have been derived from previous in situ permeability (slug) tests from a number of site monitoring wells (Table 3-2). Based on these prior tests, the hydraulic conductivity of site soils ranges from 5.3×10^{-5} cm/sec (derived at Well MW-11S) to 9×10^{-2} cm/sec (MW-17I). From the range of hydraulic conductivity values, the measured hydraulic gradient across the landfill, and soil porosity estimates, the average groundwater seepage velocity can be estimated according to the Darcy equation:

$$V = Ki/n$$

where:

- **v** = groundwater seepage velocity (length/time)
- **K** = hydraulic conductivity (length/time)
- **i** = hydraulic gradient (length/length)
- **n** = effective soil porosity (percent).

The hydraulic gradient is estimated by the decrease in hydraulic head along the groundwater flow path, divided by the distance over which that headloss occurs. From Figures 3-7 and 3-8, there is a headloss of between 4 and 5 feet along a horizontal flow path approximately 1,000 feet long, so the gradient is approximately 0.0045. As porosity is estimated to be between 20 and 30 percent, two separate velocity calculations were carried out (Table 3-2).

Using the above equation, the velocity of groundwater flow at the landfill is calculated to range from 3.38 x 10^{-3} ft/day (MW-11S) to over 5 ft/day (MW-17I) based on a porosity of 20 percent, and 2.25 x 10^{-3} to over 3 ft/day based on a porosity of 30 percent. To estimate an average seepage velocity based on all measurements, it is necessary to use a geometric mean, rather than a traditional arithmetic mean. This is because higher conductivity values will exert too great an influence over the arithmetic mean, resulting in an estimate that is probably artificially high. For example, the geometric mean seepage velocity is 0.2 feet per day at 20 percent porosity, whereas the arithmetic mean velocity is 1.5 feet per day. In reality, areas of relatively low hydraulic conductivity will limit the apparent flow velocity across an area, so using the geometric mean is usually more appropriate for seepage velocity estimates. Thus, the average groundwater seepage velocity across the site is estimated to be less than 1 foot per day. The range of porosity values used had little effect on the outcome of the calculation.

3.4 AQUIFER DESIGNATION

One of the objectives of this RI was to determine whether the aquifer directly beneath the Farwell Landfill is either a primary or principal aquifer. Unconfined primary and principal aquifers are viewed as potentially vulnerable to contamination from activities on the land surface directly overlying them. Confined aquifers are viewed as less vulnerable to activities directly above them. It is emphasized that primary and principal aquifer designations were developed as a means for determining areas directly over said aquifers, so that protective measures can be applied as appropriate. As written, NYSDEC guidance (TOGS 2.1.3, October 23, 1990) which pertains to primary and principal aquifers suggests heightened protectiveness for areas directly overlying unconfined aquifers. The guidance suggests that heightened protectiveness may also be appropriate for areas outside the limit of a confined aquifer, if those areas are within the aquifer's recharge area, and if the recharge area is well defined.

Primary and principal aquifers are defined below.

- A primary water supply aquifer means a highly productive aquifer that is presently used as a source of public water supply by major municipal water supply systems.

- A principal aquifer means a formation or formations known to be highly productive or deposits whose geology suggests abundant potential water supply, but which is not intensively used as a source of water supply by major municipal systems at the present time. Some water supply development has taken place in some of these areas but is generally not as intensive as in the primary aquifer areas.

An important guidance criterion for establishing the location and limit of primary and principal aquifers is that existing aquifer maps and reports shall be relied upon. Thus, preliminary identification is to be based on how aquifers are presently mapped across the state.

A review of available aquifer data and an understanding of the geology of the area reveal the nature of the local groundwater-bearing units. The local alluvial deposits that occur in a narrow band along Ischua Creek have been given a "U" designation adjacent to the landfill (Miller, 1988), which defines them as being potentially confined, with unconfirmed thickness and depth (Figure 3-9). The confining layers in this case are presumably the upper tills identified during this and previous investigations, although this till does not appear to cover the alluvial deposits identified along the creek during the course of field work. This narrowly defined alluvial formation is the only aquifer defined near the landfill, and the landfill is apparently outside the defined limits. Previous work (Malcolm Pirnie, 1986) indicates that the alluvial deposits clearly do not extend under the landfill (Figure 3-10).

A review of the U. S. Geological Survey map which identifies potential yields of wells in the area (Miller, 1988) indicates that no major municipal water supply system relies on groundwater near the Farwell Landfill. By definition, therefore, neither the deposits underlying the landfill, or the alluvial aquifer as defined, is a primary aquifer. The closest designated primary aquifer area is roughly 7 miles south of the site, in Olean.

As stated in the previous section, hydraulic data from the site indicate that there is vertical flow between the overburden units at the site. It appears that area topography exerts a major control over local groundwater flow, enhancing the vertical flow of groundwater between the various geologic units. Therefore, it is doubtful that any unit in proximity to the landfill can be viewed as hydraulically isolated from its surrounding units. Further, the alluvial deposits are evidently very close to ground surface near Ischua Creek, resulting in unconfined conditions. According to NYSDEC criteria (October, 1990), aquifers that are unconfined, potentially high-yielding, and well-mapped can potentially be considered as principal aquifers. Further, "The boundary of an aquifer area is determined by the pattern of geologic deposits...", according to NYSDEC guidance (1990). In this case, the aquifer is defined by the extent of the alluvial deposits. Because the landfill is not directly over the alluvial aquifer as mapped, according to NYSDEC guidance, it cannot be technically argued that the landfill overlies a principal aquifer.

Surficial geologic maps of the area indicate that the landfill itself is located on extensive till deposits. South and east of the landfill is the remnant of an alluvial sand and gravel deposit. The alluvium in the vicinity of the landfill is limited to small, non-contiguous locations on either side of the valley. In areas where the sand and gravel is more extensive and contiguous, Miller determined that the aquifer was capable of significant yields of groundwater. These areas are substantial distances north (approximately 8 miles) and south (approximately 1 mile) of the landfill area.

Previous investigators have occasionally referred to the water-bearing formations underlying the landfill as being a "principal aquifer" (Malcolm Pirnie, 1986). However, the selection of the term "principal aquifer" appears to have been arbitrary and inappropriate in this case. It nonetheless prompted attention to the possibility that the aquifer might be a principal aquifer despite the fact it is not clearly mapped as such. In a letter dated February 19, 1985 from the Office of the County Attorney to NYSDEC, NYSDEC suggested the aquifer's status as a principal aquifer be verified through pumping tests to determine the sustained yield (10 gpm or better). However, NYSDEC guidance (October 1990) indicates that the boundary of an aquifer shall be determined by geologic formation type, and not by an arbitrary yield.

In short, the Farwell Landfill does not directly overlay a primary or principal aquifer. The closest mapped aquifer to the landfill is a narrow, unconfined alluvial aquifer, and the landfill is not located directly above it.

It is further noted that the dimensions of the alluvial aquifer near the landfill site do not seem to meet the criteria in NYSDEC guidance, which requires 5 to 10 square miles of contiguous area. The glaciofluvial unit likewise appears to be limited in extent, pinching out up the valley wall away from the creek. Its limited thickness of around 10 feet also seems to disqualify it from being a principal aquifer.

It will be discussed in Chapter 5 that landfill impacts are being naturally attenuated along the groundwater flow path, so that no landfill-related chemicals are reaching Ischua Creek or its underlying alluvial sediments. Thus, ignoring for the moment that the landfill is outside the limits of the alluvial aquifer, it can also be demonstrated that the landfill is not chemically affecting the aquifer.

3.5 WATER WELL SURVEY

A water well survey was completed to determine groundwater usage within 1 mile downgradient and 1/2 mile upgradient of the landfill. A survey form was mailed to a total of 29 area residents and businesses as part of the RI. In addition, the results of a water well survey completed in 1991 (Malcolm Pirnie) were reviewed. The mailing list and returned survey forms are included as Appendix C.

A total of 11 completed RI survey forms were returned, and 2 others were returned unopened by the U.S. postal service. Four of the completed surveys indicated no well was located on the premises. In all, four water supply wells were identified in the 1991 survey, and an additional six were identified in the RI well survey within 1 mile of the landfill.

Three of the completed RI surveys alluded to some type of water quality problem relating to bad taste, odor, or staining. These water quality traits are not uncommon for natural groundwater. Objectionable taste can be derived from iron, manganese, or sulfur derived from natural minerals. Odors are commonly associated with hydrogen sulfide, which produces the typical "rotten egg" smell. Staining of plumbing fixtures is common from iron and manganese. This information suggests poor groundwater quality, which would be expected of wells installed in deeper till or bedrock deposits across the area. In contrast, wells installed in sandy deposits would be expected to produce higher quality water, owing to the lower dissolved solids content characteristic of sandier formations. Of the respondents who knew the depth of their well, bedrock was the formation in which the well was installed. Others generally reported that their wells were "deep." This suggests that the wells are installed in bedrock, or perhaps deposits immediately overlying the rock, discounting the possibility that those wells are within the shallow alluvial deposits discussed in the previous section. Also, it is clear that the majority of residents are located well beyond the immediate creek floodplain area, which corresponds to the alluvial deposits. Thus, the local alluvial aquifer is apparently not widely utilized as a groundwater source near the landfill. The residents rely more on deeper overburden or bedrock for their wells, which produces water of somewhat lower quality.

Figure 3-11 shows the properties on which supply wells have been identified from surveys completed as part of this RI. Only two wells were identified on properties west (i.e., on the landfill side) of Ischua Creek. These two wells are approximately 3/4 mile southwest of the landfill. In view of the fact that groundwater flows southeast across the landfill towards Ischua Creek, these two properties are not hydraulically influenced by groundwater from the landfill. The closest residence on the west side of the creek, and in a location that could be considered downgradient of the landfill, is reportedly 2-1/2 miles away. Site data discussed above indicates that groundwater from the landfill is prevented from crossing the creek, because the creek is a groundwater flow boundary. Thus, areas east of the creek can be considered as hydraulically isolated from the landfill and not susceptible to potential groundwater impacts relating to the landfill.

CHAPTER 4

SAMPLING AND ANALYTICAL RESULTS

This chapter discusses the results of the groundwater, surface water, and sediment sampling program completed as part of the RI. The discussion includes TCL volatile organics, TAL metals, and the general Part 360 routine parameters. The dissolved gases oxygen, carbon dioxide, and methane were also included in the sampling and analytical program to provide evidence of natural attenuation, and will be discussed as part of Chapter 5. Laboratory analytical results are presented in Appendix B.

4.1 LEACHATE

A leachate sample was collected from a holding tank at the landfill to provide an idea of the types of impact that might be expected. Overall, the leachate sample from the Farwell Landfill had a fairly typical chemical composition compared to other solid waste disposal sites. The following is a brief discussion of the leachate sample results. A more detailed treatment will be provided in Chapter 5, where a geochemical evaluation is presented.

A. **Volatile Organic Compounds.** A summary of leachate analytical results for VOCs is presented on Table 4-1. The leachate sample contained a number of VOCs that have historically been identified in site groundwater samples. The single compound detected at the highest level in leachate was 1,2- dichloroethene (DCE), at 160 parts per billion (ppb). Trichloroethene (TCE) was present at 18 ppb. Overall, the total VOC concentration in the leachate sample was 390 ppb.

B. **Inorganics.** Inorganic parameters included the TAL metals as well as NYCRR Part 360 routine parameters. Analytical results for the leachate sample are presented on Tables 4-2 and 4-3. Among metals, the leachate sample contained relatively high levels of iron, magnesium, potassium, and sodium. In terms of the general Part 360 parameters, the sample contained noticeable levels of alkalinity, chloride, ammonia, BOD, COD, hardness, and TDS. The parameters are typical of many municipal solid waste leachates.

The dissolved gases carbon dioxide (CO_2), oxygen (O_2), and methane (CH_4) were all detected in the leachate sample. The significance of these gases will be presented in Chapter 5, as part of the discussion of natural attenuation. For now, it is noted that the CO_2 concentration in the leachate was generally high, at 192 ppm, while oxygen levels were quite low, at less than 1 ppm. The lack of oxygen, coupled with elevated CO_2, is evidence of biological activity which degrades organic material in the landfill waste.

4.2 GROUNDWATER

In September 1998, groundwater samples were collected from a total of 18 monitoring wells surrounding the landfill, including the 3 new wells installed as part of the RI (MW-18S, MW-18D, and MW-19S). Monitoring well MW 9S was dry and therefore could not be sampled. In addition, a bedrock water supply well located east of Ischua Creek (SH-1) was sampled. A follow-up sampling event was conducted in September 1999 and included Well MW-19S and the newer Well MW-20D, which was installed in August 1999.

All groundwater samples were analyzed for TAL metals and TCL volatile organic compounds, as well as additional parameters to support geochemical evaluation. The additional parameters included the routine parameters under 6 NYCRR Part 360, in addition to the dissolved gases oxygen, carbon dioxide, and methane. The analytical data were validated by an independent third party, pursuant to NYSDEC Analytical Services Protocol (ASP).

A. **VOCs.** A total of nine organic compounds were detected in the groundwater samples. The following are the compounds and the number of wells in which each compound was detected in parentheses: 1,1-dichloroethane (15); chloroethane (10); 1,2-dichloroethene (9); trichloroethene (7); 1,1,1-trichloroethane (7); vinyl chloride (6); 1,1-dichloroethene (3); benzene (3); methylene chloride (1). A summary of VOC analytical results is presented as Table 4-4.

Groundwater samples that contained the greatest number of compounds (seven) were from wells MW-9D, MW-11D, MW-13D, MW-14S, and MW-14I. Well MW-19S contained six compounds, and MW-16S contained five compounds. Of the remaining wells, MW-10D contained four compounds; MW-15I contained three; MW-16I contained two; MW-6, MW-10S, MW-15S, MW-17S, and MW-18S contained one; and MW-17I, MW-18D, and SH-1 contained no detectable compounds. The wells containing the greatest number of compounds were those at the immediate downgradient edge of the landfill. The single compound detected in MW-18S was methylene chloride at less than 1 ppb. Methylene chloride was not detected at any other location, nor has it been a prevalent compound over the landfill's sampling history. It is noted that methylene chloride is a common solvent used in laboratories, and as such it is not uncommon as a lab contaminant. Well MW-19S, located several hundred feet southeast of the landfill, contained many of the same compounds that were detected at the landfill's edge, but at lower concentrations. Although there has apparently been migration of organic compounds from the landfill to the southeast, it will be discussed in Chapter 5 that there is also measurable natural attenuation that reduces the levels of those compounds. Indeed, among the five landfill perimeter wells that contained 7 compounds, an average of 4.8 compounds were above New York State water quality standards. In contrast, MW-19S contained only three compounds above water quality standards.

Eleven of the 19 locations sampled contained at least one compound above the state water quality standards. Of these 11 locations, 8 were at the immediate perimeter of the landfill (MW-9D, MW-10S, MW-10D, MW-11S, MW-11D, MW-13D, MW-14S, MW-14I). Therefore, of the other locations either upgradient or further downgradient of the landfill, only 3 of 11 contained compounds above water quality standards (MW-16S, -16I, and -19S). This pattern suggests that the majority of landfill-related impacts are confined to the immediate downgradient vicinity of the landfill.

The compounds present in groundwater above standards include 1,1-dichloroethane (11 locations); 1,1,1-trichloroethane (7); chloroethane (7); 1,2-dichloroethene (6); vinyl chloride (6); benzene (1); and trichloroethene (1). Thus, six of the eight detected compounds at the site were found at least at one location above water quality standards. Wells that contained no compounds above the standards included MW-6, MW-15S, MW-15I, MW-17S, MW-17I, MW-18S, MW-18D, and SH-1.

The follow-up sampling event of September 1999 detected only a trace (0.3 ppb) of 1,1-dichloroethane in Well MW-19S, and no VOCs in Well MW-20D. (Note: Although acetone and 2-butanone were detected in MW-20D, these compounds were also present in the method blank and trip blank, and therefore represent laboratory interference).

B. **Inorganics.** The following metals were detected above water quality standards or guidance levels in groundwater in the September 1998 sampling event: total iron (15 locations), total manganese (11), total sodium (8), total magnesium (6), total lead (3), arsenic (2), barium (2), zinc (1). In general, there is little correlation between the occurrence of total metals and the frequency of detection for VOCs in the site's wells. For example, Wells MW-18S and -18D, located east of Ischua Creek and hydraulically separated from the landfill, contained five total metals above water quality standards, comparable to MW-9D, which is west of the creek and close to the landfill and contained six. Among the other seven wells at the immediate downgradient edge of the landfill, three contained only two total metals above groundwater standards (MW-10S and 10D [iron and manganese]; MW-11D [magnesium and sodium]), and one contained only one metal above the standard (MW-13D [magnesium]). This indicates that proximity to the landfill has little influence over whether metals exceed water quality standards. It follows that that natural mineralogy probably exerts a greater influence over metals concentrations than the landfill. This is clearly true for well cluster MW-18, which is east of the creek and hydrologically isolated from the landfill. Further, sample turbidity is likely to have influenced the total metals concentrations to at least some degree. For example, dissolved iron was above water quality standards in only 7 wells, compared to 15 for total iron. Dissolved lead was not detected above water quality standards in any well. Analytical results for metals in groundwater are included as Tables 4-5 (total metals) and 4-6 (dissolved metals).

The September 1999 follow-up sampling event detected iron, lead, and barium above water quality standards in Well MW-20D and iron and lead above water quality standards in MW-19. Regarding MW-20D, it is noted that iron and barium were detected above standards in Well MW-18D, which is hydraulically separated from the landfill. Further, lead was detected in Well MW-18S, which is also hydraulically separated from the landfill.

A number of additional inorganic parameters common to landfill leachate were also included in the analysis of groundwater. These parameters, referred to collectively as "wet chemistry" or "general chemistry" parameters, are presented as Table 4-7 and offer additional insights regarding the origin of groundwater quality at the landfill.

Alkalinity, a parameter present in leachate at 1850 ppm, generally ranged from 450 to 650 ppm in the group of wells immediately downgradient of the landfill (MW-9D, MW-10S/D, MW-11S/D, MW-13D, MW-14S/I). Otherwise, alkalinity was generally between 100 and 350 ppm for other site wells either upgradient or further downgradient from the landfill. However, there were two exceptions to this. The groundwater sample from Well MW-17I reportedly contained 1220 ppm alkalinity. This result is considered highly suspect for a number of reasons, and it is believed that sampling or analytical error may be the cause. First of all, the charge balance error, which is the percent difference between positively charged and negatively charge ions, is excessively high (-75 percent) for the sample from MW-17I. This means that there is a considerable excess of negatively charged ions in the water sample. In reality, all water must contain equal amounts of positive and negative charge. Therefore, the excessive negative charge suggests an analytical error. Further, the historical concentration for alkalinity in Well MW-17I has consistently been around 120 ppm. The result of 1220 ppm is considered highly unusual for this well. Lastly, the total dissolved solids (TDS) are reported to be only 130 ppm. Based on historical information and chemical reasoning, the alkalinity in Well MW-17I is unlikely to be as high as reported. The second exception is for Well MW-18D, a bedrock well east of Ischua Creek that contained 680 ppm alkalinity. Groundwater flow data have shown that Ischua Creek is a hydraulic boundary that prevents groundwater from the landfill from flowing east of the creek. Thus, the alkalinity in MW-18D reflects natural bedrock conditions. (It is further recalled that none of the wells along the western bank of the creek contain more than 354 ppm alkalinity, which indicates that the source of alkalinity east of the creek in MW-18D cannot be from the landfill.)

Chloride levels in site monitoring wells are generally low, at less than 100 ppm. Well MW-18D is again an exception, containing 682 ppm chloride. However, flow hydraulics preclude the landfill from being the source. It is much more plausible that bedrock groundwater has been impacted by another source. It is recalled that groundwater has been affected regionally by brines that were produced across southwestern New York State as a consequence of natural gas exploration. Also, chloride impacts from road salt cannot be ruled out. It is further recalled that, as with alkalinity, wells along the western bank of the creek and downgradient of the landfill do not contain enough chloride to support the theory that the landfill is the source. The absence of a significant chloride plume demonstrates a high attenuation capacity for the local groundwater system. Chloride is a conservative parameter, in that it is not chemically altered or attenuated along the groundwater flow path. The only way that its concentrations decrease is by dilution in a process known as dispersion. Thus, it is clear that leachate-impacted groundwater disperses rapidly as it migrates away from the landfill. However, as will be discussed in Chapter 5, there is ample evidence that chemical and biological attenuation processes are also at work, which reduce the levels of many non-conservative contaminants of concern at the site.

The results for TDS, TOC, BOD, and COD suggest some degree of leachate impacts in wells MW-14S and -14I, and more subtle impacts in other wells along the downgradient edge of the landfill, but generally do not show evidence that leachate impacts are widespread. Hardness also suggests leachate impacts are limited primarily to the immediate downgradient edge of the landfill. The average hardness concentration in WMW-9D, MW-10S/D, MW-11S/I, MW-13D, and MW-14S/I is 586 ppm. The hardness of the leachate sample is 608 ppm. In contrast, the average hardness for the other wells is 212 ppm.

4.3 SURFACE WATER AND SEDIMENT

Three surface water samples were collected from Ischua Creek, at locations upstream of (Dutch Hill Road bridge), adjacent to (Farwell Road bridge), and downstream of (Kent Road bridge) the landfill. Two additional surface water samples were collected from the landfill pond and a railroad pond. At each surface water location, a sediment sample was also collected.

A. **VOCs.** Volatile organics results for the surface water samples are included on Table 4-1. No VOCs were detected in any of the creek samples or in the landfill pond. Two VOCs were detected in the railroad pond (sample RRP-1A): carbon disulfide at 4 ppb, and 2-butanone (methyl ethyl ketone) at 26 ppb. Although a small amount (12 ppb) of 2-butanone was detected in the leachate sample, neither of the two compounds was detected in any of the groundwater samples, so they cannot be derived from groundwater seeping into the railroad pond. It is likely that some amount of surface runoff from the railroad tracks affects the pond, so the tracks themselves may be a source of 2-butanone. The absence of VOCs in the landfill pond suggests that runoff from the landfill is not conveying VOCs to the railroad pond.

Results of the sediment analysis for VOCs are summarized on Table 4-7. The creek sediments generally contained only trace amounts of a few organic compounds, but none of the specific chlorinated compounds of concern. The upstream sediment sample (Dutch Hill Road) contained traces of bromomethane (0.5 ppm) and acetone (3 ppm), while the sediment sample at the Farwell Road bridge adjacent to the landfill contained only a trace of acetone (4 ppm). The downstream sediment sample contained 15 ppm of 2-butanone and a trace of toluene (2 ppb). Aside from these, no other VOCs were detected in the creek sediments. In the landfill and railroad ponds, sediments contained both carbon disulfide and 2-butanone. Carbon disulfide is a common metabolic breakdown product in organic-rich sediments such as in wetlands and ponds, and so is probably not directly related to that landfill.

B. **Inorganics.** Surface water inorganics analytical results are included on Tables 4-2 and 4-3. Creek water samples contained total aluminum and iron above surface water quality standards. The presence of elevated aluminum and iron in the upstream samples is evidence that these metals are naturally occurring in surface water. Indeed, aluminum and iron are among the most abundant metals in natural rocks, so their presence is not at all surprising. There were no other water quality exceedances for metals in the creek. Water from the landfill pond also did not contain any metals above surface water quality standards. The railroad pond contained several metals above water quality standards, including aluminum, antimony, cobalt, iron, manganese, vanadium, and zinc. It is recalled that aside from iron and manganese, these metals were not elevated in the groundwater samples, so it is improbable that they are caused by groundwater from the landfill seeping into the pond. Further, no metals were elevated in the landfill pond, so it does not appear that surface runoff from the landfill causes the metals in the railroad pond. It is more likely that surface runoff from the railroad corridor has introduced various metals into the railroad pond.

The general water quality parameters likewise indicate minimal, if any, impact to the creek by the landfill. Upstream concentrations of alkalinity, chloride, TOC, and TDS are generally similar to downstream. In the case of surface water, oxygen demand is of particular interest because it is an indication of the effects of oxygen depletion, and hence habitat viability. BOD and COD indicate that the landfill is not introducing chemicals into the creek that could potentially deplete the levels of oxygen available to aquatic life.

Inorganic parameters in sediments are presented on Tables 4-8 and 4-9. Because the inorganic sediment samples at the upstream location and adjacent to the landfill were damaged during shipment to the laboratory, no direct comparison can be made with the downstream sediment location. However, it is noted that the sediment sample from the downstream (Kent Road) location contained higher levels of the naturally occurring metals, such as aluminum, calcium, magnesium, manganese, and iron, with relatively little else, suggesting little or no landfill impacts to creek sediments. Likewise, the pond sediments do not appear to be particularly elevated with respect to metals other than those found naturally. In regard to the general chemistry parameters, the railroad pond sediments appear to be relatively concentrated with chloride, sulfate, sulfide, and TOC compared to sediments from other areas. This appears to be primarily railroad influence, particularly for sulfide, which might be attributable to runoff containing coal residues from the tracks. Chloride can be derived from road runoff.

4.4 SUMMARY

Evidence of landfill-related impacts to groundwater appears to be primarily in the wells immediately adjacent to the waste mass (MW-9D, MW-10S/D, MW-11S/D, MW-13D, MW-14S/I). Wells further away from the waste mass contain noticeably lower concentrations of parameters related to the landfill. There is no evidence of landfill-related impacts in groundwater east of Ischua Creek, and none are possible owing to the clear hydrogeologic boundary formed by the creek. The creek itself shows no sign of leachate impacts.

The newly installed Well MW-19S suggests that groundwater flows more towards the south-southeast than previously thought. The presence of VOCs in downgradient wells such as MW-15I and MW-19 indicates that groundwater flow to the southeast has transported some landfill-related compounds there. However, it is equally clear that the concentrations decline for both organic and inorganic parameters along the groundwater flow path. The possibility of migration of contaminants further off site is greatly limited by the fact that concentrations decline along the groundwater flow path. Because the County owns land downgradient of the landfill, the potential for human exposure is also greatly reduced.

By considering the solubility limits of the various compounds detected, the nature of the source of organic contamination can be assessed. For example, the chlorinated organic compounds detected generally have solubilities on the order of several thousands of ppm. However, the detected concentrations in groundwater samples have consistently been less than 1 ppm (1,000 ppb) throughout the landfill's monitoring history. This is less than 0.1 percent of the solubility limit, which casts doubt that there could be a significant "hot spot" of contamination (for example, a non-aqueous phase source). It is further noted that concentrations for the chlorinated organic constituents have undergone a steady decline over the past few years, which further indicates there is no significant "reservoir" source area from which the contaminants dissolve. Rather, the chemical data indicate diffuse, non-point sources of organic compounds throughout the landfill waste.

Comparing data from the landfill pond to the railroad pond enables an assessment of the effects of surface runoff and groundwater on local water quality. The railroad pond water contains a number of organic and inorganic parameters that suggest some degree of impact. However, the groundwater immediately upgradient of the railroad pond generally does not exhibit this level of impact, nor does water from the landfill pond. This indicates that the impacts in the railroad pond are neither from groundwater flowing from the landfill, nor from runoff from the landfill. It appears more likely that the railroad pond accepts impacted runoff from the railroad tracks.

CHAPTER 5

HYDROGEOCHEMICAL EVALUATION

One of the objectives of the RI is to investigate the possibility of natural attenuation as a site remedy. Natural attenuation includes a number of physical, chemical, and biological processes that occur in groundwater which reduce the levels of contamination over time and space. In some cases, the natural attenuation of contaminants can be an effective remedial option. Implementing natural attenuation requires a dual strategy of heightened groundwater monitoring and comprehensive data evaluation to enable ongoing assessment of its effectiveness. Although the feasibility of natural attenuation will be addressed more fully as part of the feasibility study (FS), chemical data collected as part of this RI lays a foundation of geochemical evidence that attenuation does, in fact, occur at the Farwell Landfill.

One example of a physical attenuation process is the dispersion, or dilution, of contaminants in groundwater as it flows. However, dispersion does not reduce the mass of contaminants; it only reduces the concentration. Generally, therefore, dispersion is not by itself a preferred attenuation remedy. Other physical degradation processes include volatilization, which transfers dissolved contamination to the gas phase, and sorption, which transfers dissolved contamination to the solid soil phase. Like dispersion, these other processes do not reduce the actual mass of contamination; it just changes form.

Dispersion occurs to some degree in all groundwater flow situations, and can often enhance the effects of other chemical and biological forms of natural attenuation. Chemical and biological attenuation reduce the actual mass of contaminants, as well as reducing the concentrations in groundwater. That is, unlike dispersion alone, chemical and biological attenuation chemically break down, or degrade, the contaminants. Because these natural chemical and biological processes are potentially so effective at destroying contamination, they are used in many types of artificial remediation systems.

The degradation of organic compounds in groundwater produces both direct and indirect chemical evidence. Perhaps the most obvious direct evidence is the decline in contaminant levels over time. Attenuation also produces patterns in space, along the groundwater flow path.

If contaminant levels decline along the groundwater flow path at a faster rate than more conservative leachate parameters, then the contaminants are being attenuated. For example, a compound that is degraded biologically (in addition to dispersion) will undergo a faster drop in concentration than a parameter such as chloride, which can be diluted but will not biodegrade. Direct chemical evidence also includes the formation of chemical daughters, or breakdown products, of the original contaminant. Indirect chemical evidence involves parameters whose concentrations are affected by changes in ambient geochemistry caused by the degradation, but which are not themselves directly involved in the chemical breakdown reaction. Groundwater at the Farwell Landfill does contain a number of contaminant daughter products, and there has been an overall decrease in contaminant levels over time. Further compelling indirect evidence of attenuation is the presence of geochemical indicator parameters that are affected by the attenuation process, including anionic species and dissolved gases.

Natural attenuation can occur biologically (biodegradation) or abiotically (without biological activity). Biodegradation is a common process by which organic contaminants are consumed by naturally occurring microorganisms ("microbes"), thereby lowering the contaminant concentration. Sometimes, the biodegradation rate is sufficiently fast that no active form of cleanup is needed. It is believed that biodegradation will occur, to some extent, naturally in most groundwater environments. Research has shown biodegradation can occur in both oxygen-rich (aerobic, or oxic) and oxygen-poor (anaerobic, or reducing) environments for many different classes of common contaminants. Typically, however, one environment is favored over the other. For example, the common organic contaminant benzene usually degrades most quickly in an aerobic (oxic) environment; however, it can also degrade anaerobically, albeit at a slower rate. In contrast, chlorinated organic compounds such as TCE generally degrade most readily under anaerobic (reducing) conditions. TCE is reduced to DCE, which is reduced to vinyl chloride (VC). Vinyl chloride is somewhat more resistant to reductive degradation than TCE or DCE, and so it may be more persistent under anaerobic conditions. However, VC can undergo oxidation to CO_2. Weidmeir et al (1996) reported that reduction of TCE and DCE, followed by oxidation of VC, is a most desirable scenario. Fortunately, many landfills provide just the sort of geochemical environment for such a reaction sequence to occur. It will be discussed that the Farwell Landfill produces an anaerobic zone in groundwater immediately downgradient of it, in which reductive degradation of TCE and DCE can occur. Further downgradient, where groundwater is more aerobic, oxidation of VC becomes favorable.

The following sections present a number of independent geochemical observations that, together, are evidence of natural attenuation at the Farwell Landfill. Specifically, there is a preponderance of data that suggest anaerobic degradation is a significant attenuation process for chlorinated compounds.

5.1 CARBONATE CHEMISTRY AND pH

We can often see evidence of biological degradation of contaminants by looking at carbonate solubility relationships. Groundwater at the site is primarily a calcium/magnesium-bicarbonate type. This is a common chemical composition for natural groundwaters, reflecting the presence of limestone (calcium carbonate) and dolostone (calcium/magnesium carbonate) minerals. Even in the absence of limestone or dolostone bedrock, calcium/magnesium-bicarbonate groundwater can arise from carbonates which form the "cement" holding the grains of other sedimentary rock types such as sandstone and shale together.

Bicarbonate is the dominant anion in site groundwater, produced primarily by dissolving carbonate minerals:

$$\underset{\text{(dolostone)}}{CaMg(CO_3)_2} + \underset{\text{(water)}}{2H_2O} + \underset{\text{(carbon dioxide)}}{2CO_2} = \underset{\text{(calcium)}}{Ca^{2+}} + \underset{\text{(magnesium)}}{Mg^{2+}} + \underset{\text{(bicarbonate)}}{4HCO_{3^-}} \qquad (1)$$

Carbon dioxide is produced naturally in the upper soil zone by biological activity. Carbonic acid is formed as the carbon dioxide dissolves in the soil pore water. Carbonate minerals dissolve as carbonic acid lowers the pH of the water.

$$CO_2 + H_2O = H_2CO_3 \qquad (2)$$

$$H_2CO_3 = H^+ + HCO_{3^-} \qquad (3)$$

Thus, there is a relationship between bicarbonate and pH. Where biological activity is more pronounced, such as where organic wastes are being degraded, carbonate chemistry can change noticeably as more CO_2 is produced. Figure 5-1 is a plot of pH versus log alkalinity, which is approximately the same as log HCO_{3^-}, showing the equilibrium relationship between those two parameters (Langmuire, 1971). At equilibrium, no more carbonate minerals can dissolve as in equation 1, so adding CO_2 to the water will instead decrease pH as carbonic acid is formed

(Equation 2). This will also result in an increase in bicarbonate (Equation 3), so at equilibrium, adding CO_2 will decrease pH and increase bicarbonate. When the water is not at equilibrium, the opposite relationship holds. More carbonate minerals can dissolve, and so adding CO_2 to the water will dissolve the minerals (Equation 1), increasing bicarbonate as before, but as CO_2 is consumed, pH will go up as Equations 2 and 3 react to the left.

Figure 5-1 shows that most of the groundwater samples from the Farwell Landfill are either at or very near equilibrium with respect to carbonate minerals. Some samples are slightly undersaturated with respect to carbonate minerals, including groundwater from MW-9D, -10S, and -10D, as well as MW-6 and a few of the surface water locations. Waters that are undersaturated with respect to carbonate minerals will dissolve those minerals if CO_2 is added so that pH and bicarbonate both increase.

Background groundwater quality for bedrock is represented by data from well MW-6, and also by data from Well MW-18D, located east of the creek. Data from well cluster MW 17 and Well MW-18S can also be viewed as upgradient, since these wells are not hydraulically influenced by the landfill according to the groundwater flow contours (Figure 3-3). This being the case, upgradient groundwater is at or near saturation with respect to carbonate minerals, and experiences an increase in bicarbonate and a decrease in pH as it flows under the landfill. This chemical change is evidenced by the wells at the edge of the landfill (MW-9D, MW-10S/D, MW-11S/D, MW-13D, MW-14S/D), and is due to the addition of CO_2 to the groundwater at the landfill's downgradient edge. The added CO_2 is from the biological activity that degrades organic wastes in the landfill (see Section 5.3).

There appear to be two distinct data clusters in the zone of carbonate saturation. One cluster is for wells at the immediate downgradient edge of the landfill (MW-9D, MW-10S/D, MW-11S/D, MW-13D, MW-14S/I), and the second cluster includes wells located further downgradient (MW-15S/I, MW-16S/D, and MW-19), as well as cluster MW-17S/I and the surface water samples. The two clusters are a consequence of changes in CO_2 levels; dissolved CO_2 declines as groundwater migrates from the landfill's edge to further downgradient. It will be discussed in Section 5.3 that CO_2 is being produced by the aerobic degradation of organic contaminants in the waste mass, which consumes dissolved oxygen and creates an anaerobic (oxygen poor) zone at the downgradient edge of the landfill, and relatively high CO_2 levels. Indeed, the concentration of CO_2 in the leachate sample was relatively high, at 192 ppm. As groundwater migrates from the immediate downgradient edge of the landfill to areas further away, dissolved CO_2 must re-equilibrate with the relatively lower CO_2 levels in the soil gas further from the landfill, and so dissolved CO_2 levels decline, accompanied by a rise in pH and a drop in bicarbonate. Thus, we see evidence of aerobic biological degradation of landfill wastes in the carbonate equilibrium of site groundwater, and the formation of an oxygen-poor anaerobic zone immediately downgradient of the landfill.

Data from Wells MW-9D, -10S, and -10D plot away from the carbonate equilibrium zone, indicating undersaturation. It was noted in the preliminary evaluation of remediation scenarios (Stearns & Wheler, 1997) that water quality in Wells MW-9D, MW-10S, and MW-10D was chemically distinct from other wells at the landfill because of their elevated iron. Both the elevated iron and the position of the data points on Figure 5-1 can be explained by the degradation scenario posed above. Groundwater originally at equilibrium with respect to calcium carbonate experiences an increase in iron in the anaerobic zone. The increase in dissolved iron is due to the fact that iron is more soluble when conditions are anaerobic (i.e., when there is less dissolved oxygen). This prompts iron carbonate (siderite) to precipitate, removing bicarbonate from solution, raising the ratio Ca/HCO_3, and pushing the water out of carbonate equilibrium. Figure 5-2 illustrates the distinct trend relating iron to bicarbonate for MW-9D, -10S, and -10D. As iron levels rise, bicarbonate concentrations decline as siderite precipitates out of solution. The pH drops because reaction 3 above moves to the right as bicarbonate is removed from solution, and also probably from organic acids produced from the degradation of organic wastes.

5.2 CHEMICAL TRENDS AND MIGRATION PATTERNS

The levels of chlorinated organic compounds were plotted over time for a number of wells to determine whether their concentrations were decreasing. Figures 5-3 through 5-9 indicate that there has been a noticeable decline in the concentrations over the past several years. Such a pattern is typical where natural attenuation is occurring.

The increase in levels of VC in certain downgradient wells indicates the breakdown of TCE to DCE, and then to VC. The wells containing VC are at the immediate downgradient edge of the landfill. However, it is evident that VC is not reaching wells further downgradient. This is likely due to the oxidation of VC as the groundwater becomes more aerobic further from the landfill.

Table 5-1 summarizes the observed trends for the majority of chlorinated compounds; there are clear downward trends.

It is important to understand the full extent of leachate impacts in order to evaluate the effectiveness of natural attenuation. This requires that a full suite of parameters, both inorganic and organic, be considered. Looking only at parameters that are likely to be attenuated (for example, organic compounds) underestimates the true extent of leachate impact because conservative parameters with greater migration potential are neglected. However, by comparing conservative parameters with those that are attenuated, the degree of attenuation can be measured.

Chloride is a common landfill contaminant that is also a conservative parameter. Once in solution, there is very little that can remove it, which makes chloride an excellent tracer and an effective indicator of leachate impact.

From Figure 5-10, chlorinated compounds are almost completely attenuated as groundwater migrates from the edge of the landfill (MW-11D) to downgradient Wells MW 15S and MW-19. Recalling that chloride is chemically and biologically unreactive, the decline in chloride concentrations is attributable to dispersion. The fact that chloride levels undergo an obvious decline testifies that dispersion alone can mitigate the majority of impact from the landfill before groundwater migrates more than a few hundred feet. Figure 5-10 shows that only about 25 percent of the chloride present in Well MW-11D is present in Well MW-19, and only about 15 percent is present in Well MW-15S. Thus, chloride is significantly dispersed as groundwater migrates from the edge of the landfill to downgradient. In contrast, only 10 percent or less of the original amount of TCE, 1,2-DCE, and VC is present in Well MW-19 compared to MW-11D, and none of these compounds are present in Well MW-15S. The significant difference in concentration loss for chloride compared to the chlorinated compounds is attributable to biological and chemical attenuation reactions.

Because only 25 percent of the chloride in Well MW-11D is present in Well MW-19, dispersion alone evidently causes a 75 percent decline in contaminant concentration. TCE was detected in Well MW-11D at 45 ppb, which was the highest detected level of TCE. Based on the dispersion evidence, about 11.25 ppb of TCE would be expected in Well MW-19S (a 75 percent decline) if no other forms of attenuation apart from dispersion were occurring. Because only 0.7 ppb of TCE was detected in Well MW-19S, it appears that chemical and/or biological degradation accounts for 93.7 percent reduction in TCE as groundwater migrates from the landfill to Well MW-19S (e.g., 0.7 ppb compared to 11.25 ppb). For DCE, similar calculations indicate a 57 percent reduction due solely to chemical/biological processes. Vinyl chloride undergoes a 100 percent reduction. The compound 1,1-dichloroethane (DCA) is present in most wells and at the highest concentrations. DCA was detected in Well MW-11D at 150 ppb, and in MW-19S at 20 ppb. Carrying out a similar calculation as above indicates that level of 1,1-DCA is reduced chemically/biologically by 46 percent between the edge of the landfill and Well MW-19S, and is reduced by a total of 86 percent when dispersion is also considered.

At a groundwater flow velocity of around 1 foot per day, and considering that Well MW-19S is approximately 600 feet from the edge of the landfill waste, it is estimated that it would take one to two years for groundwater to reach Well MW-19S from the landfill. Assuming a conservative two years for groundwater to travel this distance, and considering the percent decline in contaminant levels indicated above, degradation half lives can be estimated, particularly for DCE and DCA, which seem to have undergone close to 50 percent degradation between the landfill and MW-19S (57 percent and 46 percent, respectively). It appears therefore that the degradation half lives for DCE and DCA at the site are approximately two years. The degradation half life for TCE must be faster than this, since it is more than 90 percent degraded over the same time period. These computed half lives tend to be toward the slower end of the ranges observed in various other studies (Howard et al, 1991). It is recalled that, for practical purposes, the real degradation rate is much faster than those suggested by the above half lives, owing to the fact that dispersion also occurs.

Water quality data were reviewed to determine the probable migration distance for organic compounds in site groundwater. The compound 1,1-DCA was targeted specifically, since this compound is the most concentrated among those detected in site wells, and is therefore considered to be a reliable "worst case" indicator. Since 1989, there were 126 instances in which DCA was detected in a well. Table 5-2 summarizes the data reviewed by Stearns & Wheler, showing the cases in which DCA was detected. The data are presented according to descending concentrations to illustrate the frequency at which various concentrations were detected. Of the total number of cases where DCA was detected, there were 26 instances when the reported concentration was between 1 and 10 ppb, and 24 in which the concentration was between 100 and 200 ppb. These two concentration ranges are by far the most frequently detected over the last 10 years. For the purpose of judging the potential downgradient impacts and the effects of natural attenuation, a source concentration of 200 ppb can therefore be considered the maximum probable concentration for any given compound. Based on a half life of 2 years, and assuming first order reaction kinetics, 12 years (i.e., six half lives) would be required for contaminant levels to decline to below 5 ppb, which is the regulatory standard for most of the compounds present in site groundwater. At a flow velocity of 1 foot per day, groundwater could travel about 4,380 feet in this time. However, there is clearly a degree of mechanical dispersion, based on the data for chloride which indicates as much as a 75 percent decline in concentration along the groundwater flow path. The combined effect of chemical/biological degradation and dispersion is known to result in greater than 86 percent total reduction in contaminant levels between the landfill and Well MW-19S, which conservatively corresponds to a travel time of two years, as described previously. If a first order decay reaction is again assumed, an 86 percent reduction over two years corresponds to a half life of approximately 0.7 years, based on the data for DCA and the combined effects of dispersion plus chemical/biological reactions. It would take approximately 4.2 years for contaminant levels to decline from 200 ppb to less than 5 ppb. Over this time period, groundwater can only migrate approximately 1,530 feet from the landfill. Thus, it would appear to be feasible to implement a monitoring well array at a location at least 1,530 feet from the downgradient edge of the landfill, and still on County-owned property, to monitor groundwater compliance at this estimated boundary.

5.3 GEOCHEMICAL EVIDENCE OF ATTENUATION

The principal groundwater contaminants of concern at the Farwell Landfill are chlorinated aliphatic compounds including TCE; 1,2-DCE; 1,1,1-TCA; 1,1-DCA; and VC. Numerous studies have shown that these compounds may degrade abiotically in anaerobic environments. For example, TCE is degraded by reductive dechlorination into the daughter product 1,2-DCE, which can be further degraded under reducing conditions to vinyl chloride. Reductive dechlorination involves a transfer of electrons from some electron donor to the compound being degraded. Usually, reduced forms of iron or manganese can provide the electrons needed to degrade the contaminant. Thus, reductive dechlorination is most favorable for TCE and DCE where conditions are anaerobic and there is a supply of reduced electron donor species. Although microbes are not directly involved in abiotic degradation reactions, their influence on ambient geochemistry can nonetheless make reductive degradation chemically favorable. For example, as microbes consume oxygen, conditions become increasingly anaerobic, which increases the ability for TCE to be reduced to DCE.

The above chlorinated compounds may also undergo aerobic degradation, particularly the chlorinated alkanes such as 1,1,1 TCA (Pankow and Cherry, 1996). Aerobic degradation of 1,1,1 TCA can produce alkenes such as DCE, so it is likely that DCE is being produced at the Farwell Landfill by a number of different degradation reactions for both TCE and 1,1,1 - TCA. Although it may be impossible to unequivocally determine which of the many possible reactions, or combinations of reactions, may be occurring, such a determination does not need to be made to demonstrate attenuation. The following discussion cites specific chemical evidence that natural attenuation is occurring in site groundwater.

A. **Dissolved Oxygen (DO).** Biodegradation under aerobic conditions can be represented by the generic equation

$$O_2 + CH_2O \rightarrow CO_2 + H_2O$$

where O_2 is dissolved oxygen, CH_2O represents a generic organic molecule, and CO_2 is carbon dioxide. The levels of dissolved oxygen in water samples indicate biological activity, and the extent of degradation of organic compounds. Where aerobic degradation occurs, oxygen levels will fall as oxygen is consumed.

Dissolved oxygen levels measured in the laboratory were generally higher than the field measured data. The discrepancy between laboratory and field data was greater for the groundwater samples than the surface water samples. It is believed that disturbance caused by the containerization and laboratory handling of the water samples allowed atmospheric oxygen to dissolve in the samples. Therefore, the field-measured data are regarded as more closely representing the true oxygen levels of site water samples. This is supported by less discrepancy between field and lab data for surface water samples that were nearly saturated with oxygen. For the samples close to oxygen saturation, less atmospheric oxygen was able to dissolve into the laboratory samples. The validity of the field data is also supported by somewhat better correlation between Eh and oxygen based on field data compared to laboratory data.

Figure 5-11 is a contour plot for dissolved oxygen in landfill groundwater. The data included in the contour plot are from the same deeper wells in and around the glaciofluvial zone that were used to create the groundwater contour map (Figure 3-7).

Dissolved oxygen in the groundwater from Well MW-17S is relatively high, which indicates background water in the shallow glaciofluvial zone is fairly well oxygenated. Among wells around the downgradient perimeter of the landfill, oxygen levels are lowest for MW-9D, -10D, and -16S. These three wells are located due east of the landfill. From the oxygen contour plot, it appears that biodegradation has reduced oxygen levels most noticeably for this portion of the landfill. Further south, near well MW-11D, there is somewhat more dissolved oxygen. This may indicate greater aerobic biological activity has consumed more oxygen in the area near well clusters MW-9 and -10 than near MW-11D. (Note that the elevated dissolved iron in Wells MW-9 and MW-10S/D, as discussed in Section 5.1, evidenced the reducing conditions). Overall, there is a well-defined "shadow" of low dissolved oxygen (<3 ppm) downgradient of the landfill.

B. **Dissolved Inorganic Carbon (DIC).** Dissolved carbon dioxide will react with water, producing bicarbonate (HCO_3^-), according to the equation:

$$CO_2 + H_2O \rightarrow H^+ + HCO_3^-$$

As indicated previously, aerobic biodegradation of organic compounds will increase the concentrations of dissolved carbon dioxide. Thus, aerobic degradation can be expected to produce DIC in the form of CO_2 and bicarbonate, and depress pH.

The presence of a significant concentration of CO_2 in the leachate sample (192 ppm) indicates that landfill wastes are, in fact, aerobically degrading. As aerobic degradation progresses, total organic carbon (TOC) and oxygen levels will fall in groundwater contacting the waste, forming an anaerobic groundwater "core" under the landfill and at its immediate downgradient fringe. Reduced forms of various inorganic parameters may become more concentrated, such as iron, manganese, and ammonia. This, in turn, will eventually promote the reductive degradation of chlorinated compounds such as TCE and DCE.

Figures 5-12 through 5-14 show the concentrations of carbon dioxide, bicarbonate, and pH across the landfill. From Figures 5-12 and 5-13, it is clear that levels of CO_2 and HCO_3- are relatively elevated under the downgradient portion of the waste mass, indicating that degradation of organic material has occurred as in the above equations. Figure 5-14 shows that pH is relatively low in the same general area, which is further evidence of the above reactions.

It is recalled that Figure 5-11 showed a relatively higher concentration of dissolved oxygen around Well MW-11D compared to adjacent areas. It was concluded that this pattern in the oxygen contours was a consequence of varying rates of biological degradation in the waste mass, which causes oxygen to be less depleted near MW-11D compared to other areas at the landfill's downgradient edge. It is interesting to note that the contours of CO_2 and pH likewise indicate a subtle difference in groundwater chemistry in MW-11D compared to surrounding areas. That CO_2 is slightly lower and pH slightly higher in MW-11D, compared to adjacent areas, is entirely consistent with the variable degradation hypothesis cited above. Less complete aerobic degradation in the waste upgradient of MW-11D leaves more oxygen in the groundwater, creates less CO_2, and leaves pH somewhat higher than areas where aerobic degradation has occurred more extensively. This, in turn, can explain why there is a more consistent detection of chlorinated organic compounds in Well MW-11D than other wells at the landfill perimeter, which will be discussed in subsection D below.

Anaerobic groundwater zones at the downgradient edge of waste are common in landfill settings. Under some circumstances where groundwater is excessively anaerobic, methane may be produced from the reaction

$$CO_2 + 8H^+ + 8e^- \rightarrow CH_4 + 2H_2O$$

where "e" represents the electrons that reduce the carbon dioxide, and CH_4 is methane gas. Although some methane was detected in groundwater samples, it does not appear that significant quantities are being created by the landfill. The leachate sample contained only 1.07 ppm of CH_4 gas. Among the glaciofluvial zone wells, there is only a subtle variation in methane levels across the landfill. Well MW-11D contained about 2 ppm dissolved methane, which is comparable to upgradient bedrock Well MW-6. Deep groundwater from Well MW-18D, a bedrock well east of Ischua Creek, contained the most methane, at around 16 ppm. The data indicate that this methane is not from the landfill; none of the wells west of Ischua Creek around the landfill contained methane this high. It is plausible that the methane detected in Well MW-18D is natural, as southwestern New York State is known for historical methane gas production.

C. **Electron Acceptors**. Landfill refuse contains a large amount of organic material, the majority of which is composed of reduced forms of carbon. The oxidation of this organic carbon releases energy that microbes use to sustain their growth. When the carbon is oxidized, electrons are transferred from the carbon to some other parameter (i.e., an "electron acceptor"), which reduces that parameter. Ultimately, the oxidized carbon occurs as carbon dioxide and bicarbonate, as described above. Figure 5-15 is a plot of iron concentrations that is evidence of the highly reducing zone downgradient of well clusters MW-9S/D and MW-10S/D. As the groundwater becomes more anaerobic, the concentrations of parameters such as iron increases, as well as ammonia and chemical oxygen demand (COD). Thus, the higher levels of reduced inorganic parameters around Wells MW-9D and -10D, along with elevated DIC, are further evidence of aerobic degradation of organics, resulting in an anaerobic plume, or reducing zone.

D. **Organic Carbon**. The oxidation of organic carbon in the landfill has created a reducing zone at the landfill's edge. This, in turn, enhances the reduction of chlorinated compounds, so their concentrations are relatively low in wells MW-9D, -10S, and –10D. Groundwater from Wells MW-11D and -14I have historically contained among the highest levels of chlorinated organic compounds found at the site, and have an overall higher TOC content. Here, organic wastes have not degraded aerobically to the same extent as near clusters MW-9 and -10, so conditions are not as strongly reducing. Consequently, the reductive dechlorination process is less rapid in those wells. It is recalled, however, that a number of different lines of evidence were presented in Section 5.3 which support that natural attenuation nonetheless occurs downgradient of Wells MW-11D and -14I, although at a somewhat slower rate than the more highly reducing zone to the north.

A number of trends were noted in the preliminary assessment of groundwater quality (Stearns & Wheler, 1997) involving the extent of degradation of chlorinated compounds. The data collected as part of this RI largely confirm the preliminary findings. The figures discussed below were included in the preliminary report based on historical site data and are consistent with the above findings and interpretations.

Figure 5-16 shows the relationship between TCE and dissolved iron and manganese. Iron and manganese are two parameters whose concentrations are largely dependent upon dissolved oxygen. Where dissolved oxygen levels are low, iron and manganese are more soluble. As previously discussed, TCE degrades more readily when dissolved oxygen levels are low, which means that manganese and iron should be inversely correlated with TCE in situations where TCE undergoes reductive dechlorination. Figure 5-16 shows that historically, groundwater at the Farwell Landfill contains less iron and manganese where TCE is more prevalent, which indicates a relationship between TCE levels and dissolved oxygen. Where groundwater is most anaerobic, iron and manganese are more concentrated and TCE is degraded more rapidly. Figure 5-16 indicates that TCE degrades more slowly in Well MW-11D because groundwater is not as anaerobic there, and hence there is less iron and manganese as well.

Figure 5-17 likewise supports the findings of this RI. There is evidence of reductive dechlorination in wells along the eastern downgradient portion of the landfill, downgradient of the reducing zone identified in this RI. Reductive dechlorination is less rapid in the less reducing waters downgradient of well clusters MW-11 and -14, although data from the RI does show that it occurs (Section 5.2).

5.5 SUMMARY

There are multiple lines of evidence that chlorinated compounds in groundwater at the landfill are being naturally degraded by biological and/or chemical attenuation processes.

1. The contaminants have undergone a noticeable and steady decline in concentration over the past several years.

2. A number of common degradation daughter products are present.

3. The contaminants are degrading at rates that exceed the dispersion rate of the conservative parameter chloride.

4. A number of geochemical parameters are present that indicate specific aerobic degradation reactions have occurred within the waste mass, and have produced a reducing plume at the downgradient edge of the landfill. Where conditions are apparently most reducing, the chlorinated compounds are present in only trace amounts, if at all. Where conditions are apparently less reducing, the levels of chlorinated compounds are somewhat higher. This indicates that reductive dechlorination is an active mechanism for reducing contaminant levels.

CHAPTER 6

RISK ASSESSMENT

6.1 INTRODUCTION

This chapter presents the findings of the qualitative risk assessment for Cattaraugus County's Farwell Landfill. Risk assessments are conducted as an integral part of the RI/FS process in order to characterize the potential for risk to human health posed by the presence of site-related contaminants. The analysis of risk at the site helps determine the need for, and the extent of, potential remedial actions. During the FS, remedial activities can be evaluated for their ability to reduce the risks to human health identified by the risk assessment.

This risk assessment was prepared in a manner generally consistent with methodologies presented in USEPA guidance documents "*Risk Assessment Guidance for Superfund. Volume I, Human Health Evaluation Manual (Part A) Interim Final*" (1989). It is noted, however, that the risk assessment completed for this investigation was qualitative, not quantitative. Thus, the USEPA guidance was not strictly applicable. The qualitative risk assessment presented herein is therefore preliminary in that numerical calculations for dose assessment were not carried out. However, the following overview of the quantitative risk assessment process is provided for the sake of establishing the general objectives and methods of risk assessment.

Following procedures discussed in the guidance manual, a risk assessment consists of four activities. Figure 6-1 presents a flow chart that illustrates the role of each of the four steps in the risk assessment process.

Hazard identification is the first step undertaken in a risk assessment. The purpose of this activity is to define the extent to which contamination is present at the site, and then to identify the chemicals of potential concern. Samples of the various site media are collected and analyzed for quantitative information concerning concentrations of chemicals. The data obtained from the laboratories is then screened to identify chemicals of concern. As illustrated in Figure 6-2, the data screening includes steps such as data validation, comparison to background concentrations, and/or regulatory standards and guidance values. Chemicals that survive this screening process are termed "chemicals of concern" and are carried through the remaining steps of the risk assessment process.

The second risk assessment activity is termed exposure assessment. This activity considers the pathways by which humans or other populations might realistically be exposed to site chemicals, both now and in the future. This is a key step in identifying risks posed by contamination at a site, because exposure can only occur when a mechanism for contaminant transport and a receptor exist simultaneously with a contaminant source. The goal for this step often includes a calculation of the amount of chemicals to which receptors could be exposed.

The third activity is toxicity assessment. This step consists of reviewing toxicological databases for the chemicals of concern. If exposure doses have been calculated as part of the exposure assessment step, this activity also includes a comparison of the exposure doses to levels that are known to cause adverse health effects.

The final activity is called risk characterization. In this step, the previous activities are integrated together and the potential for adverse effects on human health is characterized. Both carcinogenic (cancer-causing) and non-carcinogenic (toxic) effects on human health are detailed. The result of this step is an understanding of whether a reduction in risk may be required and, if so, whether the focus should be on the source of the unacceptable risk, on stopping transport of the chemical to the receptor, or on control of the exposure.

The results of the risk assessment are based on the outcome of this four-step process. Normally, the results are presented as a quantitative estimate of the potential risk that site contaminants pose to identified human receptors. For this site, the conclusions of this chapter will present a qualitative description of the potential risk that site contaminants pose to identified human receptors.

6.2 SITE BACKGROUND AND ENVIRONMENTAL SETTING

The environmental character and surrounding land uses of a site will, to a large degree, determine the amount of risk posed to human health by site conditions. Land use determines the extent to which potential receptors could contact impacted media (air, sediment, water, soil). Isolated sites and those with minimal access pose less of a potential risk to human health than sites accessible to large numbers of people. The environmental setting of the site also determines the relative importance of transport of chemicals through the various media. In the risk assessment process, this environmental setting, including current and future land use, combined with knowledge of site-related, contaminated media, are integrated into an evaluation of current and future pathways by which exposure to site-related chemicals may occur. The paragraphs that follow describe the environmental setting of the Farwell Landfill include summaries of information presented in greater detail in other chapters of this report.

The Farwell Landfill is located north of Farwell Road in the Town of Ischua, Cattaraugus County, NY. The landfill occupies the northern portion of property owned by the County located along the western wall of the Ischua Creek Valley. The entire site is approximately 200 acres and is bisected by Farwell Road. The landfill is bounded on the west by a narrow strip of trees and old fields. On the north and east sides, the landfill is bounded by a bend in Ischua Creek and an active Conrail railroad line. At its closest point, the creek is approximately 400 feet from the landfill. Ischua Creek flows south into Olean Creek, which in turn discharges into the Allegheny River. The land surface rises steeply to the west, where elevations of greater than 2,000 feet above sea level are common at the hilltops. Regional relief is high, with numerous hills and valleys.

Phase I and II areas of the landfill, approximately 10 acres, were utilized from 1975 to 1985 and are unlined. The Phase III portion of the landfill was utilized until 1987 and was constructed with a compacted soil liner and leachate collection system. Following closure, the entire landfill was capped with a minimum of 18 inches of compacted soil followed by a 6-inch topsoil layer. The cap has an established vegetative cover consisting of mixed grasses and herbaceous plants. Surface runoff from the landfill drains into either the landfill pond located southeast of the landfill and north of Farwell Road, or a depression located southwest of the landfill, also north of Farwell Road.

Since the landfill was closed, the site has served as a transfer station. Two buildings are located on the site, both adjacent to the north side of Farwell Road. One of the buildings is used by the Cattaraugus County DPW for storage of heavy equipment and transfer station operations. The other building contains offices; however, during the RI field work it was noted that the offices are not regularly staffed. The property has a water supply well, but bottled water is supplied for drinking water. Well water is only used for washing maintenance vehicles and for the facility toilet and sink. A sign posted at the landfill prohibits use of well water for drinking. The well is located just south of Farwell Road. Access to the site is from the north and is limited by the proximity of the creek and the railroad tracks. A fence limits access along a portion of Farwell Road adjacent to the two site buildings and parking lot adjacent to the transfer station.

The surrounding area is primarily rural and agricultural. Within 1 mile southeast of the landfill (i.e., in the direction of groundwater flow), there are reportedly nine full or part-time residents, all on the eastern side of the creek. A former one-room schoolhouse is located on the northwest corner of the intersection of Farwell Road and New York State Route 16, approximately 600 feet from the easternmost access drive to the landfill site. Water in the area is supplied by private wells.

The site geology consists of an upper layer of ablation till underlain by a coarser-grained sand and gravel unit. The upper till layer is approximately 70 to 80 feet thick in the western portion of the site and thins to an approximate 30-foot thickness adjacent to the creek. The sand and gravel unit is relatively thin, extending only 10 to 15 feet thick. Under the sand and gravel unit is a lower till unit estimated to be roughly 40 to 70 feet thick. The overburden layers rest on bedrock consisting of highly fractured fine-grained sandstone interbedded with thin layers of shale. Observations during drilling activities indicate there is less physical distinction between the layers. The groundwater flow direction across the landfill is from northwest to southeast with flow discharging to Ischua Creek. Groundwater elevations recorded in the wells over the past several years suggest that hydraulic mixing occurs between the different stratigraphic units.

6.3 SUMMARY OF SITE CONTAMINATION

The sampling plan designed to evaluate environmental conditions at the site has been described in detail in Chapter 2. Groundwater, surface water, sediment, and leachate samples were collected during September 1998 to address the objectives of this RI.

Each sample was analyzed in a laboratory certified in the NYSDEC Analytical Services Protocol program. Each analytical result was subject to data validation by scientists at Analytical Assurance Associates, Inc. Included in the data validation procedures is examination of each analytical result for compliance with the criteria specified by NYSDEC and USEPA for technically defensible data. Technically acceptable data underwent additional screening before inclusion in the assessment of site-related risk. This additional screening included comparison to background concentrations and comparison to applicable standards or cleanup goals.

A. **Media - Groundwater Sample Screening - VOCs.** Table 6-1 summarizes analytical results for concentrations of VOCs in samples from the background monitoring well (MW-6) and from monitoring wells located either downgradient or crossgradient from the landfill. Data from 16 of the 19 wells sampled as part of this RI were used to evaluate site impacts. Of the wells sampled as part of this RI, only one is considered truly upgradient (MW-6). For the purpose of this assessment, therefore, only Well MW-6 shall be considered as "background." A total of 15 wells are considered downgradient or crossgradient of the landfill, and are potentially susceptible to groundwater impacts from the landfill. Three other wells (MW-18S, MW-18D, and the school well) are located on the eastern side of Ischua Creek, hydraulically separated from the landfill. As these three wells are technically in a different groundwater flow system, they are included in neither the background or downgradient/crossgradient groups.

Only one organic compound was detected in the background well. 1,1-DCA was estimated to be at 1 part per billion (ppb) in Well MW-6. Of the downgradient/crossgradient wells, 1,1-DCA was detected in all wells but MW-17I, at concentrations that ranged from 1 ppb (MW-15S) to 160 ppb (MW-9D). Other compounds detected, but not necessarily in all the wells, include vinyl chloride, chloroethane, 1,1-dichloroethene (1,1-DCE), 1,2-DCE, TCA, TCE, and benzene.

Table 6-2 presents a comparison between background and downgradient concentrations of VOCs. Only compounds that were detected in samples are included in this comparison. The table includes both the maximum detected concentration and the mean concentration calculated for each set of monitoring wells. The value listed in the maximum column is the maximum concentration detected in samples from the group of monitoring wells. If only one sample was found to contain the listed compound, then the value listed is the detected concentration. The mean value used for comparison basis is the geometric mean for the samples in the monitoring well group. The mean was calculated using a replacement value of one-half the detection limit for samples with non-detectable concentrations. Compounds with concentrations that exceed both background and New York State groundwater standards are then considered contaminants of concern, and are highlighted in Table 6-2. Maximum concentrations of all VOCs detected in "downgradient" wells, except for 1,1-DCE, exceeded New York State standards. Mean concentrations also exceeded New York State standards and background concentrations for VC, chloroethane, 1,1-DCA, 1,2-DCE, TCA, and benzene. These VOCs are therefore considered contaminants of concern for this risk assessment.

B. **Groundwater Sample Screening - Metals.** The groundwater sample results for metal concentrations were screened using the same procedure as that used for the VOC analytical data. Table 6-3 presents an initial review of the data, including frequency of detection and concentration ranges for both dissolved and total metals in background and downgradient groundwater. Of the total (unfiltered) metals tested, 13 (aluminum, barium, cadmium, calcium, chromium, copper, iron, magnesium, manganese, potassium, selenium, sodium, and zinc) were detected in both background and downgradient groundwater samples. Among filtered (dissolved) metals, 11 (arsenic, barium, cadmium, calcium, cobalt, iron, magnesium, manganese, potassium, sodium, and zinc) were detected in both background and downgradient wells.

Table 6-4 presents the results of the comparison between maximum detected concentrations and mean concentrations in background and downgradient groundwater samples for both total and dissolved metals. Antimony, beryllium, selenium, and silver were omitted from this comparison because of the low frequency of occurrence for each of the metals in samples from both the background and downgradient well groups.

The mean concentration for each metal in both background and downgradient samples was generally below the applicable New York State standard. For most of the total and dissolved metals that were tested, the downgradient concentrations exceeded background. However, this finding is not very useful for assessing site water quality because of the fact that the background database consists of only one datum (MW-6). Statistically speaking, comparing the characteristics of a population of 15 (i.e., downgradient wells) with a population of 1 (background) is not valid, because a population consisting of the single member (background) cannot account for any natural variability. Thus, in comparing the background site well data with downgradient site well data, there is no way to determine whether the variability of the downgradient groundwater chemistry is natural variability or influenced by the landfill.

From the metals data, it appears that iron, manganese, and sodium are naturally elevated in site groundwater, since the background levels are above applicable groundwater standards. Excluding these three metals, only barium, cadmium, and zinc exceeded New York State standards in the downgradient wells. Magnesium, a prominent element in natural carbonate minerals, exceeded the New York State guidance value in downgradient wells, but is not subject to a true standard. Thus, only barium, cadmium, and zinc are identified as potential contaminants of concern.

It should be noted that although arsenic was detected in both filtered and unfiltered samples from monitoring Well MW-18S, that particular well is located on the east side of Ischua Creek. Therefore, although the concentrations of arsenic were found to exceed regulatory standards, its presence cannot be attributed to the landfill.

C. **VOCs in Water Samples.** Table 6-5 presents the VOC concentrations found in samples of surface water. VOCs were not detected in any samples of water collected from Ischua Creek, and VOCs were not detected in the water sample collected from the landfill pond. Only two VOCs -- 2-butanone and carbon disulfide -- were detected in the water sample collected from the railroad pond. However, carbon disulfide is a common metabolic breakdown product found in organic-rich sediments such as occurs in ponds and wetlands. Therefore, the presence of carbon disulfide in the railroad pond may have nothing to do with the landfill.

D. **Metals in Water Samples.** Table 6-6 presents the total and dissolved metal concentrations found in samples of surface water.

E. **VOCs in Sediments Samples.** Table 6-7 presents the results from screening sediment analytical results for VOCs for inclusion in the risk assessment. Only three VOCs were detected in sediment samples from Ischua Creek. Acetone and 2-butanone were each detected in one downstream sediment sample, and acetone was also detected in the upstream sediment sample. Toluene was also detected in a downstream sediment sample. None of the concentrations exceeded New York State sediment standards.

Only two VOCs were detected in the samples of sediment collected from the landfill pond and the railroad pond -- carbon disulfide and 2-butanone. Neither compound was detected above regulatory standards. Therefore, no VOCs were identified as compounds of concern in sediment samples.

F. **Metals in Sediment Samples.** Table 6-8 presents the results from screening sediment analytical results for metals for inclusion in the risk assessment. No metals were detected at concentrations exceeding the New York State sediment criteria for severe effect level, so no metals have been identified as compounds of concern in sediment samples.

6.4 SELECTION OF EXPOSURE PATHWAYS

Figure 6-3 illustrates all the potential pathways of human exposure to site-related contaminants. The exposure pathways that could actually occur are only a subset of the entire range of possibilities. The site's environmental setting and surrounding land use, coupled with the nature and extent of chemical impacts, determine the feasible exposure routes. This section presents the rationale for including, or eliminating, one or more pathway from this risk assessment. As discussed above, human exposure from site-related contamination is only possible when there is a pathway of contaminant migration and a human receptor.

The environmental setting, including current and future land use, is used to frame the possible pathways of exposure to site-related contaminants. Groundwater underlying the landfill and in wells located downgradient from the landfill contains several VOCs and metals that exceed groundwater standards. At the present time, the only well located in the area of impacted groundwater is the landfill supply well, which is not used for drinking water; a sign is currently posted which prohibits such use. In the future, development of the area south of the landfill is possible. If development occurs, it would likely be limited to seasonal use, such as a hunting lodge or camp. Regardless, development could be accompanied by installation of a water supply well. Exposure to contaminants in groundwater could occur through ingestion, inhalation while showering or bathing, or via dermal absorption while showering or bathing. This scenario is noted to be unlikely due to the rural, isolated nature of the area, and also considering the County's ownership of much of the land south of the landfill and west of the creek, but has been included in order to be conservative.

Although groundwater discharges to Ischua Creek, sampling results have indicated that the groundwater discharge has not impacted the water quality of the creek. Because contaminants have not been identified in the creek, there are no associated risks due to exposure to contaminants during recreational (or accidental) activities.

Any contractors working on site as part of implementation of remedial actions will be trained per the requirements of OSHA regulations (29 CFR Part 1910.120). Contractors would have personal protective equipment and medical surveillance in addition to the required education and training. Consequently, exposure to site contaminants by remedial contractors is not considered as a potential exposure pathway in this risk assessment.

Ingestion of contaminated soils is a potential exposure pathway at any impacted site. However, this pathway is unlikely because the landfill has been closed with a soil cover that supports healthy vegetative growth. Therefore, it is unlikely that landfill workers or trespassers would be exposed to contaminated soil.

In summary, exposure to contaminants in groundwater via ingestion along with inhalation and dermal contact during bathing or showering are the only identified exposure pathways for this site.

6.5 HAZARD IDENTIFICATION

The next step of a quantitative risk assessment process is to calculate representative exposure doses that could be expected to occur for each of the "complete" exposure pathways. As this risk assessment is a qualitative assessment of potential health impacts, hazard identification, or identification of chemicals of concern in affected media, is required. Representative media concentrations have been estimated as described in Section 6.3. As discussed previously, the VOCs 1,1-DCE, VC, chloroethane, 1,1-DCA, 1,2-DCE, TCA, benzene, and the metals barium, cadmium, and zinc have been identified as chemicals of concern in groundwater.

6.6 TOXICITY ASSESSMENT

Toxicity assessment determines the extent to which adverse health impacts could arise from exposure to the identified site-related compounds of concern. Data on known health impacts for each identified compound of concern were obtained from the Integrated Risk Information System (IRIS) on-line database. The database is maintained by the USEPA and includes information on known and suspected health impacts for a large number of chemicals. When chemicals or effects were not listed in the IRIS database, the database maintained by the Agency for Toxic Substances and Disease Registry was consulted.

Two types of health impacts from exposure to chemicals are possible. Toxicity, both subchronic and chronic, is the first type. Carcinogenicity is the second. Subchronic and chronic toxic effects are health impacts that are exerted slowly over the same time period as exposure occurs. A "threshold" model is used to conceptualize these effects; that is, there is a dose below which no adverse effects will occur. Carcinogenic effects, in contrast, are molecular events that evoke changes on the cellular level that can lead to uncontrolled cellular proliferation and eventually to the disease cancer. Exposure can lead to clinical effects later in life, in comparison to the subchronic and chronic effects where the impacts occur over the same time period as exposure. Carcinogenesis is conceptualized as a "non-threshold" model, because there is no exposure that produces a zero chance of a carcinogenic response.

Toxicity assessment calculations reflect the differences between the two human health responses. The potential impacts of exposure to non-carcinogenic chemicals are evaluated by comparing the calculated exposure to the published "reference dose" (RfD in units of mg/kg/day) or "reference concentration" (RfC in units of mg/cubic meter for exposure to toxics in air) for the chemical of concern. The RfD (or RfC) is the estimated exposure at which no adverse health impacts will occur, even among sensitive subpopulations. Exposure at the reference dose may occur without deleterious effects for a lifetime. Uncertainty in the RfD (or RfC), however, may span an order of magnitude.

For this risk assessment, IRIS was reviewed for known toxic effects caused by ingestion and inhalation of chemicals of concern. If a reference dose was listed, it was noted, along with the health effect or the target organ. The smaller the RfD, the more toxic the compound, as the effects occur for lower exposure concentrations. IRIS does not contain data for health impacts due to dermal absorption. These type of effects can be modeled and calculated using the inhalation and ingestion toxic effects.

Similarly, data contained in IRIS was also reviewed for known carcinogenic effects caused by site-related chemicals of concern, and the "weight of evidence" classification assigned to each chemical. Carcinogenic effects are quantified by using a "slope factor" which is the unit risk per mg/kg/day exposure dose. The slope factors resulting from human and animal studies are published by the USEPA and reflect consensus judgements of the agency scientists. Each slope factor is qualified by a "weight of evidence" factor denoting the uncertainty in prediction of human carcinogenicity. Similar to the RfD, the smaller the slope factor, the greater the estimate of potential risk due to exposure.

Tables 6-9 and 6-10 summarize the health effect parameters obtained from IRIS for the various groundwater chemicals of concern identified in the Farwell Landfill plume. These tables present only effects associated with the ingestion exposure pathway. As indicated in Table 6-9, chronic non-carcinogenic effects have been associated with exposure, via ingestion, to four of the site chemicals of concern identified in groundwater: trans-1,2-DCE, barium, cadmium, and zinc.

Table 6-10 summarizes assessments of carcinogenic health effects for the chemicals of concern. Two of the groundwater chemicals of concern are associated with carcinogenic effects via ingestion. Benzene and VC are known human carcinogens (Class A carcinogens). However, a slope factor is currently unavailable for VC. 1,1-DCA is considered a Class C possible human carcinogen; however, no quantitative estimate of the carcinogenicity is available. TCA, cis-1,2-DCE, barium, and zinc are not considered human carcinogens. Although cadmium is considered a carcinogen, its effects are only associated with inhalation exposure to metal dust and/or fumes.

Table 6-11 summarizes both chronic non-carcinogenic effects and carcinogenic effects for groundwater chemicals of concern associated with the inhalation exposure pathway. Only VOCs have been evaluated, as the metals would not be volatilized from warm water during showers or baths, so inhalation exposure to the three metals would not be expected. Only benzene is considered a carcinogen via inhalation exposure at this time. Both VC and chloroethane are associated with chronic, non-carcinogenic risks.

Exposure via dermal absorption during showers or baths is also likely to occur. Health effects associated with this type of exposure could be estimated using the ingestion health effects.

6.7 CONCLUSIONS

In conclusion, the results of this qualitative risk assessment indicate that there would likely be unacceptable risks associated with ingestion of groundwater from wells located in the area hydraulically downgradient of the landfill, including the landfill supply well. A sign is currently posted at the landfill which prohibits the use of well water for drinking. As the landfill well is used only for non-potable purposes, and there are no wells located downgradient from the landfill, these risks are not associated with "complete" exposure pathways, given current land use in the area. In the future, if land in the area of the plume were developed, unacceptable risks may be associated with ingestion of water or inhalation and dermal contact during showering and/or bathing. Because all the land located in the area of identified groundwater impacts is owned by the County, deed restrictions could be used to prevent sale and development of the land, and thereby prevent unacceptable exposures in the future.

There are no other identified impacts with associated exposure scenarios, so further analysis of risk is not necessary.

CHAPTER 7

FISH AND WILDLIFE IMPACT ANALYSIS

7.1 INTRODUCTION

As specified in the approved work plan, a preliminary Fish and Wildlife Impact Analysis (FWIA) was completed on the Farwell Landfill site. The FWIA was performed in accordance with the criteria outlined in NYSDEC Division of Fish and Wildlife's "*Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites*" (1994). Step 1 of the analysis was completed, including the description of the site and fish and wildlife resources and values within a 0.5-mile and 2-mile radius, and identification of applicable fish and wildlife regulations. Data were compiled from reviews of published maps and reports, information obtained from state and federal regulatory agencies, and from a field investigation of the site and the surrounding area on October 6, 1998.

The landfill property is essentially rectangular, with the northeast corner rounded off where it meets the Conrail railway line. The landfill cap has established a typical old field plant community of mixed grasses and herbaceous plants. There is a sedimentation basin in the southeast corner of the parcel. The transfer station, driveway, and garage for the site are located along the southern boundary of the property, along Farwell Road, immediately west of the sedimentation pond.

7.2 SITE LOCATION

The Farwell Landfill site is located on the north side of Farwell Road, immediately east of the Conrail railway line and Ischua Creek, in the Town of Ischua, Cattaraugus County, NY. The site is situated in a rural and sparsely populated area. Lands surrounding and within 0.5 miles and 2 miles of the site are dominated by two distinct cover types (Figures 7-1 and 7-2). These include old field grasslands and second growth, broad-leafed deciduous forest in a variety of age classes. Other cover types represented in the area, but not dominant, were agricultural fields (corn), residential turf grass lawns, and scrub/shrub and old field floodplains of Ischua Creek. The 13-acre landfill area is bordered to the south by Farwell Road, to the east and north by the Conrail railway line, and to the west by a narrow strip of trees and old fields. A photographic log of items described in the following sections is included as Appendix D-1. The numbered photographs correspond to the numbered locations indicated on Figure 7-2.

7.3 TOPOGRAPHIC FEATURES

The Farwell Landfill site sits on the edge of the Ischua Creek floodplain, in a valley that runs between two highland ridges. The topography within a 0.5-mile and 2-mile radius of the site is characterized by ridges at $\pm$2,000 feet elevation with steep slopes down into the 1/4- to 1/2-mile wide river valley inscribed by Ischua Creek at an elevation of $\pm$1,500 feet. The slopes contain steep-sided gullies that carry surface runoff to Ischua Creek. The largest of these gullies is Farwell Hollow, located east and north of the landfill on the east side of Ischua Creek.

There are two peaks to the landfill cap, one in the northwest corner of the property, and another larger one toward the center of the property. The southwest corner of the parcel is an excavated hollow. The north face of the landfill slopes down steadily to the surrounding woodlands, but the east, south, and west faces are terraced with steep slopes in between level landings.

7.4 SURFACE DRAINAGE PATTERNS

The Farwell Landfill site drains in all directions, but all runoff from the landfill ultimately drains to the southeast corner of the property into the detention pond there, or into the depression in the southwest corner of the property. The northwest corner of the property, which does not have any landfill area, drains to the north, toward Ischua Creek. Runoff patterns on the landfill and within a 0.5-mile radius of the site are depicted in Figure 7-3. From the border of the landfill property, the nearest waterway is Ischua Creek, which is located $\pm$400 feet to the east at its closest point. Ischua Creek flows south into Olean Creek, which in turn discharges into the Allegheny River east of the Town of Olean.

7.5 VEGETATION

The dominant plant species were identified on the property, within a 0.5-mile radius, and within a 2-mile radius of the landfill site. The results of this vegetation survey are outlined by area in tabular form below. A list of all plant species identified within the 2-mile and 0.5-mile radius areas is included in Appendix D-2. Plant species observed included:

A. **Old Fields On and Around Site.**

New England Aster	Grass-leafed Goldenrod	Canada Goldenrod
Crown Vetch	Narrow-leafed Goldenrod	Queen Anne's Lace
Timothy	Curly Dock	Dandelion
Common Cinquefoil	Gill-Over-the-Ground	Yarrow
Blackberry	Teasel	Thistle sp.
Common Milkweed	Reed Canary Grass	Boneset
Soft Rush*	Fox Sedge*	Umbrella Sedge*
Colt's Foot	Purple Loosestrife*	Wild Mint*
Woolgrass*	Burdock	Alfalfa
Birdsfoot Trefoil	Purple Milkwort	Indian Hemp
Orchard Grass	Bluegrass	Daisy Fleabane

*Indicates species observed near localized, seasonal wet spot

B. **Area Around Sedimentation Pond.**

Rice Cut Grass	Fox Sedge
Woolgrass	Grass-leafed Goldenrod
Curly Dock	Needle Rush
Soft Rush	New England Aster

C. **Wooded Perimeter of Landfill Site.**

White Ash	Hawthorne	Sugar Maple
Multiflora Rose	Autumn Olive	Red Maple
Norway Spruce	Cottonwood	Black Cherry
Crab Apple	Red Osier Dogwood	Arrowood
Staghorn Sumac	Wild Grape	Blackberry
Tartarian Honeysuckle	Autumn Olive	

D. **Wooded Areas On Ridges and Hillsides.**

Sugar Maple	American Beech	Red Maple
Red Oak	Hop Hornbeam	White Ash
Black Cherry	White Pine	Quaking Aspen
Blackberry	Burdock	Teasel
Goldenrod sp.		

E. **Ishua Creek Floodplain (Old Field, Riparian, and Scrub/Shrub Habitats).**

Black Willow	Sugar Maple	Green Ash
Red Osier Dogwood	Staghorn Sumac	Tartarian Honeysuckle
Stinging Nettle	Blackberry	Wild Grape
Meadow Rue	Joe Pye Weed	Goldenrod sp.
Reed Canary Grass	Red Alder	Quaking Aspen
Indian Hemp	Jewelweed	Sand Bar Willow
American Elm		

6. **Agricultural Lands.** Corn.

7. **Roadsides.**

Teasel	Burdock	Blackberry
Goldenrod spp.	Chickory	
Daisy Fleabane	Blackberry	
New England Aster		

No evidence of stressed vegetation within the area of study was observed, with the exception of the Hawthorne trees on the site. All of the Hawthornes observed were leafless and appeared dead. No other plant species demonstrated any sign of stress, so this may have been an infection or blight specific to Hawthornes. In all other locations within the area of study, including downslope and downstream from the landfill, no other indications of stressed vegetation were observed.

7.6 FISH AND WILDLIFE

The combination of mature and young forests, old fields, scrub/shrublands, agricultural lands, and a large riparian corridor provide habitat for a large diversity of wildlife species. These cover types provide breeding, feeding, nesting, and roosting habitat, as well as covered travel corridors for wildlife to move from one area to another. In addition to the habitat value of each of the distinct cover types, the edge habitat found at the interfaces of these cover types provides valuable food, cover, and space resources for many wildlife species. A list of wildlife species that were observed in the area, or are likely to use the area at some time of year, is included in Appendix D-3.

Ischua Creek, a large perennial stream, provides feeding, spawning, cover, and dispersal habitat for a wide variety of fish species. The stream varies in width, but is ±40 feet wide near the subject site. Depth varies from riffles less than 1 foot deep to pools in excess of 3 feet deep. Stream survey data provided by the NYSDEC Bureau of Fisheries indicate water temperatures in the 70-75° range in mid-June of 1991, and in the low 60s in early May in the early 1980s and mid-June of 1971. In mid-June 1991, the pH of the water was measured at 8.0, and the creek had a flow of ±18 cubic feet per second.

The following fish species have been found in Ischua Creek within the 2-mile radius of the Farwell Landfill site:

Brilliant Darter	Rainbow Darter	Banded Darter
Variegated Darter	Johnny Darter	Greensided Darter
Fantail Darter	Black Sided Darter	Log Perch
Striped Shiner	Common Shiner	Rosyface Shiner
Emerald Shiner	Silver Shiner	Straw Minnow
Central Stoneroller Minnow	Bluntnose Minnow	Fathead Minnow
Pearl Dace	Blacknose Dace	Long Nosed Dace
Brilliant Dace	Northern Hog Sucker	White Sucker
Quillback Carp Sucker	Creek Chub	Redhorse Sucker sp.
Shorthead Eastern Redhorse	Sucker	Brook Stickleback
Carp	Stone Cat	Brown Trout
Rock Bass	Smallmouth Bass	Yellow Perch
Northern Pike		

According to the NYSDEC's Region 9 Bureau of Fisheries, they "...have no records of any mortalities in the circle of interest nor any related specifically to the landfill" (see copy of correspondence, Appendix D-4). Other aquatic species identified during the site visit included aquatic insect larvae of stone flies, mayflies, and caddis flies.

7.7 RARE, THREATENED, ENDANGERED, AND SPECIAL CONCERN SPECIES

Requests were made to both the NYSDEC Natural Heritage Program (NHP) and Region 9 Bureau of Wildlife, as well as to the U.S. Fish & Wildlife Service for information regarding rare, threatened, endangered, or special concern species on the site or within the 2-mile radius area. The NHP's records indicate that the Variegated Darter, a small fish found in Ischua Creek, is considered "very rare" and "very vulnerable" in New York State, though it is considered "demonstrably secure globally".

7.8 VALUE OF FISH AND WILDLIFE RESOURCES

A. **Value of Resources to Fish and Wildlife.** The mixture of several cover types, interspersed to provide large areas of edge habitat, provides a diverse and valuable habitat resource for a great variety of wildlife species within 0.5 miles of the site. The two dominant cover types, second growth woodlands and old fields, are also present in various sized patches, providing further benefit to an even wider range of species. Small woodland patches will favor edge species like Great Horned Owls and Black Capped Chickadees, while larger patches of woods (>100 contiguous acres) favor many neotropical migrant songbirds such as many warbler species. Likewise, smaller open fields will favor edge species such as White tailed Deer, while larger old fields will favor grassland species such as Eastern Meadowlarks or Meadow Voles. The open field areas are particularly important in the area within 0.5 mile of the site; farther from the site, mature forest takes over as the dominant cover type, with few and small openings.

The riparian corridor along Ischua Creek provides not only another cover type, but vital water resources and a large travel corridor for migration into and out of the subject area. The creek itself provides habitat for a wide variety of mostly warm water fish species, with a few cold water species, one of which (Brown Trout) probably survives only because of repeated stocking efforts. The survival of some trout at sampling points near the landfill site may be an indicator of good water quality, as trout tend to be very sensitive to water quality. The presence of stone fly, mayfly, and caddis fly larvae are also indicators of good water quality.

B. **Value of Resources to Humans.** The primary value to humans of the natural resources surrounding the Farwell Landfill lies in the habitat value to fish and wildlife. The landscape provides ample habitat for a wide variety of game species, including White-tailed Deer, Ruffed Grouse, American Woodcock, Gray Squirrel, and others, as well as game fish species, such as Brown Trout, Northern Pike, and Smallmouth Bass. Thus, the primary value of the resource to humans is in hunting and fishing opportunities, which provide recreation as well as potential economic benefits from those who come to the area to hunt and fish and spend money on local businesses.

Other potential values to humans may include agriculture and development potential. Although the floodplain of Ischua Creek provides gently sloping land, which may provide limited opportunities for agriculture and residential or commercial development, such development is likely discouraged by the real possibility of periodic flooding. Such flooding could potentially be aggravated by the fact that the Ischua Creek is the primary watercourse conveying runoff for a fairly steep drainage area. The old fields around the site are likely former agricultural lands, some of which may have supported crops, while others may have been in pasture. Currently, only a small portion of this land is currently cultivated, but the potential to expand on that use exists. Likewise, a small area of the floodplain is developed as residential lots, but potential exists for further development. No resource extraction operations (timber or mining) were observed during the site visit; however, opportunities may exist for harvest of hardwoods.

CHAPTER 8

CONCLUSIONS

The Farwell Landfill occurs in a rural, sparsely populated setting that supports a rich and diverse fish and wildlife habitat. The resource value of the natural setting is high, owing to the variety and number of species. The landfill does not appear to have caused any adverse impacts to the local setting. No stressed vegetation was observed that could be linked to the landfill, and fish and wildlife populations showed signs of generally good health. This was particularly evident in Ischua Creek, where brown trout were observed, along with stone fly, mayfly, and caddis fly larvae. The above species are good indicators of water quality.

The chemical quality of the creek water showed no evidence of landfill-related impacts. Upstream and downstream samples generally displayed similar water quality characteristics. Groundwater monitoring wells installed as part of this RI greatly increased the understanding of groundwater flow and the hydraulic relationship between the creek and groundwater. Groundwater and creek elevations support that the creek is a local groundwater discharge zone. Because groundwater contours converge towards the creek from both sides of it, it is clear that the creek is a hydrogeologic boundary which prevents groundwater from flowing from the landfill eastward across the creek. It is also evident that groundwater flows in a more south-southeasterly direction than originally thought.

Chemical evidence of groundwater impacts is most obvious in the wells along the immediate edge of the landfill, but further away, there is a noticeable decline in contaminant levels. This observation, along with a number of geochemical indications, support that natural attenuation is, in fact, occurring at the Farwell Landfill.

The following lines of evidence support that natural attenuation is occurring:

1. Contaminant daughter products, such as 1,2 DCE and VC, are present in wells at the immediate edge of the landfill. These compounds are produced as TCE is degraded under anaerobic (reducing) conditions. Chemical evidence indicates that an anaerobic (reducing) zone does in fact occur at the immediate downgradient edge of the landfill, creating conditions under which reductive dechlorination of TCE can occur.

2. There has been an overall decline in concentration of the chlorinated compounds over the past several years.

3. Geochemical indicators of natural attenuation reactions, such as dissolved oxygen, carbon dioxide, pH, and alkalinity, are present in ways that suggest biological and chemical attenuation reactions are occurring.

4. The concentrations of chlorinated organic compounds decline from upgradient to downgradient at a rate that exceeds the decline in the conservative tracer chloride. This indicates that the chlorinated compounds are being destroyed, in addition to being dispersed (diluted), along the groundwater flow path.

5. The absence of vinyl chloride in wells further away from the waste area (MW-15S/I, MW-16S/I, MW-17S/I, MW-19S) is evidence that it is degraded aerobically as oxygen levels in groundwater increase further away from the landfill.

The baseline qualitative risk assessment describes the potential risks to human health posed by environmental conditions at the Farwell landfill. Under current land use conditions all pathways of potential exposure, except via drinking water from the landfill well, are incomplete. Site operations personnel do not use the water for potable purposes, so there presently is no risk of exposure due to drinking. Under future land use scenarios, development of County owned property located in the area of impacted wells south of the landfill could occur. If this happened, and if drinking water supply wells were installed, then there would be a complete exposure pathway. However, it is thought that these risks could be managed given the County ownership of the land in the area of concern.

MW-19S was found to contain low concentrations of VOCs, so it is apparent that migration of landfill impacts is to the south/southeast, consistent with the groundwater flow direction. However, detected concentrations of VOCs in Well MW-19S are generally an order of magnitude lower than in wells along the immediate downgradient edge of the landfill.

Well MW-20D, installed in August 1999 and sampled in September 1999, was not found to contain detectable levels of VOCs, apart from trace amounts of laboratory contaminants (acetone, 2-butanone) which were detected in quality control blanks. It does not appear that bedrock has been affected downgradient (south/southeast) of the site based on data from MW-20D.

Chemical evidence, together with estimated groundwater flow velocities, indicates that the natural attenuation half-life is about 0.7 year. This half-life reflects a combined influence of both mechanical dispersion and chemical/biological degradation. The combined effect of attenuation processes reduces contaminant levels between the edge of the landfill and downgradient well MW-19S by more than 86 percent. It is estimated that average concentrations for individual compounds will be reduced to below 5 ppb, which is a common compliance standard, at around 1,500 feet from the downgradient edge of the landfill waste.

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TABLES

Table 1-1
Leachate Collection Record
Farwell Landfill Remedial Investigation
Cattaraugus County, New York

MONTH	1994	1995	1996	1997	1998
JAN	32000	37500	56000	45000	67500
FEB	30000	15000	28000	45000	37500
MAR	53000	60000	45000	67500	67500
APR	31500	30000	45000	37500	52500
MAY	15000	7000	45000	30000	30000
JUN	14500	14000	30000	30000	15000
JUL	22500	14000	15000	37500	22500
AUG	21000	15000	7500	15000	22500
SEP	14000	0	30000	7500	7500
OCT	14000	35000	37500	22500	7500
NOV	49000	70000	67500	52500	15000
DEC	49000	35000	75000	75000	22500
Average (gallons/month	28791.67	27708.33	40125	38750	30625
Total (gallons)	345500	332500	481500	465000	367500
Avg daily (gpd)	946.6	911.0	1319.2	1274.0	1006.8
Avg daily (gpm)	0.7	0.6	0.9	0.9	0.7

Table 3-1
Monitoring Well, Piezometer and Creek Water Level Elevations
Farwell Landfill Remedial Investigation
Cattaraugus County, New York

Location ID	Top of Riser Elevation (ft.)	Depth to Water (ft.)	Water Level Elevation (ft.)	Well Depth (ft.)	Screened Interval
MW-6	1623.68	130.06	1493.62	162.83	Bedrock
MW-8	1635.00	DRY	-	17	Till
MW-9S	1544.85	DRY	-	42.56	Upper Ablation Till
MW-9D	1545.11	55.05	1490.06	77.27	Grey Glaciofluvial
MW-10S	1530.49	37.88	1492.61	38.12	Upper Ablation Till
MW-10D	1528.42	38.79	1489.63	88.35	Grey Glaciofluvial
MW-11S	1535.19	42.86	1492.33	45.48	Upper Ablation Till
MW-11D	1535.57	48.18	1487.39	92.6	Grey Glaciofluvial
MW-13D	1586.65	99.06	1487.59	133.68	Grey Glaciofluvial/Bedrock
MW-14S	1539.42	51.70	1487.72	59.3	Upper Ablation Till
MW-14I	1539.79	52.17	1487.62	87.7	Grey Glaciofluvial
MW-15S	1508.83	21.77	1487.06	49.2	Grey Glaciofluvial
PZ-15	1508.16	20.99	1487.17	25.3	Upper Alluvial
MW-15I	1509.50	22.30	1487.20	83.8	Bedrock/Deep Ablation Till
MW-16S	1506.55	17.74	1488.81	44.5	Grey Glaciofluvial
MW-16I	1507.61	18.52	1489.09	90.3	Bedrock/Ablation Till
MW-17S	1509.24	18.13	1491.11	42.4	Grey Glaciofluvial
MW-17I	1510.45	19.90	1490.55	100.3	Grey Ablation Till
MW-18S	1502.53	14.16	1488.37	30	Grey Glaciofluvial
MW-18D	1502.51	14.23	1488.28	114	Bedrock
MW-19S	1543.31	56.64	1486.67	120	Grey Glaciofluvial
Bridge	1508.41	21.42	1486.99	N/A	

Table 3-2
Groundwater Seepage Velocity Estimates
Farwell Landfill Remedial Investigation
Cattaraugus County, New York

Well	Hydraulic Conductivity[1] (K)	Hydraulic Gradient[2] (I)	Effective Porosity[3] (n)	Seepage Velocity (cm/s)	Seepage Velocity (ft/d)	Unit
10	6.50E-05	0.0045	0.2	1.46E-06	4.15E-03	UPPER TILL
11	5.30E-05	0.0045	0.2	1.19E-06	3.38E-03	UPPER TILL
12	3.00E-04	0.0045	0.2	6.75E-06	1.91E-02	UPPER TILL
14S	8.50E-04	0.0045	0.2	1.91E-05	5.42E-02	UPPER TILL
14I	7.07E-02	0.0045	0.2	1.59E-03	4.51E+00	GLACIOFLUV
15S	2.03E-02	0.0045	0.2	4.57E-04	1.29E+00	GLACIOFLUV
15I	6.96E-02	0.0045	0.2	1.57E-03	4.44E+00	BR/OB
16S	2.09E-03	0.0045	0.2	4.70E-05	1.33E-01	GLACIOFLUV
16I	1.57E-03	0.0045	0.2	3.53E-05	1.00E-01	BR/OB
17S	1.07E-02	0.0045	0.2	2.41E-04	6.82E-01	GLACIOFLUV
17I	9.02E-02	0.0045	0.2	2.03E-03	5.75E+00	LOWER TILL
Geometric mean	3.12E-3 1.72E-04				3.0[illegible]E-1 **1.99E-01**	

Well	Hydraulic Conductivity[2] (K)	Hydraulic Gradient[2] (I)	Effective Porosity[3] (n)	Seepage Velocity (cm/s)	Seepage Velocity (ft/d)	Unit
10	6.50E-05	0.0045	0.3	9.75E-07	2.76E-03	UPPER TILL
11	5.30E-05	0.0045	0.3	7.95E-07	2.25E-03	UPPER TILL
12	3.00E-04	0.0045	0.3	4.50E-06	1.28E-02	UPPER TILL
14S	8.50E-04	0.0045	0.3	1.28E-05	3.61E-02	UPPER TILL
14I	7.07E-02	0.0045	0.3	1.06E-03	3.01E+00	GLACIOFLUV
15S	2.03E-02	0.0045	0.3	3.05E-04	8.63E-01	GLACIOFLUV
15I	6.96E-02	0.0045	0.3	1.04E-03	2.96E+00	BR/OB
16S	2.09E-03	0.0045	0.3	3.14E-05	8.89E-02	GLACIOFLUV
16I	1.57E-03	0.0045	0.3	2.36E-05	6.68E-02	BR/OB
17S	1.07E-02	0.0045	0.3	1.61E-04	4.55E-01	GLACIOFLUV
17I	9.02E-02	0.0045	0.3	1.35E-03	3.84E+00	LOWER TILL
Geometric mean	1.72E-04				**1.33E-01**	

Notes:

[1] Source: Malcolm Pirnie, 1986, 1990.

[2] Based on groundwater elevations recorded in September 1998.

[3] Estimate

Table 4-1
Volatile Organic Compounds in Surfacewater
Farwell Landfill Remedial Investigation
Cattaraugus County, New York

Analyte (ug/l)	SW Std.* ug/l	Upstream DW-1A		Adjacent FW-1A		Downstream KW-1A		Landfill pond LFP-1A		Railrd pond RRP-1A		Leachate L-1	
Chloromethane	NA		U		U		U		U		U		U
Bromomethane	5 G		U		U		U		U		U		U
Vinyl Chloride	0.3 G		U		U		U		U		U	17	
Chloroethane	5 G		U		U		U		U		U	3	J
Methylene Chloride	5 G		U		U		U		U		U	58	
Acetone	50 G		UJ		UJ		UJ		UJ		UJ	15	UJ
Carbon Disulfide	NA		U		U		U		U	4	J		U
1,1-Dichloroethene	0.07 G		U		U		U		U		U		U
1,1-Dichloroethane	5 G		U		U		U		U		U	28	
1,2-Dichloroethene (total)	5 G		U		U		U		U		U	160	
Chloroform	7		U		U		U		U		U		U
1,2-Dichloroethane	0.8		U		U		U		U		U	5	J
2-Butanone	50 G		U		U		U		U	26	J	12	
1,1,1-Trichloroethane	5 G		U		U		U		U		U		U
Carbon Tetrachloride	0.4 G		U		U		U		U		U		U
Bromodichloromethane	50 G		U		U		U		U		U		U
1,2-Dichloropropane	0.5 G		U		U		U		U		U	2	J
cis-1,3-Dichloropropene	5 G		U		U		U		U		U		U
Trichloroethene	3 G		U		U		U		U		U	18	
Dibromochloromethane	50 G		U		U		U		U		U		U
1,1,2-Trichloroethane	0.6		U		U		U		U		U		U
Benzene	1		U		U		U		U		U		U
Trans-1,3-Dichloropropene	NA		U		U		U		U		U		U
Bromoform	50 G		U		U		U		U		U		U
4-Methyl-2-pentanone	NA		U		U		UJ		UJ		UJ	4	J
2-Hexanone	50 G		UJ		UJ		U		U		U	49	
Tetrachloroethene	0.7 G		U		U		U		U		U	2	J
1,1,2,2-Tetrachloroethane	0.2 G		U		U		U		U		U		U
Toluene	5 G		U		U		U		U		U	4	J
Chlorobenzene	20		U		U		U		U		U	0.7	J
Ethylbenzene	5 G		U		U		U		U		U		U
Styrene	50		U		U		U		U		U		U
Total Xylenes	5 G		U		U		U		U		U	13	

L-1 = leachate
FW-1A = Farwell Rd.
KW-1A = Kent Road
DW-1A = Dutch Hill Road
LFP = Landfill Pond
RRP = Railroad Pond

U = undetected
J = estimated value
*Standards persuant to 6 NYCRR Part 702

Table 4-2
Dissolved (Filtered) Metals in Surface Water
Farwell Landfill Remedial Investigation
Cattaraugus County, New York
2 of 2

Dissolved	SW Std.* ug/l	SAMPLE LOCATION: Upstream DW-1A	Adjacent FW-1A	Downstream KW-1A	Landfill pond LFP-1A	Railrd pond RRP-1A	Leachate L-1
Aluminum	100	U	NA	U	U	U	U
Antimony	3 G	U	NA	U	U	$\boxed{5.5}$	6.9
Arsenic	50	U	NA	U	U	4.9	U
Barium	1000	69.2	NA	63	19.5	174	362
Beryllium	3 G	U	NA	U	U	U	U
Cadmium	10	U	NA	U	1	1.3	1.6 J
Calcium	NA	49300	NA	49200	18600	66500	95600
Chromium	50	U	NA	U	U	U	3.7
Cobalt	5	U	NA	U	8.1	U	10.7
Copper	200	U	NA	U	U	U	U
Iron	300	288	NA	27.3	123	248	385
Lead	50	U	NA	U	U	U	U
Magnesium	35000	8240	NA	8330	2610	27700	89600
Manganese	300	43.4	NA	14.9	31.9	$\boxed{1380}$	691
Mercury	2	U	NA	U	U	U	U
Nickel	NA	U	NA	U	U	U	24.2
Potassium	NA	1250	NA	1160 B	954	3170	257000
Selenium	10	U	NA	UJ	UJ	UJ	UJ
Silver	50	U	NA	U	U	U	U
Sodium	NA	14400	NA	14800	708	10600	174000
Thallium	4 G	U	NA	UJ	UJ	UJ	UJ
Vanadium	14	U	NA	U	U	U	U
Zinc	300	21.5	NA	19.1 J	36.6 J	17.6 J	38.8

NA - Filtered sample not collected

L-1 = leachate KW-1A = Kent Road LFP = Landfill Pond U = undetected

FW-1A = Farwell Rd. DW-1A = Dutch Hill Road RRP = Railroad Pond J = estimated value

*Standards persuant to 6 NYCRR Part 702

Table 4-2
Total (Unfiltered) Metals In Surface Water
Farwell Landfill Remedial Investigation
Cattaraugus County, New York
1 of 2

	SW Std.*	SAMPLE LOCATION					
		Upstream DW-1A	Adjacent FW-1A	Downstream KW-1A	Landfill pond LFP-1A	Railrd pond RRP-1A	Leachate L-1
Total (ug/l))	ug/l						
Aluminum	100	**139**	**340**	**126**	27.6	**20400**	34.1
Antimony	3 G	U	U	U	U	**9.8** B	U
Arsenic	50	U	U	U	3.4	23.4	7
Barium	1000	68.8	73.2	64.8	19.6	550	455
Beryllium	3 G	U	U	U	U	3 B	U
Cadmium	10	U	U	U	U	2 B	1.7
Calcium	NA	50600	49700	48800	18200	108000	94700
Chromium	50	U	U	U	U	30.8	4.9
Cobalt	5	U	U	U	U	**18.4** B	4.6
Copper	200	U	U	2.6	U	52.5	2.2
Iron	300	**346**	**660**	221	278	**40200**	10500
Lead	50	UJ	U	UN	UN	48.2 N	UN
Magnesium	35000	8370	8270	8260	2560	33400	88600
Manganese	300	44.8	53.6	22.5	65.6	**4160**	693
Mercury	2	U	U	U	U	U	U
Nickel	NA	U	U	U	U	39.3 B	23.2
Potassium	NA	1310	1330	1140	973	5500	251000
Selenium	10	U	U	U	U	3.5 B	U
Silver	50	U	U	U	U	U	U
Sodium	NA	16600	16100	14600	698	10900	233000
Thallium	4 G	U	U	UJ	UJ	U	UJ
Vanadium	14	U	U	U	U	**29** B	U
Zinc	300	13.4	14	102 J	23.4 J	**306**	35.3 J

L-1 = leachate KW-1A = Kent Road LFP = Landfill Pond U = undetected
FW-1A = Farwell Rd. DW-1A = Dutch Hill Road RRP = Railroad Pond J = estimated value
*Standards persuant to 6 NYCRR Part 702

Table 4-3
Water Quality Parameters in Surface Water
Farwell Landfill Remedial Investigation
Cattaraugus County, New York

ANALYTE	SW Std. mg/l	Leachate L-1	Upstream DW-1A	Adjacent FW-1A	Downstream KW-1A	Landfill Pond LFP-1A	Railrd. Pond RRP-1A
		SAMPLE LOCATION					
Alkalinity	None	1850	134	140	136	45	270
NH3	2	148	U	0.159	U	0.213	0.607
BOD	None	121	U	U	2.48	U	12.8
Bromide	2 G	5.47	U	U	U	U	U
Cl	250	1370	30.5	30.2	28.5	U	10.9
COD	None	586	U	16.1	U	20	59.6
Hardness	None	608	161	158	156	56.1	407
Nitrate	10	U	0.64	0.495	0.378	U	U
Phenols	0.001	0.057	0.011	0.009	U	0.008	0.06
Sulfate	250	53	10.9	11.3	11.9	U	37
Sulfide	.05G	U	U	U	U	U	U
TDS	None	3870	179	185	128	94	287
TKN	None	216	2.22	1.32	0.807	2.29	12.9
TOC	None	87.7	2.09	2.18	2.23	9.43	7.6
Carbon Dioxide		192.19	1.92	3.19	2.77	3.62	20.86
Oxygen		0.68	10.03	10.42	9.79	9.45	3.39
Methane		1.07	<0.07	< 0.07	< 0.07	< 0.07	< 0.07

L-1 = leachate
U = undetected
FW-1A = Farwell Rd.
KW-1A = Kent Road
DW-1A = Dutch Hill Road
LFP = Landfill Pond
RRP = Railroad Pond

Table 4-4
Volatile Organic Compounds in Groundwater
Farwell Landfill Remedial Investigation
Cattaraugus County, New York
1 of 2

Analyte (ug/l)	GW Std. ug/l	MW-6		MW-9D		MW-10S		MW-10D		MW-11S		MW-11D		MW-13D		MW-14S		MW-14I	
Chloromethane	5		U				U		U		U		U		U		U		U
Bromomethane	5		U				U		U		U		U		U		U		U
Vinyl Chloride	2		U	4	J		U	4	J		U	9	J	7	J	7	J	5	J
Chloroethane	5		U	12			U	8	J		U	93		7	J	120		98	
Methylene Chloride	5		U				U		U		U		U		U		U		U
Acetone	50 G		UJ				UJ		UJ		UJ		UJ		UJ		UJ		UJ
Carbon Disulfide	50		U				U		U		U		U		U		U		U
1,1-Dichloroethene	5		U	2	J		U		U		U	2	J		U		U		U
1,1-Dichloroethane	5	1	J	160		20		50		6	J	150		27		81		55	
1,2-Dichloroethene (total)	5		U	11			U	3	J		U	28		23		8	J	7	J
Chloroform	7		U				U		U		U		U		U		U		U
1,2-Dichloroethane	5		U				U		U		U		U		U		U		U
2-Butanone	5		U				U		U		U		U		U		U		U
1,1,1-Trichloroethane	5		U	13			U		U		U	27		7	J	5	J	4	J
Carbon Tetrachloride	5		U				U		U		U		U		U		U		U
Bromodichloromethane	50 G		U				U		U		U		U		U		U		U
1,2-Dichloropropane	5		U				U		U		U		U		U		U		U
cis-1,3-Dichloropropene	5		U				U		U		U		U		U		U		U
Trichloroethene	5		U	4	J		U		U		U	45		4	J	4	J	3	J
Dibromochloromethane	50 G		U				U		U		U		U		U		U		U
1,1,2-Trichloroethane	5		U				U		U		U		U		U		U		U
Benzene	1		U				U		U		U		U	1	J	2	J	1	J
Trans-1,3-Dichloropropene	5		U				U		U		U		U		U		U		U
Bromoform	50 G		U				U		U		U		U		U		U		U
4-Methyl-2-pentanone	50		UJ				UJ		UJ		UJ		UJ		UJ		UJ		UJ
2-Hexanone	50 G		U				U		U		U		U		U		U		U
Tetrachloroethene	5		U				U		U		U		U		U		U		U
1,1,2,2-Tetrachloroethane	5		U				U		U		U		U		U		U		U
Toluene	5		U				U		U		U		U		U		U		U
Chlorobenzene	5		U				U		U		U		U		U		U		U
Ethylbenzene	5		U				U		U		U		U		U		U		U
Styrene	5		U				U		U		U		U		U		U		U
Total Xylenes	5		U	206		20	U	65	U	6	U	354	U	76	U	227	U	173	U

G: NYSDECGuidance Value
U = below detection limit
J = estimated value

*Standards persuant to 6 NYCRR Part 702

Table 4-4
Volatile Organic Compounds in Groundwater
Farwell Landfill Remedial Investigation
Cattaraugus County, New York

	GW Std.*	SAMPLE LOCATION										
Analyte (ug/l)	ug/l	MW-15S	MW-15I	MW-16S	MW-16I	MW-17S	MW-17I	MW-18S	MW-18D	MW-19	MW-20D*	SH-1
Chloromethane	5	U	U	U	U	U	U	U	U	U	U	U
Bromomethane	5	U	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	2	U	U	U	U	U	U	U	U	U	U	U
Chloroethane	5	U	1 J	5 J	0.6 J	U	U	U	U	$\boxed{9}$ J	U	U
Methylene Chloride	5	U	U	U	U	U	U	0.7 J	U	U	U	U
Acetone	50 G	UJ	U	U	UJ	UJ	UJ	UJ	UJ	UJ	B U	U
Carbon Disulfide	50 *	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	5	U	U	U	U	U	U	U	U	0.7 J	U	U
1,1-Dichloroethane	5	1 J	4 J	$\boxed{48}$	$\boxed{6}$ J	3 J	U	U	U	$\boxed{20}$	U	U
1,2-Dichloroethene (total)	5	U	0.5 J	$\boxed{9}$ J	U	U	U	U	U	3 J	U	U
Chloroform	7	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	5	U	U	U	U	U	U	U	U	U	U	U
2-Butanone	5	U	U	U	U	U	U	U	U	U	B U	U
1,1,1-Trichloroethane	5	U	U	$\boxed{15}$	U	U	U	U	U	$\boxed{12}$	U	U
Carbon Tetrachloride	5	U	U	U	U	U	U	U	U	U	U	U
Bromodichloromethane	50 G	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloropropane	5	U	U	U	U	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	5	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	5	U	U	5 J	U	U	U	U	U	0.7 J	U	U
Dibromochloromethane	50 G	U	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	5	U	U	U	U	U	U	U	U	U	U	U
Benzene	1	U	U	U	U	U	U	U	U	U	U	U
Trans-1,3-Dichloropropene	5	U	U	U	U	U	U	U	U	U	U	U
Bromoform	50 G	U	U	U	U	U	U	U	U	U	U	U
4-Methyl-2-pentanone	50 *	U	U	UJ	U	UJ	UJ	U	U	U	U	UJ
2-Hexanone	50 G	UJ	U	U	UJ	U	U	UJ	UJ	UJ	U	U
Tetrachloroethene	5	U	U	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	5	U	U	U	U	U	U	U	U	U	U	U
Toluene	5	U	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	5	U	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	5	U	U	U	U	U	U	U	U	U	U	U
Styrene	5	U	U	U	U	U	U	U	U	U	U	U
Total Xylenes	5	U	6 U	82 U	7 U	3 U	U	1 U	U	46 U	U	U

G: NYSDECGuidance Value.
U = below detection limit
J = estimated value

B = Compound detected in method and trip blanks.
*MW-20D sampled in Septemer 1999, along with MW-19. (In September 1999 only 0.3 ppb of 1,1-dichloroethane was detected in MW-19.)

*Standards persuant to 6 NYCRR Part 702

Table 4-5
Total (Unfiltered) Metals in Groundwater
Farwell Landfill Remedial Investigation
Cattaraugus County, New York

	GW Std.*	SAMPLE LOCATION								
Total	ug/l	MW-6	MW-9D	MW-10S	MW-10D	MW-11S	MW-11D	MW-13D	MW-14S	MW-14I
Aluminum	**NA**	**595**	**32900**	**4230**	**31.8**	**14000**	**18.2**	**67.7**	**3330**	**2100**
Antimony	3 G	U	U	U	U	U	U	U	U	U
Arsenic	25	U	11.6	24.7	10.4	17.5	U	U	5.2	U
Barium	1000	642	264	735	413	680	139	53.4	308	171
Beryllium	3 G	U	2.6	U	U	2.2	U	U	U	U
Cadmium	10	1.1	U	1.3	1	3.2	U	1.4	3.2	3.1
Calcium	NA	71900	177000	167000	170000	190000	151000	110000	175000	168000
Chromium	50	1.4	48.3	10.6	U	18.5	U	U	8.7	3.3
Cobalt	NA	U	34.2	4.9	U	9	U	U	2.2	1.3
Copper	200	2.1	80.3	17.8	U	55.9	U	U	12.2	22.9
Iron	300	1830	87500	17000	5230	27600	7.5	36	6890	4720
Lead	25	UN	55 J	10.6 J	UJ	33.1 J	2 UN	2 UN	6.4 J	7.4 J
Magnesium	35,000 G	22500	59700	14600	22400	51700	52000	39300	53100	51600
Manganese	300	515	3080	1520	2940	541	54.5	11.2	1440	934
Mercury	2	U	U	U	U	U	U	U	U	U
Nickel	NA	U	79.4	13.7	U	25.6	U	U	12.3	9.1
Potassium	NA	2420	10600	3800	2920	5200	1300	1160	2580	2370
Selenium	10	3 U	8.4	5.1	U	U	U	U	U	U
Silver	50	U	U	U	U	U	U	U	U	U
Sodium	20000	21700	21100	3900	6650	20000	22600	U	39400	33500
Thallium	4 G	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
Vanadium	NA	U	42.8	5.4	U	20.6	U	U	3.7	2.5
Zinc	300	36.7 J	307	118	23.7	164 J	28 J	24.3 J	95.6 J	76.2 J

U = undetected
J = estimated value
*Standards persuant to 6 NYCRR Part 702

Table 4-5
Total (Unfiltered) Metals in Groundwater
Farwell Landfill Remedial Investigation
Cattaraugus County, New York
2 of 2

Total	GW Std. ug/l	SAMPLE LOCATION MW-15S	MW-15I	MW-16S	MW-16I	MW-17S	MW-17I	MW-18S	MW-18D	MW-19	MW-20D**	SH-1
Aluminum	NA	878	47.2	400	56.9	103	9.8	7830	31800	4520	3570	72.1
Antimony	3 G	U	U	U	5.5	6.2	6.7	U	U	U	U	U
Arsenic	25	U	U	U	8.4	U	5.4	59.8	31.3	U	U	U
Barium	1000	496	444	115	1110	80.1	475	537	8490	159	3970	283
Beryllium	3 G	U	U	U	U	U	U	U	2.9	U	U	U
Cadmium	10	1.3	1.3	1.1	1.5	12.8	1.5 J	1.5	U	U	6.1	U
Calcium	NA	53500	68800	98400	34200	68800	34200	47000	77900	63100	52300	43400
Chromium	50	3.2	U	U	U	6.4	U	19.1	41.4	11.4	11	U
Cobalt	NA	U	U	U	U	U	U	6.4	28.9	3.1	U	U
Copper	200	5.4	U	U	U	8.3	U	40.2	45.2	12.5	U	5.6
Iron	300	2400	260	711	512	408	223	18600	68700	10800	10500	7350
Lead	25	3 J	U	UJ	U	4.3 J	UN	26.7 J	11.1 J	8.1 J	25.9	3.2 J
Magnesium	35,000 G	10800	16700	27200	7030	23300	7230	7930	25400	12900	9710	5600
Manganese	300	274	92.3	31.4	180	27	129	849	674	352	270	412
Mercury	2	0.1	U	U	U	U	U	U	0.13	0.18	U	U
Nickel	NA	U	U	U	U	7	U	17.5	62.1	11.5	U	U
Potassium	NA	1090	844	1050	728	10800	829	4060	19200	1700	U	2700
Selenium	10	U	U	U	U	U	U	U	6	U	U	U
Silver	50	U	U	U	U	U	U	U	U	U	U	U
Sodium	20000	16400	13800	11100	9770	11100	15100	54600	209000	7390	U	29400
Thallium	4 G	U	U	U	U	UJ	UJ	U	U	U	U	U
Vanadium	NA	1.3	U	U	U	U	U	12.7	36.4	6.4	U	U
Zinc	300	42.8	17	73.6	17.3	61.6 J	9.7 J	258	240	108	32.3	125

U = undetected
J = estimated value

*Standards persuant to 6 NYCRR Part 702
**MW-20D sampled in September 1999. Followup sampling for MW-19 in September 1999 showed iron (5,370 ppb) and lead (34,9 ppb) above water quality standards.

Table 4-6
Dissolved (Filtered) Metals in Groundwater
Farwell Landfill Remedial Investigation
Cattaraugus County, New York

		SAMPLE LOCATION								
Dissolved	ug/l	MW-6	MW-9D	MW-10S	MW-10D	MW-11S	MW-11D	MW-13D	MW-14S	MW-14I
Aluminum	NA	44.2 U	13.4	10.5	13.6	21 U	14.7 U	18.5 U	17 U	12 U
Antimony	3 G	U	U	5	5.6	U	U	U	U	U
Arsenic	25	3 U	U	19.7	6.7	3 U	3 U	3 U	3 U	3 U
Barium	1000	595	187	725	415	319	142	54.9	285	152
Beryllium	3 G	U	U	U	U	U	U	U	U	U
Cadmium	10	1.9	U	U	U	1.4	1.5	1.3	2	1.5
Calcium	NA	73800	129000	159000	170000	160000	154000	109000	187000	163000
Chromium	50	U	U	2.5	U	U	U	U	U	U
Cobalt	NA	1.2	5.9	9.4	U	5.3	U	7.5	5.1	5.6
Copper	200	U	U	U	U	7.8	U	U	U	U
Iron	300	427	3320	6550	4290	U	U	U	U	25.9
Lead	25	U	U	U	U	U	U	U	U	U
Magnesium	35,000 G	23300	38700	11400	22800	44200	52900	39200	55900	49900
Manganese	300	551	728	1410	2960	29.6	56.1	33.2	1370	882
Mercury	2	U	U	U	U	0.11 J	U	U	U	U
Nickel	NA	U	U	5.6	U	6.3	U	U	7.2	5.5
Potassium	NA	5720	7900	3430	2970	4190	1300	1480	2220	1740
Selenium	10	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
Silver	50	U	U	U	U	U	U	U	U	U
Sodium	20000	21300	16100	2040	5390	20700	23700	8700	42000	34400
Thallium	4 G	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Vanadium	NA	U	U	U	U	U	U	U	U	U
Zinc	300	23.8 J	43.6 J	42.1 J	23.1 J	26 J	15.5 J	20.6 J	24.3 J	72.5 J

U = undetected
J = estimated value
*Standards persuant to 6 NYCRR Part 702

Table 4-6
Dissolved (Filtered) Metals in Groundwater
Farwell Landfill Remedial Investigation
Cattaraugus County, New York

		SAMPLE LOCATION									
Dissolved	**ug/l**	**MW-15S**	**MW-15I**	**MW-16S**	**MW-16I**	**MW-17S**	**MW-17I**	**MW-18S**	**MW-18D**	**MW-19**	**SH-1**
Aluminum	NA	15.4	20	15.1	14.8	16.3 U	11.7 U	18.9 J	55.8	30	19.1
Antimony	3 G	U	U	U	**5.1**	U	U	U	U	U	U
Arsenic	25	U	U	U	8.5	U	U	**51.3**	U	U	U
Barium	1000	471	471	114	**1130**	125	446	427	**6660**	105	284
Beryllium	3 G	U	U	U	U	U	U	U	U	U	U
Cadmium	10	U	U	1.3	1	2.8	U	U	U	1.2	U
Calcium	NA	52200	68000	99800	32800	60600	32100	27900	66000	49600	43100
Chromium	50	U	U	U	U	1.2	U	UJ	U	U	U
Cobalt	NA	U	U	4.3	U	5.5	5.2	U	U	U	U
Copper	200	U	U	U	U	U	U	U	U	U	U
Iron	300	**519**	246	28.9	**377**	U	211	150 J	259	27.2	**320**
Lead	25	U	U	U	U	U	U	U	U	U	U
Magnesium	35,000 G	10500	16400	27700	6730	17900	6720	3400	14400	9690	5650
Manganese	300	165	97.4	31	163	29.3	138	**329**	202	55.8	**335**
Mercury	2	U	U	U	U	U	U	U	U	U	U
Nickel	NA	U	U	U	U	7.3	5	U	5.8	U	U
Potassium	NA	758	881	934	638	1700	725	1610	16000	865	2740
Selenium	10	U	U	U	3 U	UJ	UJ	U	U	U	U
Silver	50	U	U	U	1 U	U	U	U	U	U	U
Sodium	20000	12300	14300	8050	7670	6370	13300	4060	**215000**	6830	**26900**
Thallium	4 G	UJ	U	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Vanadium	NA	U	U	U	U	U	U	U	U	U	U
Zinc	300	125	47.7	31.6 J	74.1	35.9 J	17.4 J	30 J	43.4 J	52.7 J	45.2 J

U = undetected

*Standards persuant to 6 NYCRR Part 702

Table 4-7
Water Quality Parameters in Groundwater
Farwell Landfill Remedial Investigation
Cattaraugus County, New York

	GW Std.	SAMPLE LOCATION								
ANALYTE	mg/l	MW-6	MW-9D	MW-10S	MW-10D	MW-11S	MW-11D	MW-13D	MW-14S	MW-14I
Alkalinity	NA	305	530	457	535	578	480	438	641	608
NH3	2	0 195	0.05	1.02	0.96	0.286	0.04	U	U	U
BOD	NA	4 11	U	U	U	5.49	3.99	2.02	6.51	3.81
Bromide	2	U	U	U	U	U	2	U	U	U
Cl	250	4.75	6 67	3.51	6.31	10 4	58.2	U	99.8	62.7
COD	NA	U	17.5	22 6	12.4	U	10	U	20	U
Hardness	NA	272	688	477	517	690	592	436	657	632
Nitrate	10	U	U	U	0.1 U	1.16	0.1	U	U	U
Phenols	0.001	0 005 U	0.005 U	0.077	0.005 U	U	0.005	U	0.01	0 09
Sulfate	250	U	25.8	U	10 U	32.9	16.1	17.8	35.5	13.9
Sulfide	.05G	U	U	U	U	U	1	U	U	U
TDS	NA	316	477	426	486	460	598	411	843	686
TKN	NA	2.41	1.5	1.97	1.76	4.46	1 92	1 43	1.91	1 76
TOC	NA	1.84	1.98	4 25	3.69	2 77	5 51	1 08	5.81	5.48
Carbon Dioxide		29.8	80.45	137 91	176.44	68.11	91.52	54.06	130.89	118.12
Oxygen		4.17	6 44	7 22	6.44	9.59	8 43	3 49	3.58	6 39
Methane		2 34	0 95	< 0.07	1.05	< 0.07	2.09	0 08	1.58	1 75

	GW Std.	SAMPLE LOCATION										
ANALYTE	mg/l	MW-15S	MW-15I	MW-16S	MW-16I	MW-17S	MW-17I	MW-18S	MW-18D	MW-19	MW-20D**	SH-1
Alkalinity	NA	184	212	354	124	225	1220	112	680	164	286	134
NH3	2	0 048	0.047	U	U	0.046	0.09	0.06	0.92	0.111	0.218	U
BOD	NA	U	U	U	U	U	U	U	3.78	U	6.72	U
Bromide	2	U	U	U	U	U	U	U	5.8	U	U	U
Cl	250	8 41	44.1	5 79	3 61	4 88	9.39	11.6	682	14.7	93.4	5.03
COD	NA	U	U	U	U	14 9	U	U	38	10 U	U	17.5
Hardness	NA	178	241	358	114	268	115	150	299	211	171	131
Nitrate	10	U	U	U	U	0.235	U	U	U	U	U	U
Phenols	0.001	0 014	0.04	0.018	0.017	U	U	0.009	0.016	0.008	U	U
Sulfate	250	U	U	16 6	U	12.7	U	U	U	19.6	U	U
Sulfide	.05G	U	U	U	U	U	U	U	U	U	U	U
TDS	NA	178	274	385	113	148	130	127	1640	169	415	197
TKN	NA	1 58	1 87	0 563	U	1 17	0.692	0.984	2.72	2.04	0.68	0.62
TOC	NA	2 02	1.06	2 38	1.94	2 01	2.22	1.28	3.49	2.09	7.58	3.7
Carbon Dioxide		3.62	5 75	23.84	4 68	0.43	5 32	2.13	68 96	1.49	17.86	6.38
Oxygen		8 19	6 49	7.99	9 01	8 67	4.89	8.04	7.36	8.62	0.92	7.56
Methane		< 0 07	0 56	< 0 07	< 0.07	0 08	< 0.07	0.66	16.27	< 0.07	35.92	0.34

U - undetected

**MW-20D sampled in September 1999 follow-up event.

*Standards persuant to 6 NYCRR Part 702

Table 4-8

Volatile Organic Compounds In Sediment

Farwell Landfill Remedial Investigation

Cattaraugus County, New York

	LOCATION				
	Upstream	Adjacent	Downstream	Landfill pond	Railrd pond
Analyte (ug/kg)	DW-1	FW-1	KW-1	LFP-1	RRP-1
Chloromethane	U	U	U	UJ	U
Bromomethane	0.5 J	U	U	U	U
Vinyl Chloride	U	U	U	U	U
Chloroethane	U	U	U	UJ	U
Methylene Chloride	U	U	U	U	U
Acetone	3 JB	4 JB	UJ	UJ	U
Carbon Disulfide	U	U	U	1 J	4 J
1,1-Dichloroethene	U	U	U	U	U
1,1-Dichloroethane	U	U	U	U	U
1,2-Dichloroethene (total)	U	U	U	U	U
Chloroform	U	U	U	U	U
1,2-Dichloroethane	U	U	U	U	U
2-Butanone	U	U	15 J	12 J	26 J
1,1,1-Trochloroethane	U	U	U	U	U
Carbon Tetrachloride	U	U	U	U	U
Bromodichloromethane	U	U	U	U	U
1,2-Dichloropropane	U	U	U	U	U
cis-1,3-Dichloropropene	U	U	U	U	U
Trichloroethene	U	U	U	U	U
Dibromochloromethane	U	U	U	U	U
1,1,2-Trichloroethane	U	U	U	U	U
Benzene	U	U	U	U	U
Trans-1,3-Dichloropropene	U	U	U	U	U
Bromoform	U	U	U	U	U
4-Methyl-2-pentanone	U	U	U	U	U
2-Hexanone	U	U	U	U	U
Tetrachloroethene	U	U	U	U	U
1,1,2,2-Tetrachloroethane	U	U	U	U	U
Toluene	U	U	2 J	U	U
Chlorobenzene	U	U	U	U	U
Ethylbenzene	U	U	U	U	U
Styrene	U	U	U	U	U
Total Xylenes	U	U	U	U	U

L-1 = leachate

FW-1A = Farwell Rd.

KW-1A = Kent Road

DW-1A = Dutch Hill Road

LFP = Landfill Pond

RRP = Railroad Pond

U = undetected

J = estimated value

B = Contaminant detected in method blank

Table 4-9
Metals in Sediments
Farwell Landfill Remedial Investigation
Cattaraugus County, New York

ug/kg	SAMPLE LOCATION Upstream KW-1		Landfill pond LFP-1		Railrd Pond RRP-1	
Aluminum	9100		14800	J	22100	J
Antimony	1.5	UJ	2.2	UJ	3.1	UJ
Arsenic	5.8		11.5	J	17.9	J
Barium	100		134	J	285	J
Beryllium	1.6		2.7	J	3.5	J
Cadmium	0.3	UN	0.44	UJ	0.62	UJ
Calcium	5680		6350	J	20800	J
Chromium	11		25.5	J	35.7	J
Cobalt	7.4		13	J	17.2	J
Copper	10.7		23.4	J	44.8	J
Iron	18900		33000	J	39500	J
Lead	13.3	J	15.6	J	42.1	J
Magnesium	2500		4890	J	5970	J
Manganese	490		535	J	935	J
Mercury	0.084	UN	0.12	J	0.18	J
Nickel	15.4		31	J	36.4	J
Potassium	854		2090	J	2800	J
Selenium	1.5		1	J	3.6	J
Silver	0.3	UJ	0.44	UJ	0.62	UJ
Sodium	108		230	J	265	J
Thallium	1.8	UJ	2.6	UJ	3.7	UJ
Vanadium	12.2		20.1	J	33.9	J
Zinc	71.4	J	106	J	226	J

L-1 = leachate KW-1A = Kent Road LFP = Landfill Pond
FW-1A = Farwell RDW-1A = Dutch Hill RRP = Railroad Pond
U = undetected
J = estimated value

Table 4-10
Water Quality Parameters in Sediments
Farwell Landfill Remedial Investigation
Cattaraugus County, New York

	Sediments				
ANALYTE	DW-1	FW-1	KW-1	LFP-1	RRP-1
NH3	NA	NA	14.8	5.9	21.6
Cl	NA	NA	U	U	116
NO3	NA	NA	U	U	U
PHENOLS	NA	NA	2.22	1.24	2.29
SO4	NA	NA	180	U	3680
sulfide	NA	NA	U	U	2310
TKN	NA	NA	1180	2920	5460
TOC	NA	NA	11400	66200	138000

NA - Sample bottles damaged during laboratory shipment

Table 5-1
Chemical Degradation Trends
Farwell Landfill Remedial Investigation
Cattaraugus County, New York

Well	Parameter	Trend	Well	Parameter	Trend
9D	TCE	down	14I	TCE	nc
	DCE	down		DCE	up
	VC	nc		VC	up
	TCA	down		TCA	down
	DCA	down		DCA	nc
10D	TCE	nd	15I	TCE	down
	DCE	nd		DCE	down
	VC	up		VC	nd
	TCA	down		TCA	nc
	DCA	down		DCA	down
11D	TCE	down	16S	TCE	down
	DCE	nc		DCE	down
	VC	nc/nd		VC	nd
	TCA	down		TCA	down
	DCA	down		DCA	down

Summary
downward trends 17
upward trends 3
other 11

nc indicates no clear trend
nd indicates compound was frequently not detected, with no clear trend

Table 5-2
Historical Summary for 1,1 Dichloroethane
Farwell Landfill Remedial Investigation
Cattaraugus County, New York

Well	Date	1,1 DCA (ppb)	Well	Date	1,1 DCA (ppb)	Well	Date	1,1 DCA (ppb)	Well	Date	1,1 DCA (ppb)	Well	Date	1,1 DCA (ppb)
10D	4/6/89	1000	15I	9/91	130	14S	10/7/92	64	Leachate	n/a	32	16I	9/91	5.2
11D	4/6/89	960	15I	10/26/94	130	10D	12/7/89	59	14S	4/26/94	29	11S	3/6/90	5
9D	4/6/89	550	16S	10/19/93	130	14I	3/19/91	59	14I	4/27/93	29	11S	3/19/91	5
11D	9/10/90	450	16S	4/26/94	130	14I	10/96	56 05	15S	3/19/91	28	13D	12/7/89	5
9D	3/6/90	440	15I	4/1/95	127.55	14I	4/96	55 25	16I	10/96	27.28	17S	4/27/93	5
9D	9/10/90	440	10S	9/10/90	120	14S	10/19/93	54	10S	4/96	25.48	17I	9/91	4.7
11D	3/6/90	310	14S	3/19/91	120	16S	2/97	54	10S	9/30/88	25	17S	9/91	4.4
9D	3/19/91	270	15I	4/26/94	120	16S	10/96	53.38	13D	10/7/92	25	16I	3/19/91	4
11D	12/7/89	250	14I	9/91	110	14I	10/7/92	52	13D	10/26/94	21	17S	5/1/92	3.9
9D	5/1/92	230	16S	4/27/93	110	11S	4/96	50.98	13D	10/96	19.71	16I	5/1/92	3.6
10D	9/91	230	15I	4/96	104.3	10D	3/6/90	49	15I	5/1/92	19	17S	10/7/92	3.4
16S	3/19/91	210	14S	5/1/92	100	14I	5/1/92	49	14I	4/26/94	17	15S	5/1/92	3
9D	9/91	200	14S	9/91	98	14I	4/1/95	48 69	16I	2/97	15	16I	10/7/92	3
11D	3/19/91	200	16S	10/26/94	93	14S	10/96	48 54	13D	4/27/93	14	17S	2/97	3
11D	9/91	200	16S	4/1/95	87.19	13D	10/19/93	46	14I	10/19/93	14	17S	9/1/98	3
15I	10/7/92	190	9D	9/30/88	85	14I	10/26/94	46	13D	9/10/90	13	17S	10/96	1.37
16S	5/1/92	190	16S	4/96	81.69	10S	12/7/89	44	13D	3/19/91	13	15S	10/95	1.19
15I	4/27/93	180	10S	4/6/89	75	13D	2/97	43	13D	5/1/92	10	15S	9/91	1
16S	9/91	180	15I	10/19/93	75	14S	2/97	43	15I	3/19/91	10			
11D	9/30/88	170	10D	3/19/91	72	13D	4/96	42.58	17S	3/19/91	10			
10S	5/1/92	150	9D	4/96	69.27	14S	4/27/93	40	13D	9/91	8.8			
11D	10/26/94	150	14S	10/26/94	69	15I	10/96	36.76	15S	4/27/93	8			
9D	10/26/94	140	Leachate	n/a	69	10S	3/6/90	36	16I	10/26/94	7.5			
10D	5/1/92	140	10S	3/19/91	68	14I	2/97	36	13D	3/6/90	7			
11D	5/1/92	140	14S	4/1/95	65.69	13D	4/1/95	34 24	16I	10/19/93	6			
16S	10/7/92	140	14S	4/96	65.48	13D	4/26/94	34	17S	7/22/97	6			
10D	9/30/88	130	10D	10/26/94	65	10S	9/91	32	11S	5/1/92	5.9			

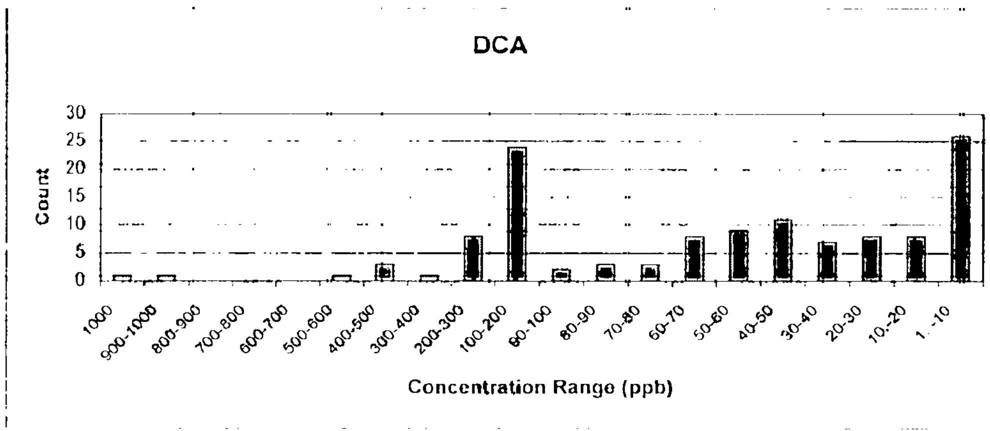


Table 6-1
Review of Analytical Data - Groundwater VOCs
Farwell Landfill Remedial Investigation
Cattaraugus County, New York

Compound	Background Groundwater		own/Crossgradient Groundwate	
	Frequency of Occurrence	Concentration Range (µg/L)	Frequency of Occurrence	Concentration Range (µg/L)
Chloromethane	0 of 1	N/A	0 of 15	N/A
Bromomethane	0 of 1	N/A	0 of 15	N/A
Vinyl Chloride	0 of 1	N/A	6 of 15	4 - 9
Chloroethane	0 of 1	N/A	10 of 15	0.9 -120
Methylene Chloride	0 of 1	N/A	0 of 15	N/A
Acetone	0 of 1	N/A	0 of 15	N/A
Carbon Disulfide	0 of 1	N/A	0 of 15	N/A
1,1-Dichloroethene	1 of 1	N/A	3 of 15	0.7 - 2
1,1-Dichloroethane	0 of 1	1	14 of 15	1 - 160
1,2-Dichloroethene (total)	0 of 1	N/A	9 of 15	0.5 - 28
Chloroform	0 of 1	N/A	0 of 15	N/A
1,2-Dichloroethane	0 of 1	N/A	0 of 15	N/A
2-Butanone	0 of 1	N/A	0 of 15	N/A
1,1,1-Trichloroethane	0 of 1	N/A	7 of 15	4 - 27.
Carbon Tetrachloride	0 of 1	N/A	0 of 15	N/A
Bromodichloromethane	0 of 1	N/A	0 of 15	N/A
1,2-Dichloropropane	0 of 1	N/A	0 of 15	N/A
cis-1,3-Dichloropropene	0 of 1	N/A	0 of 15	N/A
Trichloroethene	0 of 1	N/A	7 of 15	0.7 - 45
Dibromochloromethane	0 of 1	N/A	0 of 15	N/A
1,1,2-Trichloroethane	0 of 1	N/A	0 of 15	N/A
Benzene	0 of 1	N/A	3 of 15	1 - 2.
Trans-1,3-Dichloropropene	0 of 1	N/A	0 of 15	N/A
Bromoform	0 of 1	N/A	0 of 15	N/A
4-Methyl-2-pentanone	0 of 1	N/A	0 of 15	N/A
2-Hexanone	0 of 1	N/A	0 of 15	N/A
Tetrachloroethene	0 of 1	N/A	0 of 15	N/A
1,1,2,2-Tetrachloroethane	0 of 1	N/A	0 of 15	N/A
Toluene	0 of 1	N/A	0 of 15	N/A
Chlorobenzene	0 of 1	N/A	0 of 15	N/A
Ethylbenzene	0 of 1	N/A	0 of 15	N/A
Styrene	0 of 1	N/A	0 of 15	N/A
Total Xylenes	0 of 1	N/A	0 of 15	N/A

Table 6-2
Comparison of Background and Downgradient Groundwater Quality - VOCs
Farwell Landfill Remedial Investigation
Cattaraugus County, New York

Analyte (ug/l)	GW Std. ug/l	Background Concentrations Max (ug/l)	Background Concentrations Mean (ug/l)	Down/Cross Gradient Max (ug/l)	Down/Cross Gradient Mean (ug/l)
Vinyl chloride	2	<10	<10	**9**	**5.3**
Chloroethane	5	<10	<10	**120**	**7.2**
Methylene chloride	5	<10	<10	<10	<10
1,1 - Dichloroethene	5	<10	<10	2	3.7
1,1 - Dichloroethane	5	1	1	**160**	**20.6**
1,2 - Dichloroethene (tot)	5	<10	<10	**28**	**5.8**
1,1,1 - Trichloroethane	5	<10	<10	**27**	**6.9**
Trichloroethene	5	<10	<10	**45**	4.6
Benzene	0.7	<10	<10	**2**	**3.8**

Table 6-3
Review of Analytical Data - Groundwater Metals
Farwell Landfill Remedial Investigation
Cattaraugus County, New York

	Background Groundwater Total Concentrations		Background Groundwater Dissolved Concentrations		Down/Crossgradient Groundwater Total Concentrations		Down/Crossgradient Groundwater Dissolved Concentrations	
Compound	Frequency of Occurrence	Concentration Range (µg/L)	Frequency of Occurrence	Concentration Range (µg/L)	Frequency of Occurrence	Concentration Range (µg/L)	Frequency of Occurrence	Concentration Range (µg/L)
Aluminum	1 of 1	595	0 of 1	N/A	15 of 15	9.8 - 32,900	10 of 15	10.5 - 30
Antimony	0 of 1	N/A	0 of 1	N/A	3 of 15	5.5 - 6.7	3 of 15	5 - 5.6
Arsenic	0 of 1	N/A	1 of 1	1.50	7 of 15	5.2 - 24.7	3 of 15	6.7 - 19.7
Barium	1 of 1	642	1 of 1	595	15 of 15	53.4 - 8490	15 of 15	54.9 - 1130
Beryllium	0 of 1	N/A	0 of 1	N/A	2 of 15	2.2 - 2.6	0 of 15	N/A
Cadmium	1 of 1	1.10	1 of 1	1.90	12 of 15	1 - 12.8	9 of 15	1 - 2.8
Calcium	1 of 1	71900	1 of 1	73800	15 of 15	34,200 - 190,000	15 of 15	32,100 - 187,000
Chromium	1 of 1	1.40	0 of 1	N/A	8 of 15	3.2 - 48.3	2 of 15	1.2 - 2.5
Cobalt	0 of 1	N/A	1 of 1	1.20	6 of 15	1.3 - 34.2	9 of 15	4.3 - 9.4
Copper	1 of 1	2.10	0 of 1	N/A	8 of 15	5.4 - 80.3	1 of 15	7.8
Iron	1 of 1	1830	1 of 1	427	15 of 15	7.5 - 87,500	10 of 15	25.9 - 6550
Lead	0 of 1	N/A	0 of 1	N/A	8 of 15	3 - 55	0 of 15	N/A
Magnesium	1 of 1	22500	1 of 1	23300	15 of 15	14,600 - 59,700	15 of 15	6720 - 55,900
Manganese	1 of 1	515	1 of 1	551	15 of 15	11.2 -3,080	15 of 15	29.3 - 2960
Mercury	0 of 1	N/A	0 of 1	N/A	2 of 15	0.10 - 0.18	1 of 15	0.11
Nickel	0 of 1	N/A	0 of 1	N/A	7 of 15	7 - 79.4	6 of 15	5 - 7.3
Potassium	1 of 1	2420	1 of 1	5720	15 of 15	728 - 10,800	15 of 15	638 - 7900
Selenium	1 of 1	1.50	0 of 1	N/A	2 of 15	5.1 - 8.4	0 of 15	N/A
Silver	0 of 1	N/A	0 of 1	N/A	0 of 15	N/A	0 of 15	N/A
Sodium	1 of 1	21700	1 of 1	21300	15 of 15	3900 - 39,400	15 of 15	2040 - 42,000
Thallium	0 of 1	N/A	0 of 1	N/A	0 of 15	N/A	0 of 15	N/A
Vanadium	0 of 1	N/A	0 of 1	N/A	7 of 15	1.3 - 42.8	0 of 15	N/A
Zinc	1 of 1	37	1 of 1	23.80	15 of 15	9.7 - 307	15 of 15	15.5 - 125

Table 6-4
Comparison of Background and Downgradient Groundwater Quality - Metals
Farwell Landfill Remedial Investigation
Cattaraugus County, New York

Analyte (ug/l)	GW Std. ug/l	Concentration of Total metals				Concentration of Dissolved metals			
		Background		Down/Cross Gradient		Background		Down/Cross Gradient	
		Max (ug/L)	Mean (ug/L)	Max (ug/L)	Mean (ug/L)	Max (ug/L)	Mean (ug/L)	Max (ug/L)	Mean (ug/L)
Aluminum		595	595	*32,900*	355	22.1	22.1	21	13.6
Arsenic	25	ND	ND	*24.7*	*4.6*	1.5	1.5	*19.7*	*2.27*
Barium	1000	642	642	***1,110***	285	595	595	***1,130***	268
Cadmium	10	1.1	1.10	***12.8***	1.61	1.9	1.90	2.8	0.95
Calcium		71,900	71,900	*190,000*	*102,215*	73,800	73,800	*187,000*	*96,919*
Chromium	50	1.4	1.40	48.3	2.14	ND	ND	2.5	2.5
Cobalt		ND	ND	*34.2*	*1.57*	1.2	1.20	*9.4*	*3.98*
Copper	200	2.1	2.10	*80.3*	*3.98*	N D	N D	*7.8*	*0.91*
Iron	300	**1,830**	**1830**	***87,500***	**1,299**	**427**	**427**	***6,550***	79
Lead	25	ND	ND	*55*	*3.20*	N D	N D	N D	N D
Magnesium	35,000 G	22,500	22,500	*59,700*	*24,776*	23,300	23,300	*55,900*	22,747
Manganese	300	**515**	**515**	***3080***	246	**551**	**551**	***2,960***	188
Mercury	2	ND	ND	*0.1*	*0.05*	N D	N D	*0.11*	*0.11*
Nickel		ND	ND	*79.4*	*5.64*	2.5	2.50	*7.3*	*3.66*
Potassium		2,420	2,420	*10,800*	2,114	5,720	5,720	*7,900*	1,662
Sodium	20,000	**21,700**	**21,700**	***39,400***	14,027	**21,300**	**21,300**	***42,000***	11,791
Vanadium		ND	ND	*42.8*	*1.71*	N D	N D	N D	N D
Zinc	300	36.7	36.7	*39,400*	*48.4*	24	24	*125*	*36*

Bold value indicates concentration greater then NYS groundwater standardas
Italics indicates concentration above background levels, based on MW-6.

Table 6-5
Review of Analytical Data - Water and Leachate VOCs
Farwell Landfill Remedial Investigation
Cattaraugus County, New York

Compound	Background Surface Water Conc. (µg/L)	Downstream/Adjacent Surface Water Frequency of Occurrence	Downstream/Adjacent Surface Water Concentration Range (µg/L)	Landfill Pond Conc. (µg/L)	Railroad Pond Conc. (µg/L)
Chloromethane	N D	0 of 2	N/A	N D	N D
Bromomethane	N D	0 of 2	N/A	N D	N D
Vinyl Chloride	N D	0 of 2	N/A	N D	N D
Chloroethane	N D	0 of 2	N/A	N D	N D
Methylene Chloride	N D	0 of 2	N/A	N D	N D
Acetone	N D	0 of 2	N/A	N D	N D
Carbon Disulfide	N D	0 of 2	N/A	N D	4
1,1-Dichloroethene	N D	0 of 2	N/A	N D	N D
1,1-Dichloroethane	N D	0 of 2	N/A	N D	N D
1,2-Dichloroethene (total)	N D	0 of 2	N/A	N D	N D
Chloroform	N D	0 of 2	N/A	N D	N D
1,2-Dichloroethane	N D	0 of 2	N/A	N D	N D
2-Butanone	N D	0 of 2	N/A	N D	26
1,1,1-Trochloroethane	N D	0 of 2	N/A	N D	N D
Carbon Tetrachloride	N D	0 of 2	N/A	N D	N D
Bromodichloromethane	N D	0 of 2	N/A	N D	N D
1,2-Dichloropropane	N D	0 of 2	N/A	N D	N D
cis-1,3-Dichloropropene	N D	0 of 2	N/A	N D	N D
Trichloroethene	N D	0 of 2	N/A	N D	N D
Dibromochloromethane	N D	0 of 2	N/A	N D	N D
1,1,2-Trichloroethane	N D	0 of 2	N/A	N D	N D
Benzene	N D	0 of 2	N/A	N D	N D
Trans-1,3-Dichloropropene	N D	0 of 2	N/A	N D	N D
Bromoform	N D	0 of 2	N/A	N D	N D
4-Methyl-2-pentanone	N D	0 of 2	N/A	N D	N D
2-Hexanone	N D	0 of 2	N/A	N D	N D
Tetrachloroethene	N D	0 of 2	N/A	N D	N D
1,1,2,2-Tetrachloroethane	N D	0 of 2	N/A	N D	N D
Toluene	N D	0 of 2	N/A	N D	N D
Chlorobenzene	N D	0 of 2	N/A	N D	N D
Ethylbenzene	N D	0 of 2	N/A	N D	N D
Styrene	N D	0 of 2	N/A	N D	N D
Total Xylenes	N D	0 of 2	N/A	N D	N D

Table 6-6
Review of Analytical Data - Water and Leachate - Total Metals
Farwell Landfill Remedial Investigation
Cattaraugus County, New York

Compound	Surface Water Standard (µg/L)	Background Surface Water Conc. (µg/L)	Downstream/Adjacent Surface Water Frequency of Occurrence	Downstream/Adjacent Surface Water Concentration Range (µg/L)	Landfill Pond Conc. (µg/L)	Railroad Pond Conc. (µg/L)
Aluminum	100	139	2 of 2	126 - 340	27.6	20,400
Antimony	3 G	N D	0 of 2	N/A	N D	9.8
Arsenic	None	N D	0 of 2	N/A	3.4	23.4
Barium	None	68.8	2 of 2	64.8 - 73.2	19.6	550
Beryllium	1100A	N D	0 of 2	N/A	N D	3
Cadmium	1.22-1.85	N D	1 of 2	1	N D	2.0
Calcium	None	50,600	2 of 2	48,800 - 49,700	18,200	108,000
Chromium	223-345	N D	0 of 2	N/A	N D	36.8
Cobalt	5	N D	0 of 2	N/A	N D	18.4
Copper	12.8-20.1	N D	1 of 2	2.6	N D	52.5
Iron	300	346	2 of 2	221 - 620	278	40,200
Lead	3.63-7.11	N D	0 of 2	N/A	N D	48.2
Magnesium	None	8,370	2 of 2	8260 - 8270	2,560	33,400
Manganese	None	44.8	2 of 2	22.5 - 53.6	65.6	4,160
Mercury	0.2 G	N D	0 of 2	N/A	N D	N D
Nickel	1.2-153	N D	0 of 2	N/A	N D	39.3
Potassium	None	1310	2 of 2	1140 -1330	973	5,500
Selenium	1	N D	0 of 2	N/A	N D	3.5
Silver	0.1	N D	0 of 2	N/A	N D	N D
Sodium	None	16,600	2 of 2	14,600 - 16,100	698	10,900
Thallium	8	N D	0 of 2	N/A	N D	N D
Vanadium	14	N D	0 of 2	N/A	N D	29.0
Zinc	30	13.4	2 of 2	14 - 102	23.4	306

Table 6-7
Review of Analytical Data - Sediment VOCs
Farwell Landfill Remedial Investigation
Cattaraugus County, New York

Compound	Sediment Standard (µg/kg)	Background Sediment (µg/kg)	Downstream/Adjacent Sediment Frequency of Occurrence	Downstream/Adjacent Sediment Concentration Range (µg/kg)	Landfill Pond (µg/kg)	Railroad Pond (µg/kg)
Chloromethane	None	N D	0 of 2	N/A	N D	N D
Bromomethane	None	0.5	0 of 2	N/A	N D	N D
Vinyl Chloride	0.07	N D	0 of 2	N/A	N D	N D
Chloroethane	None	N D	0 of 2	N/A	N D	N D
Methylene Chloride	None	N D	0 of 2	N/A	N D	N D
Acetone	None	3	1 of 2	4	N D	N D
Carbon Disulfide	None	N D	0 of 2	N/A	1	4
1,1-Dichloroethene	0.02	N D	0 of 2	N/A	N D	N D
1,1-Dichloroethane	0.7	N D	0 of 2	N/A	N D	N D
1,2-Dichloroethene (total)	None	N D	0 of 2	N/A	N D	N D
Chloroform	None	N D	0 of 2	N/A	N D	N D
1,2-Dichloroethane	0.7	N D	0 of 2	N/A	N D	N D
2-Butanone	None	N D	1 of 2	15	12	26
1,1,1-Trochloroethane	None	N D	0 of 2	N/A	N D	N D
Carbon Tetrachloride	0.6	N D	0 of 2	N/A	N D	N D
Bromodichloromethane	None	N D	0 of 2	N/A	N D	N D
1,2-Dichloropropane	None	N D	0 of 2	N/A	N D	N D
cis-1,3-Dichloropropene	None	N D	0 of 2	N/A	N D	N D
Trichloroethene	2	N D	0 of 2	N/A	N D	N D
Dibromochloromethane	None	N D	0 of 2	N/A	N D	N D
1,1,2-Trichloroethane	0.6	N D	0 of 2	N/A	N D	N D
Benzene	0.6	N D	0 of 2	N/A	N D	N D
Trans-1,3-Dichloropropene	None	N D	0 of 2	N/A	N D	N D
Bromoform	None	N D	0 of 2	N/A	N D	N D
4-Methyl-2-pentanone	None	N D	0 of 2	N/A	N D	N D
2-Hexanone	None	N D	0 of 2	N/A	N D	N D
Tetrachloroethene	0.8	N D	0 of 2	N/A	N D	N D
1,1,2,2-Tetrachloroethane	0.3	N D	0 of 2	N/A	N D	N D
Toluene	None	N D	1 of 2	2	N D	N D
Chlorobenzene	None	N D	0 of 2	N/A	N D	N D
Ethylbenzene	None	N D	0 of 2	N/A	N D	N D
Styrene	None	N D	0 of 2	N/A	N D	N D
Total Xylenes	None	N D	0 of 2	N/A	N D	N D

Table 6-8
Review of Analytical Data - Sediment Metals
Farwell Landfill Remedial Investigation
Cattaraugus County, New York

Compound	Sediment Criteria Lowest Effect Level (ppm)	Sediment Criteria Severe Effect Level (ppm)	Downstream Sediment (ppm)	Landfill Pond (ppm)	Railroad Pond (ppm)
Aluminum	None	None	9,100	14,800	22,100
Antimony	2	25	N D	N D	N D
Arsenic	6	33	5.8	11.5 ✓	17.9 ✓
Barium	None	None	100	134	285
Beryllium	None	None	1.6	2.7	3.5
Cadmium	0.6	9	N D	N D	N D
Calcium	None	None	5,680	6,350	20,800
Chromium	26	110	11	25.5	35.7 ✓
Cobalt	None	None	7.4	13	17.2
Copper	16	110	10.7	23.4 ✓	44.8 ✓
Iron	2%	4%	18,900	33,000 ✓	39,500 ✓
Lead	31	110	13.3	15.6	42.1 ✓
Magnesium	None	None	2,500	4,890	5,970
Manganese	460	1100	490 ✓	535 ✓	935 ✓
Mercury	0.15	1.3	N D	0.12	0.18
Nickel	16	50	15.4	31 ✓	36.4 ✓
Potassium	None	None	854	2,090	2,800
Selenium	None	None	1.5	1	3.6
Silver	1	2.2	N D	N D	N D
Sodium	None	None	108	230	265
Thallium	None	None	N D	N D	N D
Vanadium	None	None	12.2	20.1	33.9
Zinc	120	270	71.4	106	226 ✓

Table 6-9
Identification of Non-carcinogenic Health Effects for Compounds of Concern
Farwell Landfill Remedial Investigation
Cattaraugus County, New York

Chemical of Concern VOCs	Impacted Media			RfD (mg/kg/day)	Uncert. Factor	Modif. Factor	Target organ or effect	Confidence Level
	Groundwater	Surface Water	Sediment					
Vinyl chloride	X			Not Available				
Chloroethane	X			Not Available				
1,1-Dichloroethane	X			Review (8/1/89)				
cis-1,2-Dichloroethene	X			Not Available				
trans-1,2-Dichloroethene	X			0.02	1000	1		low
1,1,1-Trichloroethane	X			Withdrawn 8/1/91				
Trichloroethene	X			Review (8/1/92)				
Benzene	X			Review (7/1/89)				
Barium	X			0.07	3	1	hypertension, kidneys	medium
Cadmium	X			0.0005	10	1	kidneys	high
Zinc	X			0.3	3	1	blood chemistry	medium

Table 6-10
Identification of Carcinogenic Health Effects for Compounds of Concern
Farwell Landfill Remedial Investigation
Cattaraugus County, New York

Chemical of Concern VOCs and Metals	Chemical of Concern			Slope Factor 1/(mg/kg/day)	Class *	Target organ or effect
	Groundwater	Surface Water	Sediment			
Vinyl chloride	X			Not Available	A	Liver
Chloroethane	X			Carcinogenicity evaluation under review (1/1/95).		
1,1-Dichloroethane	X			Not Available	C	
cis-1,2-Dichloroethene	X			Not Applicable	D	
trans-1,2-Dichloroethene	X			Not classified at this time		
1,1,1-Trichloroethane	X			Not Applicable	D	
Trichloroethene	X			Carcinogenicity assessment withdrawn (7/1/89).		
Benzene	X			0.0292	A	blood; leukemia
Barium	X			Not Applicable	D	
Cadmium	X			Not Available	No positive studies of orally ingested Cd.	
Zinc	X			Not Applicable	D	

"X" indicates the compound has been identified through data screening process as site contaminant of concern.

* Class A indicates Known Human Carcinogen
Class B1 is a probable human carcinogen based on limited evidence of cancer in humans.
Class B2 is a probable human carcinogen based on inadequate human data and sufficient animal data.
Class C is a possible human carcinogen based on limited evidence in animal studies.
Class D is not classifiable as to human carcinogenicity.

Table 6-11
Identification of Health Effects (via Inhalation Pathway) for Compounds of Concern
Farwell Landfill Remedial Investigation
Cattaraugus County, New York

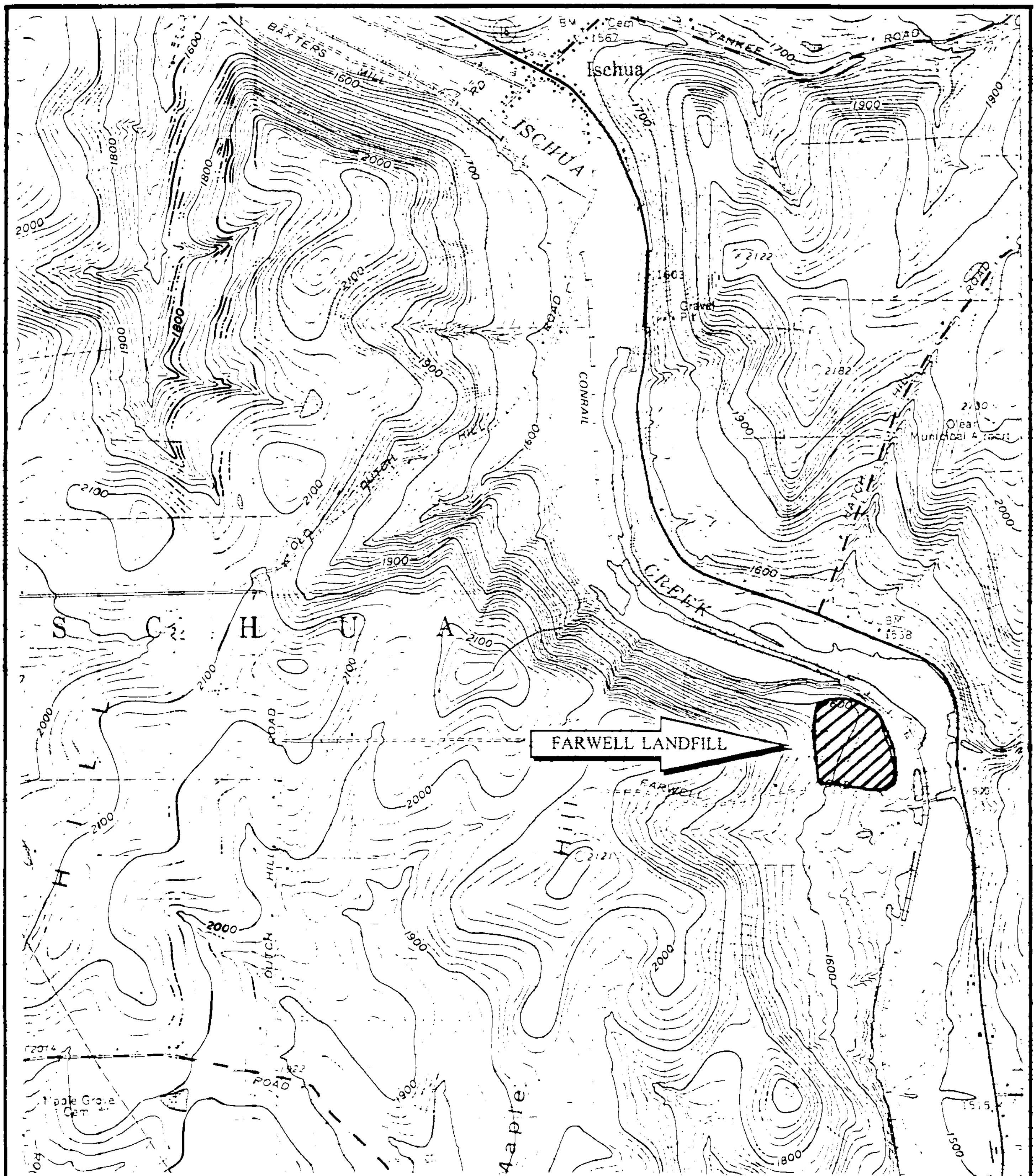
Chemical of Concern (and source of information)	RfC (mg/cu m)	Uncert. Factor	Modif. Factor	Target organ or effect	Risk Level	Air conc. µg/m^3	Class *	Target organ or effect
Vinyl chloride (ATSDR)	0.09	300	100	testicular necrosis	Not Available at this time			
Chloroethane (IRIS)	10	300	1	delayed fetal ossification	Not Available at this time			
1,1-Dichloroethane (IRIS)	Not Available at this time				None		D	
cis-1,2-Dichloroethene (IRIS)	Not Available at this time				None		D	
trans-1,2-Dichloroethene (IRIS)	Not Available at this time				Not evaluated			
1,1,1-Trichloroethane (IRIS)	Not Available at this time				None		D	
Trichloroethene (IRIS)	Not Available at this time				Undergoing Re-evaluation			
Benzene (IRIS)	Not Available at this time				$1x10^{-5}$	1.3 to 4.5	A	leukemia

* Class A indicates Known Human Carcinogen
Class B1 is a probable human carcinogen based on limited evidence of cancer in humans.
Class B2 is a probable human carcinogen based on inadequate human data and sufficient animal data.
Class C is a possible human carcinogen based on limited evidence in animal studies.
Class D is not classifiable as to human carcinogenicity.

IRIS is the Integrated Risk Information System database maintained by USEPA.

ATSDR is the database maintained by the Agency for Toxic Substances and Disease Registry.

FIGURES



QUADRANGLE LOCATION

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

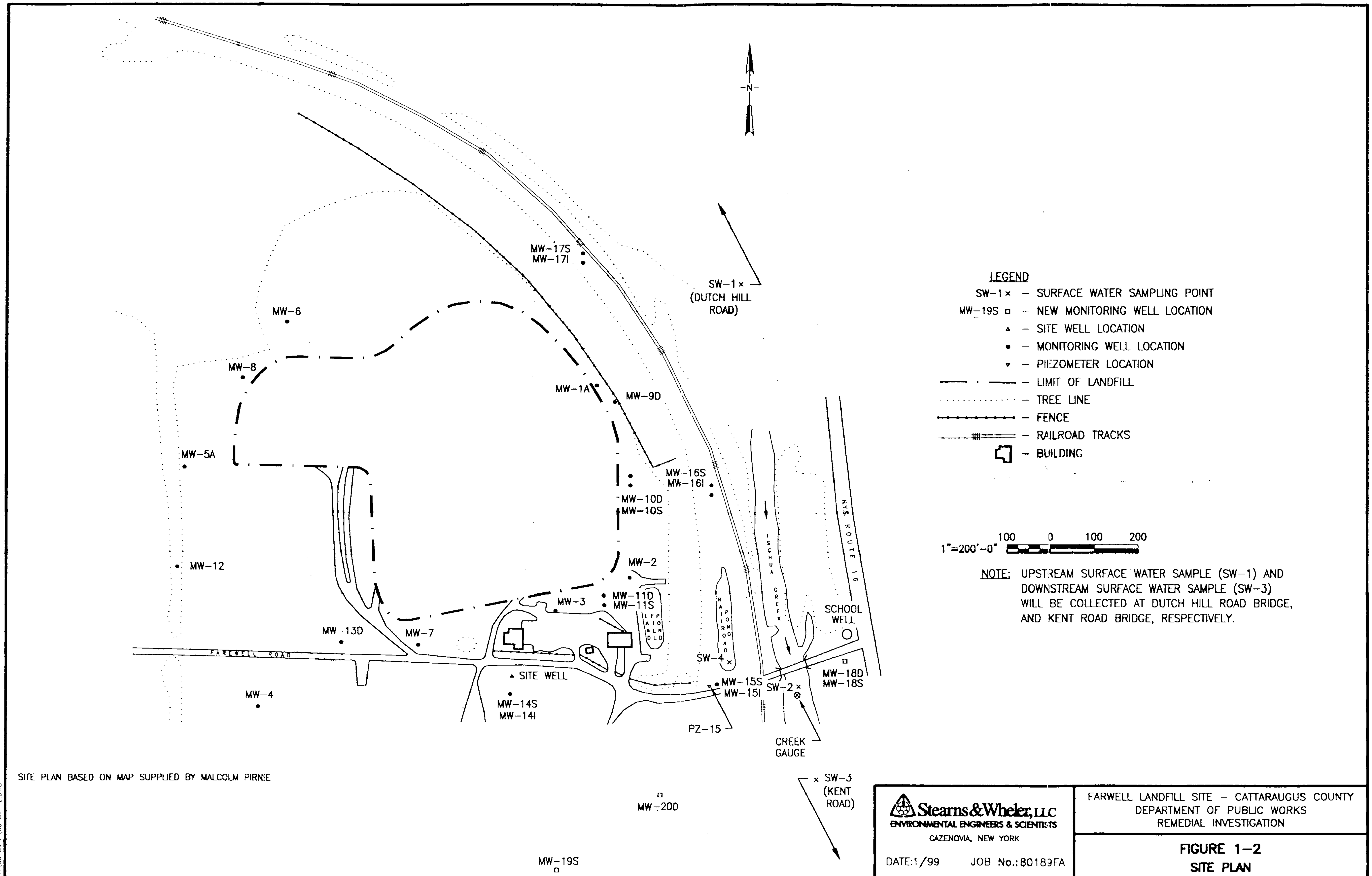
CAZENOVIA, NEW YORK

DATE: 12/98 JOB No: 80189FA

FARWELL LANDFILL
REMEDIAL INVESTIGATION
CATTARAUGUS COUNTY, NY

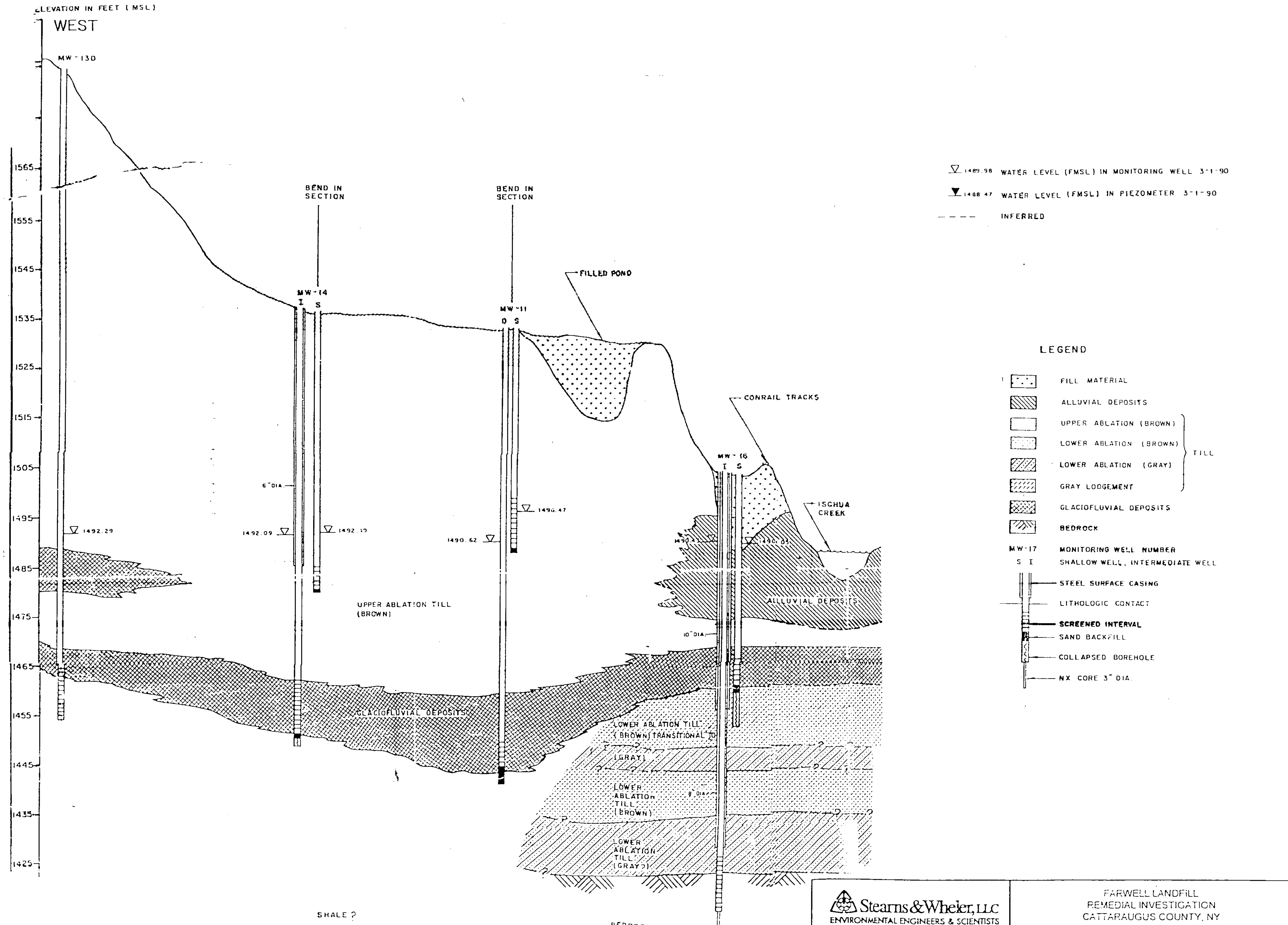
FIGURE 1-1
SITE LOCATION

HINSDALE QUADRANGLE
NEW YORK – CATTARAUGUS CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



FARWELL LANDFILL SITE – CATTARAUGUS COUNTY DEPARTMENT OF PUBLIC WORKS REMEDIAL INVESTIGATION

FIGURE 1–2
SITE PLAN



Source: Malcolm Pirnie, Inc. 1986

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CAZENOVIA, NEW YORK
DATE 12/98 JOB No. 80185FA

FARWELL LANDFILL
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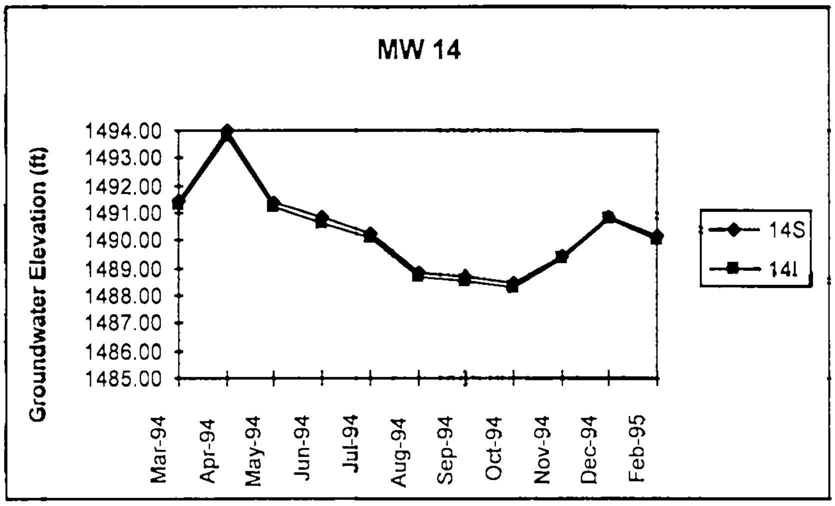
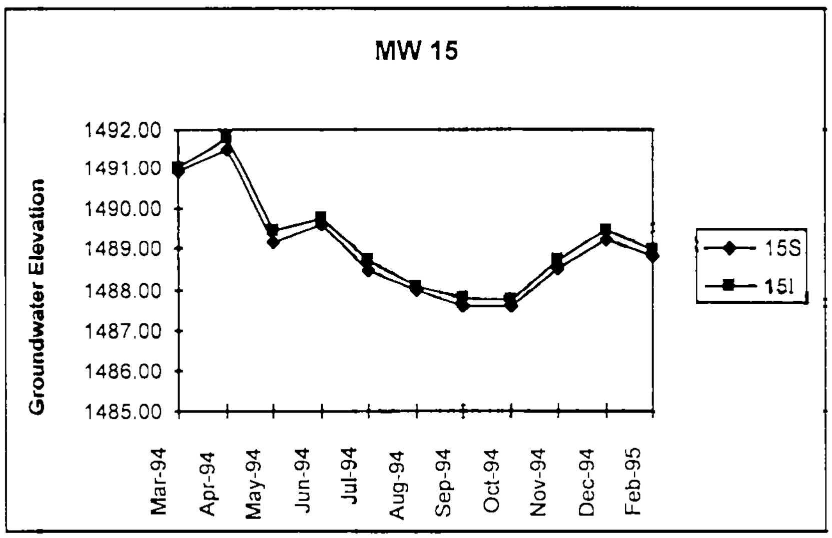
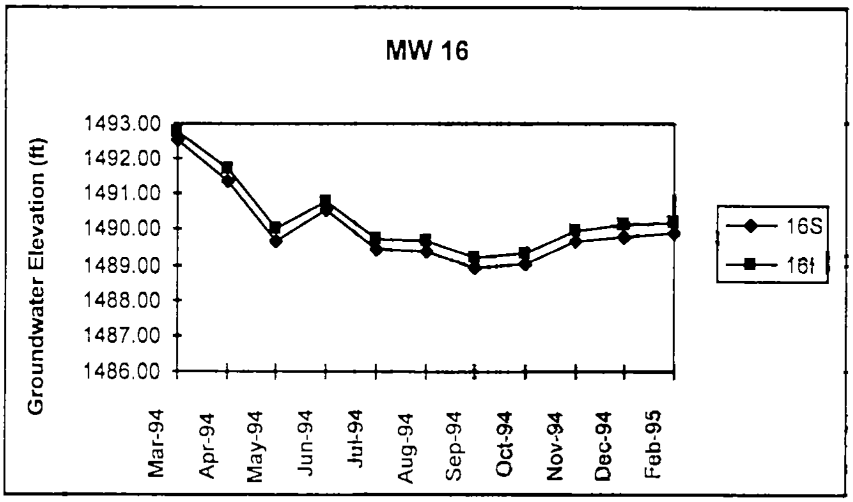
CATTARAUGUS COUNTY, NY

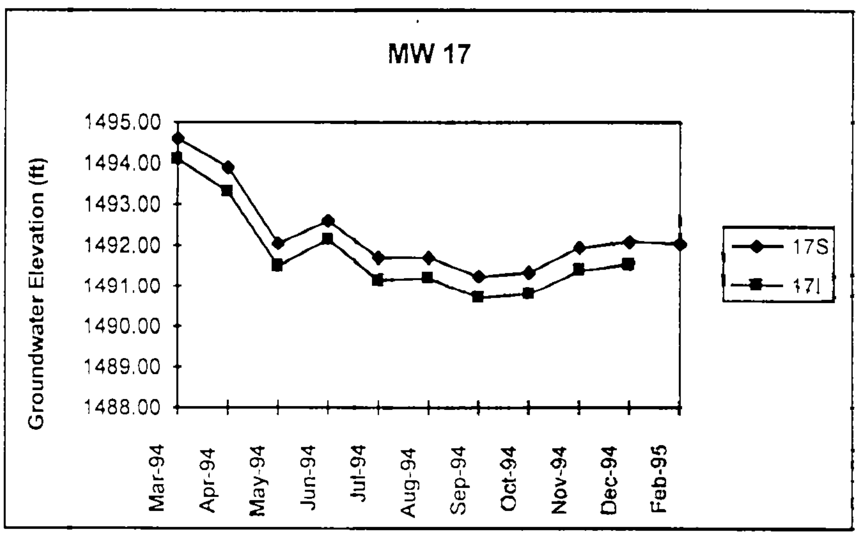
FIGURE 3-1
HYDROGEOLOGIC
CROSS SECTION



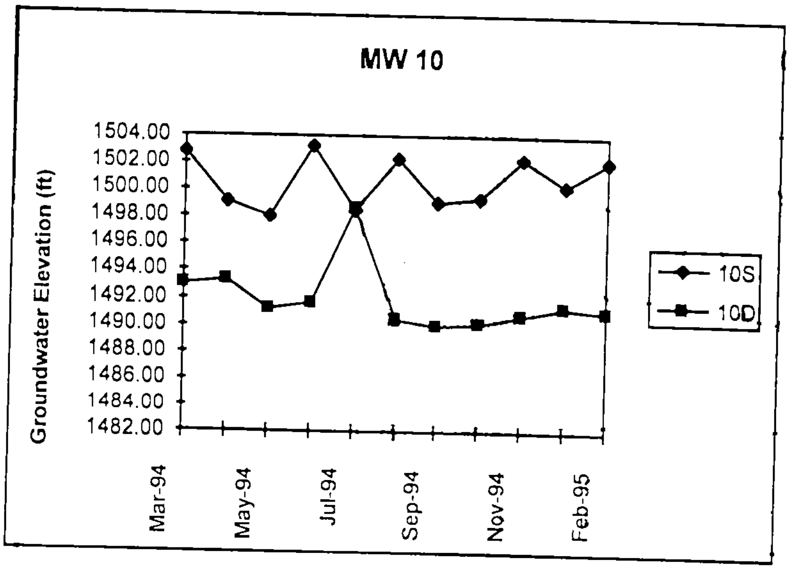


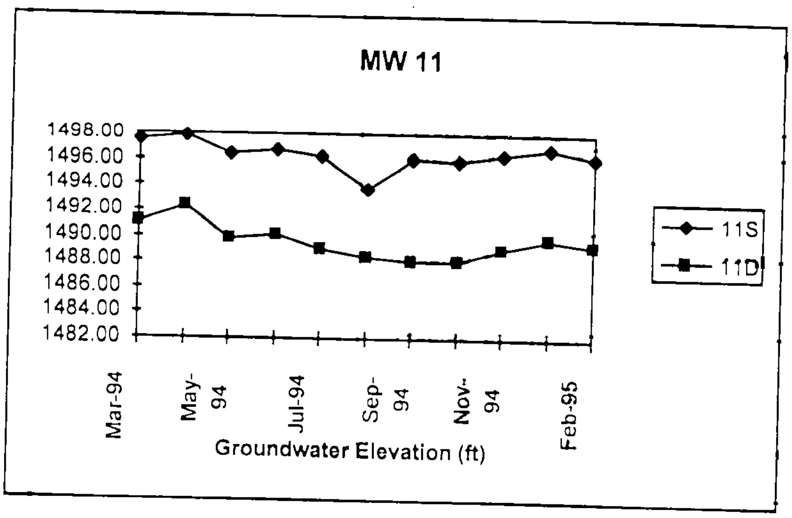
Stearns & Wheler, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, NEW YORK	FARWELL LANDFILL REMEDIAL INVESTIGATION CATTARAUGUS COUNTY, NEW YORK
DATE: 12/98 JOB No: 80189FA	FIGURE 3-2 WELL HYDROGRAPHS, 14 & 15





Stearns & Wheler, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, NEW YORK	FARWELL LANDFILL REMEDIAL INVESTIGATION CATTARAUGUS COUNTY, NEW YORK
DATE: 12/98 JOB No: 80189FA	**FIGURE 3-3** **WELL HYDROGRAPHS, 16 & 17**





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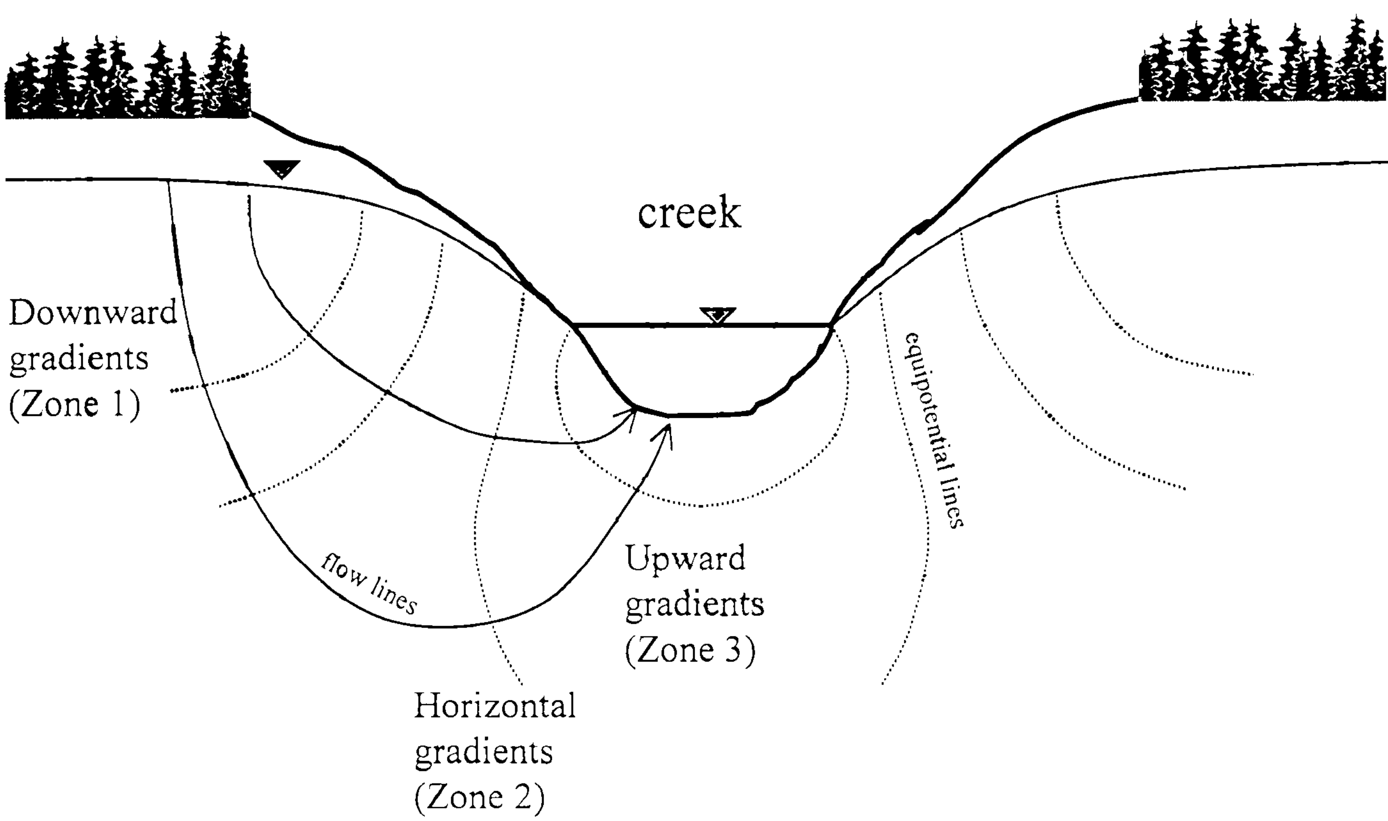
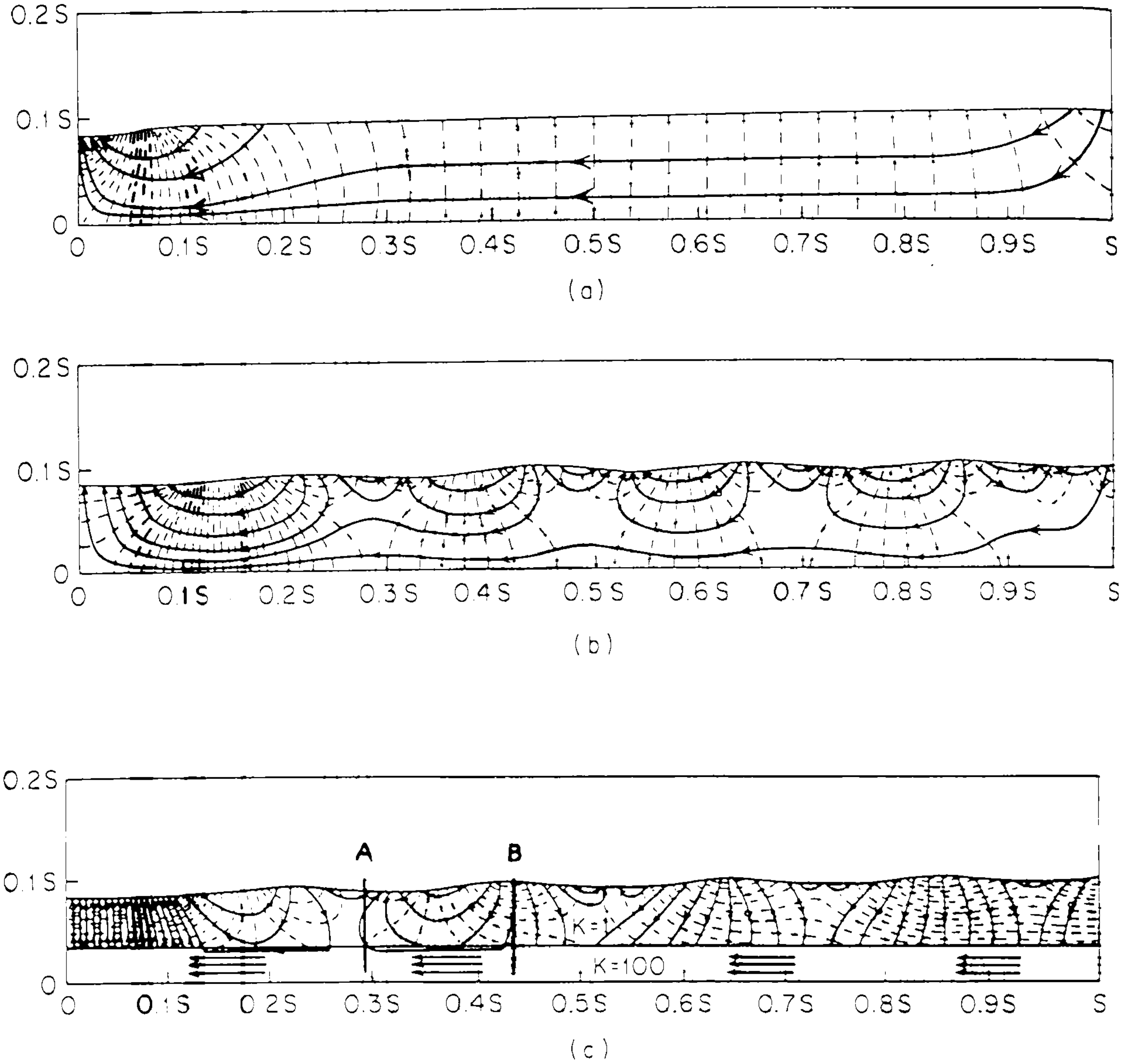
CATTARAUGUS COUNTY, NEW YORK

FIGURE 3-4
WELL HYDROGRAPHS, 10 & 11



As flow lines converge towards a discharge zone (e.g. creek) downward flow becomes horizontal, then upward. At the landfill's edge, flow is downward (Zone 1). The similarity in groundwater elevation between wells in couplets MW-14, -15, -16, and -17 indicates flow near the creek has become largely horizontal (Zone 2). However, flow becomes predominantly upward very close to the creek (Zone 3). Note that shallow and deep Zone 2 areas receive groundwater from the same recharge area (Zone 1), as apparent for wells clusters MW-14, -15, -16, and -17.

Stearns & Wheler, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, NEW YORK DATE: 12/98 JOB No: 80189FA	FARWELL LANDFILL REMEDIAL INVESTIGATION CATTARAUGUS COUNTY, NY FIGURE 3-5 VERTICAL GROUNDWATER FLOW



After Freeze & Witherspoon, 1967.

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FARWELL LANDFILL
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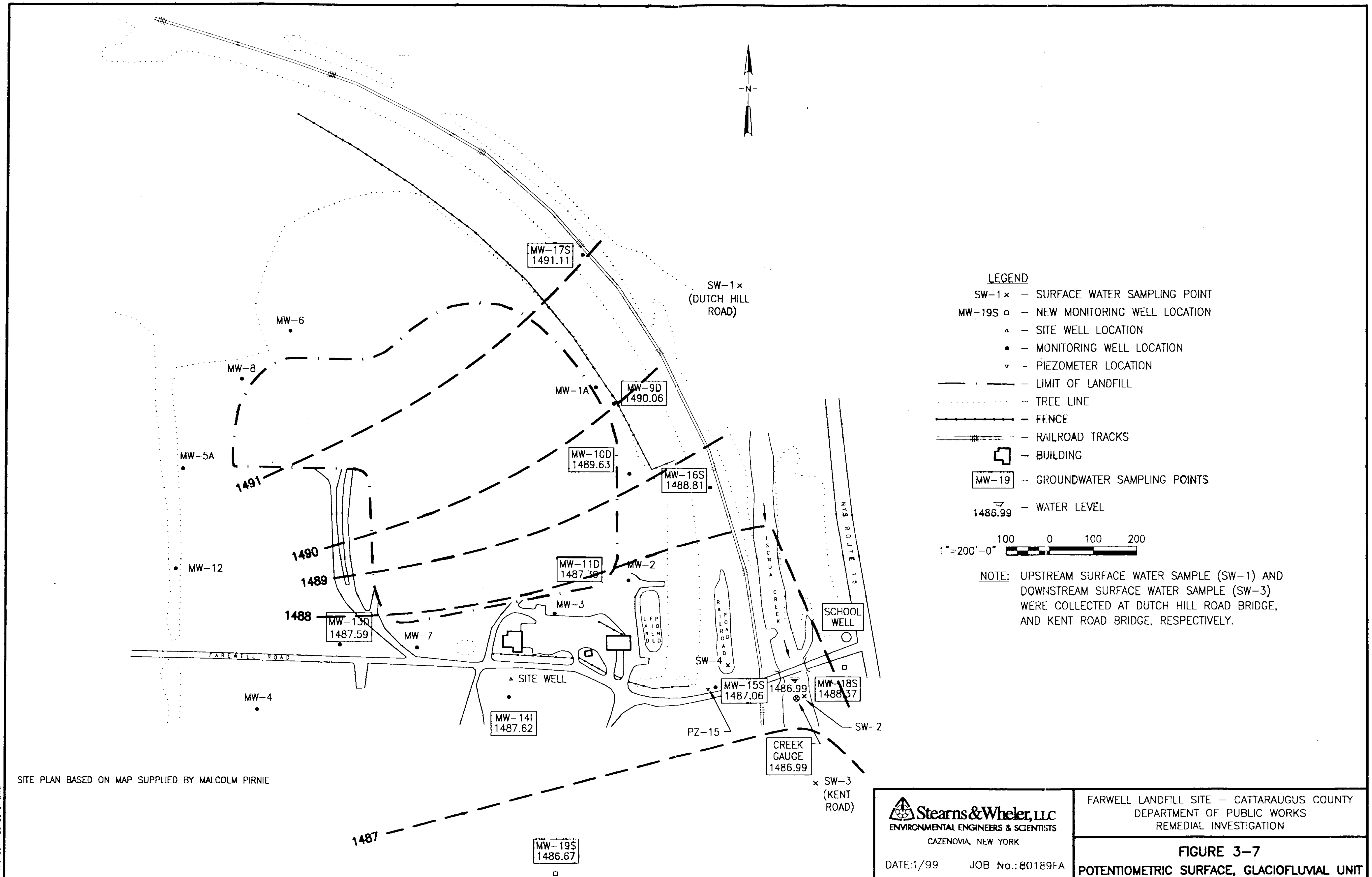
CATTARAUGUS COUNTY, NEW YORK

FIGURE 3-6
TOPOGRAPHICAL CONTROLS OVER GROUNDWATER FLOW



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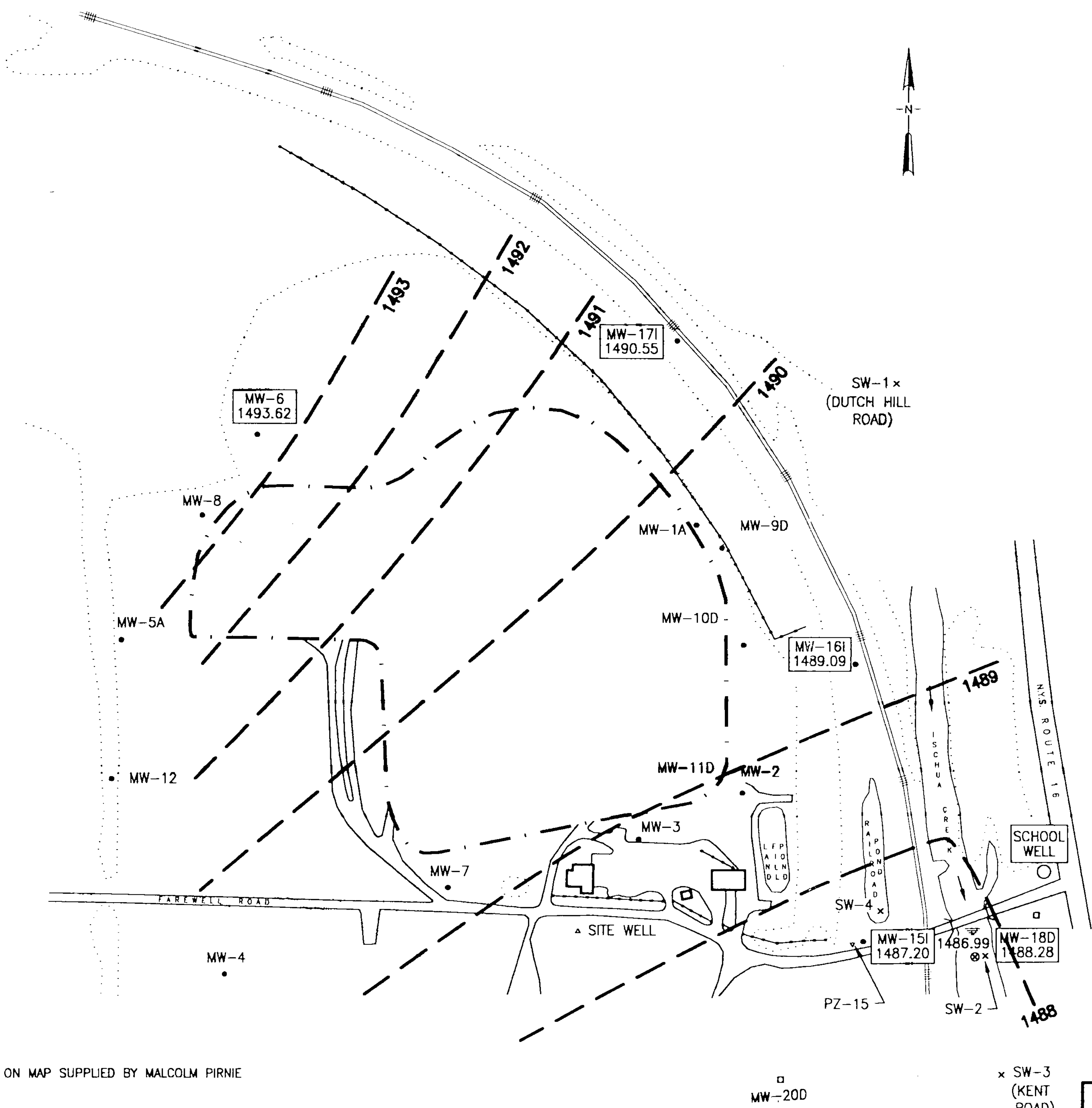
FARWELL LANDFILL SITE – CATTARAUGUS COUNTY
DEPARTMENT OF PUBLIC WORKS
REMEDIAL INVESTIGATION

FIGURE 3–7
POTENTIOMETRIC SURFACE, GLACIOFLUVIAL UNIT



SITE PLAN BASED ON MAP SUPPLIED BY MALCOLM PIRNIE

LEGEND

- SW-1 × – SURFACE WATER SAMPLING POINT
- MW-19S ▫ – NEW MONITORING WELL LOCATION
- ▵ – SITE WELL LOCATION
- • – MONITORING WELL LOCATION
- ▿ – PIEZOMETER LOCATION
- — · — – LIMIT OF LANDFILL
- .... – TREE LINE
- ——— – FENCE
- ═╫═ – RAILROAD TRACKS
- ⌐ – BUILDING
- MW-19 – GROUNDWATER SAMPLING POINTS
- 1486.99 – WATER LEVEL

100 0 100 200
1"=200'-0"

NOTE: UPSTREAM SURFACE WATER SAMPLE (SW-1) AND DOWNSTREAM SURFACE WATER SAMPLE (SW-3) WERE COLLECTED AT DUTCH HILL ROAD BRIDGE, AND KENT ROAD BRIDGE, RESPECTIVELY.

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FARWELL LANDFILL SITE – CATTARAUGUS COUNTY
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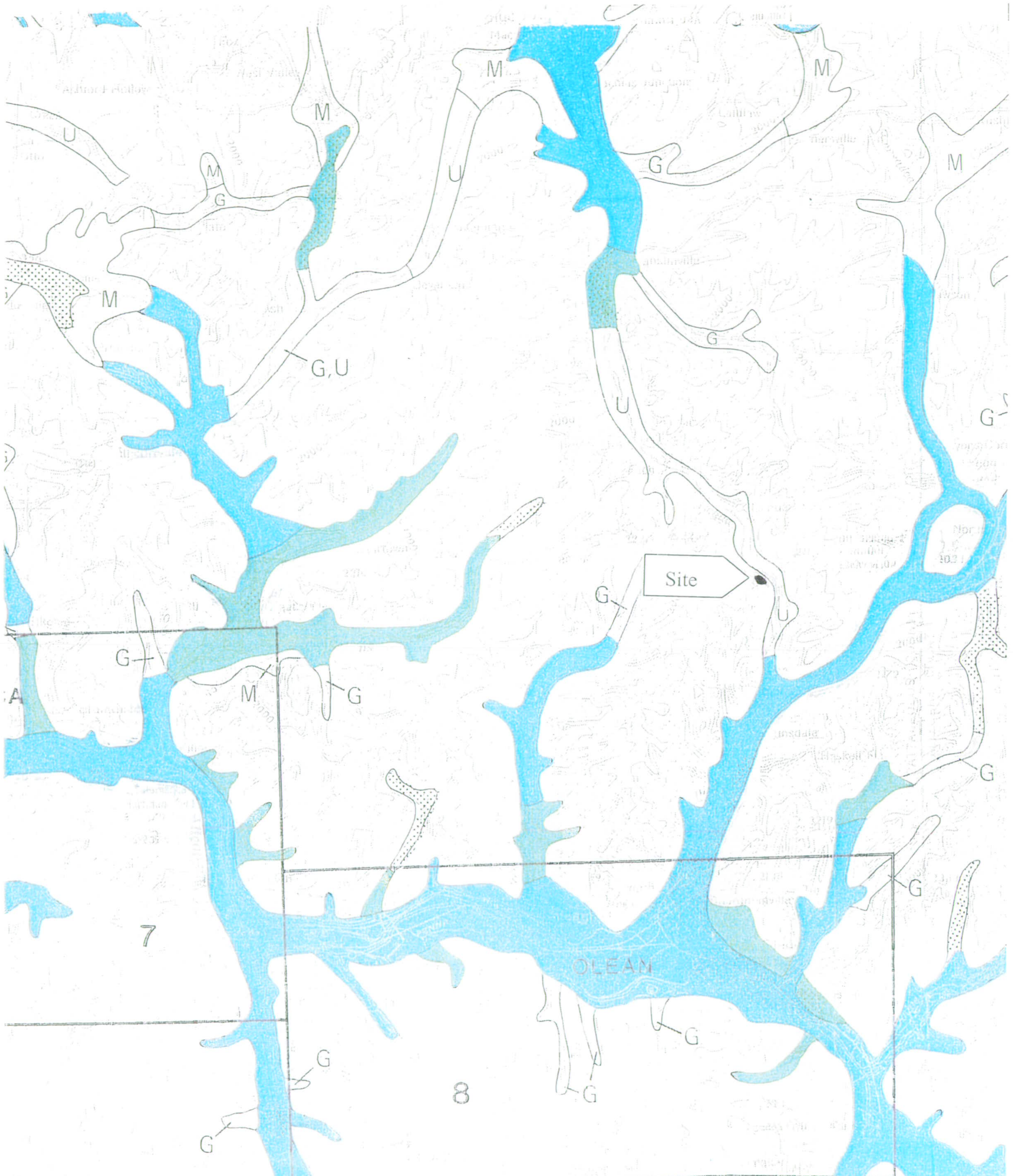
REMEDIAL INVESTIGATION

FIGURE 3-8
POTENTIOMETRIC SURFACE, LOWER TILL/BEDROCK INTERFACE

98/12 DW
M:\80189FA\80189F38.DWG



EXPLANATION

POTENTIAL YIELD OF WATER FROM WELLS THAT TAP UNCONSOLIDATED AQUIFERS

UNCONFINED AQUIFERS, 10 TO 100 GALLONS PER MINUTE--Sand and gravel with saturated zone generally less than 10 ft thick, or thicker but with less permeable silty sand and gravel. Yields in areas adjacent to streams may exceed 100 gal/min (gallons per minute) through pumping-induced infiltration, but these areas are too small to show at this scale

UNCONFINED AQUIFERS, MORE THAN 100 GALLONS PER MINUTE--Sand and gravel of high transmissivity and with saturated thickness greater than 10 ft. Many such areas are associated with a surface-water source that can provide additional water through pumping-induced recharge

CONFINED AQUIFER UNDERLYING UNCONFINED AQUIFER, 5 TO MORE THAN 500 GALLONS PER MINUTE (from confined aquifer)--Areas where a relatively impermeable till or lacustrine, very fine sand, silt, or clay layer separates the buried sand and gravel aquifer from an overlying surficial aquifer

CONFINED AQUIFER, 5 TO MORE THAN 500 GALLONS PER MINUTE--Sand and gravel overlain by till, very fine sand, silt, or clay, but without a surficial aquifer

AQUIFERS OF UNKNOWN POTENTIAL--Areas of sand and(or) sand and gravel for which little or no well data are on file to determine yield potential. Letter symbols, explained below, indicate the type of deposit

L — Lacustrine or eolian deposits--Fine to medium sand that probably yields less than 10 gal/min

G — Kame, kame terrace, kame moraine, outwash, or alluvium--Sand and gravel of unknown thickness or saturation. Yield potential is greater where streams are present

M — Moraine--Mostly till and lacustrine deposits (very fine sand, silt, and clay) capped in some places with unsaturated sand and gravel. Thin, scattered confined aquifers of sand and gravel in some places

U — Confined aquifer--Areas of lacustrine deposits or till possibly underlain by sand and gravel aquifers. Depth and saturated thickness of aquifer not investigated

1 — PRIMARY WATER-SUPPLY AQUIFER--A highly productive aquifer that is being used as a source of water supply in major public-supply systems. Number indicates name of aquifer area (see key below) and report number in list of related publications. Reports and maps cited describe these aquifers in detail.

Primary aquifer number	Aquifer area
6	Batavia
1	Jamestown
8	Olean
7	Salamanca

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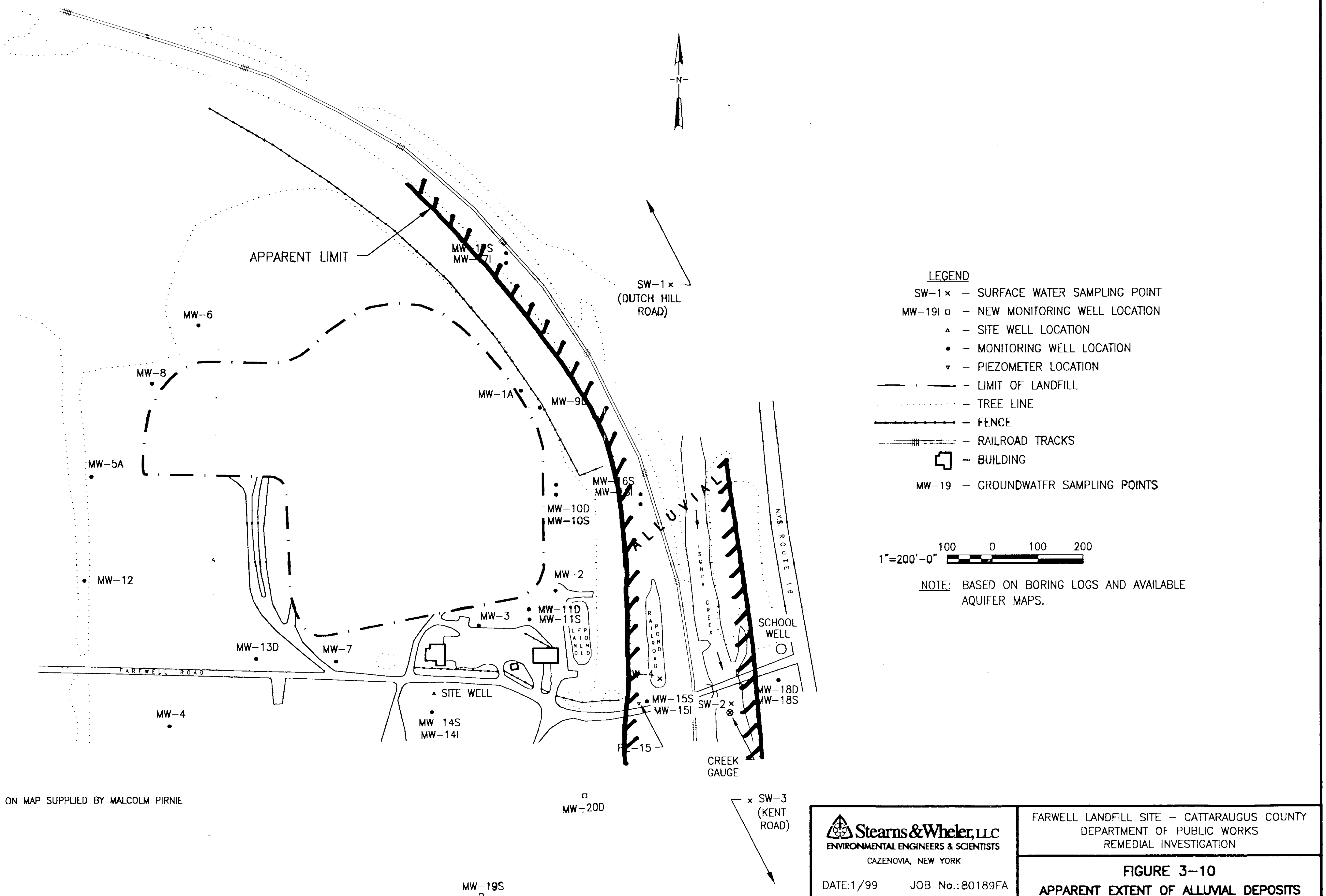
CATTARAUGUS COUNTY, NY

FIGURE 3-9
AQUIFER DESIGNATION MAP



SITE PLAN BASED ON MAP SUPPLIED BY MALCOLM PIRNIE

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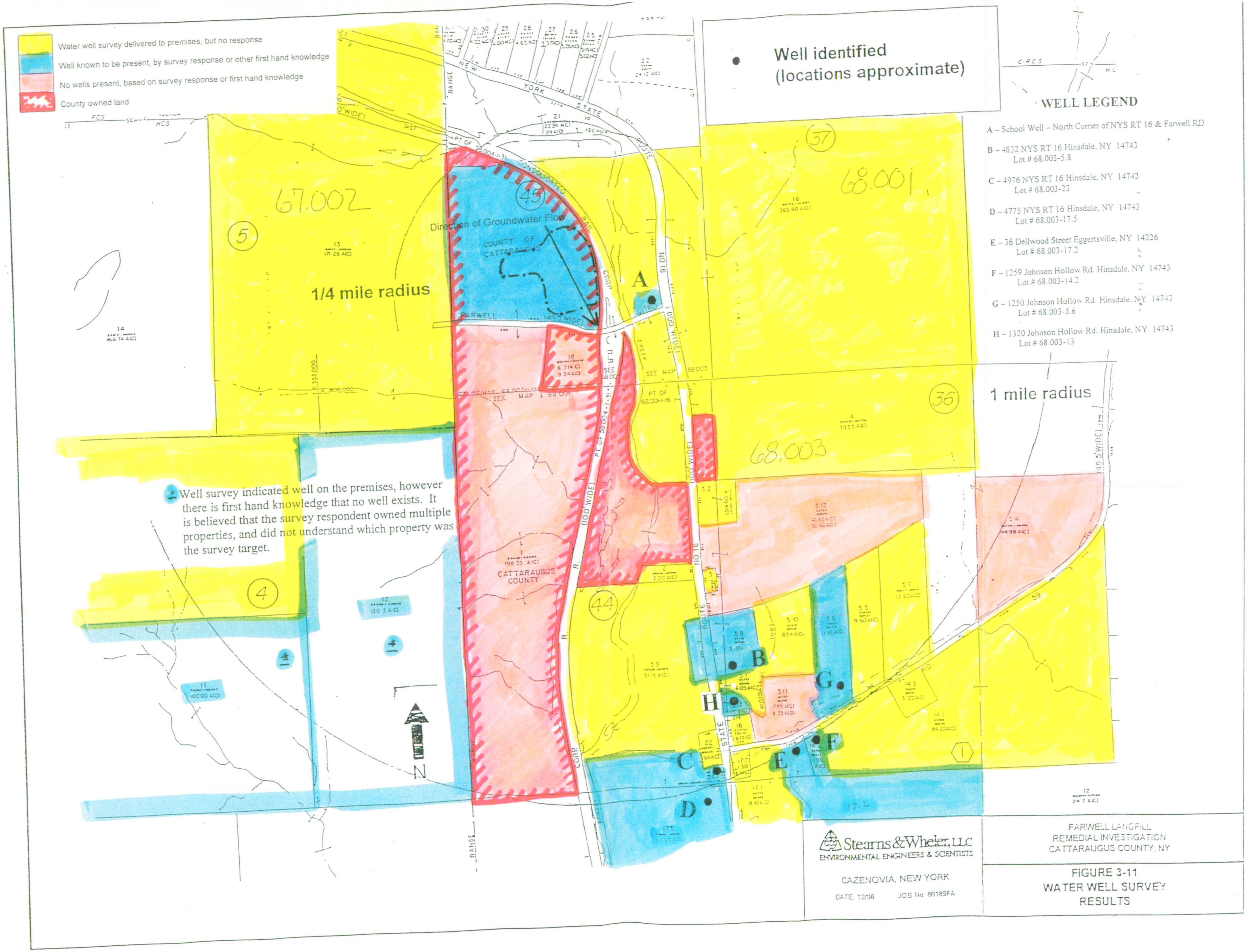
REMEDIAL INVESTIGATION

FIGURE 3-10
APPARENT EXTENT OF ALLUVIAL DEPOSITS



Water well survey delivered to premises, but no response
Well known to be present, by survey response or other first hand knowledge
No wells present, based on survey response or first hand knowledge
County owned land
Well identified
(locations approximate)
WELL LEGEND
A – School Well – North Corner of NYS RT 16 & Farwell RD
B – 4832 NYS RT 16 Hinsdale, NY 14743
Lot # 68.003-5.8
C – 4976 NYS RT 16 Hinsdale, NY 14743
Lot # 68.003-23
D – 4775 NYS RT 16 Hinsdale, NY 14743
Lot # 68.003-17.5
E – 36 Dellwood Street Eggertsville, NY 14226
Lot # 68.003-17.2
F – 1259 Johnson Hollow Rd. Hinsdale, NY 14743
Lot # 68.003-14.2
G – 1250 Johnson Hollow Rd. Hinsdale, NY 14743
Lot # 68.003-5.6
H – 1320 Johnson Hollow Rd. Hinsdale, NY 14743
Lot # 68.003-13
67.002
68.001
68.003
1/4 mile radius
1 mile radius
Direction of Groundwater Flow
COUNTY OF CATTARAUGUS
CATTARAUGUS COUNTY
FARWELL
NEW YORK STATE
Well survey indicated well on the premises, however there is first hand knowledge that no well exists. It is believed that the survey respondent owned multiple properties, and did not understand which property was the survey target.
N
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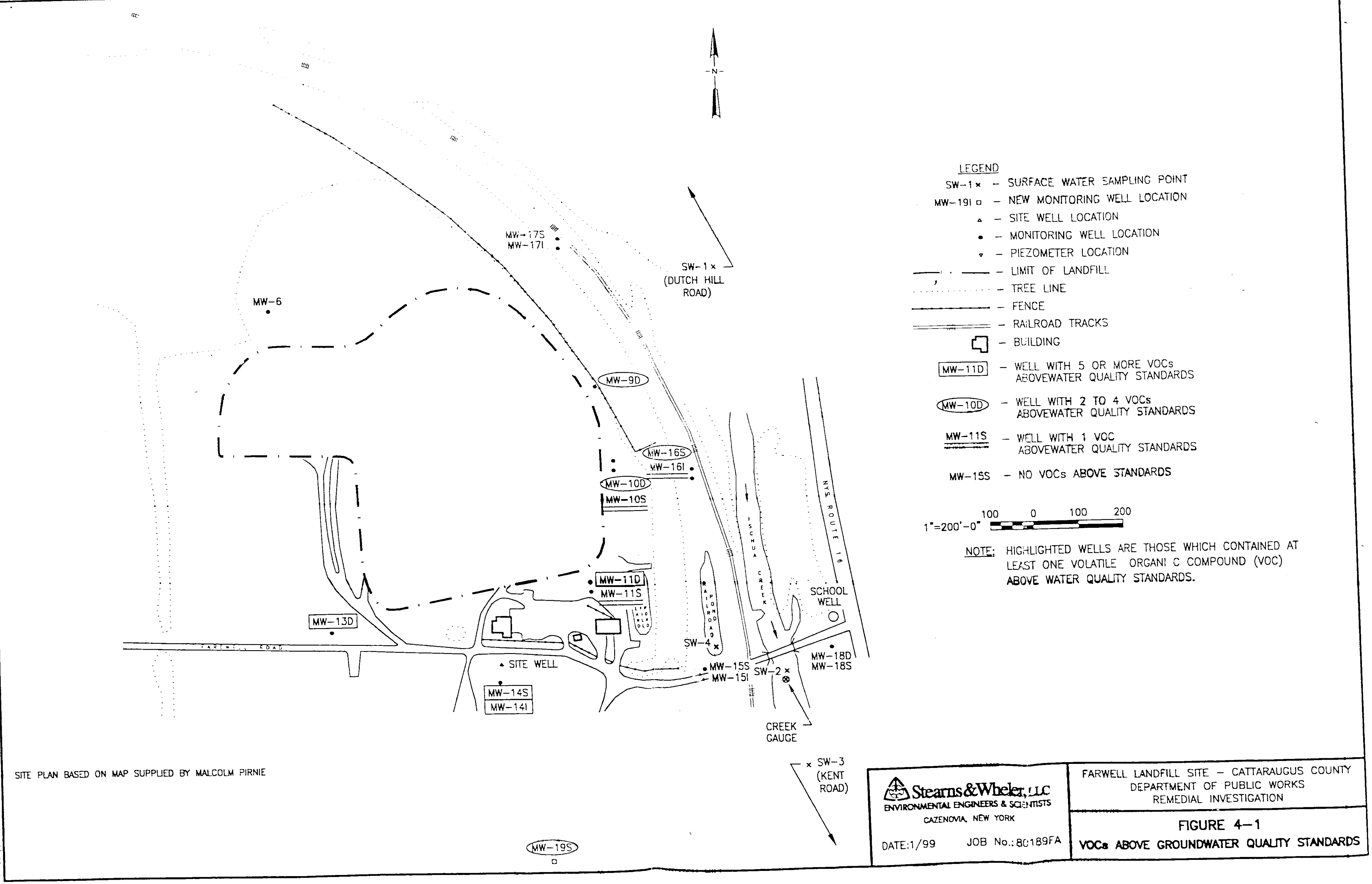
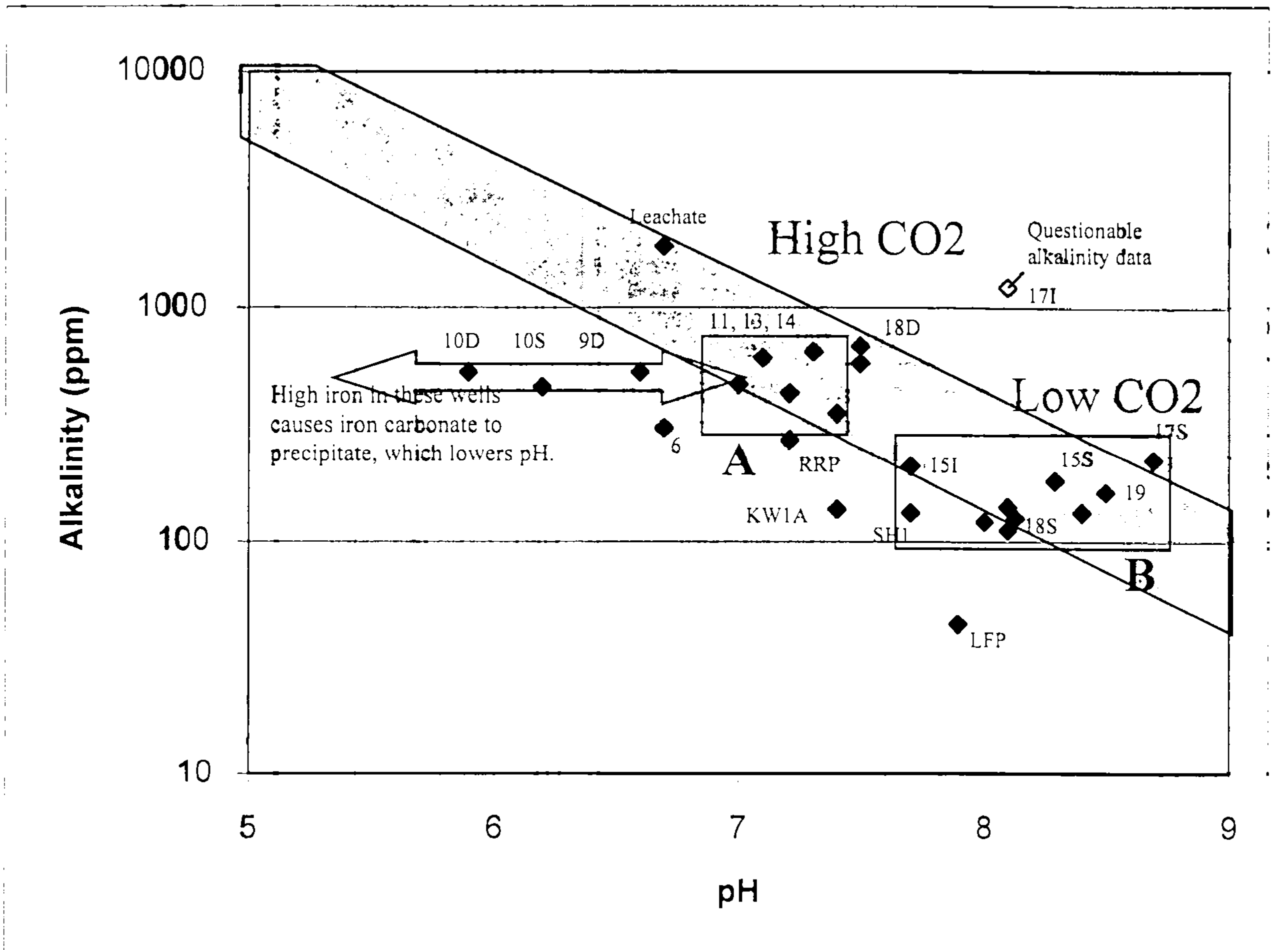
CAZENOVIA, NEW YORK
DATE: 12/08
JOB No: 80189FA
FARWELL LANDFILL
REMEDIAL INVESTIGATION
CATTARAUGUS COUNTY, NY
FIGURE 3-11
WATER WELL SURVEY
RESULTS



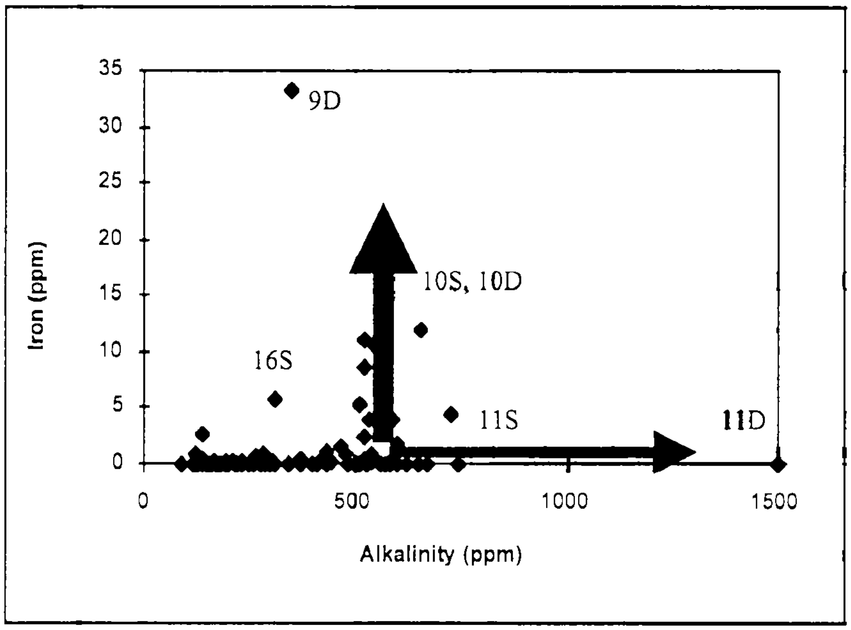
FARWELL LANDFILL SITE – CATTARAUGUS COUNTY
DEPARTMENT OF PUBLIC WORKS
REMEDIAL INVESTIGATION

FIGURE 4–1
VOCs ABOVE GROUNDWATER QUALITY STANDARDS



In the zone of carbonate equilibrium (gray shaded area) relative carbon dioxide levels can be determined by where the data plot. Data plotting towards the upper left have more carbon dioxide than data plotting to the lower right. Thus, biodegradation is evident for data cluster A (well clusters 11, 13, 14), where carbon dioxide is greater. Further downgradient (data cluster B) the carbon dioxide levels return to near background.

Stearns & Wheler, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, NEW YORK	FARWELL LANDFILL REMEDIAL INVESTIGATION CATTARAUGUS COUNTY, NY
DATE: 12/98 JOB No: 80189FA	FIGURE 5-1 pH vs. ALKALINITY



Historical site data illustrate how elevated iron controls alkalinity in wells MW-9D, -10S, and -10D.Precipitating iron carbonate (siderite) maintains alkalinity at around 600 to 700 ppm.

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FARWELL LANDFILL
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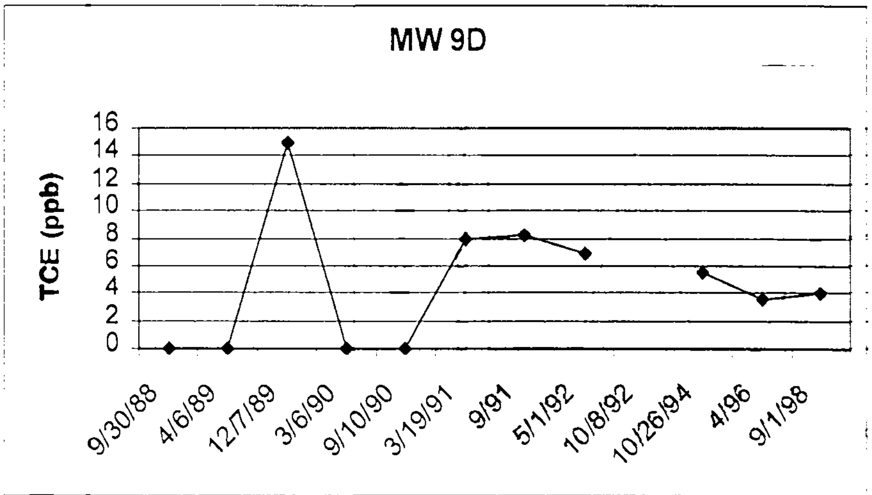
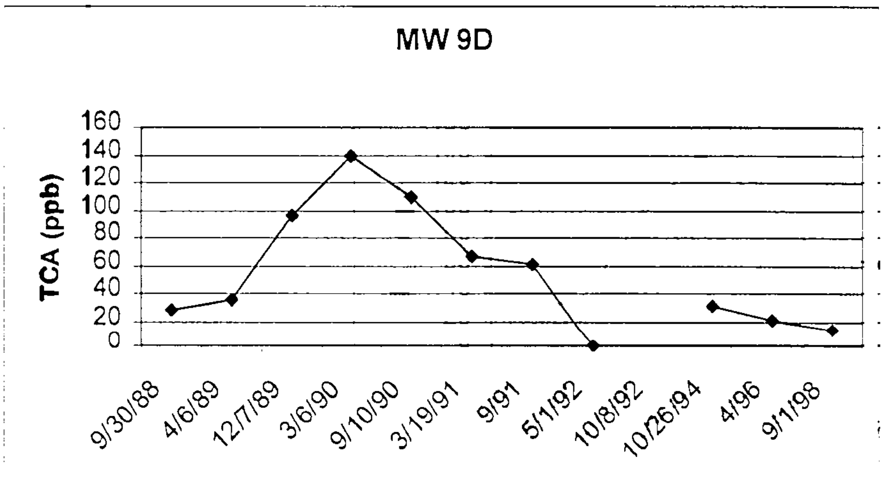
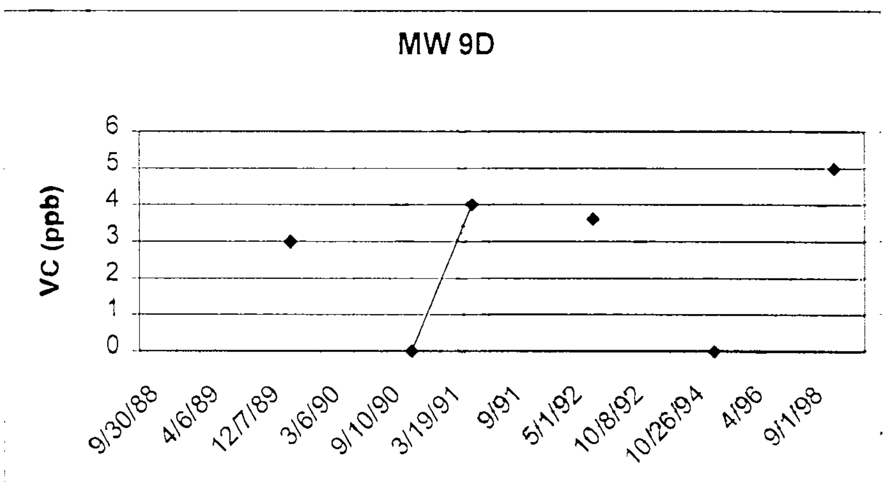
CATTARAUGUS COUNTY, NY

FIGURE 5-2
IRON vs. ALKALINITY







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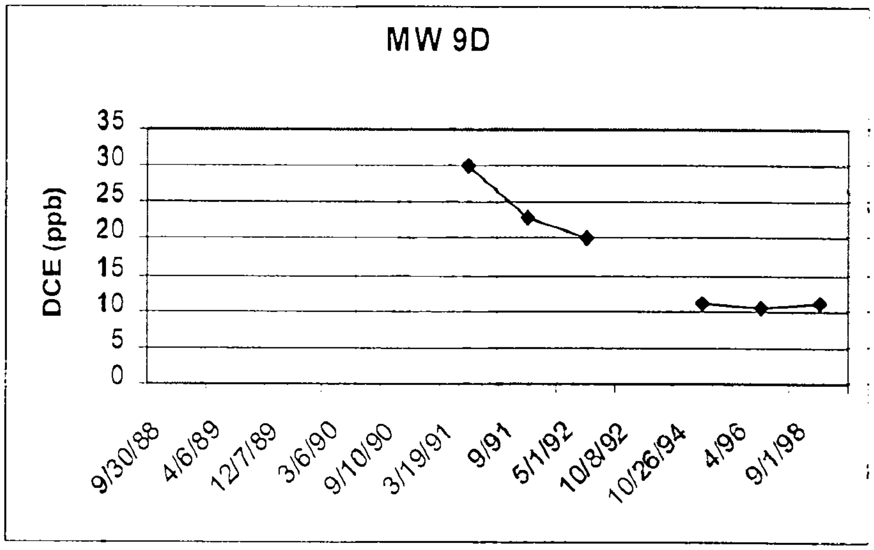
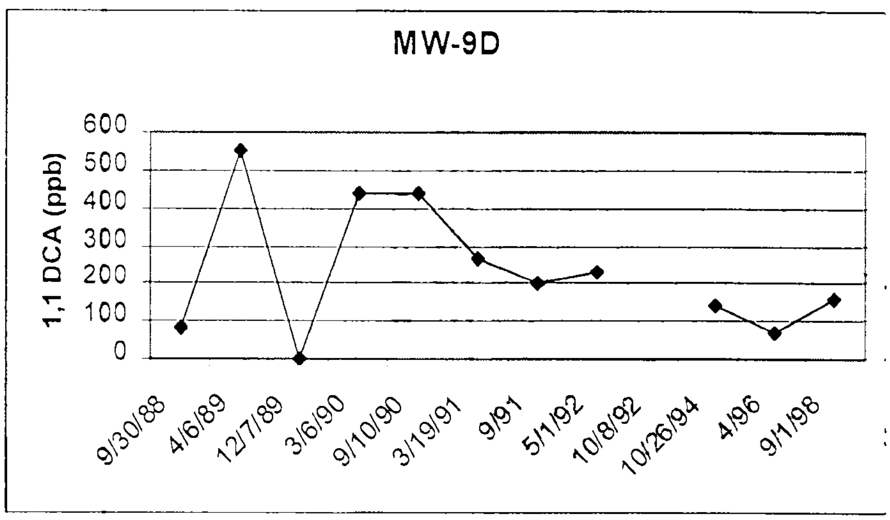
CATTARAUGUS COUNTY, NY

FIGURE 5-3A
CHEMICAL TRENDS, MW 9D





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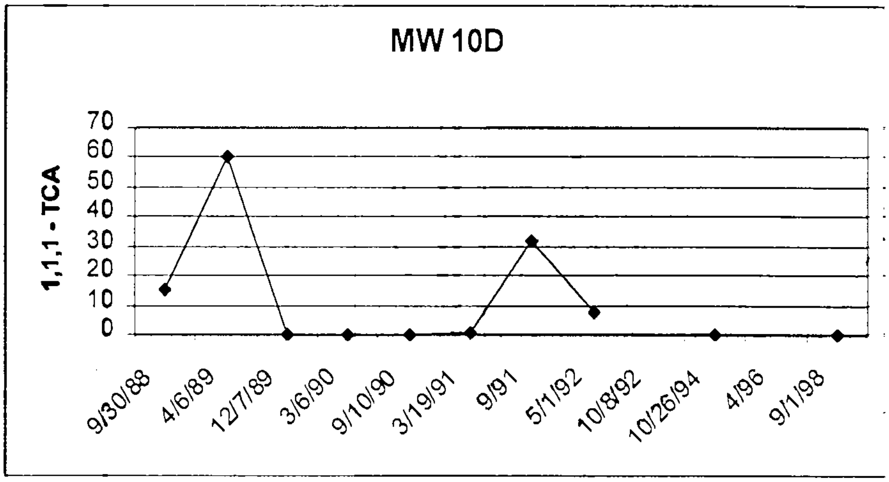
ENVIRONMENTAL ENGINEERS & SCIENTISTS

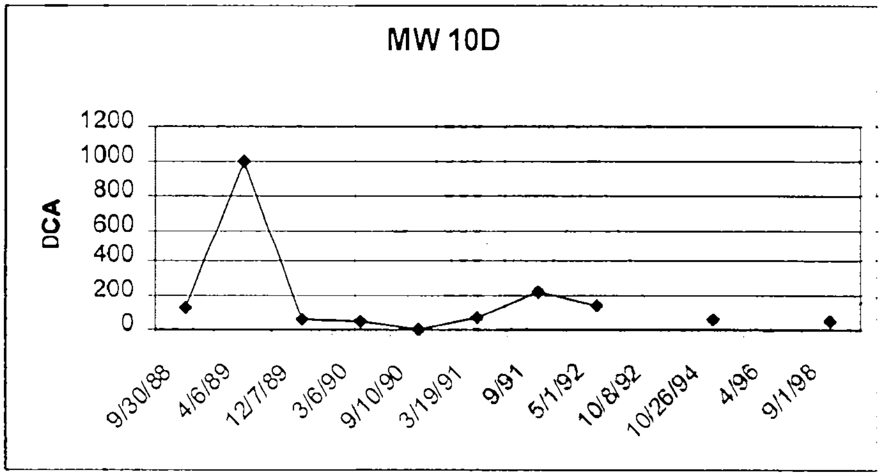
CAZENOVIA, NEW YORK

DATE: 12/98 JOB No: 80189FA

FARWELL LANDFILL
REMEDIAL INVESTIGATION
CATTARAUGUS COUNTY, NY

FIGURE 5-3B
CHEMICAL TRENDS, MW 9D





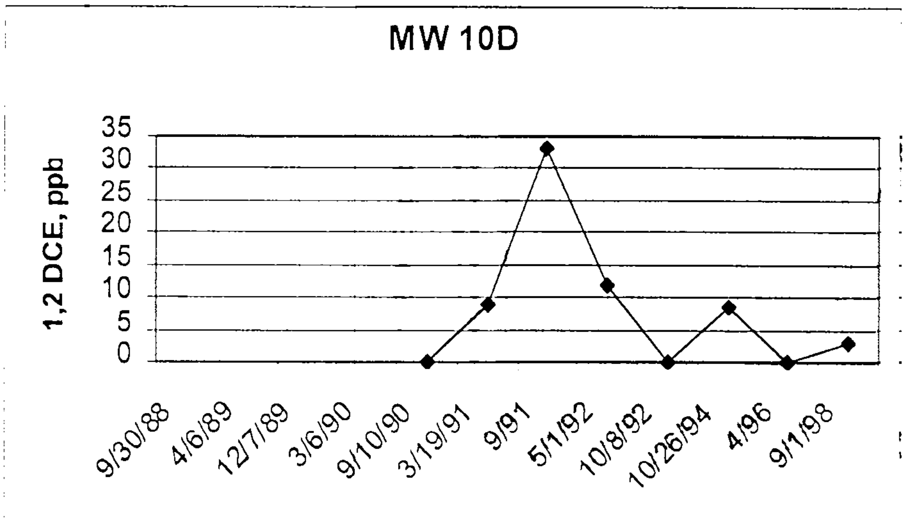
Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

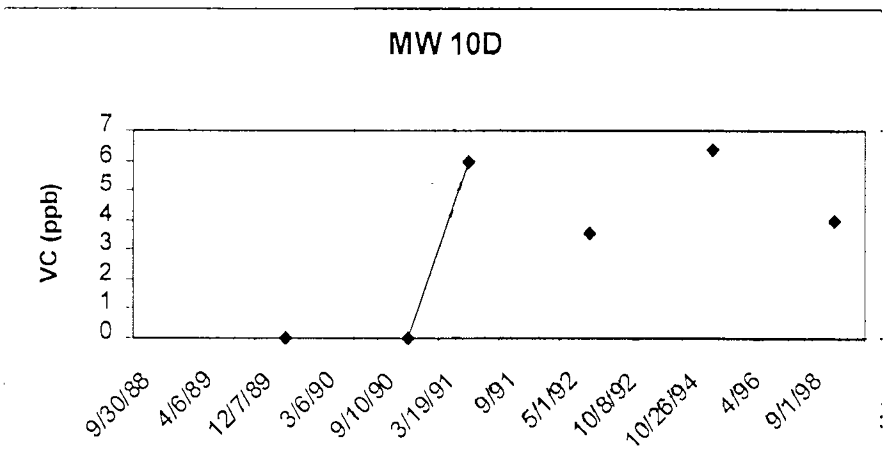
CAZENOVIA, NEW YORK

DATE: 12/98 JOB No: 80189FA

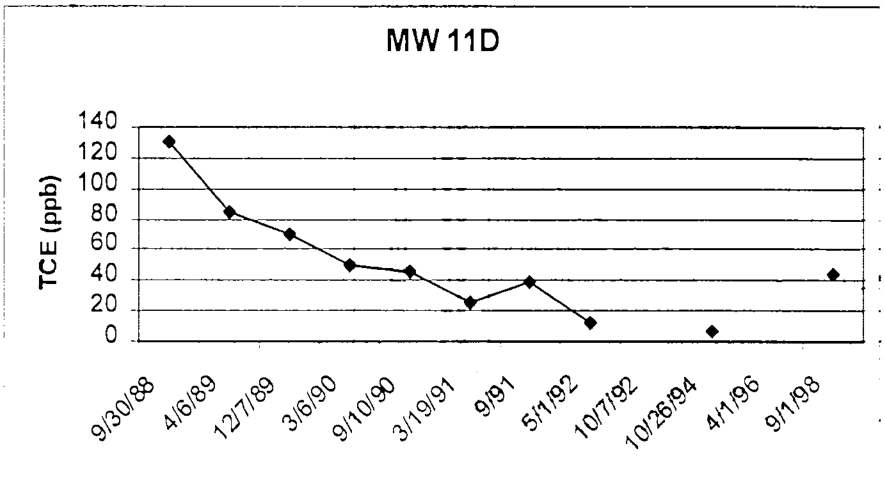
FARWELL LANDFILL
REMEDIAL INVESTIGATION
CATTARAUGUS COUNTY, NY

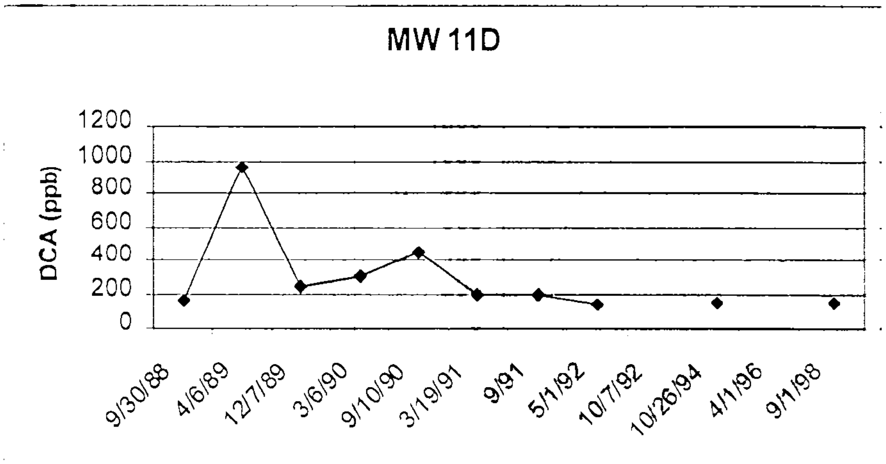
FIGURE 5-4A
CHEMICAL TRENDS, MW 10D



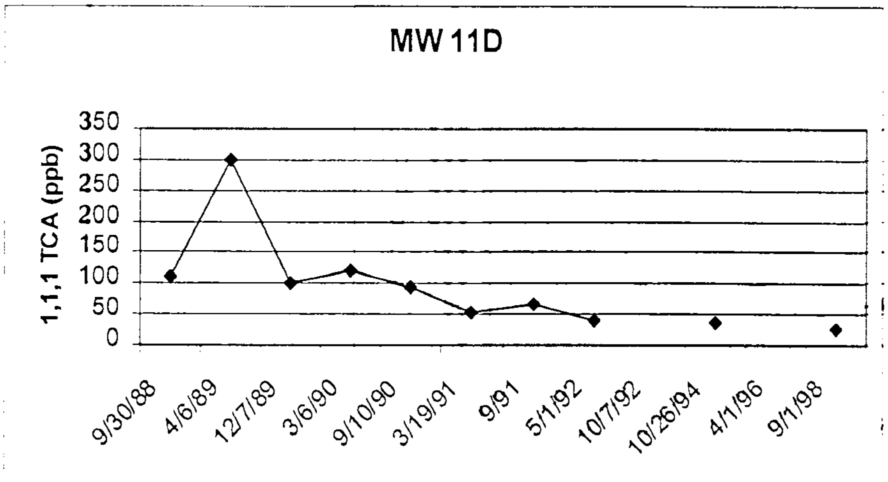


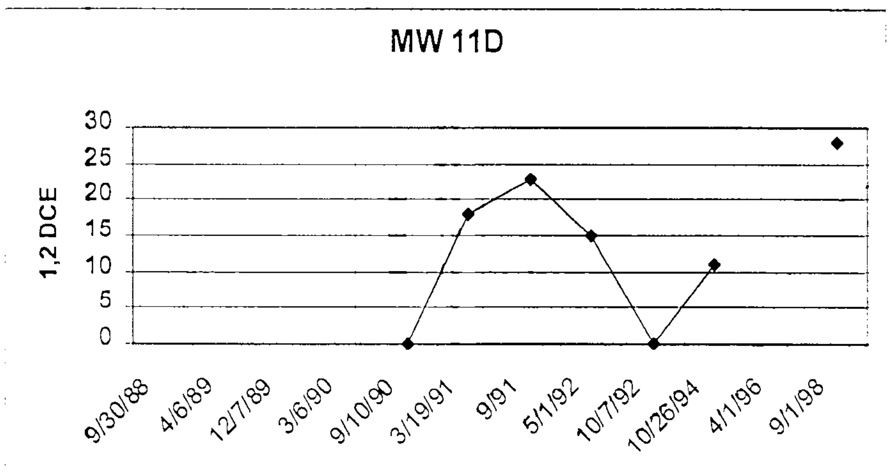
Stearns & Wheler, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, NEW YORK DATE: 12/98 JOB No: 80189FA	FARWELL LANDFILL REMEDIAL INVESTIGATION CATTARAUGUS COUNTY, NY
	FIGURE 5-4B CHEMICAL TRENDS, MW 10D



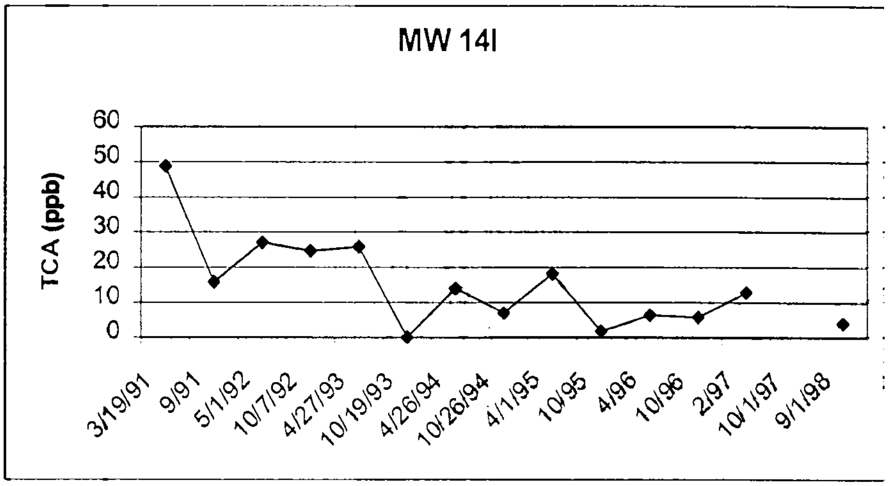


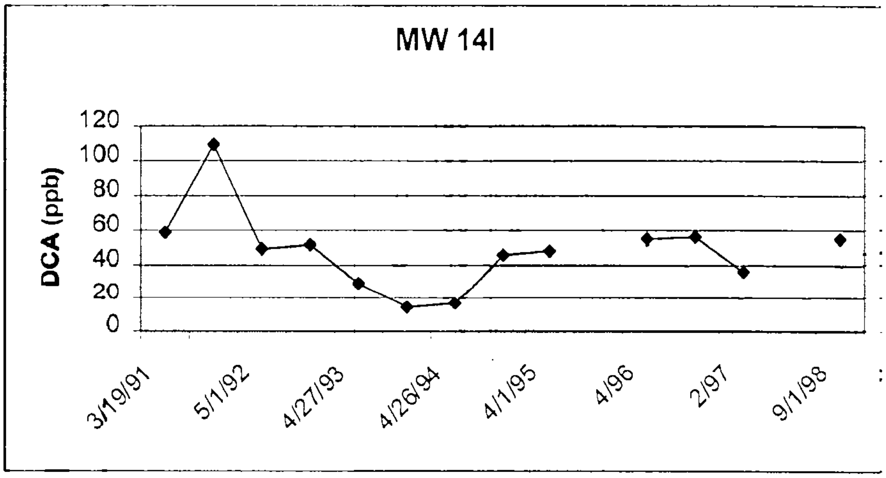
Stearns & Wheler, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, NEW YORK	FARWELL LANDFILL REMEDIAL INVESTIGATION CATTARAUGUS COUNTY, NY
DATE: 12/98 JOB No: 80189FA	**FIGURE 5-5A** **CHEMICAL TRENDS, MW 11D**





Stearns&Wheler, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, NEW YORK	FARWELL LANDFILL REMEDIAL INVESTIGATION CATTARAUGUS COUNTY, NY
DATE: 12/98 JOB No: 80189FA	**FIGURE 5-5B** **CHEMICAL TRENDS, MW 11D**



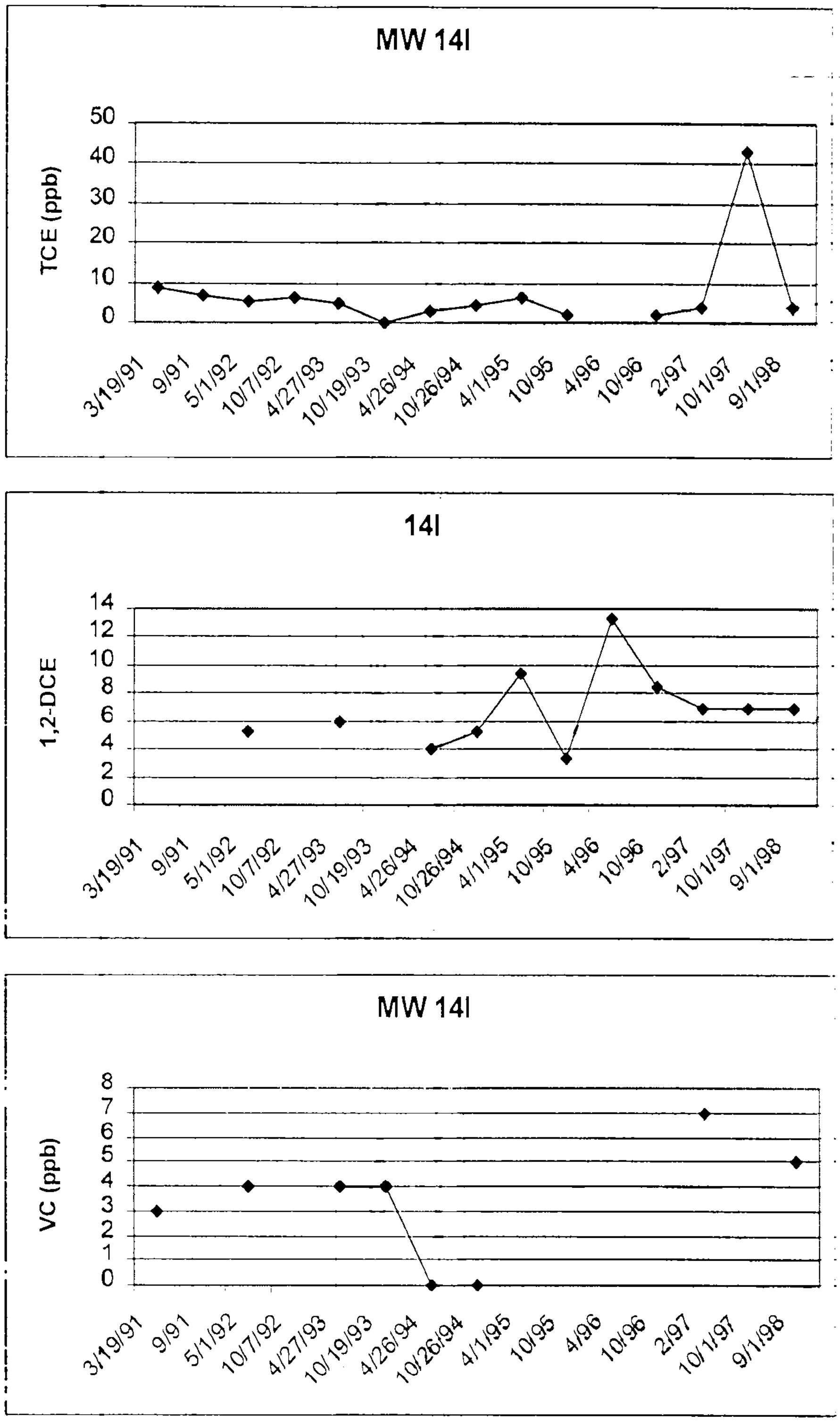


Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
CAZENOVIA, NEW YORK

DATE: 12/98 JOB No: 80189FA

FARWELL LANDFILL
REMEDIAL INVESTIGATION
CATTARAUGUS COUNTY, NY

FIGURE 5-6
CHEMICAL TRENDS, MW 14I

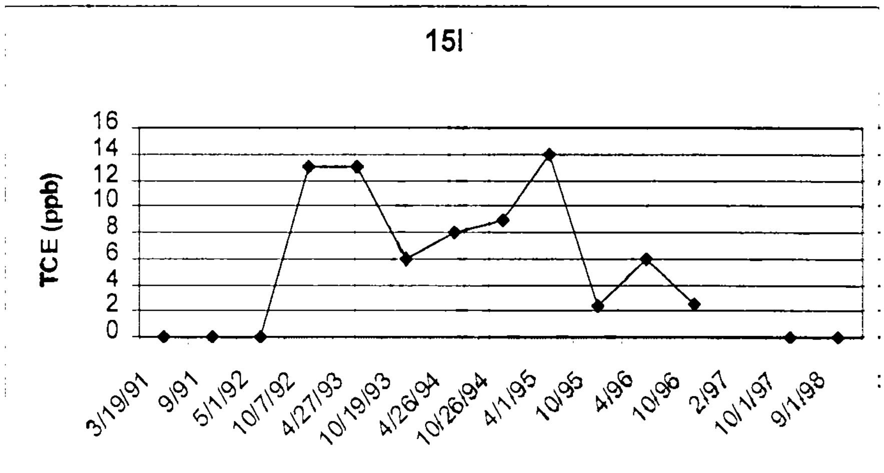


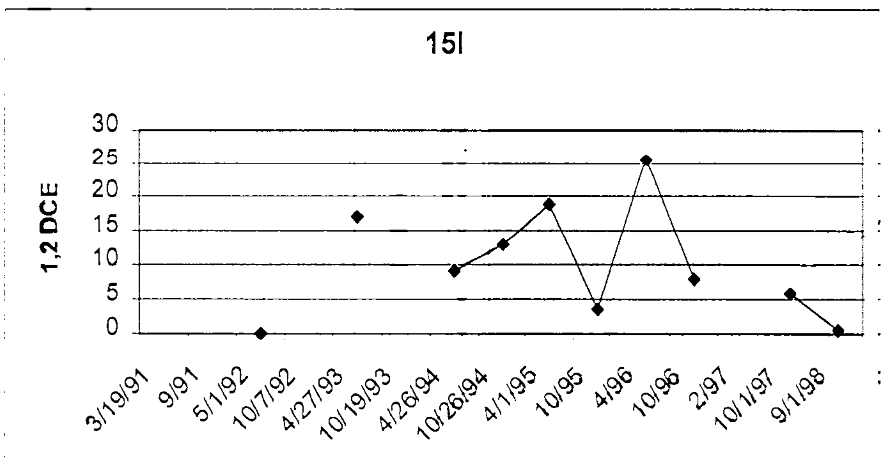
Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
CAZENOVIA, NEW YORK

DATE: 12/98 JOB No: 80189FA

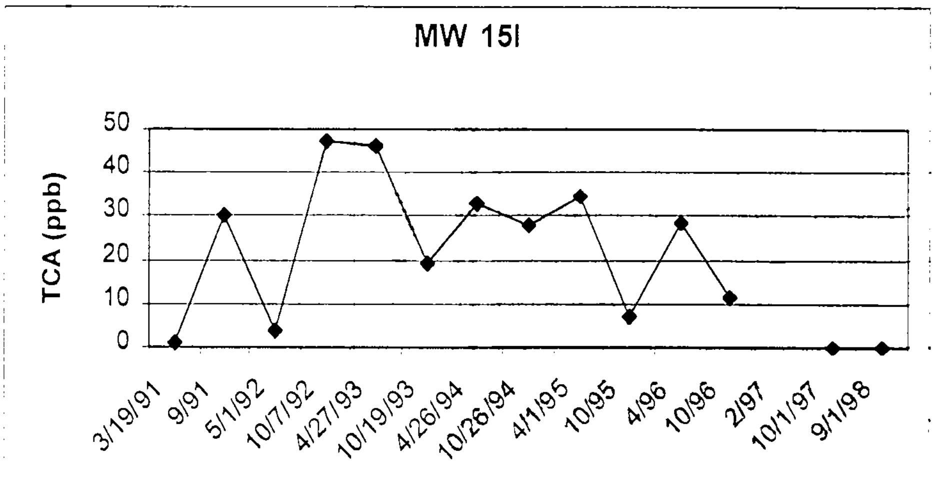
FARWELL LANDFILL
REMEDIAL INVESTIGATION
CATTARAUGUS COUNTY, NY

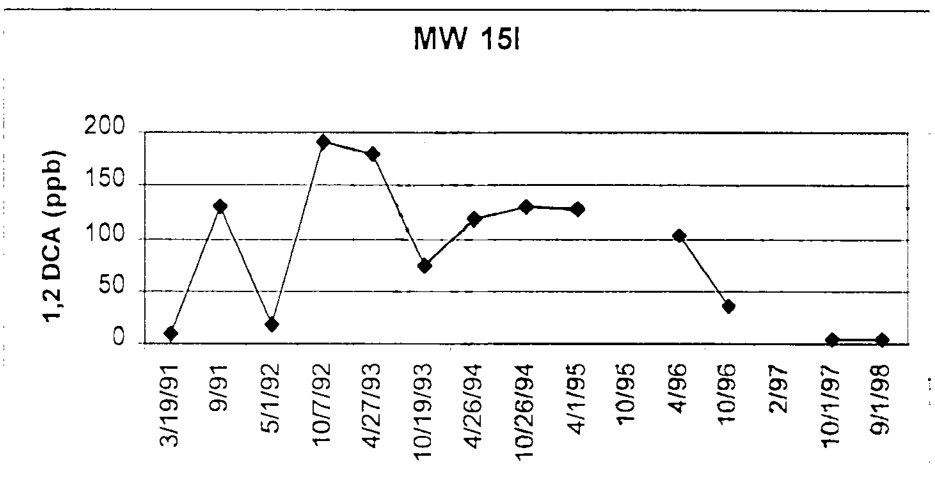
FIGURE 5-7
CHEMICAL TRENDS, MW 14I





Stearns & Wheler, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, NEW YORK	FARWELL LANDFILL REMEDIAL INVESTIGATION CATTARAUGUS COUNTY, NY
DATE: 12/98 JOB No: 80189FA	**FIGURE 5-8A** **CHEMICAL TRENDS, MW 15I**





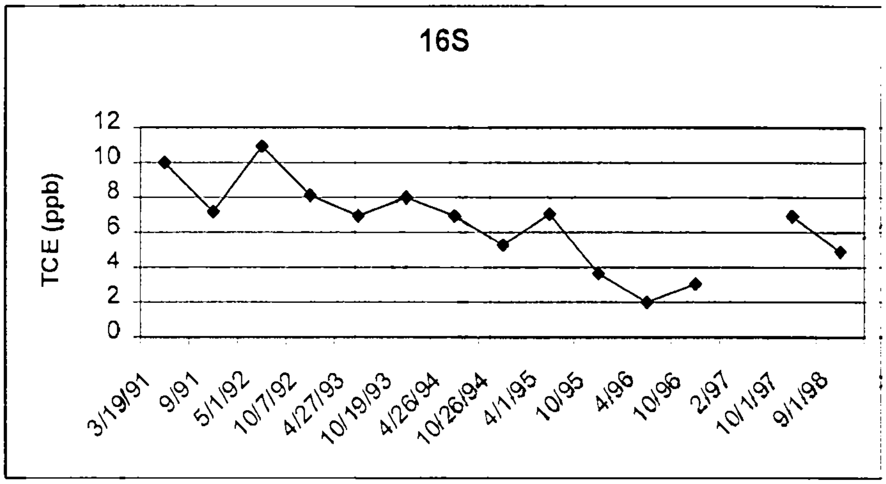
Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

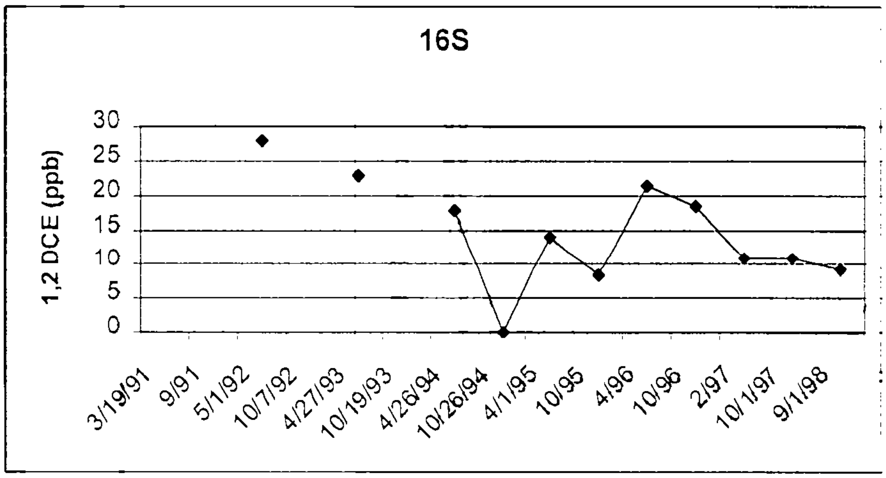
CAZENOVIA, NEW YORK

DATE: 12/98 JOB No: 80189FA

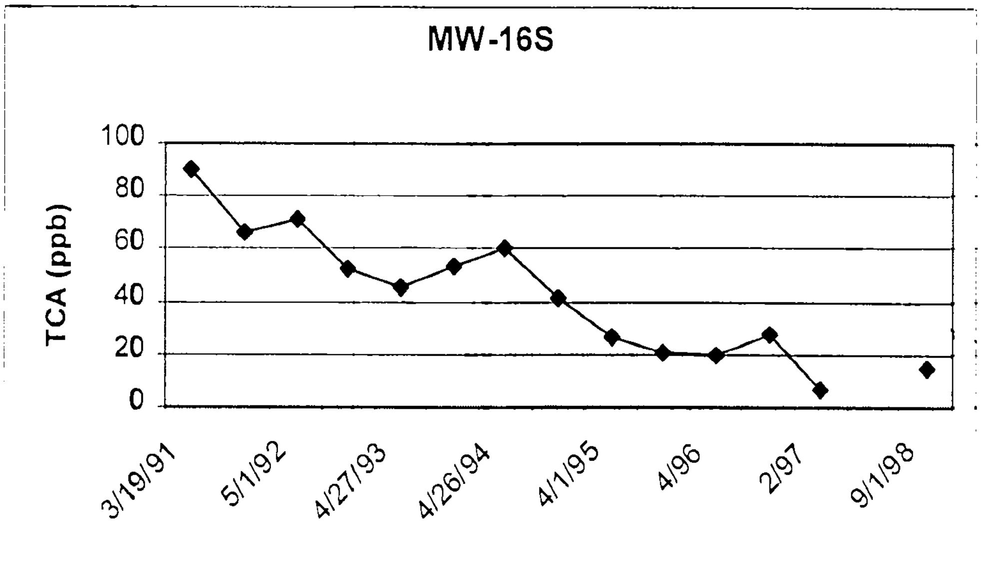
FARWELL LANDFILL
REMEDIAL INVESTIGATION
CATTARAUGUS COUNTY, NY

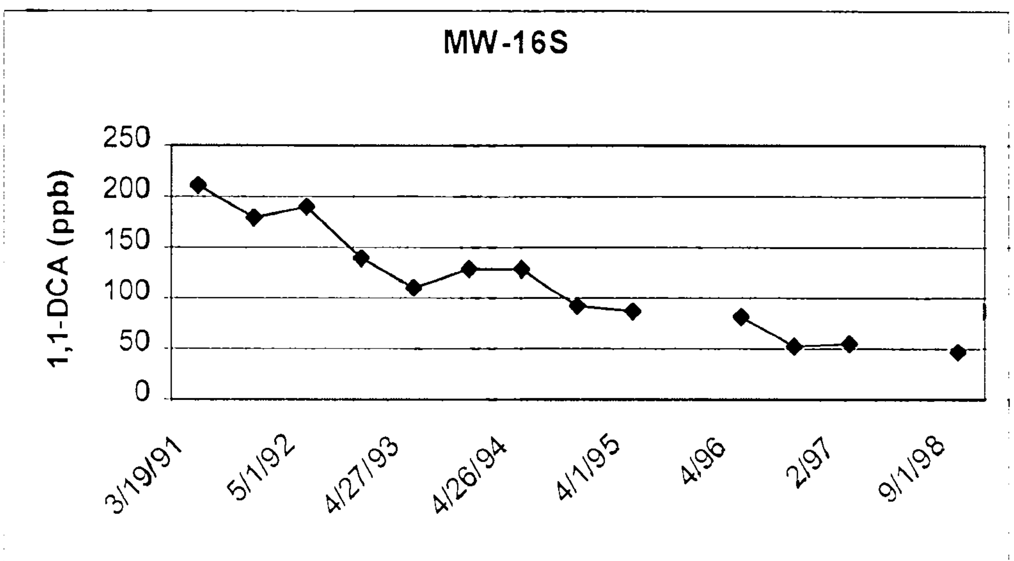
FIGURE 5-8B
CHEMICAL TRENDS, MW 15I





Stearns & Wheler, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS	FARWELL LANDFILL REMEDIAL INVESTIGATION CATTARAUGUS COUNTY, NY
CAZENOVIA, NEW YORK DATE: 12/98 JOB No: 80189FA	FIGURE 5-9A CHEMICAL TRENDS, MW 16S



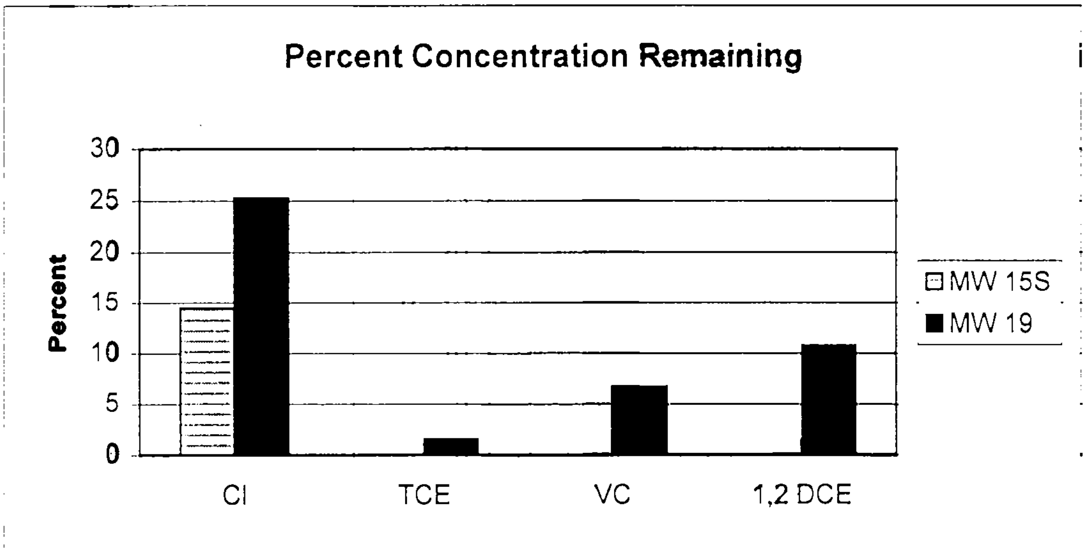


Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
CAZENOVIA, NEW YORK

DATE: 12/98 JOB No: 80189FA

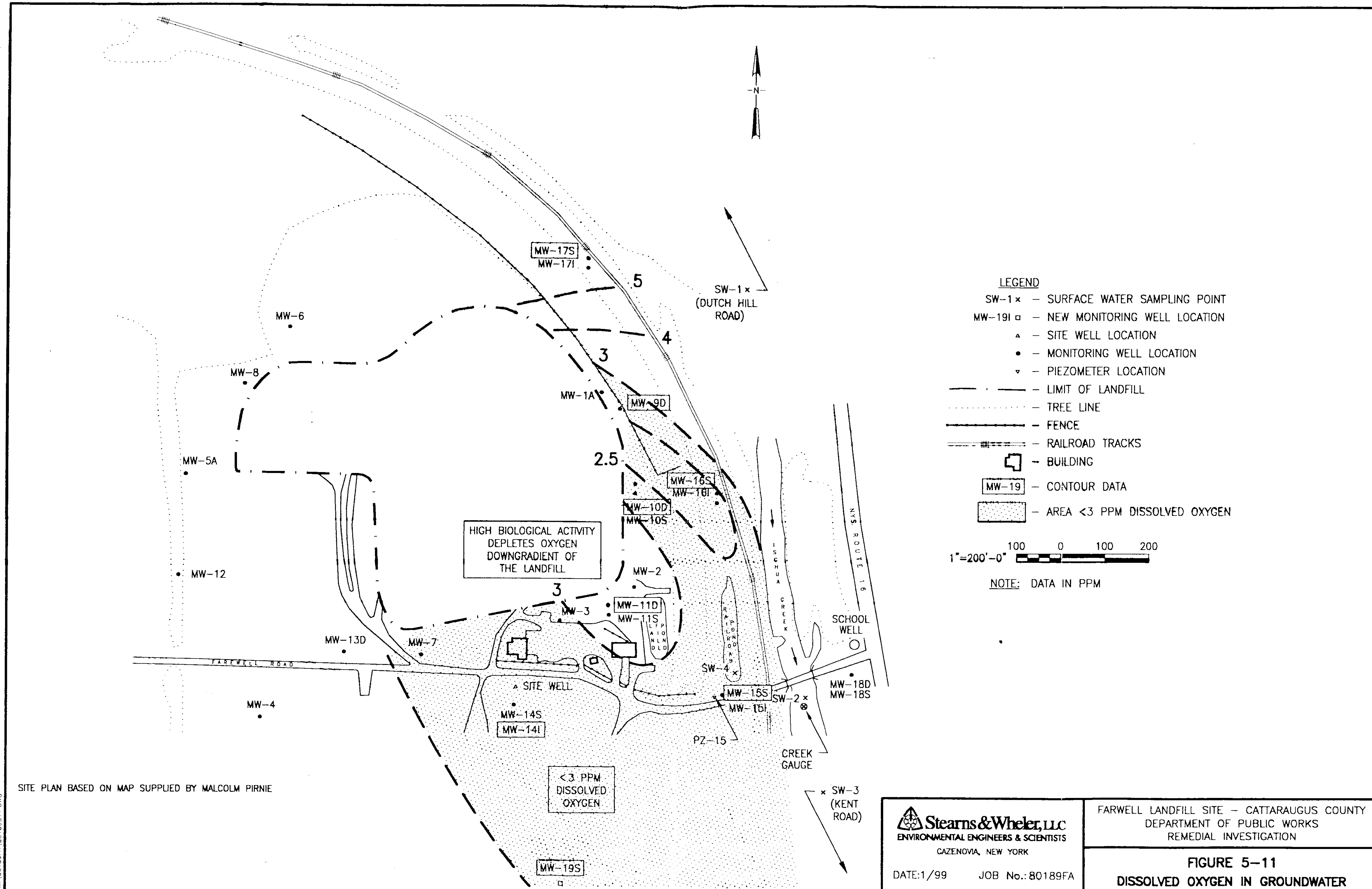
FARWELL LANDFILL
REMEDIAL INVESTIGATION
CATTARAUGUS COUNTY, NY

FIGURE 5-9B
CHEMICAL TRENDS, MW 16S



The percent of each parameter in downgradient wells MW-15S and MW-19, compared to the amount present in MW-11D (at the edge of the landfill), is presented. About 25 percent of the chloride concentration in MW-11D is present in well MW-19, and about 15 percent is present in MW-15S. In contrast, only 10 percent or less of the chlorinated compounds in MW-11D are present in MW-19, and none are present in MW-15S. Clearly, TCE; 1,2 DCE; and VC levels decline noticeably more than chloride, indicating chemical and/or biological attenuation.

Stearns & Wheler, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, NEW YORK DATE: 6/97 JOB No: 70135AA	FARWELL LANDFILL REMEDIAL INVESTIGATION CATTARAUGUS COUNTY, NY **FIGURE 5-10** **ATTENUATION TRENDS**



SITE PLAN BASED ON MAP SUPPLIED BY MALCOLM PIRNIE

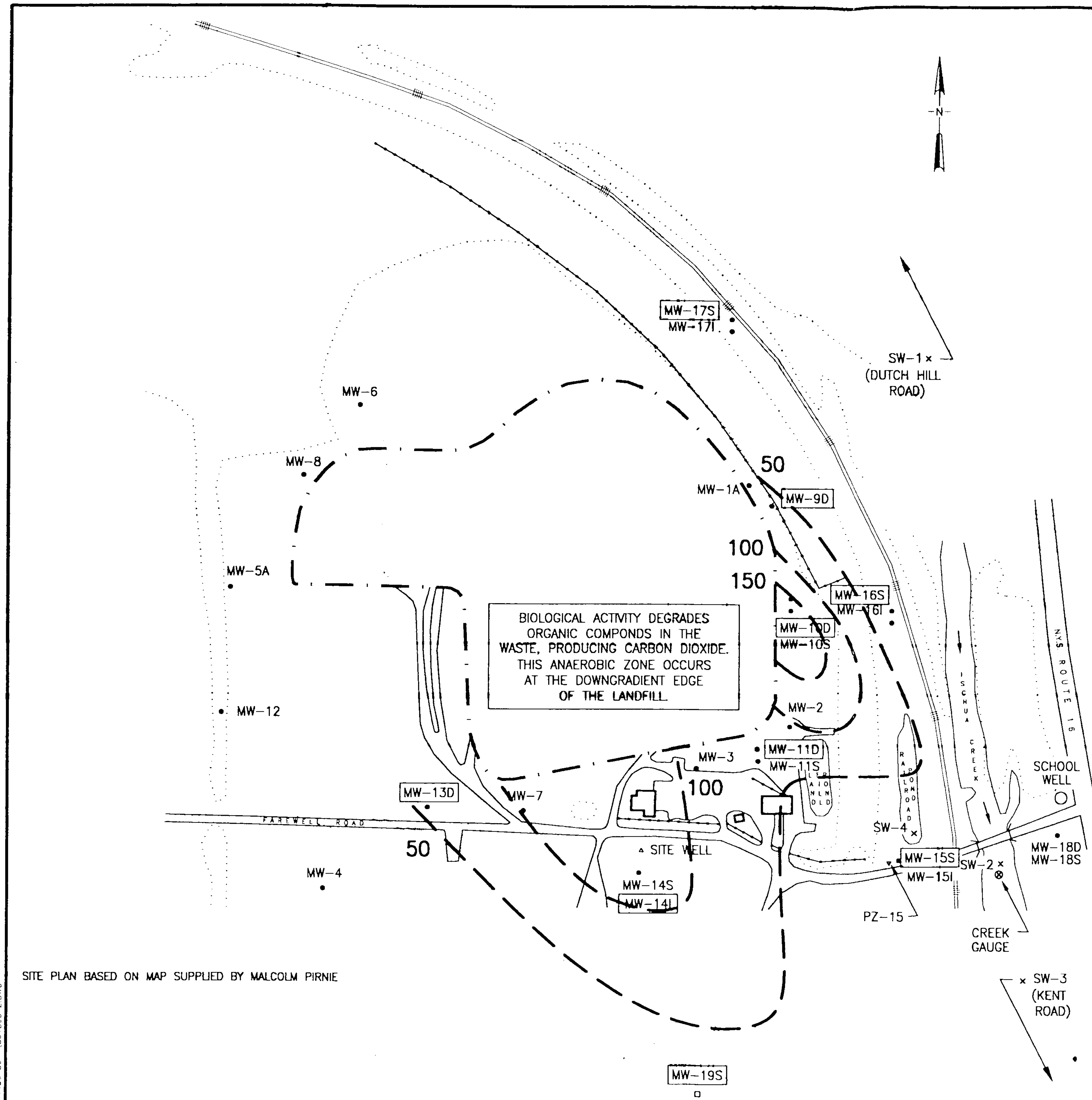
Stearns&Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
CAZENOVIA, NEW YORK

DATE:1/99 JOB No.: 80189FA

FARWELL LANDFILL SITE – CATTARAUGUS COUNTY
DEPARTMENT OF PUBLIC WORKS
REMEDIAL INVESTIGATION

FIGURE 5-11
DISSOLVED OXYGEN IN GROUNDWATER

M:\80189FA\80189511.DWG

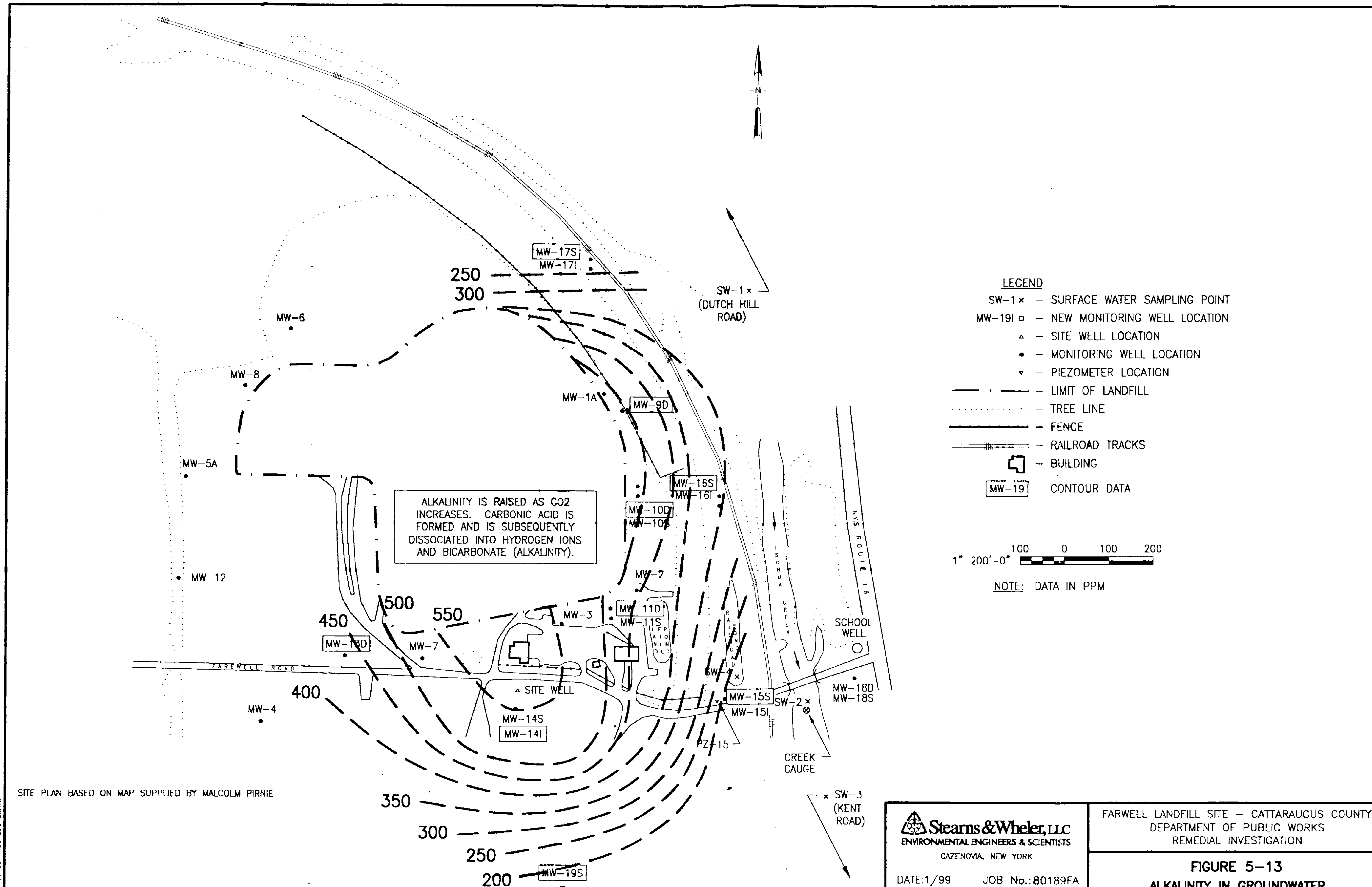


Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
CAZENOVIA, NEW YORK

DATE: 1/99 JOB No.: 80189FA

FARWELL LANDFILL SITE – CATTARAUGUS COUNTY
DEPARTMENT OF PUBLIC WORKS
REMEDIAL INVESTIGATION

FIGURE 5-12
DISSOLVED CARBON DIOXIDE IN GROUNDWATER



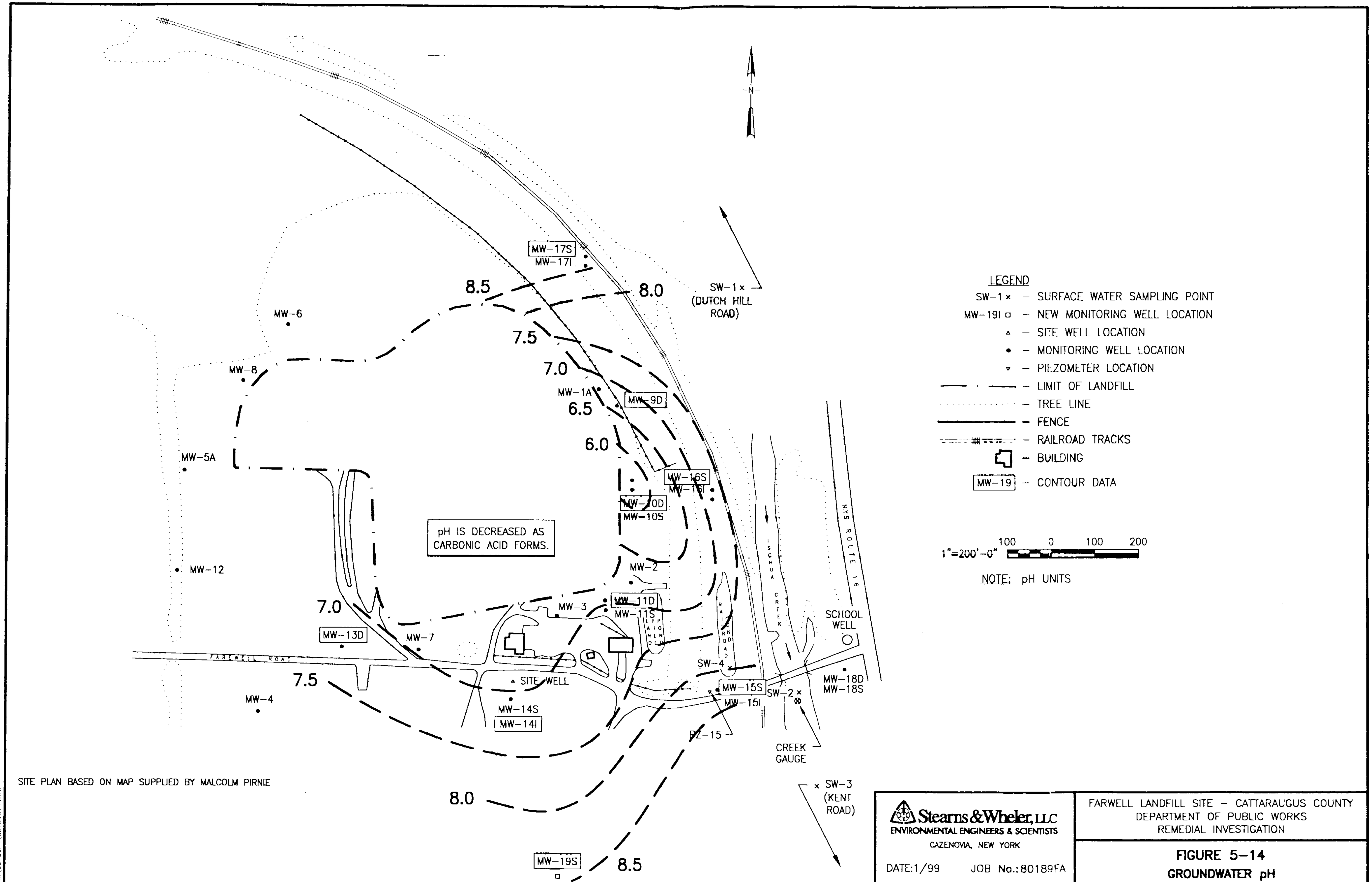
Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
CAZENOVIA, NEW YORK

DATE: 1/99 JOB No.: 80189FA

FARWELL LANDFILL SITE – CATTARAUGUS COUNTY
DEPARTMENT OF PUBLIC WORKS
REMEDIAL INVESTIGATION

FIGURE 5–13
ALKALINITY IN GROUNDWATER

98/12 DW
M:\80189FA\80189513.DWG



FARWELL LANDFILL SITE – CATTARAUGUS COUNTY
DEPARTMENT OF PUBLIC WORKS
REMEDIAL INVESTIGATION

FIGURE 5–14
GROUNDWATER pH

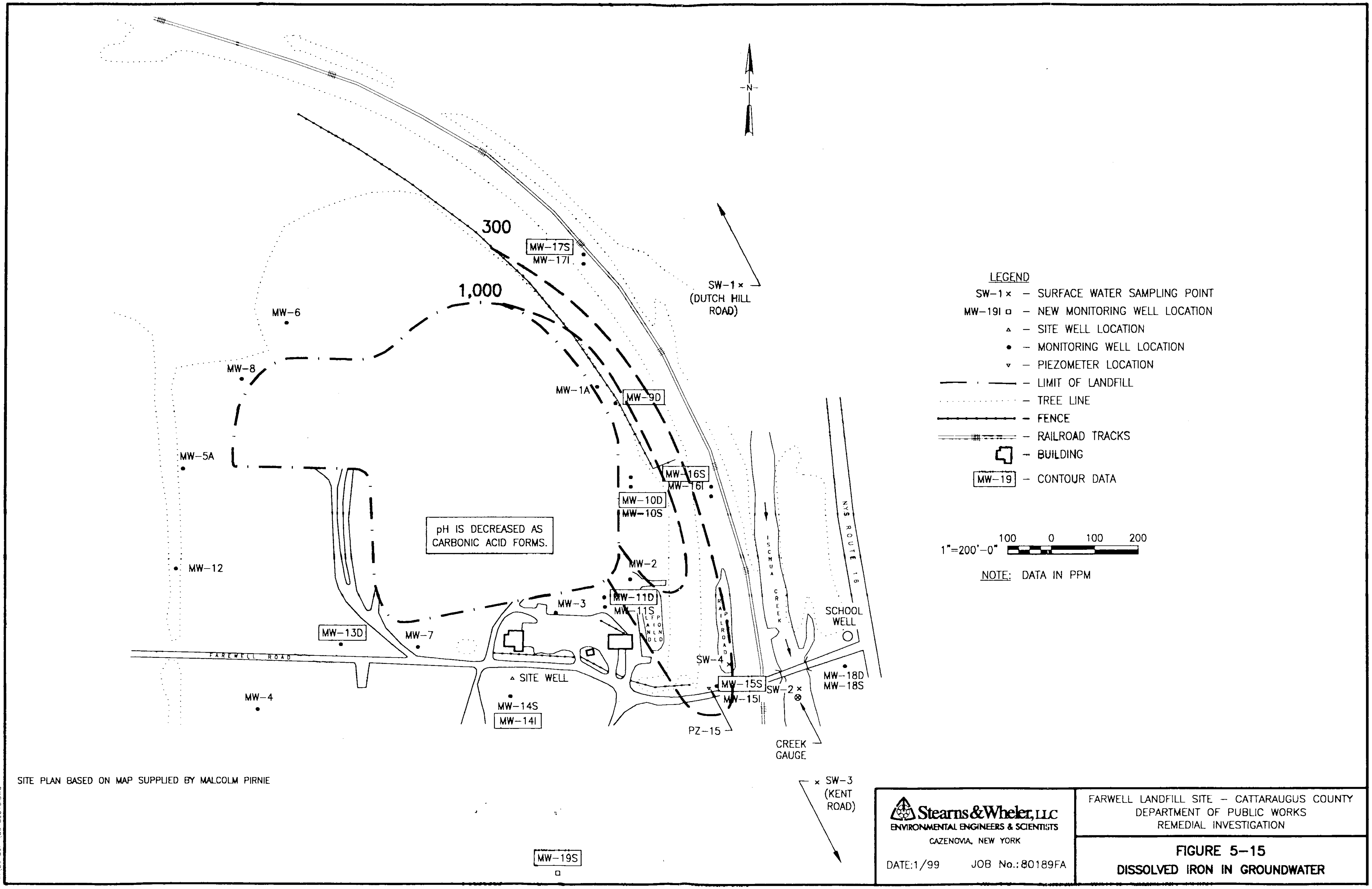
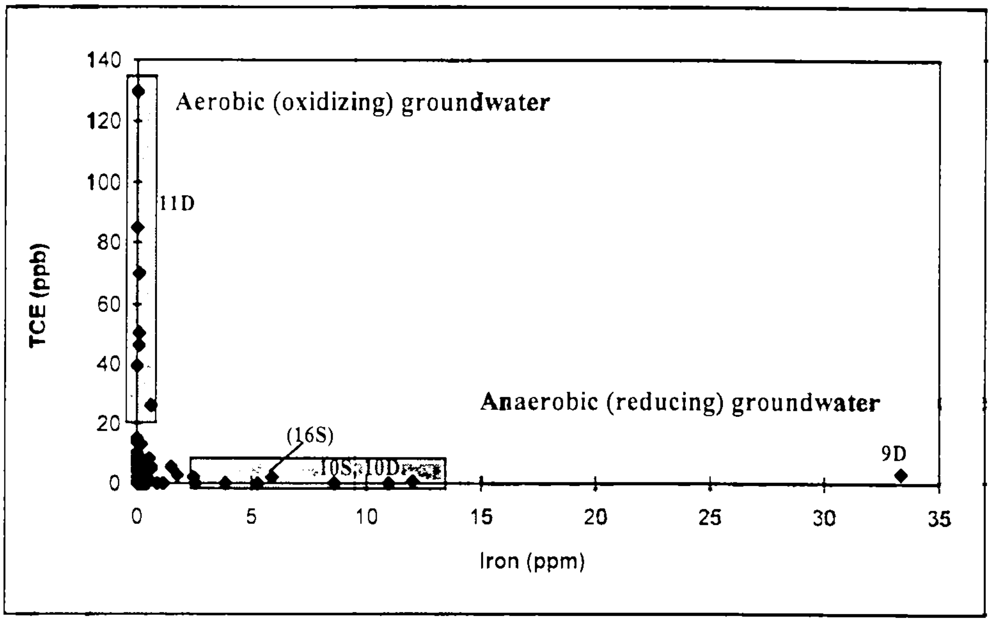
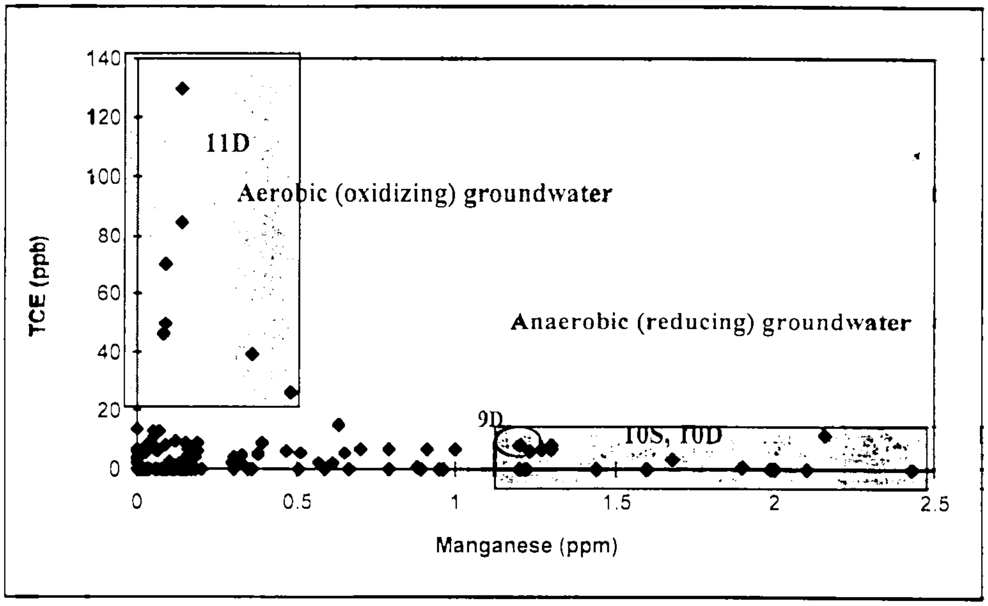
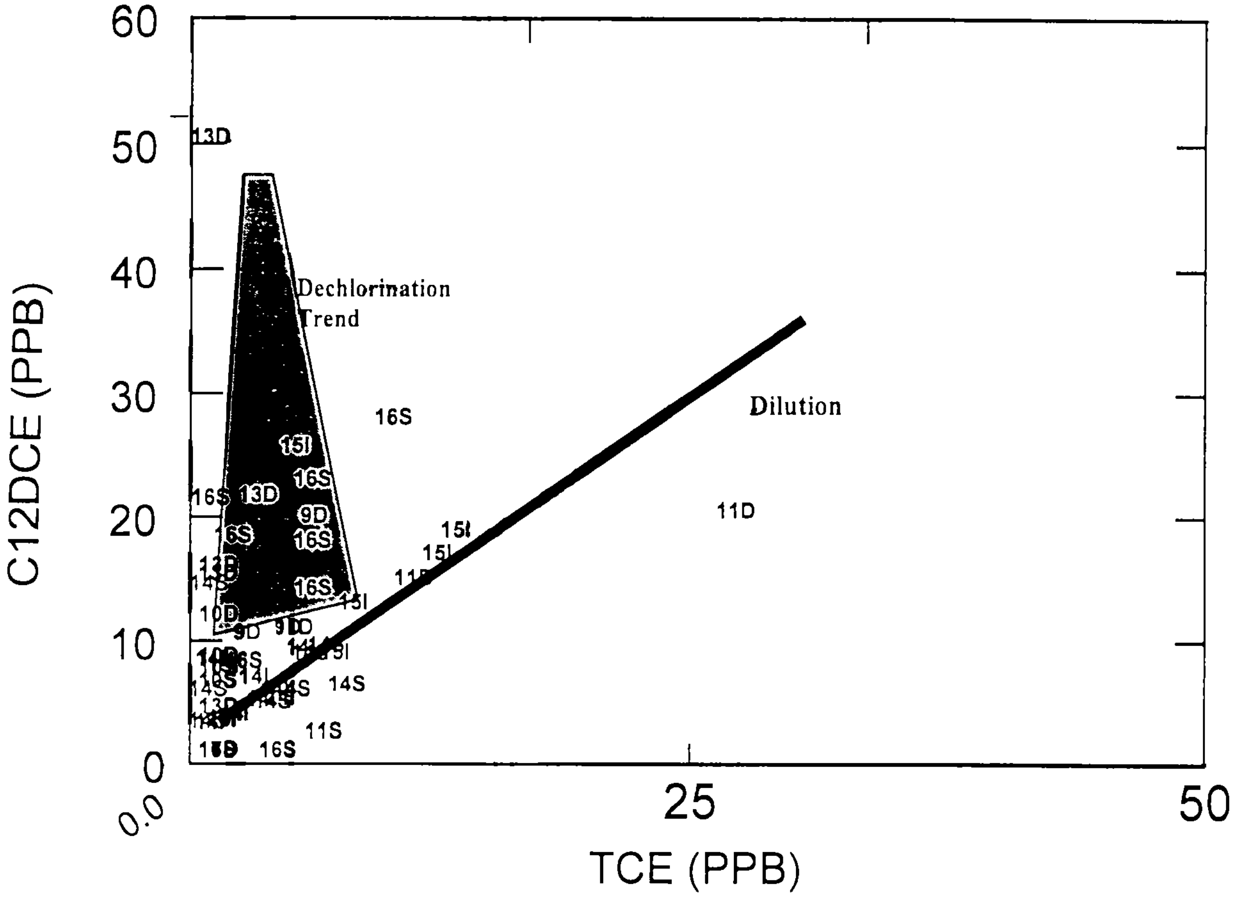


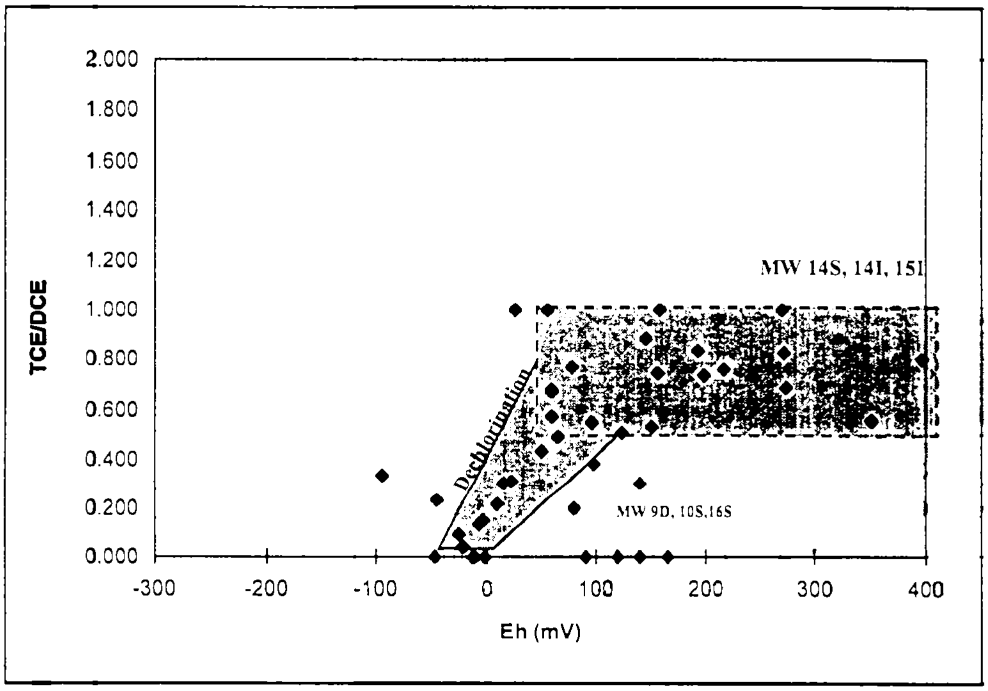
FIGURE 5-15
DISSOLVED IRON IN GROUNDWATER



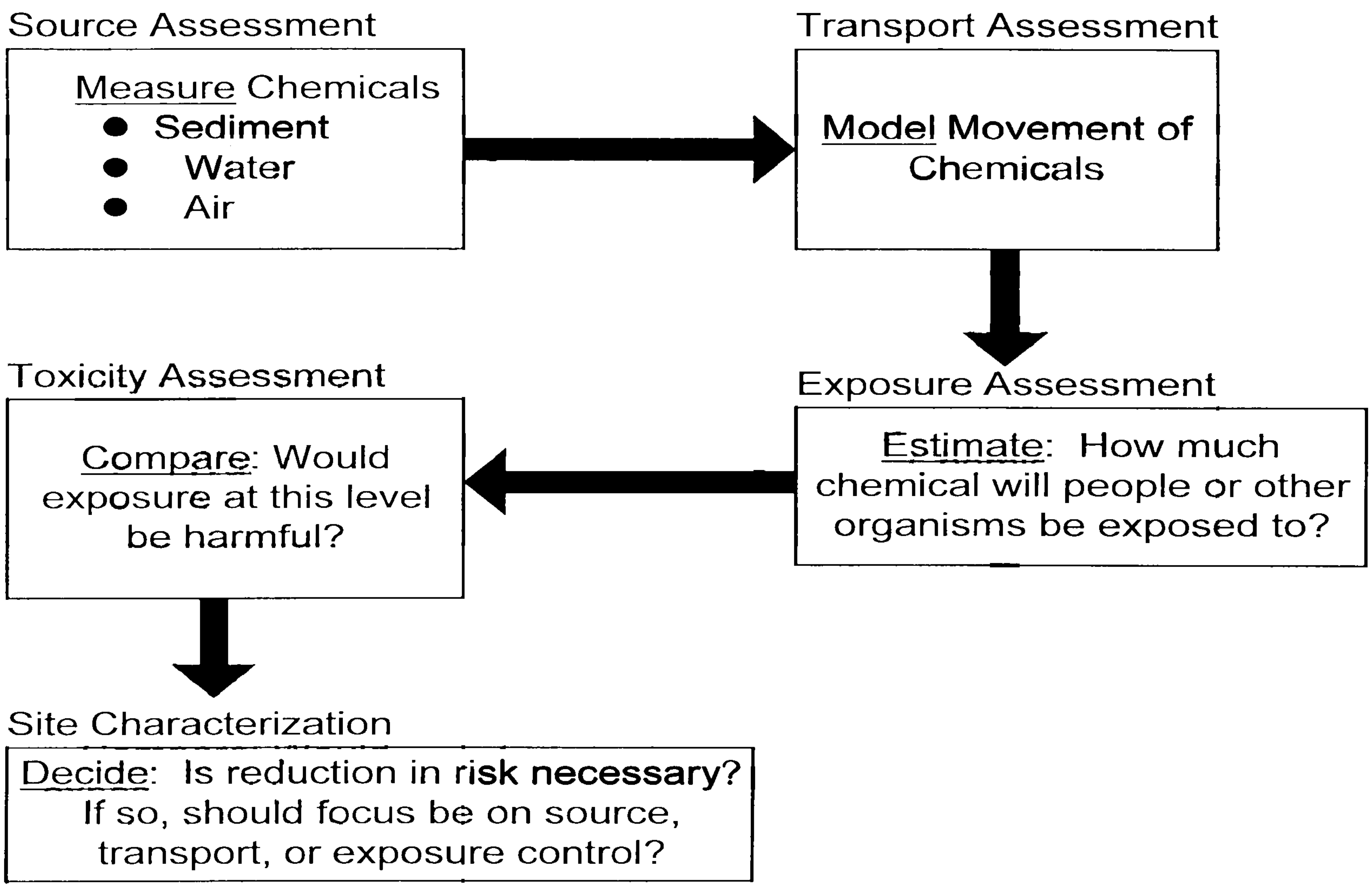


Stearns & Wheler, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, NEW YORK DATE: 6/97 JOB No: 80189AA	FARWELL LANDFILL REMEDIAL INVESTIGATION CATTARAUGUS COUNTY, NY
	FIGURE 5-16 **CHEMICAL TRENDS - TCE**





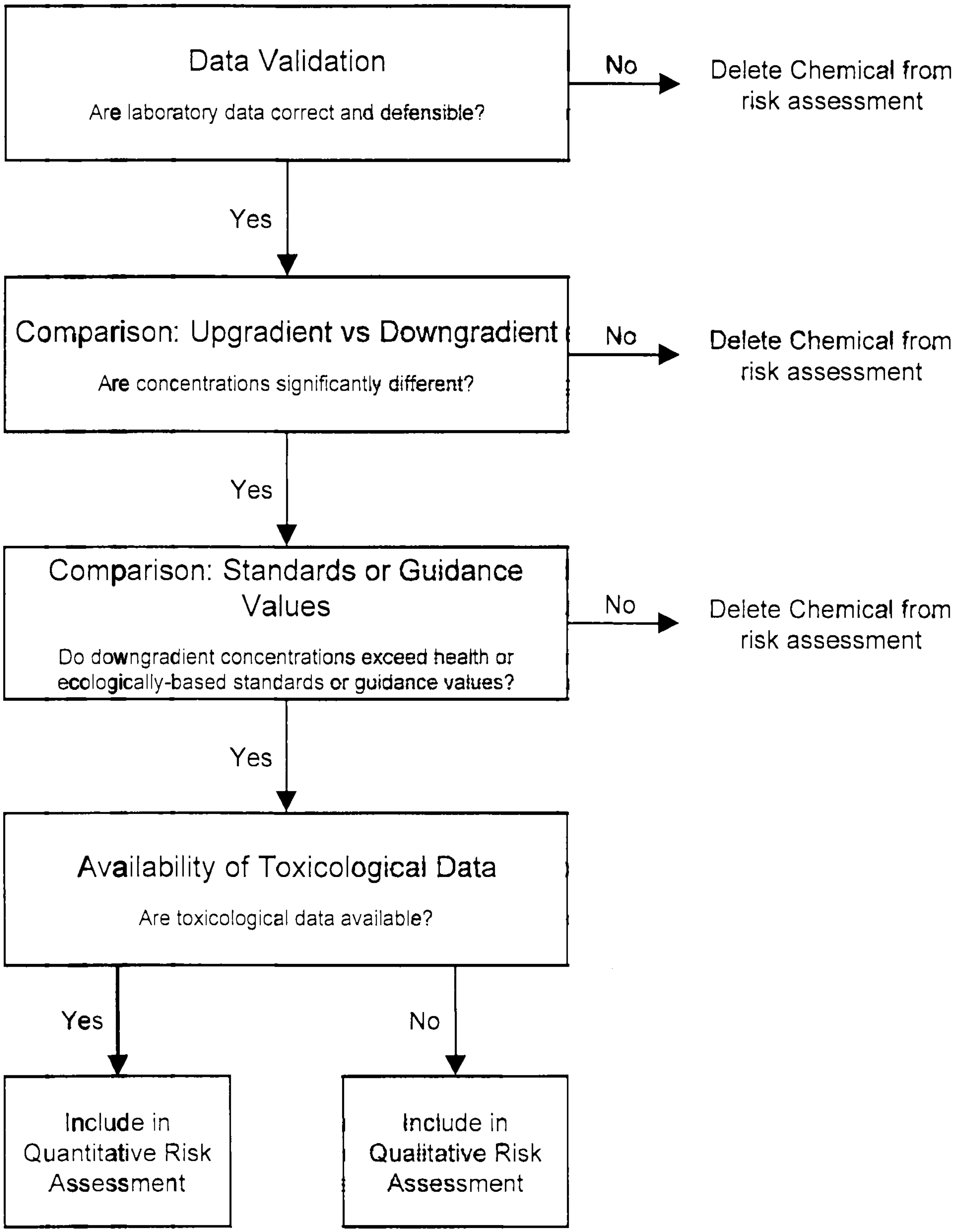
Stearns & Wheler, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, NEW YORK DATE: 6/97 JOB No: 80189FA	FARWELL LANDFILL REMEDIAL INVESTIGATION CATTARAUGUS COUNTY, NY
	FIGURE 5-17 **CHEMICAL TRENDS - DEGRADATION**



Stearns&Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
CAZENOVIA, NEW YORK
DATE: 1/99 JOB No. 80189FA

FARWELL LANDFILL SITE - CATTARAUGUS COUNTY
DEPARTMENT OF PUBLIC WORKS
REMEDIAL INVESTIGATION

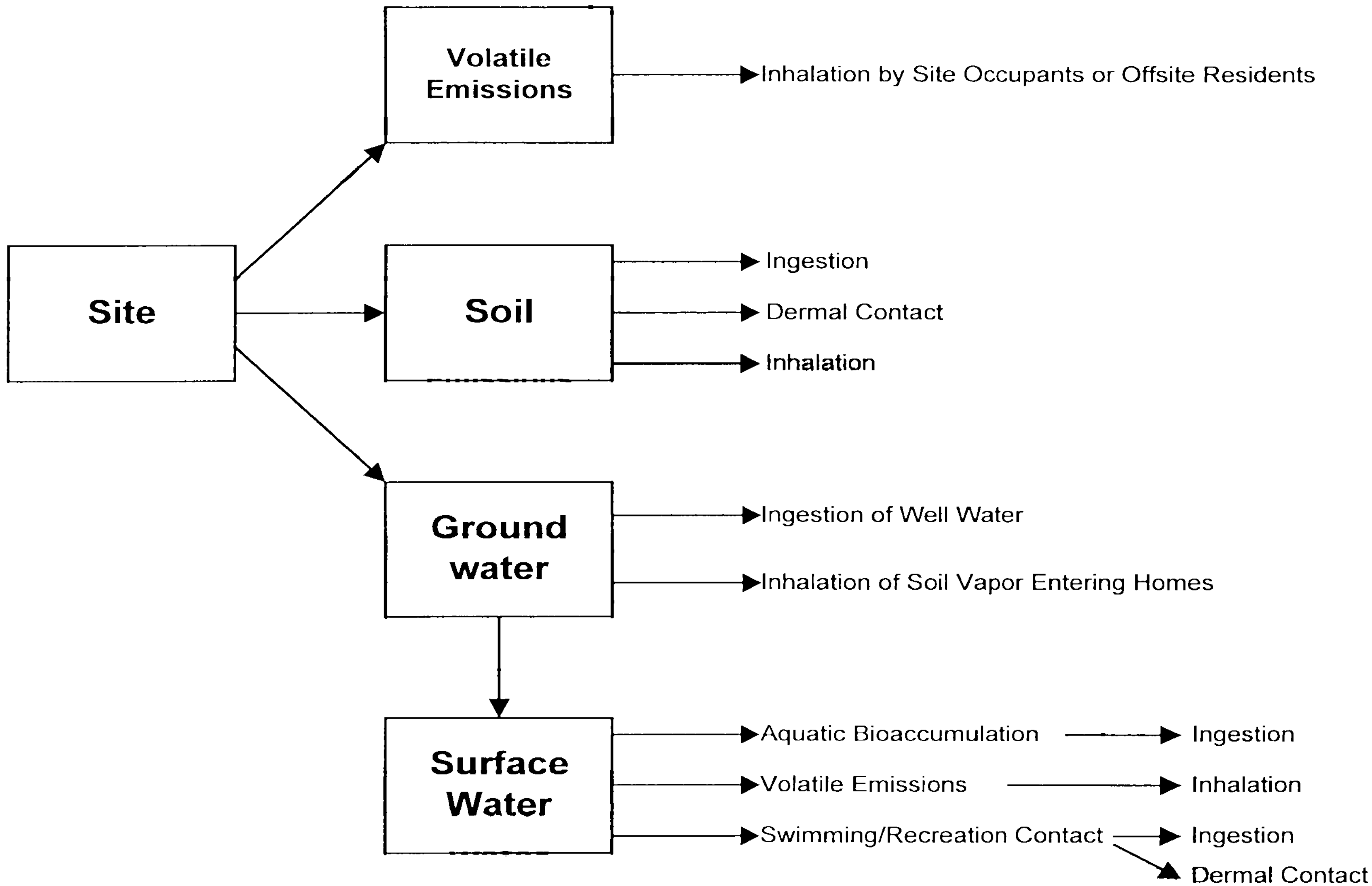
FIGURE 6-1
RISK ASSESSMENT PROCESS



Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
CAZENOVIA, NEW YORK
DATE: 1/99 JOB No. 80189FA

FARWELL LANDFILL SITE - CATTARAUGUS COUNTY
DEPARTMENT OF PUBLIC WORKS
REMEDIAL INVESTIGATION

FIGURE 6-2
SCREENING PROCESS: GROUNDWATER DATA



Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
CAZENOVIA, NEW YORK

DATE: 12/98 JOB No.80189FA

FARWELL LANDFILL SITE - CATTARAUGUS COUNTY
DEPARTMENT OF PUBLIC WORKS
REMEDIAL INVESTIGATION

FIGURE 6-3
SELECTION OF EXPOSURE PATHWAYS

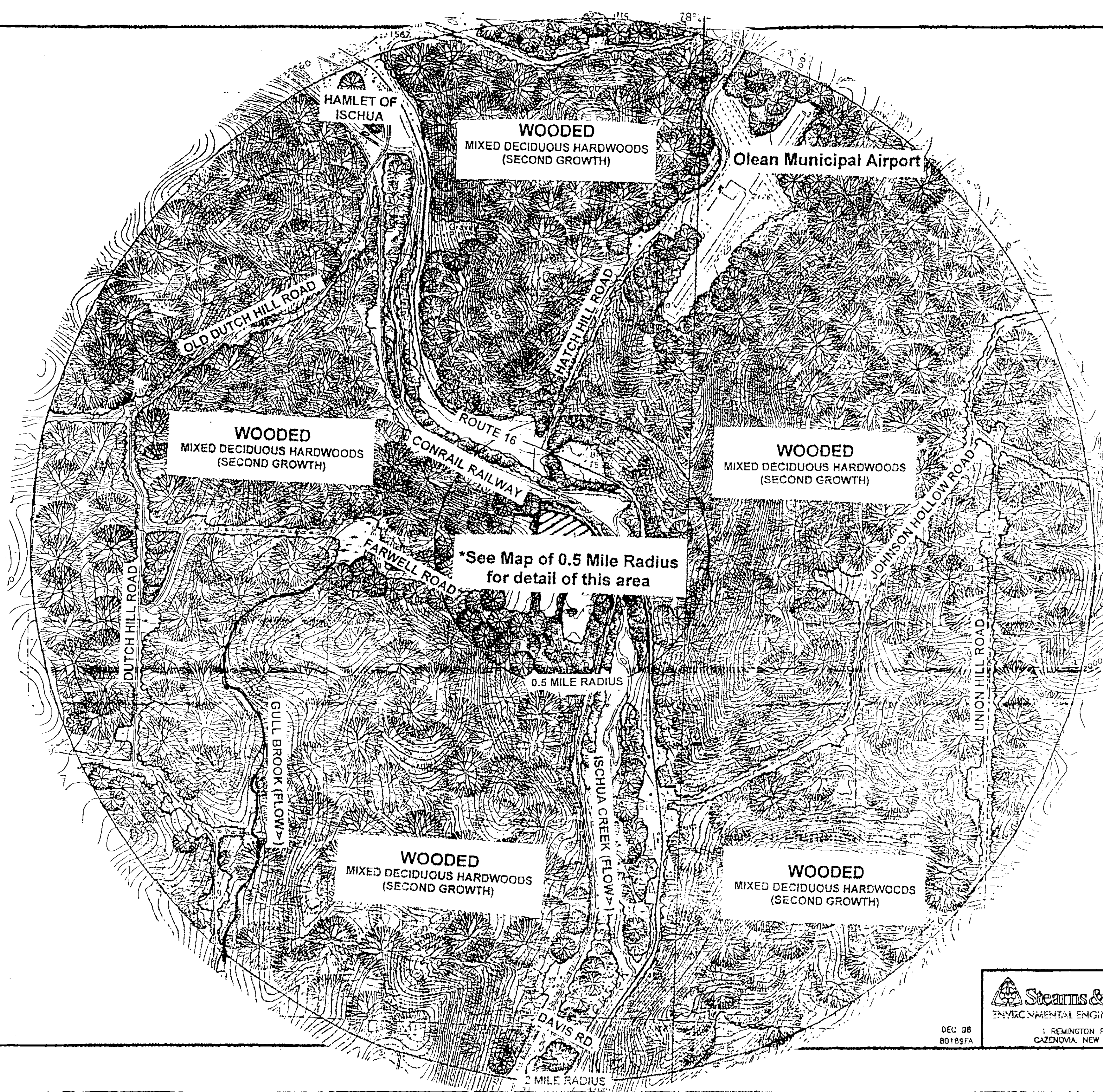


FIGURE 7-1

MAP SOURCE: USGS QUADRANGLES, HINSDALE AND CUBA, NEW YORK

DEC 98 80189FA	Stearns & Wheler, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS 1 REMINGTON PARK DRIVE CAZENOVIA, NEW YORK 13035	FISH & WILDLIFE IMPACT ASSESSMENT FARWELL LANDFILL CATTARAUGUS COUNTY, NEW YORK 2 MILE RADIUS MAP

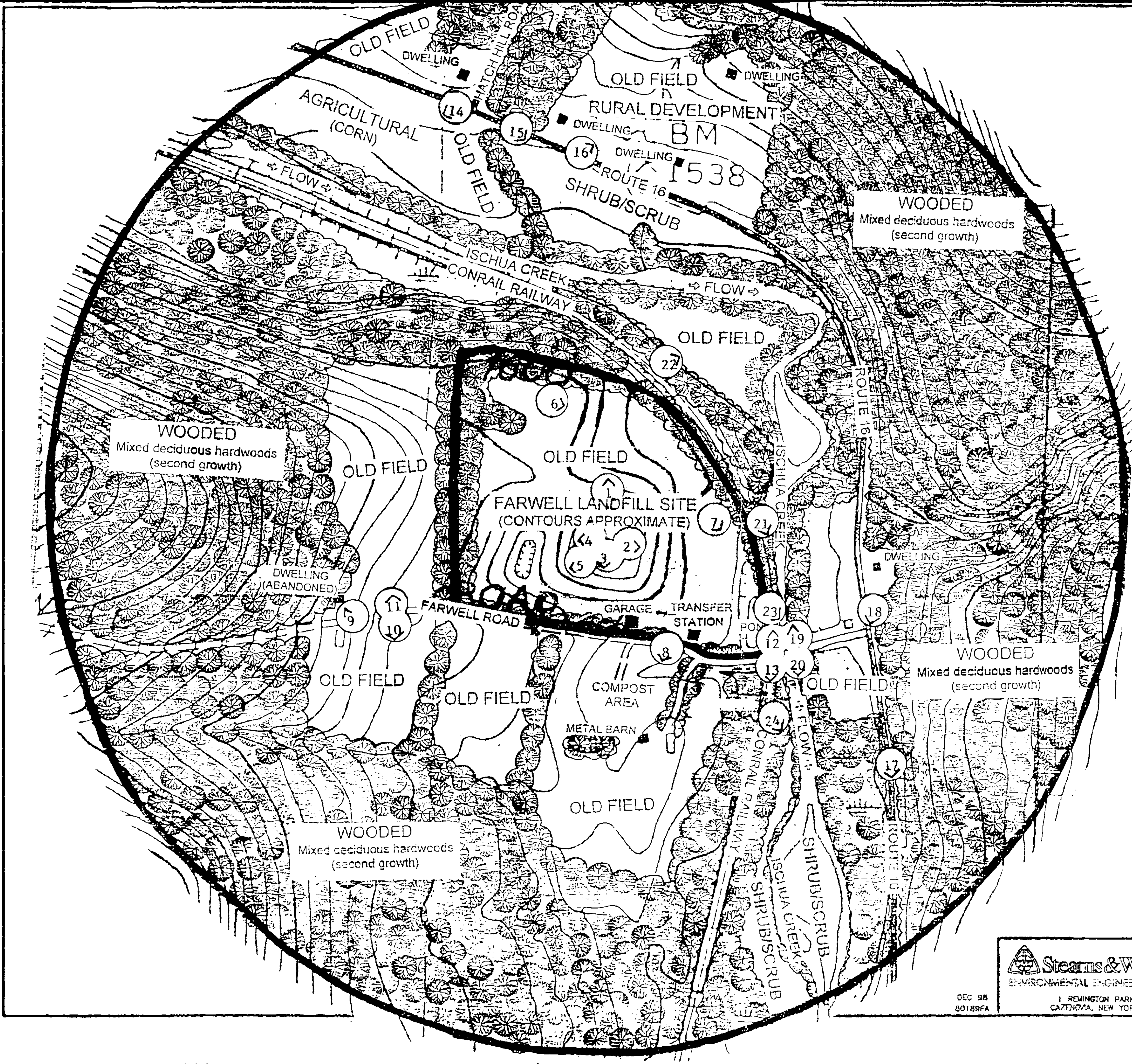


FIGURE 7-2

MAP SOURCE: USGS QUADRANGLES, HINSDALE AND CUBA, NEW YORK

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
1 REMINGTON PARK DRIVE
CAZENOVIA, NEW YORK 13035

DEC 98
80189FA

FISH & WILDLIFE IMPACT ASSESSMENT
FARWELL LANDFILL
CATTARAUGUS COUNTY, NEW YORK
0.5 MILE RADIUS MAP

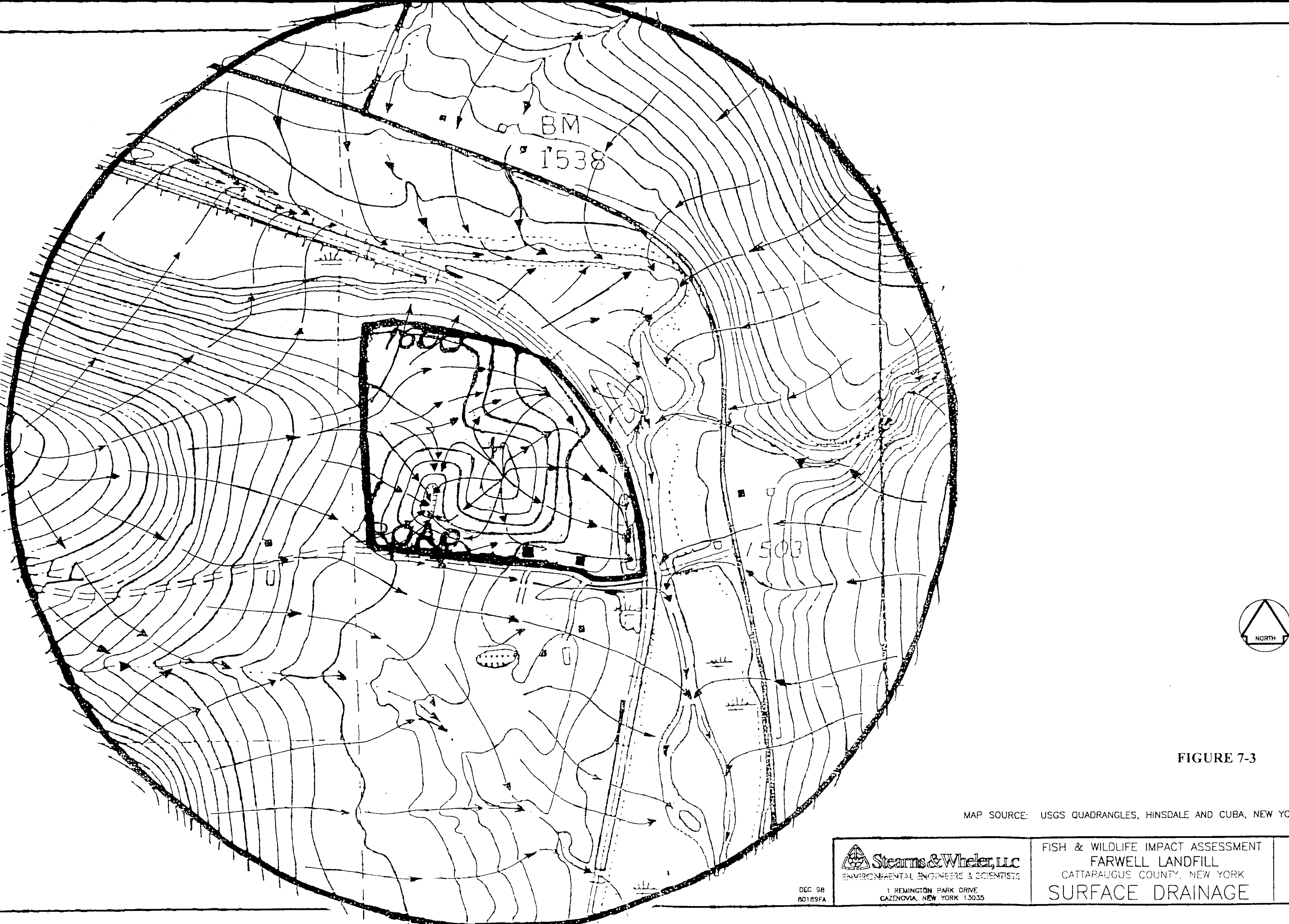


FIGURE 7-3

MAP SOURCE: USGS QUADRANGLES, HINSDALE AND CUBA, NEW YORK

DEC 98
80189FA

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
1 REMINGTON PARK DRIVE
CAZENOVIA, NEW YORK 13035

FISH & WILDLIFE IMPACT ASSESSMENT
FARWELL LANDFILL
CATTARAUGUS COUNTY, NEW YORK
SURFACE DRAINAGE

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

VOLUME II

Appendices

Farwell Landfill Remedial Investigation Cattaraugus County, NY

October 1999

Recycled Paper

VOLUME II

FARWELL LANDFILL
REMEDIAL INVESTIGATION
CATTARAUGUS COUNTY, NY

Prepared for

CATTARAUGUS COUNTY, NEW YORK

Prepared by

STEARNS & WHELER, LLC
Environmental Engineers and Scientists
One Remington Park Drive
Cazenovia, NY 13035

October 1999

Project No. 80189FA

APPENDIX A

Boring Logs

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
CAZENOVIA, NEW YORK

Boring/Well ID: MW-18S

Project Name: Farwell Landfill- Cattaraugus County
Job No: 80189FA
Start Date & Time: 8/5/98-1445
Finish Date & Time: 8/5/98-1645
Drilling Co: Parratt-Wolff, Inc
Driller: R. Bush, M. Marshall
S&W Inspector: S. Graham
Drill Rig Type: CME-75
Drilling Method: Roller Bit
Weather: Overcast, 70

Groundwater Observations

Time:
Casing Depth:
Boring Depth: 30'
Depth to Water:
below surface ______ below meas. pt. 14.16'
Surface Elevation:
Measuring Point Elevation: 1502.53'
Groundwater Elevation: 1488.37'

Sample Log Key: Sent for Lab Analysis
NAPL Key: NAPL Observed
Depth to Groundwater

Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology	Sample Description	Depth (ft)	Well Diagram	
1	18,22	0		1.3			Brown, Dry, Coarse Gravel, Fine Sand, Silt, (Fill)	1		
2	16,20	0					Brown, Dry, Coarse Gravel, Fine Sand, Silt, (Fill)	2		Bentonite Grout
3								3		2" ID PVC Riser
4								4		
5								5		
6	5,5	0		1.3			Brown, Dry/Damp, Silt, Some C/M Gravel, Some Sand	6		
7	3,3						Brown, Dry/Damp, Silt, Some C/M Gravel, Some Sand	7		
8								8		
9								9		
10								10		
11	1,1	0		1.6			Brown, Damp, Mottled, Silt, Clay,	11		
12	1,2						11.8' Grey, Clay, Some Silt, Moist	12		
13								13		
14								14		
15								15		
16	5,10	0		2			Brown, Moist, Silt, (F-M-C) Sand, M-Gravel, Clay, Till	16		Bentonite Pellets
17	14,19						Water @ 15'	17		
18								18		#00 Choker Sand
19								19		#0 Sand Pack
20								20		
21	6,8	0		1.2			Dry, Brown, Silt, F-Gravel, Sand	21		
22	5,4						21' Wet, Grey, Silty-Sand w/ Rock Fragments	22		
23	6,10	0		0.3			S.A.A. Very Little Recovery	23		
24	7,10							24		
25	15,24	0		1.5			Wet, Grey, Silt, F-M-C Sand, M-C Gravel	25		
26	30, 25						Wet, Grey, Silt, F-M-C Sand, M-C Gravel	26		
27	30,40	0		1.5			S.A.A. W/ Sandy Seams	27		2" ID PVC
28	50/.4						S.A.A. W/ Sandy Seams	28		.01"Slot, Screen
29	21,50/.4	0		0.6			S.A.A. Boulder/Cobble@ 29'	29		
30	50/.4							30		

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
CAZENOVIA, NEW YORK

Boring/Well ID: MW-18D

Project Name: Farwell Landfill- Cattaraugus County
Job No: 80189FA
Start Date & Time: 8/3/98-1435
Finish Date & Time: 8/20/98-1530
Drilling Co: Parratt-Wolff, Inc
Driller: R. Bush, M. Marshall
S&W Inspector: S. Graham
Drill Rig Type: CME-75
Drilling Method: Roller Bit
Weather: Overcast, 70

Groundwater Observations

Time:
Casing Depth: 98'
Boring Depth: 114'
Depth to Water:
below surface ________ below meas. pt. 14.23'
Surface Elevation:
Measuring Point Elevation: 1502.21'
Groundwater Elevation: 1488.28'

Sample Log Key: Sent for Lab Analysis
NAPL Key: NAPL Observed
Depth to Groundwater

Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology	Sample Description	Depth (ft)
1	18,22	0		1.3			Brown, Dry, Coarse Gravel, Fine Sand, Silt, (Fill)	1
2	16,20	0					Brown, Dry, Coarse Gravel, Fine Sand, Silt, (Fill)	2
3								3
4								4
5								5
6	5,5	0		1.3			Brown, Dry/Damp, Silt, Some C/M Gravel, Some Sand	6
7	3,3						Brown, Dry/Damp, Silt, Some C/M Gravel, Some Sand	7
8								8
9								9
10								10
11	1,1	0		1.6			Brown, Damp, Mottled, Silt, Clay.	11
12	1,2						11.8' Grey, Clay, Some Silt, Moist	12
13								13
14								14
15								15
16	5,10	0		2			Brown, Moist, Silt, (F-M-C) Sand, M-Gravel, Clay, Till	16
17	14,19						Water @ 15'	17
18								18
19								19
20								20
21	6,8	0		1.2			Dry, Brown, Silt, F-Gravel, Sand	21
22	5,4						21' Wet, Grey, Silty-Sand w/ Rock Fragments	22
23	6,10	0		0.3			S.A.A. Very Little Recovery	23
24	7,10							24
25	15,24	0		1.5			Wet, Grey, Silt, F-M-C Sand, M-C Gravel	25
26	30, 25						Wet, Grey, Silt, F-M-C Sand, M-C Gravel	26
27	30,40	0		1.5			S.A.A. W/ Sandy Seams	27
28	50/.4						S.A.A. W/ Sandy Seams	28
29	21,50/.4	0		0.6			S.A.A. Boulder/Cobble@ 29'	29
30	50/.4							30

Well Diagram: Bentonite Grout; 2" ID PVC Riser

Stearns & Wheler, LLC
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CAZENOVIA, NEW YORK

Boring/Well ID: 18D

Sample Log Key: Sent for Lab Analysis
NAPL Key: NAPL Observed
Depth to Groundwater

Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology	Description	Depth (ft)	Well Diagram
31	13,21	0		1.2			Wet, Grey, Silt, F-M-C Sand, Rock Fragments	31	
32	18,16							32	
33								33	
34								34	
35								35	
36	10,15	0		1			S.A.A. Wet Grey Silty Sand, Till	36	
37	22,21							37	
38								38	
39								39	
40								40	
41	18,32	0		1			S.A.A.	41	
42	37,35							42	
43								43	
44								44	
45								45	
46	20,27	0		0.5				46	
47	24,26						S.A.A. Rock Fragments	47	
48								48	
49								49	
50								50	
51	24,27	0		0.5			Wet Grey Silty Sand, Till, Rock Fragments	51	
52	18							52	
53								53	
54								54	
55								55	
56	50,50/.1	0		0.2			S.A.A. Increased Rock Fragments Decrease Silty Sand	56	
57								57	
58								58	
59								59	
60								60	
61	40,50/.2	0		0.5			S.A.A. Wet Grey Silty Sand, Rock Fragments	61	
62								62	
63								63	
64								64	
65								65	

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CAZENOVIA, NEW YORK

Boring/Well ID: 18D

Sample Log Key: Sent for Lab Analysis
NAPL Key: NAPL Observed
Depth to Groundwater

Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology	Description	Depth (ft)	Well Diagram
66	31,45	0		1.2			Wet, Grey, Silt, F-M-C Sand, Rock Fragments	66	
67	65	0		0.8				67	
68								68	
69								69	
70								70	
71	60,80	0		0.7			S.A.A. Increase M-C Sand, Large Rock Fragments	71	
72								72	
73								73	
74								74	
75								75	
76	50,65	0		0.5			S.A.A.	76	
77								77	
78								78	
79								79	
80								80	
81	53,70	0		0.5			S.A.A. Grey/Green Silty Sand, Rock Fragments	81	
82								82	
83								83	
84								84	
85	100/.3	0		0.3			Wet Grey Silty Sand, Till, Rock Fragments	85	
86								86	
87								87	
88								88	
89								89	
90								90	
91	75	0		0.2			S.A.A. Wet Grey, Increased Silty Sand, Some Clay	91	
92								92	
93								93	
94								94	
95							Grey M-C Grained Sandstone	95	
96		0		1.4				96	
97								97	
98		0		1.8				98	
99								99	Bentonite Pellets
100								100	

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CAZENOVIA, NEW YORK

Boring/Well ID: 18D

Sample Log Key: Sent for Lab Analysis
NAPL Key: NAPL Observed
Depth to Groundwater

Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology	Description	Depth (ft)	Well Diagram	
101		0		3			Fine Grained Sandstone, Clayey Silt Seams	101		Bentonite Pellets
102								102		#00 Choker Sand
103								103		
104								104		
105								105		
106		0		5			S.A.A.	106		#0 Sand Pack
107								107		
108								108		
109								109		
110								110		
111		0		5			S.A.A.	111		2" ID PVC
112								112		
113								113		.01" Slot, Screen
114		0		3				114		
115								115		
116								116		
117								117		
118								118		
119								119		
120								120		
121								121		
122								122		
123								123		
124								124		
125								125		
126								126		
127								127		
128								128		
129								129		
130								130		
131								131		
132								132		
133								133		
134								134		
135								135		

Stearns & Wheler, LLC
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CAZENOVIA, NEW YORK

Boring/Well ID: MW-19S

Project Name: Farwell Landfill- Cattaraugus County
Job No: 80189FA
Start Date & Time: 8/6/98-1030
Finish Date & Time: 8/19/98-1445
Drilling Co: Parratt-Wolff, Inc
Driller: R. Bush, M. Marshall
S&W Inspector: D. Sorbello
Drill Rig Type: CME-75
Drilling Method: Roller Bit
Weather: Overcast, 70

Groundwater Observations

Time: 1300
Casing Depth:
Boring Depth: 120'
Depth to Water:
below surface ______ below meas. pt. 56.64'
Surface Elevation:
Measuring Point Elevation: 1543.31'
Groundwater Elevation: 1486.67'

Sample Log Key: ■ Sent for Lab Analysis
NAPL Key: ▨ NAPL Observed
▼ Depth to Groundwater

Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology	Sample Description	Depth (ft)	Well Diagram
1							Brown, Dry, Silt, Some Gravel	1	
2	4,9	0		2			Brown, Dry, Silt, Some Gravel	2	
3	9,25	0						3	
4								4	
5								5	
6	9,19	0		0.8			Brown, Damp, Silt, Some M Gravel, Little Sand	6	
7	50/.4						Brown, Damp, Silt, Some M Gravel, Little Sand	7	
8								8	
9								9	
10								10	
11	50/.3	0		0.8			Increase Silt, Brown Dry, M Gravel	11	
12								12	Bentonite grout
13								13	
14								14	2" ID PDC Riser
15								15	
16	6,24	0		2			Brown, Dry, Silt, Some M-C Gravel	16	
17	32,35							17	
18								18	
19								19	
20								20	
21	60/.5	0		0.5			Brown, Dry, Silt, Some M-C Gravel	21	
22								22	
23		0		0.3				23	
24								24	
25								25	
26	55	0		0.3			Brown, Wet, Silt, Some M-C Gravel and Rock Fragmants	26	
27								27	
28								28	
29								29	
30								30	

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CAZENOVIA, NEW YORK

Boring/Well ID: MW-19S

Sample Log Key: ■ Sent for Lab Analysis
NAPL Key: ▨ NAPL Observed
▼ Depth to Groundwater

Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology	Description	Depth (ft)	Well Diagram	
31	22,32	0		1.5			Brown, Dry, Silt, Some M-C Gravel, Some larger rock fragments	31		
32	41						Brown, Dry, Silt, Some M-C Gravel, Some larger rock fragments	32		
33								33		
34								34		
35								35		
36	20,28	0		1.5			Brown, Dry, Silt, Some M-C Gravel, Some larger rock fragments	36		
37	37,44						Water Table	37		
38								38		
39								39		
40								40		Bentonite Grout
41	60	0		0.8			Brown, Dry, Silt, Some M-C Gravel, Many smooth rounded pebbles	41		
42								42		2" ID PVC Riser
43								43		
44								44		
45								45		
46	23,34	0		0.9			Moist Till (Silt and sand, some rock fragments)	46		
47	45/.5							47		
48								48		
49								49		
50								50		
51	24,21	0		0.9			Moist Till (Silt and sand, some rock fragments)	51		
52	32,40							52		
53								53		
54								54		
55								55		
56	35,55/.5	0		0.6			Moist Till (Silt and sand, some rock fragments)	56		
57								57		
58								58	▼	
59								59		
60								60		
61	33,41							61		
62	70/.5	0		0.6			Till (Silty F-M Sand)	62		
63								63		
64								64		
65								65		

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
CAZENOVIA, NEW YORK

Boring/Well ID: MW-19S

Sample Log Key: ■ Sent for Lab Analysis
NAPL Key: ▨ NAPL Observed
▼ Depth to Groundwater

Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology	Description	Depth (ft)	Well Diagram	
66	31,50/3	0		0.9			Moist Sand, Silt, Cobbles, Rock Fragments, Till	66		
67								67		
68								68		
69								69		
70								70		
71	50,60	0		0.6			Moist Sand, Silt, Cobbles, Rock Fragments, Till	71		
72								72		
73								73		
74								74		
75								75		
76	100,/6	0		0.1			Sand, Silt, Cobbles, Rock Fragments, Till	76		
77								77		
78								78		
79								79		
80								80		Bentonite Grout
81	65,58	0		0.6			Moist Sand, Silt, Cobbles, Rock Fragments, Till	81		
82								82		
83								83		2" ID PVC Riser
84								84		
85								85		
86	65,50/1	0		0.7			Moist Sand, Silt, Cobbles, Rock Fragments, Till	86		
87								87		
88								88		
89								89		
90								90		
91	50,50/3	0		0.8			Moist Sand, Silt, Cobbles, Rock Fragments, Till	91		
92								92		
93								93		
94								94		
95	65,85	0		0.8			Sand, Silt, gravel, some rock fragments, Till	95		
96								96		
97								97		
98								98		
99								99		
100								100		

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
CAZENOVIA, NEW YORK

Boring/Well ID: MW-19S

Sample Log Key: Sent for Lab Analysis
NAPL Key: NAPL Observed
Depth to Groundwater

	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology		Depth (ft)	Well Diagram	
101	36,51	0		0.3			Moist Sand, Silt, Cobbles, Rock Fragments, Till	101		
102								102		
103								103		
104								104		
105								105		Bontonite Pellets
106	55,65	0		0.6			Moist Sand, Silt, Cobbles, Rock Fragments, Till	106		
107								107		#00 Choker Sand
108								108		
109								109		#0 Sand Pack
110								110		
111	100/.2	0		0.2			Sand, Silt, Cobbles, Rock Fragments, Till	111		
112								112		
113								113		
114								114		
115								115		
116	68,85	0		0.9			Grey Wet Silt, M-C Sand, Some **gravel**	116		
117								117		
118								118		
119								119		2" ID PVC
120								120		.01" slot, screen
121	65,50/1	0		0.7			Grey Wet Silt, M-C Sand, Some **gravel**	121		
122								122		
123								123		
124								124		
125								125		
126								126		
127								127		
128								128		
129								129		
130								130		
131								131		
132								132		
133								133		
134								134		
135								135		

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

Boring/Well ID: MW-20D

Project Name: Farwell Landfill- Cattaraugus County
Job No: 90180.70
Start Date & Time: 8/23/99-1130
Finish Date & Time: 9/1/99-1830
Drilling Co: Parratt-Wolff, Inc
Driller: R. Bush, B. Waters
S&W Inspector: D. Sorbello
Drill Rig Type: Mobile B-57
Drilling Method: Roller Bit
Weather:

Groundwater Observations

Time: 1300
Casing Depth: 19'
Boring Depth: 135'
Depth to Water:
below surface ______ below meas. pt. 47.71'
Surface Elevation:
Measuring Point Elevation:
Groundwater Elevation:

Sample Log Key: Sent for Lab Analysis

Depth to Groundwater

Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology	Sample Description	Depth (ft)	Well Diagram	
1								1		
2								2		
3								3		
4								4		
5								5		
6								6		
7								7		
8								8		
9								9		
10								10		
11								11		
12								12		Bentonite grout
13								13		
14								14		2" ID PVC Riser
15								15		
16								16		
17								17		
18								18		
19								19		
20								20		
21								21		
22								22		
23								23		
24								24		
25								25		
26								26		
27								27		
28								28		
29								29		
30								30		

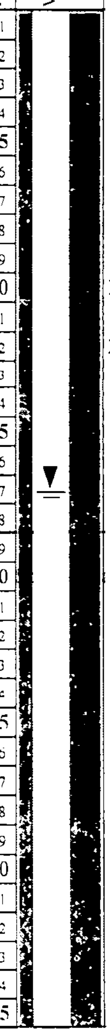
Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

Boring/Well ID: MW-20D

Sample Log Key: Sent for Lab Analysis; Depth to Groundwater

Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology		Depth (ft)
31								31
32								32
33								33
34								34
35								35
36								36
37								37
38								38
39								39
40								40
41								41
42								42
43								43
44								44
45								45
46								46
47								47
48								48
49	55,60						Begin Sampling	49
50	40,26			2'			Till. Gravel and medium cobbles. Some silt and sand.	50
51								51
52								52
53								53
54								54
55								55
56								56
57								57
58								58
59	180/.5			0				59
60								60
61								61
62								62
63								63
64								64
65								65

Well Diagram



Bentonite Grout

2" ID PVC Riser

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

Boring/Well ID: MW-20D

Sample Log Key: Sent for Lab Analysis

Depth to Groundwater

Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology		Depth (ft)	Well Diagram
66								66	
67								67	
68								68	
69	75,68						F/C Sand, Silt, and Gravel. Many Rock Fragments	69	
70							Grade to Brown silty Fine sand some clay trace gravel.	70	
71								71	
72								72	
73								73	
74								74	
75								75	
76								76	
77								77	
78								78	
79	115,135			6"			F/C Sand, Silt, and Gravel. Many Rock Fragments	79	
80								80	Bentonite Grout
81								81	
82								82	
83								83	2" ID PVC Riser
84								84	
85								85	
86								86	
87								87	
88	135/6"						F/C Sand, Silt, and Gravel. Many Rock Fragments	88	
89								89	
90								90	
91								91	
92								92	
93								93	
94								94	
95								95	
96								96	
97	200/.4			0				97	
98								98	
99								99	
100								100	

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

Boring/Well ID: MW-20D

Sample Log Key: ■ Sent for Lab Analysis

▼ Depth to Groundwater

	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology		Depth (ft)	Well Diagram	
101								101		
102								102		
103								103		
104								104		Grout
105								105		
106								106		
107								107		
108	52,110			6"			Gray Gravel, sand, and silt. Many rock fragments	108		
109								109		
110								110		
111								111		
112								112		
113								113		
114								114		3" steel casing
115								115		into bedrock
116							Bedrock	116		
117								117		
118								118		
119	200/.4			2"				119		
120								120		Bontonite Pellets
121								121		
122								122		#00 Choker Sand
123								123		
124								124		
125								125		
126								126		
127								127		
128								128		
129								129		#0 Sand Pack
130								130		
131								131		
132								132		
133								133		2" ID PVC
134								134		.01" slot, screen
135							Boring completed at 135'	135		

APPENDIX B

Analytical Reports and Data Validation

APPENDIX B-1

Field Parameter Records

Well ID MW-16I

WELL DEPTH: 90

Date 9/2/98

DTW(ft.) 18.46

Observation Water clear

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
10:45	NA	11.0	0.29	8.00	15	-	2.00	0.00

Sample taken at	10:45	
Total Volume Purge	80	gal
Final Turbidity	-	NTU

(NA) Purge rate not applicable. Well was purged with a disposable bailer or slow pumped.

Well ID | MW-15S

WELL DEPTH: 83.6

Date | 9/2/98
DTW(ft.) | 23.13

Observation | Water clear

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
12:15	NA	11.0	0.35	8.30	35	-	2.80	0.00

Sample taken at	12:15	
Total Volume Purge	14	gal
Final Turbidity	-	NTU

(NA) Purge rate not applicable. Well was purged with a disposable bailer or slow pumped.

Well ID MW-15I

WELL DEPTH: 83.6

Date 9/2/98

DTW(ft.) 23.13

Observation Water clear. MS/MSD

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
13:00	NA	12.0	0.90	7.70	150	-	0.20	0.00

Sample taken at	13:00	
Total Volume Purge	8	gal
Final Turbidity	-	NTU

(NA) Purge rate not applicable. Well was purged with a disposable bailer or slow pumped.

Well ID DH-1A

WELL DEPTH: NA

Date 9/3/98

DTW(ft.) NA

Observation: Stream bed Rocky, shallow, and swift moving.

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
12:00	NA	18.0	0.34	8.40	240	-	9.80	0.00

Sample taken at	12:00	
Total Volume Purge	NA	gal
Final Turbidity	-	NTU

Well ID DH-1A

WELL DEPTH: NA

Date 9/3/98

DTW(ft.) NA

Observation: Surface water sample from Ishua Creek water cloudy.

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
11:00	NA	16.0	0.34	8.10	225	-	6.90	0.00

Sample taken at	11:00	
Total Volume Purge	NA	gal
Final Turbidity	-	NTU

Well ID MW-19

WELL DEPTH: 120'

Date 9/3/98
DTW(ft.) 56'

Observation Water cloudy well purged during development

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
9:45	NA	10.0	0.33	8.50	120	-	2.80	0.00

Sample taken at	9:45	
Total Volume Purge	30	gal
Final Turbidity	-	NTU

(NA) Purge rate not applicable. Well was purged with a disposable bailer or slow pumped.

Well ID | MW-18S

WELL DEPTH: 120'

Date | 9/3/98
DTW(ft.) | 28.65

Observation | Water cloudy well purged during development

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
9:45	NA	11.0	0.22	8.10	115	-	2.30	0.00

Sample taken at	9:45	
Total Volume Purge	7	gal
Final Turbidity	-	NTU

(NA) Purge rate not applicable. Well was purged with a disposable bailer or slow pumped.

Well ID | MW-18D

WELL DEPTH: 113.35

Date 9/3/98

DTW(ft.) 12.95

Observation: Drawing water below pump, must allow to recover

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
8:00	NA	14.0	2.9	7.50	110	-	4.00	0.10

Sample taken at	8:00	
Total Volume Purge	50	gal
Final Turbidity	-	NTU

(NA) Purge rate not applicable. Well was purged with a disposable bailer or slow pumped.

Well ID | MW-9D

WELL DEPTH: 80.5'

Date | 9/8/98
DTW(ft.) | 55.00

Observation: Water had strong sulfur odor
Black and Cloudy

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
12:50	NA	10.0	1.00	6.60	5	-	2.80	0.00

Sample taken at	12:50	
Total Volume Purge	50	gal
Final Turbidity	-	NTU

(NA) Purge rate not applicable. Well was purged with a disposable bailer or slow pumped.

Well ID | MW-10S

WELL DEPTH: 38

Date	9/8/98
DTW(ft.)	34.80

Observation: Water clear, dry at 2.5 gallons

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
13:30	NA	11.0	0.80	6.20	40	-	3.20	0.00

Sample taken at	13:30	
Total Volume Purge	2.5	gal
Final Turbidity	-	NTU

(NA) Purge rate not applicable. Well was purged with a disposable bailer or slow pumped.

Well ID | MW-10D

WELL DEPTH: 88'

Date | 9/8/98
DTW(ft.) | 38.75

Observation: Water clear, dry at 2.5 gallons

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
12:30	NA	11.0	0.90	5.90	70	-	2.90	0.00

Sample taken at	12:30	
Total Volume Purge	2.5	gal
Final Turbidity	-	NTU

(NA) Purge rate not applicable. Well was purged with a disposable bailer or slow pumped.

Well ID MW-17I

WELL DEPTH: 100'

Date 9/9/98

DTW(ft.) 19.60

Observation Clear

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
11:30	NA	11.0	0.28	8.10	155	-	4.40	0.00

Sample taken at	11:30	
Total Volume Purge	NA	gal
Final Turbidity	-	NTU

(NA) Purge rate not applicable. Well was purged with a disposable bailer or slow pumped.

May 6, 1998

Well ID L-1

WELL DEPTH: NA

Date 9/9/98
DTW(ft.) NA

Observation: Orange color. Collected from leachate tank.

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
13:00	NA	16.0	6.7	6.70	315	NA	1.80	0.40

Sample taken at	13:00
Total Volume Purge	NA gal
Final Turbidity	NA NTU

Well ID	SH-1

WELL DEPTH: NA

Date	9/9/98
DTW(ft.)	NA

Observation: Sampled from Faucet after 15 minutes of runing water.
Water was silty with slight odor.

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
9:00	-	10.0	0.38	7.70	180	-	1.30	0.00

Sample taken at	9:00	
Total Volume Purge	-	gal
Final Turbidity	-	NTU

(NA) Purge rate not applicable. Well was purged with a disposable bailer or slow pumped.

Well ID MW-16S

WELL DEPTH: 47.5

Date 9/9/98
DTW(ft.) 17.20

Observation: Sampled from Faucet after 15 minutes of runing water.
Water was silty with slight odor.

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
9:45	NA	10.0	0.62	7.40	275	-	2.40	0.00

Sample taken at	9:45	
Total Volume Purge	15	gal
Final Turbidity	-	NTU

(NA) Purge rate not applicable. Well was purged with a disposable bailer or slow pumped.

Well ID | KW-1A

WELL DEPTH: NA

Date | 9/10/98
DTW(ft.) | NA

Observation: Water clear. Adjacent to grazing lands
MS/MSD-2

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
12:00	NA	16.0	-	0.34	280	-	9.50	0.00

Sample taken at	12:00	
Total Volume Purge	NA	gal
Final Turbidity	-	NTU

Well ID LFP-1A

WELL DEPTH: NA

Date 9/10/98

DTW(ft.) NA

Observation Water clear

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
10:00	NA	17.0	0.11	7.90	250	-	6.70	0.00

Sample taken at	10:00	
Total Volume Purge	NA	gal
Final Turbidity	-	NTU

Well ID: MW-11S

WELL DEPTH: 47.5

Date: 9/10/98
DTW(ft.): 42.70

Observation: Well purged dry, recovery was very very slow. Sampled in two phases: 9/10 BOD, Mtls, sulfide, CNT, NH3, TOC, VOAS. 9/15 completed

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
14:30	NA	13.0	1.00	7.50	-	-	9.50	0.00

Sample taken at	14:30	
Total Volume Purge	dry	gal
Final Turbidity	-	NTU

(NA) Purge rate not applicable. Well was purged with a disposable bailer or slow pumped.

Well ID MW-11D

WELL DEPTH: 92.1

Date 9/10/98
DTW(ft.) 48.10

Observation Water clear

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
9:00	NA	12.0	-	7.00	285	-	3.50	0.00

Sample taken at	9:00	
Total Volume Purge	90	gal
Final Turbidity	-	NTU

(NA) Purge rate not applicable. Well was purged with a disposable bailer or slow pumped.

Well ID RRP-1A

WELL DEPTH: NA

Date 9/15/98

DTW(ft.) NA

Observation: Pond is similar to peatland. Sediment is very soft and seems to be comprisedlargely of organic mater. Water cloudy due to sampling.

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
14:00	NA	23.0	0.81	7.20	-	-	1.93	0.02

Sample taken at	14:00	
Total Volume Purge	80	gal
Final Turbidity	-	NTU

Well ID | MW-17S

WELL DEPTH: 38.7'

Date | 9/15/98
DTW(ft.) | 18.20

Observation | Water clear

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
13:00	NA	13.0	0.30	8.70	-	-	5.50	0.01

Sample taken at	13:00
Total Volume Purge	10 gal
Final Turbidity	- NTU

(NA) Purge rate not applicable. Well was purged with a disposable bailer or slow pumped.

Well ID | MW-6

WELL DEPTH: 160'

Date	9/15/98
DTW(ft.)	132.50

Observation Water is dark and cloudy with dark feathers.
Well cap is not secured.
Dup-2

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
8:00	NA	12.0	0.54	6.70	-	-	2.30	0.02

Sample taken at	8:00	
Total Volume Purge	55	gal
Final Turbidity	-	NTU

(NA) Purge rate not applicable. Well was purged with a disposable bailer or slow pumped.

Well ID MW-14S

WELL DEPTH: 59.30'

Date 9/15/98

DTW(ft.) 52.17

Observation Water clear

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
11:00	NA	12.3	1.34	7.30	-	-	2.70	0.06

Sample taken at	11:00	
Total Volume Purge	5	gal
Final Turbidity	-	NTU

(NA) Purge rate not applicable. Well was purged with a disposable bailer or slow pumped.

Well ID MW-141

WELL DEPTH: 87.7

Date 9/15/98
DTW(ft.) 51.70

Observation Water clear

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
12:00	NA	12.5	1.16	7.10	-	-	2.90	0.05

Sample taken at	12:00	
Total Volume Purge	20	gal
Final Turbidity	-	NTU

(NA) Purge rate not applicable. Well was purged with a disposable bailer or slow pumped.

Well ID MW-13

WELL DEPTH: 140.4'

Date 9/15/98
DTW(ft.) 98.90

Observation Water clear

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
10:00	NA	12.0	0.71	7.20	-	-		0.02

Sample taken at	10:00	
Total Volume Purge	75	gal
Final Turbidity	-	NTU

(NA) Purge rate not applicable. Well was purged with a disposable bailer or slow pumped.

APPENDIX B-2

Laboratory and Validation Reports

ST10-983192

—— SEVERN TRENT LABORATORIES ——
—— PROJECT: 7098-1806B ——
—— LOCATION: STL - CT ——

Sample Names	Carbon Dioxide mg/l	Oxygen mg/l	Methane mg/l	Lab ID	Date Sampled	Date Received	Date Analyzed	Analyst
MW-17I	5.32	4.89	<.07	T11 376	9/09/98	9/11/98	9/22/98	BC
L-1	192.19	0.68	1.07	T11 377	9/09/98	9/11/98	9/22/98	BC
RRP-1A	20.86	3.39	<.07	T11 378	9/15/98	9/18/98	9/22/98	BC
MW-14S	130.89	3.58	1.58	T11 379	9/15/98	9/18/98	9/22/98	BC
MW-14I	118.12	6.39	1.75	T11 380	9/15/98	9/18/98	9/22/98	BC
MW-6	29.80	4.17	2.34	T11 381	9/15/98	9/18/98	9/22/98	BC
DUP-2	28.52	6.54	1.92	T11 382	9/15/98	9/18/98	9/22/98	BC
MW-13	54.06	3.49	5.31	T11 383	9/15/98	9/18/98	9/22/98	BC
MW-17S	0.43	8.67	0.08	T11 384	9/15/98	9/18/98	9/22/98	BC
DETECTION LIMITS	0.30mg/l	0.15mg/l	0.07mg/l					

ANALYST INITIALS BC

REVIEW AS

ST9-983176

----- SEVERN TRENT LABORATORIES -----
----- PROJECT: 7098-1806A -----
----- LOCATION: STL - CT -----

Sample Names	Carbon Dioxide mg/l	Oxygen mg/l	Methane mg/l	Lab ID	Date Sampled	Date Received	Date Analyzed	Analyst
MW-16I	4.68	9.01	<.07	T11 349	9/02/98	9/09/98	9/21/98	BC
MW-15S	3.62	8.19	<.07	T11 350	9/02/98	9/09/98	9/21/98	BC
MW-15I	5.75	6.49	0.56	T11 351	9/02/98	9/09/98	9/21/98	BC
MW-18D	68.96	7.36	16.27	T11 352	9/03/98	9/09/98	9/21/98	BC
MW-18S	2.13	8.04	0.66	T11 353	9/03/98	9/09/98	9/21/98	BC
MW-19	1.49	8.62	<.07	T11 354	9/03/98	9/09/98	9/21/98	BC
FW-1A	3.19	10.42	<.07	T11 355	9/03/98	9/09/98	9/21/98	BC
DW-1A	1.92	10.03	<.07	T11 356	9/03/98	9/09/98	9/21/98	BC
MW-9D	80.45	6.44	0.95	T11 357	9/08/98	9/11/98	9/21/98	BC
MW-10S	137.91	7.22	<.07	T11 358	9/08/98	9/11/98	9/21/98	BC
MW-10D	176.44	6.44	1.05	T11 359	9/08/98	9/11/98	9/21/98	BC
SH-1	6.38	7.56	0.34	T11 360	9/09/98	9/11/98	9/21/98	BC
MW-16S	23.84	7.99	<.07	T11 361	9/09/98	9/11/98	9/21/98	BC
DETECTION LIMITS	0.30mg/l	0.15mg/l	0.07mg/l					

ANALYST INITIALS BC

REVIEW AS

ST10-983192

— QUALITY CONTROL —
— SEVERN TRENT LABORATORIES —
— PROJECT: 7098-1806B —
— LOCATION: STL - CT —

CONTINUING CALIBRATION STANDARDS 9/22/98

COMPOUND	FILE ID	TRUE CONC.	MEASURED	% DIFF.
CARBON DIOXIDE	T11 373	15.0	14.63	2.47
OXYGEN	T11 373	7.00	6.98	0.57
METHANE (%)	T11 373	4.50	4.49	0.22

HE IN LOOP 9/22/98

COMPOUND	FILE ID	DET. LIMIT	MEASURED
CARBON DIOXIDE	T11 375	0.30mg/l	ND
OXYGEN	T11 375	0.15mg/l	ND
METHANE (%)	T11 375	0.07mg/l	ND

ANALYST INITIALS [illegible]

REVIEW AS

Analytical Assurance Associates, Inc.
600 Rock Raymond Road
Downingtown, PA 19335
Phone: 610 - 269 - 9989
Fax: 610 - 269 - 9989

TAL METAL ANALYSES
QUALITY ASSURANCE DATA REVIEW

STEARNS & WHELER
SITE: FARWELL LANDFILL
CASE NO.: 7098-1806B/ SDG NO.: B1806

REPORTED BY:
ANALYTICAL ASSURANCE ASSOCIATES (A^3)
600 ROCK RAYMOND ROAD
DOWNINGTOWN, PA 19335

REVIEWED BY:
ZOHREH HAMID, Ph.D.
NOVEMBER 06, 1998

STEARNS & WHELER
SITE: FARWELL LANDFILL
CASE NO.:7098-1806B/ SDG NO. B1806

INTRODUCTION

This quality assurance review is based upon a review of all data generated from thirteen (13) water samples and three soil samples collected on 09-09,10,15-98. The samples were analyzed by Severn Trent Laboratories according to criteria set forth in SOW3,90 (ILM03.0) for total & dissolved metals.

The following samples are included in this report:

MW-17I	KW-1A	MW-6	LFP-1*
L-1	DUP-2	KW-1*	MW11D
LFP-1A	RRP-1	MW13	MW14I
MW11S	MW14S	MW17S	RRP-1A*

* Soil Sample

All water samples were analyzed for Total & Dissolved metals.

The QA/QC samples (MS, MD and serial dilution) were analyzed on samples KW-1A and KW-1 for water and soil samples respectively.

All data have been validated with regard to usability according to the quality assurance set forth in NYSDEC ASP for Evaluating Inorganic analyses. If you have any questions or comments on this data review, please call Zohreh Hamid at (610) 269-9989.

QUALITY ASSURANCE REVIEW

The finding offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Times
- Calibrations & CRDL Analyses
- Blanks
- ICP Interference Check Sample
- Matrix Spike Analysis
- Matrix Duplicate Analysis
- Laboratory Control Sample Analysis
- ICP Serial Dilution Analysis
- Instrument Detection Limits
- Field Duplicate Results
- Sample Results

DATA COMPLETENESS

The data package completeness was satisfactory. Two different sample IDs (09 & 17) were assigned to sample MW11S for total and dissolved samples.

HOLDING TIME

All samples were digested/analyzed within the NYSDEC requirement holding times.

CALIBRATIONS & CRDL Analyses

The recoveries for all analyses in the initial and continuing calibrations were within the control limits of 90-110% with the exception of ICV4 for Ni (89.7%) and CCV4 for Se (89.5%). The data were not impacted since the deviations were marginal. The recoveries for all ICP metals in CCV2 analyzed on 10-14-98 @ 18:30 were below the lower control limits of 90-110%. The sample data could be accepted unqualified since this calibration was analyzed at the end of the sample analysis.

The CRDL sample analysis was performed prior and after all samples. The %recoveries were within the control limits of 80-120% with the exception of the following:

Analyte	% Recovery Initial/final	Associated sample
Pb Tl Zn	133.1/139.5 72.2/- 165.3/152.2	All Total samples except MW-17I
Se Tl Zn	-/61.4 79.4/52.3 127.4/-	All Dissolved l samples except L-1
Pb Tl Zn	128/148 29.7/51.8 122.6/124.9	All soil samples
Cd Se Tl	-/120.6 -/59.8 64/66	MW-17I (T0tal) L-1 (Dissolved) Soil Post Spiked sample

The positive results up to 3x CRDLs for the CRDL exceeded 120% and positive results and non-detected values for CRDL below 80% were qualified estimated.

BLANKS

The laboratory preparation blanks for soil and total analysis were free of metal contamination. The dissolved blank had Al (12 ug/l), Hg (0.11 ug/l) and Zn (1.5 ug/l) at levels below the CRDLs. The reported sample results up to action levels (5 times the blank concentration) were qualified "U" and should be considered as non-detected values. Affected sample: Al and Hg in all dissolved samples.

ICP INTERFERENCE CHECK SAMPLE

The recoveries for nickel (79%, 79.5%, 79.2% & 77.2%), Ca (79.7%) and Cd (79.9%) in five different ICS sample analyses were below the lower control limit of 80%. The data were not impacted since the deviations were marginal.

MATRIX SPIKE/SPIKE DUPLICATE ANALYSIS

Matrix spike analysis was performed for both matrices. The recoveries were within the QC limits of 75-125% in dissolved sample analyses. The recovery for Pb (131.7%) in total and Sb (50.8%), Hg (129%), Se (72.6%) and Tl (69.7%) in soil sample analyses were outside the control limits. The positive sample results for Pb and Hg and both positive and non-detected values for Se and Tl were qualified estimated in the corresponding samples.

The analytical post digestion spike sample was performed for all spike outliers with the exception of mercury as required by the method. The recoveries were with in the control limits with the exception of Tl. The possibility of matrix interference existed for thallium. The data were not qualified based on this outlier. .

MATRIX DUPLICATE ANALYSIS

The matrix duplicate analysis was also performed for all analyses The RPDs for all compounds were within the analysis and validation control limits.

LABORATORY CONTROL SAMPLE

The recoveries for all analytes were within the control limits with the exception of Fe (130.2%) in total sample analysis. The positive sample results were qualified estimated. The lower control limits for Sb was not listed in soil sample analysis. Also, the recovery was 75.8%. the data were qualified estimated because of matrix spike outlier, additional qualifier codes were not applied..

ICP SERIAL DILUTION

The %Ds for K (10.2%) and Zn (13.8%) were above the 10% requirement. The reported positive results were qualified estimated for zinc. The data for potassium were not qualified since the deviation was marginal.

INSTRUMENT DETECTION LIMITS

All analytes with the exception of mercury were analyzed with ICP. The reported IDLs were below the CRDL.

DUPLICATE ANALYSIS

Duplicate analysis was analyzed on samples MW-6/Dup-2 for total and dissolved sample analyses. The RPDs were within the control limits with the exception of Zn (54%) in the total sample analysis. The data were considered biased high and qualified estimated in the associated samples.

SAMPLE RESULTS

The reported sample results were considered reliable. All analysis was performed at one-fold dilutions. The comparison of total and dissolved sample was considered satisfactory.

The reported data for soil samples KW-1 and RRP-1A were qualified estimated since the % solids were less than 50%.

SUMMARY

The cooler temperature was within control limit of 2-6 °C. The samples were preserved at the pH< 2 unit. Overall, major problems were not encountered during the sample analyses. The minor issues have been discussed. The reported data were summarized on the data summary with the applied qualifier codes.

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2- butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICCATION.

CODES RELATING TO QUATITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED. THE REPORTED QUATITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ANALYTICAL ASSURANCE ASSOCIATES (A3)
TOTAL WATER METAL ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
SITE: FARWELL LANDFILL
STL ID: 7098-1806B
SDG NO.: B1806

CLIENT SAMPLE ID:		**MW-17I**	**L-1**	**MW11D**	**LFP-1A**	**KW-1A**	**MW11S**
LAB SAMPLE ID:		T981806B-01	T981806B-02	T981806B-03	T981806B-04	T981806B-06	T981806B-09
TARGET COMPOUNDS:	IDL						
Aluminum	6.0	9.8	34.1	18.2	27.6	126	14000
Antimony	5.0	6.7					
Arsenic	3.0	5.4	7.0		3.4		17.5
Barium	1.0	475	455	139	19.6	64.8	680
Beryllium	1.0						2.2
Cadmium	1.0	1.5 J	1.7				3.2
Calcium	4.0	34200	94700	151000	18200	48800	190000
Chromium	1.0		4.9				18.5
Cobalt	1.0		4.6				9.0
Copper	2.0		2.2			2.6	55.9
Iron	7.0	223	10500	7.5	278	221	27600
Lead	2.0						33.1 J
Magnesium	5.0	7230	88600	52000	2560	8260	51700
Manganese	1.0	129	693	54.5	65.6	22.5	541
Mercury	0.1						
Nickel	5.0		23.2				25.6
Potassium	29.0	829	251000	1300	973	1140	5200
Selenium	3.0						
Silver	1.0						
Sodium	15.0	15100	233000	22600	698	14600	20000
Thallium	6.0	UJ	UJ	UJ	UJ	UJ	UJ
Vanadium	1.0						20.6
Zinc	1.0	9.7 J	35.3 J	28.0 J	23.4 J	102 J	164 J

ANALYTICAL ASSURANCE ASSOCIATES (A3)
TOTAL WATER METAL ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
SITE: FARWELL LANDFILL
STL ID: 7098-1806B
SDG NO.: B1806

CLIENT SAMPLE ID:		**RRP-1**	**MW14S**	**MW14I**	**MW-6**	**DUP-2**	**MW13**
LAB SAMPLE ID:		T981806B-10	T981806B-11	T981806B-12	T981806B-13	T981806B-14	T981806B-15
TARGET COMPOUNDS:	**IDL**						
Aluminum	6.0	20400	3330	2100	595	787	67.7
Antimony	5.0	9.8					
Arsenic	3.0	23.4	5.2			4.2	
Barium	1.0	550	308	171	642	633	53.4
Beryllium	1.0	3.0					
Cadmium	1.0	2.0	3.2	3.1	1.1	1.5	1.4
Calcium	4.0	108000	175000	168000	71900	72700	110000
Chromium	1.0	36.8	8.7	3.3	1.4	1.4	
Cobalt	1.0	18.4	2.2	1.3			
Copper	2.0	52.5	12.2	22.9	2.1	2.2	
Iron	7.0	40200	6890	4720	1830	2340	36.0
Lead	2.0	48.2 J	6.4 J	7.4 J		2.4 J	
Magnesium	5.0	33400	53100	51600	22500	22900	39300
Manganese	1.0	4160	1440	934	515	540	11.2
Mercury	0.1						
Nickel	5.0	39.3	12.3	9.1			
Potassium	29.0	5500	2580	2370	2420	2480	1160
Selenium	3.0	3.5					
Silver	1.0						
Sodium	15.0	10900	39400	33500	21700	21400	8500
Thallium	6.0	UJ	UJ	UJ	UJ	UJ	UJ
Vanadium	1.0	29.0	3.7	2.5			
Zinc	1.0	306 J	95.6 J	76.2 J	36.7 J	65.0 J	24.3 J

ANALYTICAL ASSURANCE ASSOCIATES (A3)
TOTAL WATER METAL ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
SITE: FARWELL LANDFILL
STL ID: 7098-1806B
SDG NO.: B1806

CLIENT SAMPLE ID: **MW17S**
LAB SAMPLE ID: T981806B-16

TARGET COMPOUNDS:

	IDL		
Aluminum	6.0	103	
Antimony	5.0	6.2	
Arsenic	3.0		
Barium	1.0	80.1	
Beryllium	1.0		
Cadmium	1.0	12.8	
Calcium	4.0	68800	
Chromium	1.0	6.4	
Cobalt	1.0		
Copper	2.0	8.3	
Iron	7.0	408	
Lead	2.0	4.3	J
Magnesium	5.0	23300	
Manganese	1.0	27.0	
Mercury	0.1		
Nickel	5.0	7.0	
Potassium	29.0	10800	
Selenium	3.0		
Silver	1.0		
Sodium	15.0	11100	
Thallium	6.0		UJ
Vanadium	1.0		
Zinc	1.0	61.6	J

ANALYTICAL ASSURANCE ASSOCIATES (A3)
DISSOLVED WATER METAL ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
SITE: FARWELL LANDFILL
STL ID: 7098-1806B
SDG NO.: B1806

CLIENT SAMPLE ID:		**MW-17I**	**L-1**	**MW11D**	**LFP-1A**	**KW-1A**	**RRP-1**	**MW14S**
LAB SAMPLE ID:		F981806B-01	F981806B-02	F981806B-03	F981806B-04	F981806B-06	F981806B-10	F981806B-11
TARGET COMPOUNDS:								
	IDL							
Aluminum	6.0	11.7 U	18.6 U	14.7 U	24.1 U	16.6 U	43.7 U	17.0 U
Antimony	5.0		6.9				5.5	
Arsenic	3.0						4.9	
Barium	1.0	446	362	142	19.5	63.0	174	285
Beryllium	1.0							
Cadmium	1.0		1.6 J	1.5	1.0		1.3	2.0
Calcium	4.0	32100	95600	154000	18600	49200	66500	187000
Chromium	1.0		3.7					
Cobalt	1.0	5.2	10.7		8.1			5.1
Copper	2.0							
Iron	7.0	211	385		123	27.3	248	
Lead	2.0							
Magnesium	5.0	6720	89600	52900	2610	8330	27700	55900
Manganese	1.0	138	691	56.1	31.9	14.9	1380	1370
Mercury	0.1	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
Nickel	5.0		24.2					7.2
Potassium	29.0	725	257000	1300	954	1160	3170	2220
Selenium	3.0	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Silver	1.0							
Sodium	15.0	13300	174000	23700	708	14800	10600	42000
Thallium	6.0	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Vanadium	1.0							
Zinc	1.0	17.4 J	38.8	15.5 J	36.6 J	19.1 J	17.6 J	24.3 J

ANALYTICAL ASSURANCE ASSOCIATES (A3)
DISSOLVED WATER METAL ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
SITE: FARWELL LANDFILL
STL ID: 7098-1806B
SDG NO.: B1806

CLIENT SAMPLE ID:		**MW14I**	**MW-6**	**DUP-2**	**MW13**	**MW17S**	**MW11S**
LAB SAMPLE ID:		F981806B-12	F981806B-13	F981806B-14	F981806B-15	F981806B-16	F981806B-17
TARGET COMPOUNDS:	IDL						
Aluminum	6.0	12.0 U	44.2 U	33.8 U	18.5 U	16.3 U	21.0 U
Antimony	5.0						
Arsenic	3.0						
Barium	1.0	152	595	599	54.9	125	319
Beryllium	1.0						
Cadmium	1.0	1.5	1.9	1.7	1.3	2.8	1.4
Calcium	4.0	163000	73800	73900	109000	60600	160000
Chromium	1.0					1.2	
Cobalt	1.0	5.6	1.2		7.5	5.5	5.3
Copper	2.0						7.8
Iron	7.0	25.9	427	423			
Lead	2.0						
Magnesium	5.0	49900	23300	23600	39200	17900	44200
Manganese	1.0	882	551	548	33.2	29.3	29.6
Mercury	0.1	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 J
Nickel	5.0	5.5				7.3	6.3
Potassium	29.0	1740	5720	5840	~~14800~~ 1480	1700	4190
Selenium	3.0	UJ	UJ	UJ	UJ	UJ	UJ
Silver	1.0						
Sodium	15.0	34400	21300	21500	8700	6370	20700
Thallium	6.0	UJ	UJ	UJ	UJ	UJ	UJ
Vanadium	1.0						
Zinc	1.0	72.5 J	23.8 J	18.6 J	20.6 J	35.9 J	26.0 J

ANALYTICAL ASSURANCEASSOCIATES (A3)
TOTAL SOIL METAL ANALYSIS
mg/Kg

CLIENT: STEARNS & WHELER
SITE: FARWELL LANDFILL
STL ID: 7098-1806B
SDG NO.: B1806

CLIENT SAMPLE ID:		**LFP-1**		**KW-1**		**RRP-1A**	
LAB SAMPLE ID:		T981806B-05		T981806B-07		T981806B-19	
% SOLID		43.1		56.5		25.2	
TARGET COMPOUNDS:							
	IDL						
Aluminum	6.0	14800	J	9100		22100	J
Antimony	5.0		UJ		UJ		UJ
Arsenic	3.0	11.5	J	5.8		17.9	J
Barium	1.0	134	J	100		285	J
Beryllium	1.0	2.7	J	1.6		3.5	J
Cadmium	1.0		UJ				UJ
Calcium	4.0	6350	J	5680		20800	J
Chromium	1.0	25.5	J	11.0		35.7	J
Cobalt	1.0	13.0	J	7.4		17.2	J
Copper	2.0	23.4	J	10.7		44.8	J
Iron	7.0	33000	J	18900		39500	J
Lead	2.0	15.6	J	13.3	J	42.1	J
Magnesium	5.0	4890	J	2500		5970	J
Manganese	1.0	535	J	490		935	J
Mercury	0.1	0.12	J			0.18	J
Nickel	5.0	31.0	J	15.4		36.4	J
Potassium	29.0	2090	J	854		2800	J
Selenium	3.0	1.0	J	1.5		3.6	J
Silver	1.0		UJ		UJ		UJ
Sodium	15.0	230	J	108		265	J
Thallium	6.0		UJ		UJ		UJ
Vanadium	1.0	20.1	J	12.2		33.9	J
Zinc	1.0	106	J	71.4	J	226	J

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-17I

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806B SAS No.: SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: T981806B-01

Level (low/med): LOW Date Received: 09/10/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9.8	B		P
7440-36-0	Antimony	6.7	B		P
7440-38-2	Arsenic	5.4	B		P
7440-39-3	Barium	475.			P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.5	B		P
7440-70-2	Calcium	34200			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	1.0	U		P
7440-50-8	Copper	2.0	U		P
7439-89-6	Iron	223.			P
7439-92-1	Lead	2.0	U	N	P
7439-95-4	Magnesium	7230			P
7439-96-5	Manganese	129.			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	829.	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	15100			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	9.7	B		P
57-12-5	Cyanide				NR

Color Before: Clarity Before: OPAQUE Texture:

Color After: Clarity After: OPAQUE Artifacts:

Comments:

Total Metals

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

L-1

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 1806B SAS No.: ______ SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: T981806B-02

Level (low/med): LOW Date Received: 09/10/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	34.1	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	7.0	B		P
7440-39-3	Barium	455.			P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.7	B		P
7440-70-2	Calcium	94700			P
7440-47-3	Chromium	4.9	B		P
7440-48-4	Cobalt	4.6	B		P
7440-50-8	Copper	2.2	B		P
7439-89-6	Iron	10500			P
7439-92-1	Lead	2.0	U	N	P
7439-95-4	Magnesium	88600			P
7439-96-5	Manganese	693.			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	23.2	B		P
7440-09-7	Potassium	251000			P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	233000			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	35.3			P
57-12-5	Cyanide				NR

Color Before: YELLOW Clarity Before: CLEAR Texture: ______

Color After: YELLOW Clarity After: CLEAR Artifacts: ______

Comments:
Total Metals

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW11D

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 1806B SAS No.: ______ SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: T981806B-03

Level (low/med): LOW Date Received: 09/11/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	18.2	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	139.	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.0	U		P
7440-70-2	Calcium	151000			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	1.0	U		P
7440-50-8	Copper	2.0	U		P
7439-89-6	Iron	7.5	B		P
7439-92-1	Lead	2.0	U	N	P
7439-95-4	Magnesium	52000			P
7439-96-5	Manganese	54.5			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	1300	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	22600			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	28.0			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture: ______

Color After: COLORLESS Clarity After: CLEAR Artifacts: ______

Comments:

Total Metals

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

LFP-1A

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806B SAS No.: SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: T981806B-04

Level (low/med): LOW Date Received: 09/11/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	27.6	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.4	B		P
7440-39-3	Barium	19.6	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.0	U		P
7440-70-2	Calcium	18200			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	1.0	U		P
7440-50-8	Copper	2.0	U		P
7439-89-6	Iron	278.			P
7439-92-1	Lead	2.0	U	N	P
7439-95-4	Magnesium	2560	B		P
7439-96-5	Manganese	65.6			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	973.	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	698.	B		P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	23.4			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
Total Metals

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

KW-1A

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806B SAS No.: SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: T981806B-06

Level (low/med): LOW Date Received: 09/11/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	126.	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	64.8	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.0	U		P
7440-70-2	Calcium	48800			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	1.0	U		P
7440-50-8	Copper	2.6	B		P
7439-89-6	Iron	221.			P
7439-92-1	Lead	2.0	U	N	P
7439-95-4	Magnesium	8260			P
7439-96-5	Manganese	22.5			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	1140	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	14600			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	102.			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

Total Metals

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW11S

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806B SAS No.: SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: T981806B-09

Level (low/med): LOW Date Received: 09/11/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	14000			P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	17.5			P
7440-39-3	Barium	680.			P
7440-41-7	Beryllium	2.2	B		P
7440-43-9	Cadmium	3.2	B		P
7440-70-2	Calcium	190000			P
7440-47-3	Chromium	18.5			P
7440-48-4	Cobalt	9.0	B		P
7440-50-8	Copper	55.9			P
7439-89-6	Iron	27600			P
7439-92-1	Lead	33.1		N	P
7439-95-4	Magnesium	51700			P
7439-96-5	Manganese	541.			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	25.6	B		P
7440-09-7	Potassium	5200			P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	20000			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	20.6	B		P
7440-66-6	Zinc	164.			P
57-12-5	Cyanide				NR

Color Before: YELLOW Clarity Before: OPAQUE Texture:

Color After: YELLOW Clarity After: OPAQUE Artifacts:

Comments:

Total Metals

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

RRP-1

Lab Name: STL   Contract: ______

Lab Code: STL   Case No.: 1806B   SAS No.: ______   SDG No.: B1806

Matrix (soil/water): WATER   Lab Sample ID: T981806B-10

Level (low/med): LOW   Date Received: 09/16/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	20400			P
7440-36-0	Antimony	9.8	B		P
7440-38-2	Arsenic	23.4			P
7440-39-3	Barium	550.			P
7440-41-7	Beryllium	3.0	B		P
7440-43-9	Cadmium	2.0	B		P
7440-70-2	Calcium	108000			P
7440-47-3	Chromium	36.8			P
7440-48-4	Cobalt	18.4	B		P
7440-50-8	Copper	52.5			P
7439-89-6	Iron	40200			P
7439-92-1	Lead	48.2		N	P
7439-95-4	Magnesium	33400			P
7439-96-5	Manganese	4160			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	39.3	B		P
7440-09-7	Potassium	5500			P
7782-49-2	Selenium	3.5	B		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	10900			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	29.0	B		P
7440-66-6	Zinc	306.			P
57-12-5	Cyanide				NR

Color Before: BROWN   Clarity Before: OPAQUE   Texture: ______

Color After: YELLOW   Clarity After: OPAQUE   Artifacts: ______

Comments:
Total Metals

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW14S

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 1806B SAS No.: ______ SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: T981806B-11

Level (low/med): LOW Date Received: 09/16/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3330			P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	5.2	B		P
7440-39-3	Barium	308.			P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	3.2	B		P
7440-70-2	Calcium	175000			P
7440-47-3	Chromium	8.7	B		P
7440-48-4	Cobalt	2.2	B		P
7440-50-8	Copper	12.2	B		P
7439-89-6	Iron	6890			P
7439-92-1	Lead	6.4		N	P
7439-95-4	Magnesium	53100			P
7439-96-5	Manganese	1440			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	12.3	B		P
7440-09-7	Potassium	2580	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	39400			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	3.7	B		P
7440-66-6	Zinc	95.6			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: OPAQUE Texture: ______

Color After: COLORLESS Clarity After: CLEAR Artifacts: ______

Comments:
Total Metals

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW14I

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 1806B SAS No.: ______ SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: T981806B-12

Level (low/med): LOW Date Received: 09/16/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2100			P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	171.	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	3.1	B		P
7440-70-2	Calcium	168000			P
7440-47-3	Chromium	3.3	B		P
7440-48-4	Cobalt	1.3	B		P
7440-50-8	Copper	22.9	B		P
7439-89-6	Iron	4720			P
7439-92-1	Lead	7.4		N	P
7439-95-4	Magnesium	51600			P
7439-96-5	Manganese	934.			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	9.1	B		P
7440-09-7	Potassium	2370	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	33500			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	2.5	B		P
7440-66-6	Zinc	76.2			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: OPAQUE Texture: ______

Color After: COLORLESS Clarity After: CLEAR Artifacts: ______

Comments:

Total Metals

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-6

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806B SAS No.: SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: T981806B-13

Level (low/med): LOW Date Received: 09/16/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	595.			P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	642.			P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.1	B		P
7440-70-2	Calcium	71900			P
7440-47-3	Chromium	1.4	B		P
7440-48-4	Cobalt	1.0	U		P
7440-50-8	Copper	2.1	B		P
7439-89-6	Iron	1830			P
7439-92-1	Lead	2.0	U	N	P
7439-95-4	Magnesium	22500			P
7439-96-5	Manganese	515.			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	2420	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	21700			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	36.7			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: OPAQUE Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

Total Metals

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

DUP-2

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806B SAS No.: SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: T981806B-14

Level (low/med): LOW Date Received: 09/16/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	787.			P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	4.2	B		P
7440-39-3	Barium	633.			P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.5	B		P
7440-70-2	Calcium	72700			P
7440-47-3	Chromium	1.4	B		P
7440-48-4	Cobalt	1.0	U		P
7440-50-8	Copper	2.2	B		P
7439-89-6	Iron	2340			P
7439-92-1	Lead	2.4	B	N	P
7439-95-4	Magnesium	22900			P
7439-96-5	Manganese	540.			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	2480	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	21400			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	65.0			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: OPAQUE Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

Total Metals

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW13

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806B SAS No.: SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: T981806B-15

Level (low/med): LOW Date Received: 09/16/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	67.7	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	53.4	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.4	B		P
7440-70-2	Calcium	110000			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	1.0	U		P
7440-50-8	Copper	2.0	U		P
7439-89-6	Iron	36.0	B		P
7439-92-1	Lead	2.0	U	N	P
7439-95-4	Magnesium	39300			P
7439-96-5	Manganese	11.2	B		P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	1160	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	8500			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	24.3			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
Total Metals

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW17S

Lab Name: STL　　Contract: ______

Lab Code: STL　　Case No.: 1806B　　SAS No.: ______　　SDG No.: B1806

Matrix (soil/water): WATER　　Lab Sample ID: T981806B-16

Level (low/med): LOW　　Date Received: 09/16/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	103.	B		P
7440-36-0	Antimony	6.2	B		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	80.1	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	12.8			P
7440-70-2	Calcium	68800			P
7440-47-3	Chromium	6.4	B		P
7440-48-4	Cobalt	1.0	U		P
7440-50-8	Copper	8.3	B		P
7439-89-6	Iron	408.			P
7439-92-1	Lead	4.3		N	P
7439-95-4	Magnesium	23300			P
7439-96-5	Manganese	27.0			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	7.0	B		P
7440-09-7	Potassium	10800			P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	11100			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	61.6			P
57-12-5	Cyanide				NR

Color Before: COLORLESS　　Clarity Before: CLEAR　　Texture: ______

Color After: COLORLESS　　Clarity After: CLEAR　　Artifacts: ______

Comments:

Total Metals

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-17I

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806B SAS No.: SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: F981806B-01

Level (low/med): LOW Date Received: 09/10/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	11.7	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	446.			P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.0	U		P
7440-70-2	Calcium	32100			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	5.2	B		P
7440-50-8	Copper	2.0	U		P
7439-89-6	Iron	211.			P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	6720			P
7439-96-5	Manganese	138.			P
7439-97-6	Mercury	0.11	B		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	725.	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	13300			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	17.4	B		P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
Filtered Metals

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

L-1

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806B SAS No.: SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: F981806B-02

Level (low/med): LOW Date Received: 09/10/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	18.6	B		P
7440-36-0	Antimony	6.9	B		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	362.			P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.6	B		P
7440-70-2	Calcium	95600			P
7440-47-3	Chromium	3.7	B		P
7440-48-4	Cobalt	10.7	B		P
7440-50-8	Copper	2.0	U		P
7439-89-6	Iron	385.			P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	89600			P
7439-96-5	Manganese	691.			P
7439-97-6	Mercury	0.11	B		CV
7440-02-0	Nickel	24.2	B		P
7440-09-7	Potassium	257000			P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	174000			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	38.8			P
57-12-5	Cyanide				NR

Color Before: Clarity Before: OPAQUE Texture:

Color After: Clarity After: OPAQUE Artifacts:

Comments:

Filtered Metals

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW11D

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806B SAS No.: SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: F981806B-03

Level (low/med): LOW Date Received: 09/11/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	14.7	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	142.	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.5	B		P
7440-70-2	Calcium	154000			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	1.0	U		P
7440-50-8	Copper	2.0	U		P
7439-89-6	Iron	7.0	U		P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	52900			P
7439-96-5	Manganese	56.1			P
7439-97-6	Mercury	0.11	B		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	1300	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	23700			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	15.5	B		P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
Filtered Metals

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

LFP-1A

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 1806B SAS No.: ______ SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: F981806B-04

Level (low/med): LOW Date Received: 09/11/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	24.1	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	19.5	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.0	B		P
7440-70-2	Calcium	18600			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	8.1	B		P
7440-50-8	Copper	2.0	U		P
7439-89-6	Iron	123.			P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	2610	B		P
7439-96-5	Manganese	31.9			P
7439-97-6	Mercury	0.11	B		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	954.	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	708.	B		P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	36.6			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture: ______

Color After: COLORLESS Clarity After: CLEAR Artifacts: ______

Comments:

Filtered Metals

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

KW-1A

Lab Name: STL   Contract: ______

Lab Code: STL   Case No.: 1806B   SAS No.: ______   SDG No.: B1806

Matrix (soil/water): WATER   Lab Sample ID: F981806B-06

Level (low/med): LOW   Date Received: 09/11/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	16.6	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	63.0	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.0	U		P
7440-70-2	Calcium	49200			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	1.0	U		P
7440-50-8	Copper	2.0	U		P
7439-89-6	Iron	27.3	B		P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	8330			P
7439-96-5	Manganese	14.9	B		P
7439-97-6	Mercury	0.11	B		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	1160	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	14800			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	19.1	B		P
57-12-5	Cyanide				NR

Color Before: COLORLESS   Clarity Before: CLEAR   Texture: ______

Color After: COLORLESS   Clarity After: CLEAR   Artifacts: ______

Comments:
Filtered Metals

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

RRP-1

Lab Name: STL Contract: ____________

Lab Code: STL Case No.: 1806B SAS No.: ______ SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: F981806B-10

Level (low/med): LOW Date Received: 09/16/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	43.7	B		P
7440-36-0	Antimony	5.5	B		P
7440-38-2	Arsenic	4.9	B		P
7440-39-3	Barium	174.	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.3	B		P
7440-70-2	Calcium	66500			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	1.0	U		P
7440-50-8	Copper	2.0	U		P
7439-89-6	Iron	248.			P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	27700			P
7439-96-5	Manganese	1380			P
7439-97-6	Mercury	0.11	B		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	3170	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	10600			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	17.6	B		P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture: ______

Color After: COLORLESS Clarity After: CLEAR Artifacts: ______

Comments:
Filtered Metals

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW14S

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806B SAS No.: SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: F981806B-11

Level (low/med): LOW Date Received: 09/16/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	17.0	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	285.			P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	2.0	B		P
7440-70-2	Calcium	187000			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	5.1	B		P
7440-50-8	Copper	2.0	U		P
7439-89-6	Iron	7.0	U		P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	55900			P
7439-96-5	Manganese	1370			P
7439-97-6	Mercury	0.11	B		CV
7440-02-0	Nickel	7.2	B		P
7440-09-7	Potassium	2220	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	42000			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	24.3			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
Filtered Metals

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW14I

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 1806B SAS No.: ______ SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: F981806B-12

Level (low/med): LOW Date Received: 09/16/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	12.0	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	152.	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.5	B		P
7440-70-2	Calcium	163000			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	5.6	B		P
7440-50-8	Copper	2.0	U		P
7439-89-6	Iron	25.9	B		P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	49900			P
7439-96-5	Manganese	882.			P
7439-97-6	Mercury	0.11	B		CV
7440-02-0	Nickel	5.5	B		P
7440-09-7	Potassium	1740	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	34400			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	72.5			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture: ______

Color After: COLORLESS Clarity After: CLEAR Artifacts: ______

Comments:
Filtered Metals

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-6

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806B SAS No.: SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: F981806B-13

Level (low/med): LOW Date Received: 09/16/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	44.2	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	595.			P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.9	B		P
7440-70-2	Calcium	73800			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	1.2	B		P
7440-50-8	Copper	2.0	U		P
7439-89-6	Iron	427.			P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	23300			P
7439-96-5	Manganese	551.			P
7439-97-6	Mercury	0.11	B		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	5720			P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	21300			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	23.8			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

Filtered Metals

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

DUP-2

Lab Name: STL   Contract: ______

Lab Code: STL   Case No.: 1806B   SAS No.: ______   SDG No.: B1806

Matrix (soil/water): WATER   Lab Sample ID: F981806B-14

Level (low/med): LOW   Date Received: 09/16/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	33.8	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	599.			P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.7	B		P
7440-70-2	Calcium	73900			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	1.0	U		P
7440-50-8	Copper	2.0	U		P
7439-89-6	Iron	423.			P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	23600			P
7439-96-5	Manganese	548.			P
7439-97-6	Mercury	0.11	B		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	5840			P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	21500			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	18.6	B		P
57-12-5	Cyanide				NR

Color Before: COLORLESS   Clarity Before: CLEAR   Texture: ______

Color After: COLORLESS   Clarity After: CLEAR   Artifacts: ______

Comments:
Filtered Metals

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW13

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 1806B SAS No.: ______ SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: F981806B-15

Level (low/med): LOW Date Received: 09/16/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	18.5	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	54.9	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.3	B		P
7440-70-2	Calcium	109000			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	7.5	B		P
7440-50-8	Copper	2.0	U		P
7439-89-6	Iron	7.0	U		P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	39200			P
7439-96-5	Manganese	33.2			P
7439-97-6	Mercury	0.11	B		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	1480	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	8700			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	20.6			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture: ______

Color After: COLORLESS Clarity After: CLEAR Artifacts: ______

Comments:

Filtered Metals

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW17S

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806B SAS No.: SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: F981806B-16

Level (low/med): LOW Date Received: 09/16/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	16.3	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	125.	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	2.8	B		P
7440-70-2	Calcium	60600			P
7440-47-3	Chromium	1.2	B		P
7440-48-4	Cobalt	5.5	B		P
7440-50-8	Copper	2.0	U		P
7439-89-6	Iron	7.0	U		P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	17900			P
7439-96-5	Manganese	29.3			P
7439-97-6	Mercury	0.11	B		CV
7440-02-0	Nickel	7.3	B		P
7440-09-7	Potassium	1700	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	6370			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	35.9			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
Filtered Metals

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW11S

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 1806B SAS No.: ______ SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: F981806B-17

Level (low/med): LOW Date Received: 09/16/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	21.0	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	319.			P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.4	B		P
7440-70-2	Calcium	160000			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	5.3	B		P
7440-50-8	Copper	7.8	B		P
7439-89-6	Iron	7.0	U		P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	44200			P
7439-96-5	Manganese	29.6			P
7439-97-6	Mercury	0.11	B		CV
7440-02-0	Nickel	6.3	B		P
7440-09-7	Potassium	4190	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	20700			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	26.0			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture: ______

Color After: COLORLESS Clarity After: CLEAR Artifacts: ______

Comments:
Filtered Metals

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

LFP-1

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806B SAS No.: SDG No.: B1806

Matrix (soil/water): SOIL Lab Sample ID: 981806B-05

Level (low/med): LOW Date Received: 09/11/98

% Solids: 43.1

Concentration Units (ug/L or mg/kg dry weight): Mg/Kg

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	14800			P
7440-36-0	Antimony	2.2	U	N	P
7440-38-2	Arsenic	11.5			P
7440-39-3	Barium	134.			P
7440-41-7	Beryllium	2.7			P
7440-43-9	Cadmium	0.44	U		P
7440-70-2	Calcium	6350			P
7440-47-3	Chromium	25.5			P
7440-48-4	Cobalt	13.0	B		P
7440-50-8	Copper	23.4			P
7439-89-6	Iron	33000			P
7439-92-1	Lead	15.6			P
7439-95-4	Magnesium	4890			P
7439-96-5	Manganese	535.			P
7439-97-6	Mercury	0.12	B	N	CV
7440-02-0	Nickel	31.0			P
7440-09-7	Potassium	2090	B	E	P
7782-49-2	Selenium	1.0	B	N	P
7440-22-4	Silver	0.44	U		P
7440-23-5	Sodium	230.	B		P
7440-28-0	Thallium	2.6	U	N	P
7440-62-2	Vanadium	20.1	B		P
7440-66-6	Zinc	106.		E	P
57-12-5	Cyanide				NR

Color Before: BROWN Clarity Before: OPAQUE Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

KW-1

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 1806B SAS No.: ______ SDG No.: B1806

Matrix (soil/water): SOIL Lab Sample ID: 981806B-07

Level (low/med): LOW Date Received: 09/11/98

% Solids: 56.5

Concentration Units (ug/L or mg/kg dry weight): Mg/Kg

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9100			P
7440-36-0	Antimony	1.5	U	N	P
7440-38-2	Arsenic	5.8			P
7440-39-3	Barium	100.			P
7440-41-7	Beryllium	1.6			P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	5680			P
7440-47-3	Chromium	11.0			P
7440-48-4	Cobalt	7.4	B		P
7440-50-8	Copper	10.7			P
7439-89-6	Iron	18900			P
7439-92-1	Lead	13.3			P
7439-95-4	Magnesium	2500			P
7439-96-5	Manganese	490.			P
7439-97-6	Mercury	0.084	U	N	CV
7440-02-0	Nickel	15.4			P
7440-09-7	Potassium	854.	B	E	P
7782-49-2	Selenium	1.5	B	N	P
7440-22-4	Silver	0.30	U		P
7440-23-5	Sodium	108.	B		P
7440-28-0	Thallium	1.8	U	N	P
7440-62-2	Vanadium	12.2	B		P
7440-66-6	Zinc	71.4		E	P
57-12-5	Cyanide				NR

Color Before: BROWN Clarity Before: OPAQUE Texture: M

Color After: YELLOW Clarity After: CLEAR Artifacts: ______

Comments:

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

RRP-1A

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806B SAS No.: SDG No.: B1806

Matrix (soil/water): SOIL Lab Sample ID: 981806B-19

Level (low/med): LOW Date Received: 09/16/98

% Solids: 25.2

Concentration Units (ug/L or mg/kg dry weight): Mg/Kg

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	22100			P
7440-36-0	Antimony	3.1	U	N	P
7440-38-2	Arsenic	17.9			P
7440-39-3	Barium	285.			P
7440-41-7	Beryllium	3.5			P
7440-43-9	Cadmium	0.62	U		P
7440-70-2	Calcium	20800			P
7440-47-3	Chromium	35.7			P
7440-48-4	Cobalt	17.2	B		P
7440-50-8	Copper	44.8			P
7439-89-6	Iron	39500			P
7439-92-1	Lead	42.1			P
7439-95-4	Magnesium	5970			P
7439-96-5	Manganese	935.			P
7439-97-6	Mercury	0.18	B	N	CV
7440-02-0	Nickel	36.4			P
7440-09-7	Potassium	2800	B	E	P
7782-49-2	Selenium	3.6		N	P
7440-22-4	Silver	0.62	U		P
7440-23-5	Sodium	265.	B		P
7440-28-0	Thallium	3.7	U	N	P
7440-62-2	Vanadium	33.9			P
7440-66-6	Zinc	226.		E	P
57-12-5	Cyanide				NR

Color Before: BLACK Clarity Before: OPAQUE Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

MICROSEEPS

1035

FILE NOTE

SUBJECT: Permanent Gas Analysis of Water Samples

The VOA vials are removed from the refrigerator (4°C) and allowed to reach ambient temperature. Samples are prepared by withdrawing 30 cc of water from the bottom of the vial into a 50 cc Hamilton gas tight, locking syringe. Then 10 cc of helium is withdrawn from a reservoir and the syringe is locked. The syringe is then shaken for five minutes and allowed to equilibrate. With the syringe in a near vertical position, the headspace is injected through a septum-fitting into a 0.5 cc sample loop. The loop is allowed to equilibrate at 1 atmosphere pressure prior to switching the valve to place the sample loop into the carrier gas flow stream.

First, headspace concentrations of the analyzed gases are determined by comparison to the results of analysis of the "237" gas standard. Subsequently, the headspace concentrations are converted to the dissolved water concentrations using Henry's Law.

Results of analysis and applicable quality control parameters are supplied on the attached data sheets.

THE RESULTS SUPPLIED ARE THE ORIGINAL DISSOLVED CONCENTRATIONS OF THE ANALYTES IN MG/L AS CALCULATED FROM DETERMINED HEADSPACE CONCENTRATIONS.

220 William Pitt Way, Pittsburgh, PA 15238 • Phone (412) 826-5245, Fax (412) 826-3433

ST10-983192

—— SEVERN TRENT LABORATORIES ——
—— PROJECT: 7098-1806B ——
—— LOCATION: STL - CT ——

Sample Names	Carbon Dioxide mg/l	Oxygen mg/l	Methane mg/l	Lab ID	Date Sampled	Date Received	Date Analyzed	Analyst
MW-17I	5.32	4.89	<.07	T11 376	9/09/98	9/11/98	9/22/98	BC
L-1	192.19	0.68	1.07	T11 377	9/09/98	9/11/98	9/22/98	BC
RRP-1A	20.86	3.39	<.07	T11 378	9/15/98	9/18/98	9/22/98	BC
MW-14S	130.89	3.58	1.58	T11 379	9/15/98	9/18/98	9/22/98	BC
MW-14I	118.12	6.39	1.75	T11 380	9/15/98	9/18/98	9/22/98	BC
MW-6	29.80	4.17	2.34	T11 381	9/15/98	9/18/98	9/22/98	BC
DUP-2	28.52	6.54	1.92	T11 382	9/15/98	9/18/98	9/22/98	BC
MW-13	54.06	3.49	5.31	T11 383	9/15/98	9/18/98	9/22/98	BC
MW-17S	0.43	8.67	0.08	T11 384	9/15/98	9/18/98	9/22/98	BC
DETECTION LIMITS	0.30mg/l	0.15mg/l	0.07mg/l					

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ANALYST INITIALS BC

REVIEW AS

Micro.. .ps

ST11-983272

----- SEVERN TRENT LABORATORIES -----
----- PROJECT: 7098-1806B -----
----- LOCATION: STL - CT -----

Sample Names	Carbon Dioxide mg/l	Oxygen mg/l	Methane mg/l	Lab ID	Date Sampled	Date Received	Date Analyzed	Analyst
MW-11D	91.52	8.43	2.09	T11 433	9/10/98	9/11/98	9/24/98	BC
LFP-1A	3.62	9.45	<.07	T11 434	9/10/98	9/11/98	9/24/98	BC
KW-1A	2.77	9.79	<.07	T11 435	9/10/98	9/11/98	9/24/98	BC
MW-11S	68.11	9.59	<.07	T11 436	9/10/98	9/11/98	9/24/98	BC

DETECTION LIMITS 0.30mg/l 0.15mg/l 0.07mg/l

1051

ANALYST INITIALS BC

REVIEW AS

END OF DATA PACKAGE

Analytical Assurance Associates, Inc.
600 Rock Raymond Road
Downingtown, PA 19335
Phone: 610 - 269 - 9989
Fax: 610 - 269 - 9989

ORGANIC ANALYSES
QUALITY ASSURANCE DATA REVIEW

STEARNS & WHELER
SITE: FARWELL LANDFILL
CASE NO.: 7098-1806B/ SDG NO.: B1806

REPORTED BY:
ANALYTICAL ASSURANCE ASSOCIATES (A^3)
600 ROCK RAYMOND ROAD
DOWNINGTOWN, PA 19335

REVIEWED BY:
ZOHREH HAMID, Ph.D.
NOVEMBER 08, 1998

STEARNS & WHELER
SITE: FARWELL LANDFILL
CASE NO.:7098-1806B/SDG NO.: B1806

INTRODUCTION

This quality assurance review is based upon a review of all data generated from three (3) soils and fifteen (15) water samples including two trip blanks and one set of field duplicate samples collected on 09-9,10,15-98. The samples received by Severn Trent Laboratories (STL) on 9-10,11,16-98 and analyzed according to criteria set forth in NYSDEC ASP, Method USEPA CLP protocols, OLM03.2 for the TCL Volatile target compounds.

The following samples are contained within this report:

MW-17I	KW-1A	MW-6	LFP-1*
L-1	TB091098	DUP-2	KW-1*
LFP-1A	RRP-1	MW13	RRP-1A*
MW11S	MW14S	MW17S	
MW11D	MW14I	TB091598	

* Soil matrix sample.
Samples KW-1A and KW-1 were assigned as the QC (MS/MSD) samples in water and soil matrices respectively.

All data have been validated with regard to usability according to the quality assurance set forth in NYSDEC ASP for Evaluating Organic analyses. If you have any questions or comments on this data review, please call Zohreh Hamid at (610) 269-9989.

QUALITY ASSURANCE REVIEW

The finding offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Times
- Calibrations
- Blanks
- Surrogate Recoveries
- Internal Standards Recovery
- Matrix Spike/Spike Duplicate/Blank Spike Analyses
- Instrument Performance
- Field Duplicate Results
- Sample Results

DATA COMPLETENESS

The data package completeness was satisfactory. The collection date for sample LFP-1 was inadvertently listed as 9-01-98 on the sample preparation summary.

HOLDING TIME

All samples were analyzed within CLP method requirements.

Note: The analysis holding time exceeded the requirement established in NYSDEC ASP (5-days from VTSR) for soil samples LFP-1 and KW-1 by two days. The reported sample data were not qualified based on this issue since the samples were analyzed within the method holding time requirement limit.

CALIBRATIONS

All RRFs were with in the control limits in the initial and continuing calibrations. Also, all %Ds were within the QC limits in continuing calibrations analyzed on 9-13 &17-98. The following %RSDs & %Ds were outside the control limits of 30% and 25% respectively.

Compound Name	IC 09-10-98	IC 09-11-98	CC 09-14-98	CC 09-18-98
Chloromethane				28.6
Chloroethane				30
Acetone	32	33		
4-Methy-2-pentanone		53		
Associated Samples: 981806B-	All Soil Samples	All Water Samples	06 06MSB 03 08 06MS/MSD	All Soil Samples

IC= Initial Calibration & CC= Continuing Calibration

The reported sample results and non-detected values were qualified estimated (J & UJ) for the aforementioned compounds in the corresponding samples.

BLANKS

The water method blank analyzed on 9-13-98 had acetone at a level "14 ug/l". Also, soil blank had methylene chloride, acetone, 4-methyl-2-pentanone and 2-hexanone at levels below CRQLs. The reported sample results were elevated to the corresponding CRQLs and were qualified "U" on the data summery for these compounds.

SURROGATE RECOVERIES

All samples and the corresponding QC samples were spiked with three surrogate compounds as required by the Method. The recoveries were within the control limits.

MATRIX SPIKE/SPIKE DUPLICATE ANALYSIS

Matrix spike/spike duplicate samples were analyzed on samples KW-1A and KW-1 for water and soil matrices respectively. The recoveries and RPDs for all compounds were within the control limits in the soil MS/MSD analysis. However, the recoveries were above the control limits in water matrix spike sample. Consequently, the RPDs exceeded the QC limits. The data were not qualified based on these outliers since all recoveries met the criteria in the corresponding matrix spike duplicate. The recoveries of blank spike samples were within the laboratory control limits in both matrices.

INTERNAL STANDARD

All internal standard recoveries and retention times were within the control limits established by the laboratory.

DUPLICATE ANALYSIS

Duplicate analysis was performed on samples MW-6/DUP-2. The positive target compounds were not detected at levels above the CRQL in these two samples.

SAMPLE RESULTS

All samples were analyzed at one-fold dilutions. The reported data for soil samples KW-1 and RRP-1A were qualified estimated since the %moistures (58% & 69%) were above 50%.

Up to 18 TICs (unknowns, alkane derivatives, halogenated alkane, C10 H16 isomers, acid ester, ether and unknown siloxane) were reported in the samples.

SUMMARY

The cooler temperatures within the control limits of 5 °C. The samples were not preserved, however; the data were not impacted since the water samples were analyzed within 5-days from VTSR. The sample results below the CRQLs were qualified estimated, due to the uncertainty near the detection limits. Overall, major problems were not encountered during the sample analyses. The minor issues have been discussed. The reported data were summarized on the data summary with the applied qualifier codes.

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2- butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICCATION.

CODES RELATING TO QUATITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED. THE REPORTED QUATITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ANALYTICAL ASSURANCE ASSOCIATES (A3)
VOLATILE WATER ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
SITE: FARWELL LANDFILL
STL ID: 7098-1806B
SDG NO.: B1806

CLIENT SAMPLE ID:		**MW-17F**	**L-1**	**MW11D**	**LFP-1A**	**KW-1A**	**TB 091098**	**MW11S**
LAB SAMPLE ID:		981806B-01	981806B-02	981806B-03	981806B-04	981806B-06	981806B-08	981806B-09
DILUTION FACTOR:		1.0	1.0	1.0	1.0	1.0	1.0	1.0
TARGET COMPOUNDS:	CRQL							
Chloromethane	10							
Bromomethane	10							
Vinyl Chloride	10		17	9 J				
Chloroethane	10		3 J	93				
Methylene Chloride	10		58					
Acetone	10	UJ	15 UJ	UJ	UJ	UJ	UJ	UJ
Carbon Disulfide	10							
1,1-Dichloroethene	10			2 J				
1,1-Dichloroethane	10		28	150				6 J
1,2-Dichloroethene (total)	10		160	28				
Chloroform	10							
1,2-Dichloroethane	10		5 J					
2-Butanone	10		12					
1,1,1-Trichloroethane	10			27				
Carbon Tetrachloride	10							
Bromodichloromethane	10							
1,2-Dichloropropane	10		2 J					
cis-1,3-Dichloropropene	10							
Trichloroethene	10		18	45				
Dibromochloromethane	10							
1,1,2-Trichloroethane	10							
Benzene	10							
Trans-1,3-Dichloropropene	10							
Bromoform	10							
4-Methyl-2-pentanone	10	UJ	4 J	UJ	UJ	UJ	UJ	UJ
2-Hexanone	10		49					
Tetrachloroethene	10		2 J					
1,1,2,2-Tetrachloroethane	10							
Toluene	10		4 J					
Chlorobenzene	10		0.7 J					
Ethylbenzene	10							
Styrene	10							
Xylene (total)	10		13					

ANALYTICAL ASSURANCE ASSOCIATES (A3)
VOLATILE WATER ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
SITE: FARWELL LANDFILL
STL ID: 7098-1806B
SDG NO.: B1806

CLIENT SAMPLE ID:		**RRP-1**	**MW14S**	**MW14I**	**MW-6**	**DUP-2**	**MW13**
LAB SAMPLE ID:		981806B-10	981806B-11	981806B-12	981806B-13	981806B-14	981806B-15
DILUTION FACTOR:		1.0	1.0	1.0	1.0	1.0	1.0
TARGET COMPOUNDS:	CRQL						
Chloromethane	10						
Bromomethane	10						
Vinyl Chloride	10		7 J	5 J			7 J
Chloroethane	10		120	98			7 J
Methylene Chloride	10						
Acetone	10	UJ	UJ	UJ	UJ	UJ	UJ
Carbon Disulfide	10						
1,1-Dichloroethene	10						
1,1-Dichloroethane	10		81	55	1 J	1 J	27
1,2-Dichloroethene (total)	10		8 J	7 J			23
Chloroform	10						
1,2-Dichloroethane	10						
2-Butanone	10						
1,1,1-Trichloroethane	10		5 J	4 J			7 J
Carbon Tetrachloride	10						
Bromodichloromethane	10						
1,2-Dichloropropane	10						
cis-1,3-Dichloropropene	10						
Trichloroethene	10		4 J	3 J			4 J
Dibromochloromethane	10						
1,1,2-Trichloroethane	10						
Benzene	10		2 J	1 J			1 J
Trans-1,3-Dichloropropene	10						
Bromoform	10						
4-Methyl-2-pentanone	10	UJ	UJ	UJ	UJ	UJ	UJ
2-Hexanone	10						
Tetrachloroethene	10						
1,1,2,2-Tetrachloroethane	10						
Toluene	10						
Chlorobenzene	10						
Ethylbenzene	10						
Styrene	10						
Xylene (total)	10						

ANALYTICAL ASSURANCE ASSOCIATES (A3)
VOLATILE WATER ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
SITE: FARWELL LANDFILL
STL ID: 7098-1806B
SDG NO.: B1806

CLIENT SAMPLE ID:		**MW17S**	**TB 091598**
LAB SAMPLE ID:		981806B-16	981806B-18
DILUTION FACTOR:		1.0	1.0
TARGET COMPOUNDS:			
	CRQL		
Chloromethane	10		
Bromomethane	10		
Vinyl Chloride	10		
Chloroethane	10		
Methylene Chloride	10		
Acetone	10	UJ	UJ
Carbon Disulfide	10		
1,1-Dichloroethene	10		
1,1-Dichloroethane	10	3 J	
1,2-Dichloroethene (total)	10		
Chloroform	10		
1,2-Dichloroethane	10		
2-Butanone	10		
1,1,1-Trichloroethane	10		
Carbon Tetrachloride	10		
Bromodichloromethane	10		
1,2-Dichloropropane	10		
cis-1,3-Dichloropropene	10		
Trichloroethene	10		
Dibromochloromethane	10		
1,1,2-Trichloroethane	10		
Benzene	10		
Trans-1,3-Dichloropropene	10		
Bromoform	10		
4-Methyl-2-pentanone	10	UJ	UJ
2-Hexanone	10		
Tetrachloroethene	10		
1,1,2,2-Tetrachloroethane	10		
Toluene	10		
Chlorobenzene	10		
Ethylbenzene	10		
Styrene	10		
Xylene (total)	10		

ANALYTICAL ASSURANCE ASSOCIATES (A3)
VOLATILEL SOIL ANALYSIS
ug/Kg

CLIENT: STEARNS & WHELER
SITE: FARWELL LANDFILL
STL ID: 7098-1806B
SDG NO.: B1806

CLIENT SAMPLE ID:		**LFP-1**	**KW-1**	**RRP-1A**
LAB SAMPLE ID:		981806B-05	981806B-07	981806B-19
% Moisture		45	58	69
DILUTION FACTOR:		1.0	1.0	1.0
TARGET COMPOUNDS:				
	CRQL			
Chloromethane	10	UJ	UJ	UJ
Bromomethane	10		UJ	UJ
Vinyl Chloride	10		UJ	UJ
Chloroethane	10	UJ	UJ	UJ
Methylene Chloride	10	10 U	24 U	UJ
Acetone	10	UJ	45 UJ	80 UJ
Carbon Disulfide	10	1 J	UJ	4 J
1,1-Dichloroethene	10		UJ	UJ
1,1-Dichloroethane	10		UJ	UJ
1,2-Dichloroethene (total)	10		UJ	UJ
Chloroform	10		UJ	UJ
1,2-Dichloroethane	10		UJ	UJ
2-Butanone	10	12 J	15 J	26 J
1,1,1-Trichloroethane	10		UJ	UJ
Carbon Tetrachloride	10		UJ	UJ
Bromodichloromethane	10		UJ	UJ
1,2-Dichloropropane	10		UJ	UJ
cis-1,3-Dichloropropene	10		UJ	UJ
Trichloroethene	10		UJ	UJ
Dibromochloromethane	10		UJ	UJ
1,1,2-Trichloroethane	10		UJ	UJ
Benzene	10		UJ	UJ
Trans-1,3-Dichloropropene	10		UJ	UJ
Bromoform	10		UJ	UJ
4-Methyl-2-pentanone	10		UJ	UJ
2-Hexanone	10		UJ	UJ
Tetrachloroethene	10		UJ	UJ
1,1,2,2-Tetrachloroethane	10		UJ	UJ
Toluene	10		2 J	UJ
Chlorobenzene	10		UJ	UJ
Ethylbenzene	10		UJ	UJ
Styrene	10		UJ	UJ
Xylene (total)	10		UJ	UJ

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-17I

Lab Name: STL/CT Contract: ________

Lab Code: IEACT Case No.: 1806B SAS No.: _____ SDG No.: B1806

Matrix: (soil/water) WATER Lab Sample ID: 981806B-01

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0643

Level: (low/med) LOW Date Received: 09/10/98

% Moisture: not dec. ______ Date Analyzed: 09/14/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _______ (uL) Soil Aliquot Volume: ____ (uL)

Stearns & Wheler
Farwell Landfill
7098-1806B
B1806

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

L-1

Lab Name: STL/CT Contract: ______

Lab Code: IEACT Case No.: 1806B SAS No.: ______ SDG No.: B1806

Matrix: (soil/water) WATER Lab Sample ID: 981806B-02

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0644

Level: (low/med) LOW Date Received: 09/10/98

% Moisture: not dec. ______ Date Analyzed: 09/14/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	17	
75-00-3	Chloroethane	3	J
75-09-2	Methylene Chloride	58	
67-64-1	Acetone	15	B
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	28	
540-59-0	1,2-Dichloroethene (total)	160	
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	5	J
78-93-3	2-Butanone	12	
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	2	J
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	18	
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	4	J
591-78-6	2-Hexanone	49	
127-18-4	Tetrachloroethene	2	J
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	4	J
108-90-7	Chlorobenzene	.7	J
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	13	

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW11D

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 1806B SAS No.: _____ SDG No.: B1806

Matrix: (soil/water) WATER Lab Sample ID: 981806B-03

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0664

Level: (low/med) LOW Date Received: 09/11/98

% Moisture: not dec. ______ Date Analyzed: 09/14/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _______ (uL) Soil Aliquot Volume: ____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	9	J
75-00-3	Chloroethane	93	
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	2	J
75-34-3	1,1-Dichloroethane	150	
540-59-0	1,2-Dichloroethene (total)	28	
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	27	
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	45	
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

LFP-1A

Lab Name: STL/CT Contract: ______

Lab Code: IEACT Case No.: 1806B SAS No.: ______ SDG No.: B1806

Matrix: (soil/water) WATER Lab Sample ID: 981806B-04

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0646

Level: (low/med) LOW Date Received: 09/11/98

% Moisture: not dec. ______ Date Analyzed: 09/14/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

LFP-1

Lab Name: STL/CT Contract: ______

Lab Code: IEACT Case No.: 1806B SAS No.: ______ SDG No.: B1806

Matrix: (soil/water) SOIL Lab Sample ID: 981806B-05

Sample wt/vol: 5 (g/mL) G Lab File ID: >L0767

Level: (low/med) LOW Date Received: 09/11/98

% Moisture: not dec. 45 Date Analyzed: 09/18/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	18	U
74-83-9	Bromomethane	18	U
75-01-4	Vinyl Chloride	18	U
75-00-3	Chloroethane	18	U
75-09-2	Methylene Chloride	4	JB
67-64-1	Acetone	18	U
75-15-0	Carbon Disulfide	1	J
75-35-4	1,1-Dichloroethene	18	U
75-34-3	1,1-Dichloroethane	18	U
540-59-0	1,2-Dichloroethene (total)	18	U
67-66-3	Chloroform	18	U
107-06-2	1,2-Dichloroethane	18	U
78-93-3	2-Butanone	12	J
71-55-6	1,1,1-Trichloroethane	18	U
56-23-5	Carbon Tetrachloride	18	U
75-27-4	Bromodichloromethane	18	U
78-87-5	1,2-Dichloropropane	18	U
10061-01-5	cis-1,3-Dichloropropene	18	U
79-01-6	Trichloroethene	18	U
124-48-1	Dibromochloromethane	18	U
79-00-5	1,1,2-Trichloroethane	18	U
71-43-2	Benzene	18	U
10061-02-6	trans-1,3-Dichloropropene	18	U
75-25-2	Bromoform	18	U
108-10-1	4-Methyl-2-Pentanone	18	U
591-78-6	2-Hexanone	18	U
127-18-4	Tetrachloroethene	18	U
79-34-5	1,1,2,2-Tetrachloroethane	18	U
108-88-3	Toluene	18	U
108-90-7	Chlorobenzene	18	U
100-41-4	Ethylbenzene	18	U
100-42-5	Styrene	18	U
1330-20-7	Xylene (total)	18	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

KW-1A

Lab Name: STL/CT Contract: ______

Lab Code: IEACT Case No.: 1806B SAS No.: ______ SDG No.: B1806

Matrix: (soil/water) WATER Lab Sample ID: 981806B-06

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0659

Level: (low/med) LOW Date Received: 09/11/98

% Moisture: not dec. ______ Date Analyzed: 09/14/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

KW-1

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 1806B SAS No.: _____ SDG No.: B1806

Matrix: (soil/water) SOIL Lab Sample ID: 981806B-07

Sample wt/vol: 5 (g/mL) G Lab File ID: >L0768

Level: (low/med) LOW Date Received: 09/11/98

% Moisture: not dec. 58 Date Analyzed: 09/18/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _______ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	24	U
74-83-9	Bromomethane	24	U
75-01-4	Vinyl Chloride	24	U
75-00-3	Chloroethane	24	U
75-09-2	Methylene Chloride	4	JB
67-64-1	Acetone	45	B
75-15-0	Carbon Disulfide	24	U
75-35-4	1,1-Dichloroethene	24	U
75-34-3	1,1-Dichloroethane	24	U
540-59-0	1,2-Dichloroethene (total)	24	U
67-66-3	Chloroform	24	U
107-06-2	1,2-Dichloroethane	24	U
78-93-3	2-Butanone	15	J
71-55-6	1,1,1-Trichloroethane	24	U
56-23-5	Carbon Tetrachloride	24	U
75-27-4	Bromodichloromethane	24	U
78-87-5	1,2-Dichloropropane	24	U
10061-01-5	cis-1,3-Dichloropropene	24	U
79-01-6	Trichloroethene	24	U
124-48-1	Dibromochloromethane	24	U
79-00-5	1,1,2-Trichloroethane	24	U
71-43-2	Benzene	24	U
10061-02-6	trans-1,3-Dichloropropene	24	U
75-25-2	Bromoform	24	U
108-10-1	4-Methyl-2-Pentanone	24	U
591-78-6	2-Hexanone	24	U
127-18-4	Tetrachloroethene	24	U
79-34-5	1,1,2,2-Tetrachloroethane	24	U
108-88-3	Toluene	2	J
108-90-7	Chlorobenzene	24	U
100-41-4	Ethylbenzene	24	U
100-42-5	Styrene	24	U
1330-20-7	Xylene (total)	24	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TB 091098

Lab Name: STL/CT   Contract: ____

Lab Code: IEACT   Case No.: 1806B   SAS No.: ____   SDG No.: B1806

Matrix: (soil/water) WATER   Lab Sample ID: 981806B-08

Sample wt/vol: 5 (g/mL) ML   Lab File ID: >L0665

Level: (low/med) LOW   Date Received: 09/11/98

% Moisture: not dec. ____   Date Analyzed: 09/14/98

GC Column: 007-624 ID: 0.53 (mm)   Dilution Factor: 1.0

Soil Extract Volume: ____ (uL)   Soil Aliquot Volume: ____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW11S

Lab Name: STL/CT Contract: ________

Lab Code: IEACT Case No.: 1806B SAS No.: _____ SDG No.: B1806

Matrix: (soil/water) WATER Lab Sample ID: 981806B-09

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0647

Level: (low/med) LOW Date Received: 09/11/98

% Moisture: not dec. ______ Date Analyzed: 09/14/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _______ (uL) Soil Aliquot Volume: ____ (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	6	J
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

RRP-1

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 1806B SAS No.: ______ SDG No.: B1806

Matrix: (soil/water) WATER Lab Sample ID: 981806B-10

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0762

Level: (low/med) LOW Date Received: 09/16/98

% Moisture: not dec. ______ Date Analyzed: 09/18/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ________ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

MW14S

Lab Name: STL/CT Contract: ______

Lab Code: IEACT Case No.: 1806B SAS No.: ______ SDG No.: B1806

Matrix: (soil/water) WATER Lab Sample ID: 981806B-11

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0756

Level: (low/med) LOW Date Received: 09/16/98

% Moisture: not dec. ______ Date Analyzed: 09/18/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	7	J
75-00-3	Chloroethane	120	
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	81	
540-59-0	1,2-Dichloroethene (total)	8	J
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	4	J
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	2	J
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW14I

Lab Name: STL/CT Contract: ____

Lab Code: IEACT Case No.: 1806B SAS No.: ____ SDG No.: B1806

Matrix: (soil/water) WATER Lab Sample ID: 981806B-12

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0757

Level: (low/med) LOW Date Received: 09/16/98

% Moisture: not dec. ____ Date Analyzed: 09/18/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ____ (uL) Soil Aliquot Volume: ____ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	5	J
75-00-3	Chloroethane	98	
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	55	
540-59-0	1,2-Dichloroethene (total)	7	J
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	4	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	3	J
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	1	J
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-6

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 1806B SAS No.: _____ SDG No.: B1806

Matrix: (soil/water) WATER Lab Sample ID: 981806B-13

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0758

Level: (low/med) LOW Date Received: 09/16/98

% Moisture: not dec. ______ Date Analyzed: 09/18/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ________(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	1	J
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

DUP-2

Lab Name: STL/CT Contract: ______

Lab Code: IEACT Case No.: 1806B SAS No.: _____ SDG No.: B1806

Matrix: (soil/water) WATER Lab Sample ID: 981806B-14

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0759

Level: (low/med) LOW Date Received: 09/16/98

% Moisture: not dec. ______ Date Analyzed: 09/18/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _______(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	1	J
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW13

Lab Name: STL/CT Contract: ______

Lab Code: IEACT Case No.: 1806B SAS No.: ____ SDG No.: B1806

Matrix: (soil/water) WATER Lab Sample ID: 981806B-15

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0760

Level: (low/med) LOW Date Received: 09/16/98

% Moisture: not dec. ______ Date Analyzed: 09/18/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	7	J
75-00-3	Chloroethane	7	J
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	27	
540-59-0	1,2-Dichloroethene (total)	23	
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	7	J
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	4	J
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	1	J
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW17S

Lab Name: STL/CT Contract: ______

Lab Code: IEACT Case No.: 1806B SAS No.: ______ SDG No.: B1806

Matrix: (soil/water) WATER Lab Sample ID: 981806B-16

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0761

Level: (low/med) LOW Date Received: 09/16/98

% Moisture: not dec. ______ Date Analyzed: 09/18/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	3	J
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TB 091598

Lab Name: STL/CT Contract: ______

Lab Code: IEACT Case No.: 1806B SAS No.: _____ SDG No.: B1806

Matrix: (soil/water) WATER Lab Sample ID: 981806B-18

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0755

Level: (low/med) LOW Date Received: 09/16/98

% Moisture: not dec. ______ Date Analyzed: 09/18/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _______ (uL) Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

RRP-1A

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 1806B SAS No.: _____ SDG No.: B1806

Matrix: (soil/water) SOIL Lab Sample ID: 981806B-19

Sample wt/vol: 5 (g/mL) G Lab File ID: >L0773

Level: (low/med) LOW Date Received: 09/16/98

% Moisture: not dec. 69 Date Analyzed: 09/18/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _______ (uL) Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	32	U
74-83-9	Bromomethane	32	U
75-01-4	Vinyl Chloride	32	U
75-00-3	Chloroethane	32	U
75-09-2	Methylene Chloride	32	U
67-64-1	Acetone	80	B
75-15-0	Carbon Disulfide	4	J
75-35-4	1,1-Dichloroethene	32	U
75-34-3	1,1-Dichloroethane	32	U
540-59-0	1,2-Dichloroethene (total)	32	U
67-66-3	Chloroform	32	U
107-06-2	1,2-Dichloroethane	32	U
78-93-3	2-Butanone	26	J
71-55-6	1,1,1-Trichloroethane	32	U
56-23-5	Carbon Tetrachloride	32	U
75-27-4	Bromodichloromethane	32	U
78-87-5	1,2-Dichloropropane	32	U
10061-01-5	cis-1,3-Dichloropropene	32	U
79-01-6	Trichloroethene	32	U
124-48-1	Dibromochloromethane	32	U
79-00-5	1,1,2-Trichloroethane	32	U
71-43-2	Benzene	32	U
10061-02-6	trans-1,3-Dichloropropene	32	U
75-25-2	Bromoform	32	U
108-10-1	4-Methyl-2-Pentanone	32	U
591-78-6	2-Hexanone	32	U
127-18-4	Tetrachloroethene	32	U
79-34-5	1,1,2,2-Tetrachloroethane	32	U
108-88-3	Toluene	32	U
108-90-7	Chlorobenzene	32	U
100-41-4	Ethylbenzene	32	U
100-42-5	Styrene	32	U
1330-20-7	Xylene (total)	32	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW-17I

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 1806B SAS No.: ______ SDG No.: B1806

Matrix: (soil/water) WATER Lab Sample ID: 981806B-01

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0643

Level: (low/med) LOW Date Received: 09/10/98

% Moisture: not dec. ______ Date Analyzed: 09/14/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _______ (uL) Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs Found: 0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.				
02.				
03.				
04.				
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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

L-1

Lab Name: STL/CT   Contract: ____________

Lab Code: IEACT   Case No.: 1806B   SAS No.: _____   SDG No.: B1806

Matrix: (soil/water) WATER   Lab Sample ID: 981806B-02

Sample wt/vol: 5 (g/mL) ML   Lab File ID: >L0644

Level: (low/med) LOW   Date Received: 09/10/98

% Moisture: not dec. ______   Date Analyzed: 09/14/98

GC Column: 007-624 ID: 0.53 (mm)   Dilution Factor: 1.0

Soil Extract Volume: _______(uL)   Soil Aliquot Volume: _____(uL)

Number TICs Found: 6   CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.1066-40-6	SILANOL, TRIMETHYL-	7.86	21	JN
02.	UNKNOWN	19.04	11	J
03.	UNKNOWN	12.58	11	J
04.106-46-7	BENZENE, 1,4-DICHLORO-	17.43	10	JN
05.1195-79-5	BICYCLO[2.2.1]HEPTAN-2-ONE,	18.58	10	JN
06.470-67-7	7-OXABICYCLO[2.2.1]HEPTANE,	17.12	[illegible]	JN
07.				
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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW11D

Lab Name: STL/CT   Contract: ____

Lab Code: IEACT   Case No.: 1806B   SAS No.: ____   SDG No.: B1806

Matrix: (soil/water) WATER   Lab Sample ID: 981806B-03

Sample wt/vol: 5 (g/mL) ML   Lab File ID: >L0664

Level: (low/med) LOW   Date Received: 09/11/98

% Moisture: not dec. ____   Date Analyzed: 09/14/98

GC Column: 007-624 ID: 0.53 (mm)   Dilution Factor: 1.0

Soil Extract Volume: ____ (uL)   Soil Aliquot Volume: ____ (uL)

Number TICs Found: 3

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01. 75-43-4	METHANE, DICHLOROFLUORO-	4.71	34	JN
02. 60-29-7	ETHER	5.12	21	JN
03. 75-45-6	METHANE, CHLORODIFLUORO-	3.37	12	JN
04.				
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1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

LFP-1A

Lab Name: STL/CT Contract: ______

Lab Code: IEACT Case No.: 1806B SAS No.: ______ SDG No.: B1806

Matrix: (soil/water) WATER Lab Sample ID: 981806B-04

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0646

Level: (low/med) LOW Date Received: 09/11/98

% Moisture: not dec. ______ Date Analyzed: 09/14/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs Found: 0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.				
02.				
03.				
04.				
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06.				
07.				
08.				
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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

LFP-1

Lab Name: STL/CT Contract: ______

Lab Code: IEACT Case No.: 1806B SAS No.: ______ SDG No.: B1806

Matrix: (soil/water) SOIL Lab Sample ID: 981806B-05

Sample wt/vol: 5 (g/mL) G Lab File ID: >L0767

Level: (low/med) LOW Date Received: 09/11/98

% Moisture: not dec. 45 Date Analyzed: 09/18/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

Number TICs Found: 18

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.	UNKNOWN C10H16 ISOMER	16.49	410	J
02.	UNKNOWN	23.74	140	J
03.	UNKNOWN C10H16 ISOMER	15.77	100	J
04. 99-85-4	1,4-CYCLOHEXADIENE, 1-METHYL	17.56	87	JN
05. 87-44-5	CARYOPHYLLENE	22.88	85	JN
06.	UNKNOWN C10H16 ISOMER	17.10	66	J
07.	UNKNOWN C15H24 ISOMER	24.31	51	J
08.	UNKNOWN	23.05	35	J
09.	UNKNOWN C15H24 ISOMER	22.48	34	J
10.	UNKNOWN C10H16 ISOMER	15.56	33	J
11.	UNKNOWN C10H16 ISOMER	17.94	31	J
12. 629-50-5	TRIDECANE	20.00	29	JN
13.	UNKNOWN	22.14	22	J
14.	UNKNOWN C10H16 ISOMER	17.34	22	J
15.	UNKNOWN C10H16 ISOMER	17.22	20	J
16. 75-18-3	DIMETHYL SULFIDE	5.59	16	JN
17.	UNKNOWN	23.58	15	J
18. 3856-25-5	COPAENE	21.80	12	JN
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1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

KW-1A

Lab Name: STL/CT Contract: ___________

Lab Code: IEACT Case No.: 1806B SAS No.: _____ SDG No.: B1806

Matrix: (soil/water) WATER Lab Sample ID: 981806B-06

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0659

Level: (low/med) LOW Date Received: 09/11/98

% Moisture: not dec. ______ Date Analyzed: 09/14/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _______ (uL) Soil Aliquot Volume: ____ (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs Found: 0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.				
02.				
03.				
04.				
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1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

KW-1

Lab Name: STL/CT   Contract: ________

Lab Code: IEACT   Case No.: 1806B   SAS No.: _____   SDG No.: B1806

Matrix: (soil/water) SOIL   Lab Sample ID: 981806B-07

Sample wt/vol: 5 (g/mL) G   Lab File ID: >L0768

Level: (low/med) LOW   Date Received: 09/11/98

% Moisture: not dec. 58   Date Analyzed: 09/18/98

GC Column: 007-624 ID: 0.53 (mm)   Dilution Factor: 1.0

Soil Extract Volume: _______ (uL)   Soil Aliquot Volume: _____ (uL)

Number TICs Found: 4

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.	UNKNOWN	23.72	21	JN
02.	UNKNOWN SILOXANE	18.06	18	J
03. 6753-98-6	.ALPHA.-CARYOPHYLLENE	24.30	14	JN
04.	UNKNOWN ISOMER OF 3-CYCLOHEX	19.50	14	J
05.				
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1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

TB 091098

Lab Name: STL/CT Contract: ________

Lab Code: IEACT Case No.: 1806B SAS No.: ____ SDG No.: B1806

Matrix: (soil/water) WATER Lab Sample ID: 981806B-08

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0665

Level: (low/med) LOW Date Received: 09/11/98

% Moisture: not dec. ______ Date Analyzed: 09/14/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ____ (uL)

Number TICs Found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.				
02.				
03.				
04.				
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06.				
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1E

VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW11S

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 1806B SAS No.: _____ SDG No.: B1806

Matrix: (soil/water) WATER Lab Sample ID: 981806B-09

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0647

Level: (low/med) LOW Date Received: 09/11/98

% Moisture: not dec. ______ Date Analyzed: 09/14/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _______ (uL) Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs Found: 0

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.				
02.				
03.				
04.				
05.				
06.				
07.				
08.				
09.				
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1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

RRP-1

Lab Name: STL/CT Contract: ______

Lab Code: IEACT Case No.: 1806B SAS No.: ______ SDG No.: B1806

Matrix: (soil/water) WATER Lab Sample ID: 981806B-10

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0762

Level: (low/med) LOW Date Received: 09/16/98

% Moisture: not dec. ______ Date Analyzed: 09/18/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

Number TICs Found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.				
02.				
03.				
04.				
05.				
06.				
07.				
08.				
09.				
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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW14S

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 1806B SAS No.: _____ SDG No.: B1806

Matrix: (soil/water) WATER Lab Sample ID: 981806B-11

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0756

Level: (low/med) LOW Date Received: 09/16/98

% Moisture: not dec. ______ Date Analyzed: 09/18/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _______ (uL) Soil Aliquot Volume: ____ (uL)

Number TICs Found: 3

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.60-29-7	ETHER	5.12	28	JN
02.75-43-4	METHANE, DICHLOROFLUORO-	4.71	13	JN
03.75-45-6	METHANE, CHLORODIFLUORO-	3.37	11	JN
04.				
05.				
06.				
07.				
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1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW14I

Lab Name: STL/CT   Contract: ____________

Lab Code: IEACT   Case No.: 1806B   SAS No.: _____   SDG No.: B1806

Matrix: (soil/water) WATER   Lab Sample ID: 981806B-12

Sample wt/vol: 5 (g/mL) ML   Lab File ID: >L0757

Level: (low/med) LOW   Date Received: 09/16/98

% Moisture: not dec. ______   Date Analyzed: 09/18/98

GC Column: 007-624 ID: 0.53 (mm)   Dilution Factor: 1.0

Soil Extract Volume: ________ (uL)   Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:
Number TICs Found: 3   (ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01. 60-29-7	ETHER	5.11	24	JN
02. 75-45-6	METHANE, CHLORODIFLUORO-	3.37	10	JN
03. 75-43-4	METHANE, DICHLOROFLUORO-	4.72	10	JN
04.				
05.				
06.				
07.				
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1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW-6

Lab Name: STL/CT Contract: ______

Lab Code: IEACT Case No.: 1806B SAS No.: _____ SDG No.: B1806

Matrix: (soil/water) WATER Lab Sample ID: 981806B-13

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0758

Level: (low/med) LOW Date Received: 09/16/98

% Moisture: not dec. ______ Date Analyzed: 09/18/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ____ (uL)

Number TICs Found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.				
02.				
03.				
04.				
05.				
06.				
07.				
08.				
09.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
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30.				

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

DUP-2

Lab Name: STL/CT Contract: ____

Lab Code: IEACT Case No.: 1806B SAS No.: ____ SDG No.: B1806

Matrix: (soil/water) WATER Lab Sample ID: 981806B-14

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0759

Level: (low/med) LOW Date Received: 09/16/98

% Moisture: not dec. ____ Date Analyzed: 09/18/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ____ (uL) Soil Aliquot Volume: ____ (uL)

Number TICs Found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.				
02.				
03.				
04.				
05.				
06.				
07.				
08.				
09.				
10.				
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1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW13

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 1806B SAS No.: _____ SDG No.: B1806

Matrix: (soil/water) WATER Lab Sample ID: 981806B-15

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0760

Level: (low/med) LOW Date Received: 09/16/98

% Moisture: not dec. ______ Date Analyzed: 09/18/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _______ (uL) Soil Aliquot Volume: ____ (uL)

Number TICs Found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01. 75-43-4	METHANE, DICHLOROFLUORO-	4.73	14	JN
02.				
03.				
04.				
05.				
06.				
07.				
08.				
09.				
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1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW17S

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 1806B SAS No.: ______ SDG No.: B1806

Matrix: (soil/water) WATER Lab Sample ID: 981806B-16

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0761

Level: (low/med) LOW Date Received: 09/16/98

% Moisture: not dec. ______ Date Analyzed: 09/18/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _______ (uL) Soil Aliquot Volume: _____ (uL)

Number TICs Found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.				
02.				
03.				
04.				
05.				
06.				
07.				
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1E

VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

TB 091598

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 1806B SAS No.: ______ SDG No.: B1806

Matrix: (soil/water) WATER Lab Sample ID: 981806B-18

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0755

Level: (low/med) LOW Date Received: 09/16/98

% Moisture: not dec. ______ Date Analyzed: 09/18/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ________ (uL) Soil Aliquot Volume: _____ (uL)

Number TICs Found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.				
02.				
03.				
04.				
05.				
06.				
07.				
08.				
09.				
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1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

RRP-1A

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 1806B SAS No.: _____ SDG No.: B1806

Matrix: (soil/water) SOIL Lab Sample ID: 981806B-19

Sample wt/vol: 5 (g/mL) G Lab File ID: >L0773

Level: (low/med) LOW Date Received: 09/16/98

% Moisture: not dec. 69 Date Analyzed: 09/18/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _______ (uL) Soil Aliquot Volume: ____ (uL)

Number TICs Found: 2

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.	UNKNOWN ACID ESTER	21.67	110	J
02.	UNKNOWN SILOXANE	18.06	20	J
03.				
04.				
05.				
06.				
07.				
08.				
09.				
10.				
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END OF DATA PACKAGE

Analytical Assurance Associates, Inc.
600 Rock Raymond Road
Downingtown, PA 19335
Phone: 610 - 269 - 9989
Fax: 610 - 269 - 9989

INORGANIC ANALYSES
QUALITY ASSURANCE DATA REVIEW

STEARNS & WHELER
SITE: FARWELL LANDFILL
CASE NO.: 7098-1806B/ SDG NO.: B1806

REPORTED BY:
ANALYTICAL ASSURANCE ASSOCIATES (A^3)
600 ROCK RAYMOND ROAD
DOWNINGTOWN, PA 19335

REVIEWED BY:
ZOHREH HAMID, Ph.D.
NOVEMBER 12, 1998

STEARNS & WHELER
SITE: FARWELL LANDFILL
CASE NO.:7098-1806B/ SDG NO. B1806

INTRODUCTION

This quality assurance review is based upon a review of all data generated from thirteen (13) water samples and three soil samples collected on 09-09,10,15-98. The samples were analyzed by Severn Trent Laboratories according to criteria set forth in EPA 600 Methods for Alkalinity (310.1), Ammonia (350.2), BOD (405.1), Bromide (320.1), Chloride (325.2), COD (410.4), Nitrate (353.2), Phenols (420.2), Sulfate (375.2), Sulfide (376.1), TDS (160), TKN (351.2) and TOC (415.1) for water samples. The soil samples were analyzed according to SW846 Methods for Chloride (9250), Phenols (9066), Sulfate (9038), Sulfide (9030) and TOC (9060). Hardness analysis was performed based on Standard Method for the Examination of water and Wastewater, 18th edition.

The following samples are included in this report:

MW-17I	KW-1A	MW-6	LFP-1*
L-1	DUP-2	KW-1*	MW11D
LFP-1A	RRP-1	MW13	MW14I
MW11S	MW14S	MW17S	RRP-1A*

* Soil Sample

All data have been validated with regard to usability according to the quality assurance set forth in NYSDEC ASP for Evaluating Inorganic analyses. If you have any questions or comments on this data review, please call Zohreh Hamid at (610) 269-9989.

QUALITY ASSURANCE REVIEW

The finding offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Times
- Calibrations Analyses
- Blanks
- Matrix Spike Analysis
- Matrix Duplicate Analysis
- Laboratory Control Sample Analysis
- Field Duplicate Results
- Sample Results

DATA COMPLETENESS

The data package completeness was satisfactory. Two different sample IDs (09 & 17) were assigned to sample MW11S. The result for phenol was reported under laboratory ID # -17. The result was transferred to sample "09" in the data validation summary.

HOLDING TIME

All samples were digested/analyzed within the NYSDEC requirement holding times.

CALIBRATIONS

The recoveries for all parameters in the initial and continuing calibrations were within the control limits of 80-120%.

BLANKS

The laboratory preparation blanks for soil samples were not included on the corresponding forms with the exception of TOC. Also, the water blank results for chloride and sulfide were not listed on the corresponding blank forms. The reported laboratory preparation and calibration blanks were free of target analytes.

MATRIX SPIKE/SPIKE DUPLICATE ANALYSIS

Matrix spike analysis was reported for soil sample. The recoveries were within the control limits.

MATRIX DUPLICATE ANALYSIS

The matrix duplicate analysis was also performed for soil samples. The RPDs for all compounds were within the analysis and validation control limits.

LABORATORY CONTROL SAMPLE

The recoveries for all analytes were within the control limits with the exception of TKN (133%). The data were not qualified since the other LCS recoveries for this parameter were within the control limits.

Note: The QC samples (MS & MD) were not analyzed/reported with this batch of samples for water analysis. Therefore, the log term accuracy and precision could not be evaluated.

DUPLICATE ANALYSIS

Duplicate analysis was analyzed on samples MW-6/Dup-2 in water samples. The RPDs for the analytes detected at levels above the detection limits were within the control limits. The RPDs for BOD, sulfate and phenols (200%) exceeded the requirements since these parameters were not detected in either field sample or field duplicate. The reported sample results and non-detected values were qualified estimated.

SAMPLE RESULTS

The reported sample results were considered reliable. The reported data for soil samples KW-1 and RRP-1A were qualified estimated since the % solids were less than 50%. All water samples were subbed to Microseeps Laboratory for permanent Gas Analysis (carbon dioxide, oxygen and methane) for water samples. The sample analysis results and procedure was included in Appendix D for the data user

SUMMARY

The cooler temperature was within control limit of 2-6 °C. The samples were preserved at the pH< 2 unit. Overall, major problems were not encountered during the sample analyses. The minor issues have been discussed. The reported data were summarized on the data summary with the applied qualifier codes.

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2- butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICCATION.

CODES RELATING TO QUATITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED. THE REPORTED QUATITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ANALYTICAL ASSURANCE ASSOCIATES (A3)
INORGANIC WATER ANALYSIS
mg/L

ANALY

CLIENT: STEARNS & WHELER
SITE: FARWELL LANDFILL
STL ID: 7098-1806B
SDG NO.: B1806

CLIENT SAMPLE ID:		**MW-17I**	**L-1**	**MW11D**	**LFP-1A**	**KW-1A**	**MW11S**	**RRP-1**
LAB SAMPLE ID:		981806B-01	981806B-02	981806B-03	981806B-04	981806B-06	981806B-09	981806B-10
TARGET COMPOUNDS:								
	IDL							
Alkalinity	2	1220	1850	480	45.0	136	578	270
Ammonia	0.04	0.09	148		0.213		0.286	0.607
BOD5	2		121	3.99		2.48	5.49	12.8
Bromide	2		5.47					
Chloride	3	9.39	1370	58.2		28.5	10.4	10.9
COD	10		586		20.0			59.6
Hardness	1.0	115	608	592	56.1	156	690	407
Nitrate	0.033					0.378	1.16	
Phenols	0.005		0.0570		0.008			0.06
Sulfate	10		53.0	16.1		11.9	32.9	37.0
Sulfide	1.0							
TDS	10	130	3870	598	94.0	128	460	287
TKN	0.1	0.692	216	1.92	2.29	0.807	4.46	12.9
TOC	1.0	2.22	87.7	5.51	9.43	2.23	2.77	7.60

ANALYTICAL ASSURANCE ASSOCIATES (A3)
INORGANIC WATER ANALYSIS
mg/L

CLIENT: STEARNS & WHELER
SITE: FARWELL LANDFILL
STL ID: 7098-1806B
SDG NO.: B1806

CLIENT SAMPLE ID:		**MW14S**	**MW14I**	**MW-6**	**DUP-2**	**MW13**	**MW17S**
LAB SAMPLE ID:		981806B-11	981806B-12	981806B-13	981806B-14	981806B-15	981806B-16
TARGET COMPOUNDS:	**IDL**						
Alkalinity	2	641	608	305	307	438	225
Ammonia	0.04			0.195	0.147		0.0460
BOD5	2	6.51	3.81	4.11 J	UJ	2.02	
Bromide	2						
Chloride	3	99.8	62.7	4.75	4.46		4.88
COD	10	20.0					14.9
Hardness	1.0	657	632	272	276	436	268
Nitrate	0.033						0.235
Phenols	0.005	0.01	0.09	UJ	0.0130 J		
Sulfate	10	35.5	13.9	UJ	10.9 J	17.8	12.7
Sulfide	1.0						
TDS	10	843	686	316	308	411	148
TKN	0.1	1.91	1.76	2.41	1.73	1.43	1.17
TOC	1.0	5.81	5.48	1.84	1.85	1.08	2.01

ANALYTICAL ASSURANCE ASSOCIATES (A3)
INORGANIC SOIL ANALYSIS
mg/kg

CLIENT: STEARNS & WHELER
SITE: FARWELL LANDFILL
STL ID: 7098-1806B
SDG NO.: B1806

CLIENT SAMPLE ID:		**LFP-1**		**KW-1**		**RRP-1A**	
LAB SAMPLE ID:		981806B-05		981806B-07		981806B-19	
%SOLID		52.2		65.7		26.0	
TARGET COMPOUNDS:							
	IDL						
Alkalinity	2.0	NA		NA		NA	
Ammonia	0.0400	5.90	J	14.8		21.6	J
BOD5	2.00	NA		NA		NA	
Bromide	2.00	NA					UJ
Chloride	3.00		UJ			116	J
COD	10.0	NA		NA		NA	
Hardness	1.0	NA		NA		NA	
Nitrate	0.0330		UJ				UJ
Phenols	0.00500	1.24	J	2.22		2.29	J
Sulfate	10.0		UJ	180		3680	J
Sulfide	1.00		UJ			2310	J
TDS	10	NA		NA		NA	
TKN	0.100	2920	J	1180		5460	J
TOC	1.00	66200	J	11400		138000	J

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

MW-17I

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 1806B SAS No.: ______ SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: 981806B-01

% Solids: 0 Date Received: 09/10/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	1220		mg/l		T
7727-37-9	Ammonia	0.0900		mg/l		L
	BOD5	2.00	U	mg/l		P
24959-67-9	Bromide	2.00	U	mg/l		T
16887-00-6	Chloride	9.39		mg/l		L
	COD	10.0	U	mg/l		C
	Hardness	115.		mg/l		D
14797-55-8	Nitrate	0.100	U	mg/l		L
	Phenols	0.00500	U	mg/l		L
	Sulfate	10.0	U	mg/l		L
	Sulfide	1.00	U	mg/l		D
	TDS	130.		mg/l		G
	TKN	0.692		mg/l		L
	TOC	2.22		mg/l		D

Comments:

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

L-1

Lab Name: STL　　Contract: ______

Lab Code: STL　　Case No.: 1806B　　SAS No.: ______　　SDG No.: B1806

Matrix (soil/water): WATER　　Lab Sample ID: 981806B-02

% Solids: 0　　Date Received: 09/10/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	1850		mg/l		T
7727-37-9	Ammonia	148.		mg/l		L
	BOD5	121.		mg/l		P
24959-67-9	Bromide	5.47		mg/l		T
16887-00-6	Chloride	1370		mg/l		L
	COD	586.		mg/l		C
	Hardness	608.		mg/l		D
14797-55-8	Nitrate	0.100	U	mg/l		L
	Phenols	0.0570		mg/l		L
	Sulfate	53.0		mg/l		L
	Sulfide	1.00	U	mg/l		D
	TDS	3870		mg/l		G
	TKN	216.		mg/l		L
	TOC	87.7		mg/l		D

Comments:

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

MW11D

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 1806B SAS No.: ______ SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: 981806B-03

% Solids: 0 Date Received: 09/11/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	480.		mg/l		T
7727-37-9	Ammonia	0.0400	U	mg/l		L
	BOD5	3.99		mg/l		P
24959-67-9	Bromide	2.00	U	mg/l		T
16887-00-6	Chloride	58.2		mg/l		L
	COD	10.0	U	mg/l		C
	Hardness	592.		mg/l		D
14797-55-8	Nitrate	0.100	U	mg/l		L
	Phenols	0.00500	U	mg/l		L
	Sulfate	16.1		mg/l		L
	Sulfide	1.00	U	mg/l		D
	TDS	598.		mg/l		G
	TKN	1.92		mg/l		L
	TOC	5.51		mg/l		D

Comments:

FORM I - WC

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

LFP-1A

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806B SAS No.: SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: 981806B-04

% Solids: 0 Date Received: 09/11/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	45.0		mg/l		T
7727-37-9	Ammonia	0.213		mg/l		L
	BOD5	2.00	U	mg/l		P
24959-67-9	Bromide	2.00	U	mg/l		T
16887-00-6	Chloride	3.00	U	mg/l		L
	COD	20.0		mg/l		C
	Hardness	56.1		mg/l		D
14797-55-8	Nitrate	0.100	U	mg/l		L
	Phenols	0.00800		mg/l		L
	Sulfate	10.0	U	mg/l		L
	Sulfide	1.00	U	mg/l		D
	TDS	94.0		mg/l		G
	TKN	2.29		mg/l		L
	TOC	9.43		mg/l		D

Comments:

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

KW-1A

ab Name: STL Contract:

Lab Code: STL Case No.: 1806B SAS No.: SDG No.: B1806

atrix (soil/water): WATER Lab Sample ID: 981806B-06

% Solids: 0 Date Received: 09/11/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	136.		mg/l		T
7727-37-9	Ammonia	0.0400	U	mg/l		L
	BOD5	2.48		mg/l		P
24959-67-9	Bromide	2.00	U	mg/l		T
16887-00-6	Chloride	28.5		mg/l		L
	COD	10.0	U	mg/l		C
	Hardness	156.		mg/l		D
14797-55-8	Nitrate	0.378		mg/l		L
	Phenols	0.00500	U	mg/l		L
	Sulfate	11.9		mg/l		L
	Sulfide	1.00	U	mg/l		D
	TDS	128.		mg/l		G
	TKN	0.807		mg/l		L
	TOC	2.23		mg/l		D

omments:

FORM I - WC

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

MW11S

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806B SAS No.: SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: 981806B-09

% Solids: 0 Date Received: 09/11/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	578.		mg/l		T
7727-37-9	Ammonia	0.286		mg/l		L
	BOD5	5.49		mg/l		P
24959-67-9	Bromide	2.00	U	mg/l		T
16887-00-6	Chloride	10.4		mg/l		L
	COD	10.0	U	mg/l		C
	Hardness	690.		mg/l		D
14797-55-8	Nitrate	1.16		mg/l		L
	Sulfate	32.9		mg/l		L
	Sulfide	1.00	U	mg/l		D
	TDS	460.		mg/l		G
	TKN	4.46		mg/l		L
	TOC	2.77		mg/l		D

Comments:

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

RRP-1

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806B SAS No.: SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: 981806B-10

% Solids: 0 Date Received: 09/16/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	270.		mg/l		T
7727-37-9	Ammonia	0.607		mg/l		L
	BOD5	12.8		mg/l		P
24959-67-9	Bromide	2.00	U	mg/l		T
16887-00-6	Chloride	10.9		mg/l		L
	COD	59.6		mg/l		C
	Hardness	407.		mg/l		D
14797-55-8	Nitrate	0.100	U	mg/l		L
	Phenols	0.0600		mg/l		L
	Sulfate	37.0		mg/l		L
	Sulfide	1.00	U	mg/l		D
	TDS	287.		mg/l		G
	TKN	12.9		mg/l		L
	TOC	7.60		mg/l		D

Comments:

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

MW14S

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806B SAS No.: SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: 981806B-11

% Solids: 0 Date Received: 09/16/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	641.		mg/l		T
7727-37-9	Ammonia	0.0400	U	mg/l		L
	BOD5	6.51		mg/l		P
24959-67-9	Bromide	2.00	U	mg/l		T
16887-00-6	Chloride	99.8		mg/l		L
	COD	20.0		mg/l		C
	Hardness	657.		mg/l		D
14797-55-8	Nitrate	0.100	U	mg/l		L
	Phenols	0.0100		mg/l		L
	Sulfate	35.5		mg/l		L
	Sulfide	1.00	U	mg/l		D
	TDS	843.		mg/l		G
	TKN	1.91		mg/l		L
	TOC	5.81		mg/l		D

Comments:

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

MW14I

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 1806B SAS No.: ______ SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: 981806B-12

% Solids: 0 Date Received: 09/16/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	608.		mg/l		T
7727-37-9	Ammonia	0.0400	U	mg/l		L
	BOD5	3.81		mg/l		P
24959-67-9	Bromide	2.00	U	mg/l		T
16887-00-6	Chloride	62.7		mg/l		L
	COD	10.0	U	mg/l		C
	Hardness	632.		mg/l		D
14797-55-8	Nitrate	0.100	U	mg/l		L
	Phenols	0.0900		mg/l		L
	Sulfate	13.9		mg/l		L
	Sulfide	1.00	U	mg/l		D
	TDS	686.		mg/l		G
	TKN	1.76		mg/l		L
	TOC	5.48		mg/l		D

Comments:

WET_CHEM ANALYSIS DATA SHEET

SAMPLE NO.

MW-6

Lab Name: STL　　Contract: ______

Lab Code: STL　　Case No.: 1806B　　SAS No.: ______　　SDG No.: B1806

Matrix (soil/water): WATER　　Lab Sample ID: 981806B-13

% Solids: 0　　Date Received: 09/16/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	305.		mg/l		T
7727-37-9	Ammonia	0.195		mg/l		L
	BOD5	4.11		mg/l		P
24959-67-9	Bromide	2.00	U	mg/l		T
16887-00-6	Chloride	4.75		mg/l		L
	COD	10.0	U	mg/l		C
	Hardness	272.		mg/l		D
14797-55-8	Nitrate	0.100	U	mg/l		L
	Phenols	0.00500	U	mg/l		L
	Sulfate	10.0	U	mg/l		L
	Sulfide	1.00	U	mg/l		D
	TDS	316.		mg/l		G
	TKN	2.41		mg/l		L
	TOC	1.84		mg/l		D

Comments:

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

DUP-2

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806B SAS No.: SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: 981806B-14

% Solids: 0 Date Received: 09/16/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	307.		mg/l		T
7727-37-9	Ammonia	0.147		mg/l		L
	BOD5	2.00	U	mg/l		P
24959-67-9	Bromide	2.00	U	mg/l		T
16887-00-6	Chloride	4.46		mg/l		L
	COD	10.0	U	mg/l		C
	Hardness	276.		mg/l		D
14797-55-8	Nitrate	0.100	U	mg/l		L
	Phenols	0.0130		mg/l		L
	Sulfate	10.9		mg/l		L
	Sulfide	1.00	U	mg/l		D
	TDS	308.		mg/l		G
	TKN	1.73		mg/l		L
	TOC	1.85		mg/l		D

Comments:

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

MW13

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 1806B SAS No.: ______ SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: 981806B-15

% Solids: 0 Date Received: 09/16/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	438.		mg/l		T
7727-37-9	Ammonia	0.0400	U	mg/l		L
	BOD5	2.02		mg/l		P
24959-67-9	Bromide	2.00	U	mg/l		T
16887-00-6	Chloride	3.00	U	mg/l		L
	COD	10.0	U	mg/l		C
	Hardness	436.		mg/l		D
14797-55-8	Nitrate	0.100	U	mg/l		L
	Phenols	0.00500	U	mg/l		L
	Sulfate	17.8		mg/l		L
	Sulfide	1.00	U	mg/l		D
	TDS	411.		mg/l		G
	TKN	1.43		mg/l		L
	TOC	1.08		mg/l		D

Comments:

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

MW17S

ab Name: STL Contract:

Lab Code: STL Case No.: 1806B SAS No.: SDG No.: B1806

atrix (soil/water): WATER Lab Sample ID: 981806B-16

% Solids: 0 Date Received: 09/16/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	225.		mg/l		T
7727-37-9	Ammonia	0.0460		mg/l		L
	BOD5	2.00	U	mg/l		P
24959-67-9	Bromide	2.00	U	mg/l		T
16887-00-6	Chloride	4.88		mg/l		L
	COD	14.9		mg/l		C
	Hardness	268.		mg/l		D
14797-55-8	Nitrate	0.235		mg/l		L
	Phenols	0.00500	U	mg/l		L
	Sulfate	12.7		mg/l		L
	Sulfide	1.00	U	mg/l		D
	TDS	148.		mg/l		G
	TKN	1.17		mg/l		L
	TOC	2.01		mg/l		D

omments:

FORM I - WC

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

MW11S

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806B SAS No.: SDG No.: B1806

Matrix (soil/water): WATER Lab Sample ID: 981806B-17

% Solids: 0 Date Received: 09/16/98

CAS No.	Analyte	Concentration	C	Units	Q	M
	Phenols	0.00500	U	mg/l		L

Comments:

FORM I - WC

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

LFP-1

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806B SAS No.: SDG No.: B1806

Matrix (soil/water): SOIL Lab Sample ID: 981806B-05

% Solids: 52.2 Date Received: 09/11/98

CAS No.	Analyte	Concentration	C	Units	Q	M
7727-37-9	Ammonia	5.90		mg/kg		L
16887-00-6	Chloride	61.5	U	mg/kg		L
14797-55-8	Nitrate	5.00	U	mg/kg		L
	Phenols	1.24		mg/kg		L
	Sulfate	250.	U	mg/kg		L
	Sulfide	9.61	U	mg/kg		D
	TKN	2920		mg/kg		L
	TOC	66200		mg/kg		D

Comments:

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

KW-1

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806B SAS No.: SDG No.: B1806

Matrix (soil/water): SOIL Lab Sample ID: 981806B-07

% Solids: 65.7 Date Received: 09/11/98

CAS No.	Analyte	Concentration	C	Units	Q	M
7727-37-9	Ammonia	14.8		mg/kg		L
24959-67-9	Bromide	30.4	U	mg/kg		T
16887-00-6	Chloride	49.0	U	mg/kg		L
14797-55-8	Nitrate	1.64	U	mg/kg		L
	Phenols	2.22		mg/kg		L
	Sulfate	180.		mg/kg		L
	Sulfide	7.69	U	mg/kg		D
	TKN	1180		mg/kg		L
	TOC	11400		mg/kg		D

Comments:

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

RRP-1A

Lab Name: STL Contract: ____

Lab Code: STL Case No.: 1806B SAS No.: ____ SDG No.: B1806

Matrix (soil/water): SOIL Lab Sample ID: 981806B-19

% Solids: 26 Date Received: 09/16/98

CAS No.	Analyte	Concentration	C	Units	Q	M
7727-37-9	Ammonia	21.6		mg/kg		L
24959-67-9	Bromide	76.8	U	mg/kg		T
16887-00-6	Chloride	116.		mg/kg		L
14797-55-8	Nitrate	3.85	U	mg/kg		L
	Phenols	2.29		mg/kg		L
	Sulfate	3680		mg/kg		L
	Sulfide	2310		mg/kg		D
	TKN	5460		mg/kg		L
	TOC	138000		mg/kg		D

Comments:

MICROSEEPS

FILE NOTE

SUBJECT: Permanent Gas Analysis of Water Samples

The VOA vials are removed from the refrigerator (4°C) and allowed to reach ambient temperature. Samples are prepared by withdrawing 30 cc of water from the bottom of the vial into a 50 cc Hamilton gas tight, locking syringe. Then 10 cc of helium is withdrawn from a reservoir and the syringe is locked. The syringe is then shaken for five minutes and allowed to equilibrate. With the syringe in a near vertical position, the headspace is injected through a septum-fitting into a 0.5 cc sample loop. The loop is allowed to equilibrate at 1 atmosphere pressure prior to switching the valve to place the sample loop into the carrier gas flow stream.

First, headspace concentrations of the analyzed gases are determined by comparison to the results of analysis of the "237" gas standard. Subsequently, the headspace concentrations are converted to the dissolved water concentrations using Henry's Law.

Results of analysis and applicable quality control parameters are supplied on the attached data sheets.

THE RESULTS SUPPLIED ARE THE ORIGINAL DISSOLVED CONCENTRATIONS OF THE ANALYTES IN MG/L AS CALCULATED FROM DETERMINED HEADSPACE CONCENTRATIONS.

220 William Pitt Way, Pittsburgh, PA 15238 • Phone (412) 826-5245, Fax (412) 826-3433

[redacted]

ST10-983192

—— SEVERN TRENT LABORATORIES ——
—— PROJECT: 7098-1806B ——
—— LOCATION: STL - CT ——

Sample Names	Carbon Dioxide mg/l	Oxygen mg/l	Methane mg/l	Lab ID	Date Sampled	Date Received	Date Analyzed	Analyst
MW-17I	5.32	4.89	<.07	T11 376	9/09/98	9/11/98	9/22/98	BC
L-1	192.19	0.68	1.07	T11 377	9/09/98	9/11/98	9/22/98	BC
RRP-1A	20.86	3.39	<.07	T11 378	9/15/98	9/18/98	9/22/98	BC
MW-14S	130.89	3.58	1.58	T11 379	9/15/98	9/18/98	9/22/98	BC
MW-14I	118.12	6.39	1.75	T11 380	9/15/98	9/18/98	9/22/98	BC
MW-6	29.80	4.17	2.34	T11 381	9/15/98	9/18/98	9/22/98	BC
DUP-2	28.52	6.54	1.92	T11 382	9/15/98	9/18/98	9/22/98	BC
MW-13	54.06	3.49	5.31	T11 383	9/15/98	9/18/98	9/22/98	BC
MW-17S	0.43	8.67	0.08	T11 384	9/15/98	9/18/98	9/22/98	BC
DETECTION LIMITS	0.30mg/l	0.15mg/l	0.07mg/l					

ANALYST INITIALS BC

REVIEW AS

ST11-983272

—— SEVERN TRENT LABORATORIES ——
—— PROJECT: 7098-1806B ——
—— LOCATION: STL - CT ——

Sample Names	Carbon Dioxide mg/l	Oxygen mg/l	Methane mg/l	Lab ID	Date Sampled	Date Received	Date Analyzed	Analyst
MW-11D	91.52	8.43	2.09	T11 433	9/10/98	9/11/98	9/24/98	BC
LFP-1A	3.62	9.45	<.07	T11 434	9/10/98	9/11/98	9/24/98	BC
KW-1A	2.77	9.79	<.07	T11 435	9/10/98	9/11/98	9/24/98	BC
MW-11S	68.11	9.59	<.07	T11 436	9/10/98	9/11/98	9/24/98	BC

DETECTION LIMITS 0.30mg/l 0.15mg/l 0.07mg/l

ANALYST INITIALS BC

REVIEW AS

END OF DATA PACKAGE

Analytical Assurance Associates, Inc.
600 Rock Raymond Road
Downingtown, PA 19335
Phone: 610 - 269 - 9989
Fax: 610 - 269 - 9989

INORGANIC ANALYSES
QUALITY ASSURANCE DATA REVIEW

STEARNS & WHELER
SITE: FARWELL LANDFILL
CASE NO.: 7098-1806A/ SDG NO.: A1806

REPORTED BY:
ANALYTICAL ASSURANCE ASSOCIATES (A^3)
600 ROCK RAYMOND ROAD
DOWNINGTOWN, PA 19335

REVIEWED BY:
ZOHREH HAMID, Ph.D.
NOVEMBER 21, 1998

STEARNS & WHELER
SITE: FARWELL LANDFILL
CASE NO.:7098-1806A/ SDG NO. A1806

INTRODUCTION

This quality assurance review is based upon a review of all data generated from fourteen (14) water samples collected on 09-02, 03, 08, 09-98. The samples were analyzed by Severn Trent Laboratories according to criteria set forth in EPA 600 Methods for Alkalinity (310.1), Ammonia (350.2), BOD (405.1), Bromide (320.1), Chloride (325.2), COD (410.4), Nitrate (353.2), Phenols (420.2), Sulfate (375.2), Sulfide (376.1), TDS (160), and TKN (351.2) and SW846 Methods for TOC (9060). Hardness analysis was performed based on Standard Method for the Examination of water and Wastewater , 18th edition.

The following samples are included in this report:

MW-16I	MW-18D	MW-19	MW-9D	SH-1
MW-15S	MW-18S	DW1A	MW-10S	MW-16S
MW-15I	DUP	MW-10D	FW1A*	

All data have been validated with regard to usability according to the quality assurance set forth in NYSDEC ASP for Evaluating Inorganic analyses. If you have any questions or comments on this data review, please call Zohreh Hamid at (610) 269-9989.

QUALITY ASSURANCE REVIEW

The finding offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Times
- Calibrations Analyses
- Blanks
- Matrix Spike Analysis
- Matrix Duplicate Analysis
- Laboratory Control Sample Analysis
- Field Duplicate Results
- Sample Results

DATA COMPLETENESS

The raw data for hardness was not included in the data package. The laboratory has been contacted. The re-submissions were included in Appendix D of this data review package.

Note: The results for hardness was not calculated/reported on the sample raw data by the laboratory. These results were only listed on formI.

HOLDING TIME

All samples were digested/analyzed within the NYSDEC requirement holding times with the exception of BOD, Nitrate and TDS in samples DW1A, FW1A, MW-19, DUP, MW-18S & MW-18D. The reported sample results and non-detected values were qualified estimated "J & UJ" in the data summary.

CALIBRATIONS

The recoveries for all parameters in the initial and continuing calibrations were within the control limits of 80-120%.

BLANKS

The laboratory preparation blanks were free of target analytes.

MATRIX SPIKE/SPIKE DUPLICATE ANALYSIS

The matrix spike analyses was preformed on sample MW-15I for all applicable analytes with the exception of BOD and nitrate. The recoveries were within the control limits with the exception of TKN (60.6%). The reported data were qualified estimated.

MATRIX DUPLICATE ANALYSIS

The matrix duplicate analysis was also performed. The RPDs for alkalinity (39.7%), TKN (39.6%) and phenols (25.4%) were above the data validation control limits. The positive results were qualified estimated.

LABORATORY CONTROL SAMPLE

The recoveries for all analytes were within the control limits with the exception of TKN (133%). The data have already been qualified due to the low spike recovery. The LCS for bromide and sulfide were not reported. The QC samples (MS & MD) was not reported for BOD and nitrate. Therefore, the long term accuracy and precision could not be evaluated.

DUPLICATE ANALYSIS

Duplicate analysis was analyzed on samples MW-18S/dup. The RPDs for the analytes detected at levels above the detection limits were within the control limits with the exception of nitrate (200%). The data were considered estimated.

SAMPLE RESULTS

The reported sample results were considered reliable. All samples were subbed to Microseeps Laboratory for permanent Gas Analysis (carbon dioxide, oxygen and methane) for water samples. The sample analysis results and procedure were included in Appendix D for the data user information.

SUMMARY

The cooler temperature was within control limit of 2-6 °C. The samples were preserved at the pH< 2 unit. Overall, major problems were not encountered during the sample analyses. The minor issues have been discussed. The reported data were summarized on the data summary with the applied qualifier codes.

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2- butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICCATION.

CODES RELATING TO QUATITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED. THE REPORTED QUATITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ANALYTICAL ASSURANCE ASSOCIATES (A3)
INORGANIC WATER ANALYSIS
mg/L

CLIENT: STEARNS & WHELER
SITE: FARWELL LANDFILL
STL ID: 7098-1806A
SDG NO.: A1806

CLIENT SAMPLE ID:		**MW-16I**	**MW-15S**	**MW-15I**	**MW-18D**	**MW-18S**	**DUP**	**MW-19**
LAB SAMPLE ID:		981806A-01	981806A-02	981806A-03	981806A-05	981806A-06	981806A-07	981806A-08
TARGET COMPOUNDS:	IDL							
Alkalinity	2.0	124 J	184 J	212 J	680 J	112 J	107 J	164 J
Ammonia	0.0400		0.0480	0.0470	0.920	0.0600	0.0540	0.111
BOD5	2.00				3.78 J	UJ	UJ	UJ
Bromide	2.00				5.8			
Chloride	3.00	3.61	8.41	44.1	682	11.6	8.14	14.7
COD	10.0				38.0			
Hardness	1.0	114	178	241	299	150	146	211
Nitrate	0.0330				UJ	UJ	0.140 J	UJ
Phenols	0.00500	0.0170 J	0.0140 J	0.0400 J	0.0160 J	0.00900 J	0.0120 J	0.00800 J
Sulfate	10.0							19.6
Sulfide	1.00							
TDS	10	113	178	274	1640 J	127 J	84.0 J	169 J
TKN	0.100	UJ	1.58 J	1.87 J	2.72 J	0.984 J	1.22 J	2.04 J
TOC	1.00	1.94	2.02	1.06	3.49	1.28	1.01	2.09

ANALYTICAL ASSURANCE ASSOCIATES (A3)
INORGANIC WATER ANALYSIS
mg/L

CLIENT: STEARNS & WHELER
SITE: FARWELL LANDFILL
STL ID: 7098-1806A
SDG NO.: A1806

CLIENT SAMPLE ID:		FW1A	DW1A	MW-9D	MW-10S	MW-10D	SH-1	MW-16S
LAB SAMPLE ID:		981806A-09	981806A-10	981806A-14	981806A-15	981806A-16	981806A-18	981806A-19
TARGET COMPOUNDS:	IDL							
Alkalinity	2.0	140 J	134 J	530 J	457 J	535 J	134 J	354 J
Ammonia	0.0400	0.159	UJ	0.0500	1.02	0.960		
BOD5	2.00	UJ						
Bromide	2.00							
Chloride	3.00	30.2	30.5	6.67	3.51	6.31	5.03	5.79
COD	10.0	16.1		17.5	22.6	12.4	17.5	
Hardness	1.0	158	161	688	477	517	131	358
Nitrate	0.0330	0.495 J	0.640 J					
Phenols	0.00500	0.0090 J	0.0110 J		0.0770 J			0.0180 J
Sulfate	10.0	11.3	10.9	25.8				16.6
Sulfide	1.00							
TDS	10	185 J	179 J	477	426	486	197	385
TKN	0.100	1.32 J	2.22 J	1.50 J	1.97 J	1.76 J	0.620 J	0.563 J
TOC	1.00	2.18	2.09	1.98	4.25	3.69	3.70	2.38

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

MW-16I

Lab Name: STL   Contract: ____________

Lab Code: STL   Case No.: 1806   SAS No.: ______   SDG No.: A1806

Matrix (soil/water): WATER   Lab Sample ID: 981806A-01

% Solids: 0   Date Received: 09/03/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	124.		mg/l		T
7727-37-9	Ammonia	0.0400	U	mg/l		L
	BOD5	2.00	U	mg/l		P
24959-67-9	Bromide	2.00	U	mg/l		T
16887-00-6	Chloride	3.61		mg/l		L
	COD	10.0	U	mg/l		C
	Hardness	114.		mg/l		D
14797-55-8	Nitrate	0.100	U	mg/l		L
	Phenols	0.0170		mg/l		L
	Sulfate	10.0	U	mg/l		L
	Sulfide	1.00	U	mg/l		D
	TDS	113.		mg/l		G
	TKN	0.100	U	mg/l		L
	TOC	1.94		mg/l		D

Comments:

FORM I - WC

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

MW-15S

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806 SAS No.: SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: 981806A-02

% Solids: 0 Date Received: 09/03/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	184.		mg/l		T
7727-37-9	Ammonia	0.0480		mg/l		L
	BOD5	2.00	U	mg/l		P
24959-67-9	Bromide	2.00	U	mg/l		T
16887-00-6	Chloride	8.41		mg/l		L
	COD	10.0	U	mg/l		C
	Hardness	178.		mg/l		D
14797-55-8	Nitrate	0.100	U	mg/l		L
	Phenols	0.0140		mg/l		L
	Sulfate	10.0	U	mg/l		L
	Sulfide	1.00	U	mg/l		D
	TDS	178.		mg/l		G
	TKN	1.58		mg/l		L
	TOC	2.02		mg/l		D

Comments:

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

MW-15I

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806 SAS No.: SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: 981806A-03

% Solids: 0 Date Received: 09/03/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	212.		mg/l		T
7727-37-9	Ammonia	0.0470		mg/l		L
	BOD5	2.00	U	mg/l		P
24959-67-9	Bromide	2.00	U	mg/l		T
16887-00-6	Chloride	44.1		mg/l		L
	COD	10.0	U	mg/l		C
	Hardness	241.		mg/l		D
14797-55-8	Nitrate	0.100	U	mg/l		L
	Phenols	0.0400		mg/l		L
	Sulfate	10.0	U	mg/l		L
	Sulfide	1.00	U	mg/l		D
	TDS	274.		mg/l		G
	TKN	1.87		mg/l		L
	TOC	1.06		mg/l		D

Comments:

FORM I - WC

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

MW-18D

Lab Name: STL   Contract: ______

Lab Code: STL   Case No.: 1806   SAS No.: ______   SDG No.: A1806

Matrix (soil/water): WATER   Lab Sample ID: 981806A-05

% Solids: 0   Date Received: 09/04/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	680.		mg/l		T
7727-37-9	Ammonia	0.920		mg/l		L
	BOD5	3.78		mg/l		P
24959-67-9	Bromide	5.80		mg/l		T
16887-00-6	Chloride	682.		mg/l		L
	COD	38.0		mg/l		C
	Hardness	299.		mg/l		D
14797-55-8	Nitrate	0.100	U	mg/l		L
	Phenols	0.0160		mg/l		L
	Sulfate	10.0	U	mg/l		L
	Sulfide	1.00	U	mg/l		D
	TDS	1640		mg/l		G
	TKN	2.72		mg/l		L
	TOC	3.49		mg/l		D

Comments:

FORM I - WC

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

MW-18S

Lab Name: STL   Contract: ______

Lab Code: STL   Case No.: 1806   SAS No.: ______   SDG No.: A1806

Matrix (soil/water): WATER   Lab Sample ID: 981806A-06

% Solids: 0   Date Received: 09/04/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	112.		mg/l		T
7727-37-9	Ammonia	0.0600		mg/l		L
	BOD5	2.00	U	mg/l		P
24959-67-9	Bromide	2.00	U	mg/l		T
16887-00-6	Chloride	11.6		mg/l		L
	COD	10.0	U	mg/l		C
	Hardness	150.		mg/l		D
14797-55-8	Nitrate	0.100	U	mg/l		L
	Phenols	0.00900		mg/l		L
	Sulfate	10.0	U	mg/l		L
	Sulfide	1.00	U	mg/l		D
	TDS	127.		mg/l		G
	TKN	0.984		mg/l		L
	TOC	1.28		mg/l		D

Comments:

FORM I - WC

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

DUP

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806 SAS No.: SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: 981806A-07

% Solids: 0 Date Received: 09/04/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	107.		mg/l		T
7727-37-9	Ammonia	0.0540		mg/l		L
	BOD5	2.00	U	mg/l		P
24959-67-9	Bromide	2.00	U	mg/l		T
16887-00-6	Chloride	8.14		mg/l		L
	COD	10.0	U	mg/l		C
	Hardness	146.		mg/l		D
14797-55-8	Nitrate	0.140		mg/l		L
	Phenols	0.0120		mg/l		L
	Sulfate	10.0	U	mg/l		L
	Sulfide	1.00	U	mg/l		D
	TDS	84.0		mg/l		G
	TKN	1.22		mg/l		L
	TOC	1.01		mg/l		D

Comments:

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

MW-19

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806 SAS No.: SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: 981806A-08

% Solids: 0 Date Received: 09/04/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	164.		mg/l		T
7727-37-9	Ammonia	0.111		mg/l		L
	BOD5	2.00	U	mg/l		P
24959-67-9	Bromide	2.00	U	mg/l		T
16887-00-6	Chloride	14.7		mg/l		L
	COD	10.0	U	mg/l		C
	Hardness	211.		mg/l		D
14797-55-8	Nitrate	0.100	U	mg/l		L
	Phenols	0.00800		mg/l		L
	Sulfate	19.6		mg/l		L
	Sulfide	1.00	U	mg/l		D
	TDS	169.		mg/l		G
	TKN	2.04		mg/l		L
	TOC	2.09		mg/l		D

Comments:

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

FW1A

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806 SAS No.: SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: 981806A-09

% Solids: 0 Date Received: 09/04/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	140.		mg/l		T
7727-37-9	Ammonia	0.159		mg/l		L
	BOD5	2.00	U	mg/l		P
24959-67-9	Bromide	2.00	U	mg/l		T
16887-00-6	Chloride	30.2		mg/l		L
	COD	16.1		mg/l		C
	Hardness	158.		mg/l		D
14797-55-8	Nitrate	0.495		mg/l		L
	Phenols	0.00900		mg/l		L
	Sulfate	11.3		mg/l		L
	Sulfide	1.00	U	mg/l		D
	TDS	185.		mg/l		G
	TKN	1.32		mg/l		L
	TOC	2.18		mg/l		D

Comments:

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

DW1A

Lab Name: STL Contract: ____

Lab Code: STL Case No.: 1806 SAS No.: ____ SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: 981806A-10

% Solids: 0 Date Received: 09/04/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	134.		mg/l		T
7727-37-9	Ammonia	0.0400	U	mg/l		L
	BOD5	2.00	U	mg/l		P
24959-67-9	Bromide	2.00	U	mg/l		T
16887-00-6	Chloride	30.5		mg/l		L
	COD	10.0	U	mg/l		C
	Hardness	161.		mg/l		D
14797-55-8	Nitrate	0.640		mg/l		L
	Phenols	0.0110		mg/l		L
	Sulfate	10.9		mg/l		L
	Sulfide	1.00	U	mg/l		D
	TDS	179.		mg/l		G
	TKN	2.22		mg/l		L
	TOC	2.09		mg/l		D

Comments:

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

MW-9D

Lab Name: STL   Contract: ______

Lab Code: STL   Case No.: 1806   SAS No.: ______   SDG No.: A1806

Matrix (soil/water): WATER   Lab Sample ID: 981806A-14

% Solids: 0   Date Received: 09/09/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	530.		mg/l		T
7727-37-9	Ammonia	0.0500		mg/l		L
	BOD5	2.00	U	mg/l		P
24959-67-9	Bromide	2.00	U	mg/l		T
16887-00-6	Chloride	6.67		mg/l		L
	COD	17.5		mg/l		C
	Hardness	688.		mg/l		D
14797-55-8	Nitrate	0.100	U	mg/l		L
	Phenols	0.00500	U	mg/l		L
	Sulfate	25.8		mg/l		L
	Sulfide	1.00	U	mg/l		D
	TDS	477.		mg/l		G
	TKN	1.50		mg/l		L
	TOC	1.98		mg/l		D

Comments:

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

MW-10S

Lab Name: STL Contract: ____________

Lab Code: STL Case No.: 1806 SAS No.: ______ SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: 981806A-15

% Solids: 0 Date Received: 09/09/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	457.		mg/l		T
7727-37-9	Ammonia	1.02		mg/l		L
	BOD5	2.00	U	mg/l		P
24959-67-9	Bromide	2.00	U	mg/l		T
16887-00-6	Chloride	3.51		mg/l		L
	COD	22.6		mg/l		C
	Hardness	477.		mg/l		D
14797-55-8	Nitrate	0.100	U	mg/l		L
	Phenols	0.0770		mg/l		L
	Sulfate	10.0	U	mg/l		L
	Sulfide	1.00	U	mg/l		D
	TDS	426.		mg/l		G
	TKN	1.97		mg/l		L
	TOC	4.25		mg/l		D

Comments:

FORM I - WC

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

MW-10D

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 1806 SAS No.: ______ SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: 981806A-16

% Solids: 0 Date Received: 09/09/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	535.		mg/l		T
7727-37-9	Ammonia	0.960		mg/l		L
	BOD5	2.00	U	mg/l		P
24959-67-9	Bromide	2.00	U	mg/l		T
16887-00-6	Chloride	6.31		mg/l		L
	COD	12.4		mg/l		C
	Hardness	517.		mg/l		D
14797-55-8	Nitrate	0.100	U	mg/l		L
	Phenols	0.00500	U	mg/l		L
	Sulfate	10.0	U	mg/l		L
	Sulfide	1.00	U	mg/l		D
	TDS	486.		mg/l		G
	TKN	1.76		mg/l		L
	TOC	3.69		mg/l		D

Comments:

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

SH-1

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806 SAS No.: SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: 981806A-18

% Solids: 0 Date Received: 09/10/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	134.		mg/l		T
7727-37-9	Ammonia	0.0400	U	mg/l		L
	BOD5	2.00	U	mg/l		P
24959-67-9	Bromide	2.00	U	mg/l		T
16887-00-6	Chloride	5.03		mg/l		L
	COD	17.5		mg/l		C
	Hardness	131.		mg/l		D
14797-55-8	Nitrate	0.100	U	mg/l		L
	Phenols	0.00500	U	mg/l		L
	Sulfate	10.0	U	mg/l		L
	Sulfide	1.00	U	mg/l		D
	TDS	197.		mg/l		G
	TKN	0.620		mg/l		L
	TOC	3.70		mg/l		D

Comments:

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

MW-16S

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 1806 SAS No.: ______ SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: 981806A-19

% Solids: 0 Date Received: 09/10/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	354.		mg/l		T
7727-37-9	Ammonia	0.0400	U	mg/l		L
	BOD5	2.00	U	mg/l		P
24959-67-9	Bromide	2.00	U	mg/l		T
16887-00-6	Chloride	5.79		mg/l		L
	COD	10.0	U	mg/l		C
	Hardness	358.		mg/l		D
14797-55-8	Nitrate	0.100	U	mg/l		L
	Phenols	0.0180		mg/l		L
	Sulfate	16.6		mg/l		L
	Sulfide	1.00	U	mg/l		D
	TDS	385.		mg/l		G
	TKN	0.563		mg/l		L
	TOC	2.38		mg/l		D

Comments:

MICROSEEPS

FILE NOTE

SUBJECT: Permanent Gas Analysis of Water Samples

The VOA vials are removed from the refrigerator (4°C) and allowed to reach ambient temperature. Samples are prepared by withdrawing 30 cc of water from the bottom of the vial into a 50 cc Hamilton gas tight, locking syringe. Then 10 cc of helium is withdrawn from a reservoir and the syringe is locked. The syringe is then shaken for five minutes and allowed to equilibrate. With the syringe in a near vertical position, the headspace is injected through a septum-fitting into a 0.5 cc sample loop. The loop is allowed to equilibrate at 1 atmosphere pressure prior to switching the valve to place the sample loop into the carrier gas flow stream.

First, headspace concentrations of the analyzed gases are determined by comparison to the results of analysis of the "237" gas standard. Subsequently, the headspace concentrations are converted to the dissolved water concentrations using Henry's Law.

Results of analysis and applicable quality control parameters are supplied on the attached data sheets.

THE RESULTS SUPPLIED ARE THE ORIGINAL DISSOLVED CONCENTRATIONS OF THE ANALYTES IN MG/L AS CALCULATED FROM DETERMINED HEADSPACE CONCENTRATIONS.

220 William Pitt Way, Pittsburgh, PA 15238 • Phone (412) 826-5245, Fax (412) 826-3433

Microseeps

ST9-983176

----- SEVERN TRENT LABORATORIES -----
----- PROJECT: 7098-1806A -----
----- LOCATION: STL - CT -----

Sample Names	Carbon Dioxide mg/l	Oxygen mg/l	Methane mg/l	Lab ID	Date Sampled	Date Received	Date Analyzed	Analyst
MW-16I	4.68	9.01	<.07	T11349	9/02/98	9/09/98	9/21/98	BC
MW-15S	3.62	8.19	<.07	T11350	9/02/98	9/09/98	9/21/98	BC
MW-15I	5.75	6.49	0.56	T11351	9/02/98	9/09/98	9/21/98	BC
MW-18D	68.96	7.36	16.27	T11352	9/03/98	9/09/98	9/21/98	BC
MW-18S	2.13	8.04	0.66	T11353	9/03/98	9/09/98	9/21/98	BC
MW-19	1.49	8.62	<.07	T11354	9/03/98	9/09/98	9/21/98	BC
FW-1A	3.19	10.42	<.07	T11355	9/03/98	9/09/98	9/21/98	BC
DW-1A	1.92	10.03	<.07	T11356	9/03/98	9/09/98	9/21/98	BC
MW-9D	80.45	6.44	0.95	T11357	9/08/98	9/11/98	9/21/98	BC
MW-10S	137.91	7.22	<.07	T11358	9/08/98	9/11/98	9/21/98	BC
MW-10D	176.44	6.44	1.05	T11359	9/08/98	9/11/98	9/21/98	BC
SH-1	6.38	7.56	0.34	T11360	9/09/98	9/11/98	9/21/98	BC
MW-16S	23.84	7.99	<.07	T11361	9/09/98	9/11/98	9/21/98	BC
DETECTION LIMITS	0.30mg/l	0.15mg/l	0.07mg/l					

ANALYST INITIALS BC

REVIEW AS

ST9-983176

—— QUALITY CONTROL ——
—— SEVERN TRENT LABORATORIES ——
—— PROJECT: 7098-1806A ——
—— LOCATION: STL - CT ——

CONTINUING CALIBRATION STANDARDS 9/21/98

COMPOUND	FILE ID	TRUE CONC.	MEASURED	% DIFF.
CARBON DIOXIDE	T11 345	15.0	15.15	1.00
OXYGEN	T11 345	7.00	6.54	6.57
METHANE (%)	T11 345	4.50	4.64	3.11

HE IN LOOP 9/21/98

COMPOUND	FILE ID	DET. LIMIT	MEASURED
CARBON DIOXIDE	T11 348	0.30mg/l	ND
OXYGEN	T11 348	0.15mg/l	ND
METHANE (%)	T11 348	0.07mg/l	ND

ANALYST INITIALS ßL

REVIEW AS

AEN

CORRECTIVE ACTION FORM

Client Inquiry X

A. Originator Information

Client: Adams + Wheeler Farwell

Job/Case: 7098-18067

Date/time: 11/18/98 9:15

Sample Number(s): all

Client/Lab Contact: A. Plunkett

Date/Time Response Due: ~~* need timeframe~~ ASAP

Detailed Description of Potential Problem: For the A SDG only the validator cannot find the raw data for hardness with either the metals or wetchem data. Please provide calculation

B. Quality Assurance Information

Corrective Action ID# 7 4 5

Recommended Corrective Action:

Groups Involved:

- _ Sample Control
- X Wet Chemistry
- _ Metals
- _ Gas Chromatography
- _ Mass Spectrometry
- _ Report Generation
- _ Client Service
- _ Sample Preparation
- _ Systems

C. Final Resolution

Describe What Happened and Long Term Corrective Action Taken: Attached is raw data from ICAP an used to calculate Hardness. Calculation: Ca factor 2.497 x Ca result + Mg factor 4.118 x Mg result = Hardness

Supervisor Signature: [signature]

Date 11/18/98

Date/Time Client Notified:

D. Quality Assurance Final Approval (QA Manager use only)

Corrective Action Approved:

Date Finalized:

AEN Doc # QAF00201 CT

nalysis Report Sun 09-27-98 11:17:39 AM page 1

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ethod: TEACT98 Sample Name: 1.0001.000PBW1 Operator:
un Time: 09/27/98 11:10:51
omment:
: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3179
Units	ppb	ppm	ppb	ppb	ppb	ppb	ppm
Avge	.0893813	.0041320	-1.98985	-.761895	.2836205	.0768147	.0014958
SDev	.1195875	.0011375	1.62751	1.017957	.1565059	.0663852	.0066674
%RSD	133.7948	27.52832	81.79086	133.6087	55.18145	86.42249	445.7560
#1	.2274691	.0051866	-1.19250	-1.16726	.4598953	.1431999	.0090739
#2	.0203374	.0042827	-.914755	.3962969	.2299716	.0768147	-.001117
#3	.0203374	.0029267	-3.86229	-1.51472	.1609944	.0104295	-.003469
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
Low	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000
Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppm	ppm	ppm
Avge	-.004656	.2081550	.2725285	-.098607	.0052119	.0376126	.0095844
SDev	.221552	.2876882	.1652907	.230317	.0026305	.0028958	.0055604
%RSD	4758.551	138.2087	60.65078	233.5709	50.47192	7.699018	58.01529
#1	-.255720	.4313665	.4617202	.1634386	.0067271	.0376126	.0160050
#2	.1634245	-.116516	.1997475	-.190323	.0021744	.0347168	.0063741
#3	.0783280	.3096147	.1561179	-.268936	.0067341	.0405084	.0063741
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
Low	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000
Elem	Mn2576	Mo2020	Na5889	Ni2316	Sb2068	Pb2203	Se1960
Units	ppb	ppb	ppm	ppb	ppb	ppb	ppb
Avge	-.001348	.4292492	.0104258	-.209493	.6119978	-.743960	.5033421
SDev	.385732	.3807606	.0125974	.627216	1.628595	.640671	.7691731
%RSD	28607.22	88.70386	120.8300	299.3972	266.1112	86.11633	152.8132
#1	.2212575	.5486692	.0244653	.0506641	-.250679	-.270680	.0571987
#2	.2214501	.7359855	.0067021	-.924925	2.490459	-1.47301	.0613241
#3	-.446753	.0030931	.0001099	.2457821	-.403786	-.488194	1.391504
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
Low	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000
Elem	Sn1899	Tl1908	Ti3349	V_2924	Zn2138	220371	220372
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1.907643	-1.32930	.0200257	.3874983	-4.21800	-1.24478	-.493924
SDev	.289532	1.55191	.0661631	.1308744	.54927	.49308	1.155678
%RSD	15.17747	116.7460	330.3904	33.77417	13.02195	39.61156	233.9789
#1	1.814890	4.305474	.0891050	.5586190	-3.58376	-1.80803	.4968444
#2	2.232185	-1.91563	.0137458	.3119979	-4.53279	-.891142	-1.76350
#3	1.675852	2.50263	-.042774	.3118781	-4.53744	-1.03517	-.215115
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0

ethod: TEAC198   Sample Name: 1.0001.0001CSW1   Operator:

un Time: 09/27/98 11:17:45

omment:

Mode: CONC   Corr. Factor: 1

418

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3179
Units	ppb	ppm	ppb	ppb	ppb	ppb	ppm
Avge	100.7209	.5186420	509.5437	-2.84664	501.9390	208.5036	21.08976
SDev	.5109	.0019701	1.5623	.95682	.9912	.6524	.09366
%RSD	.5072244	.3798659	.3065980	33.61238	.1974661	.3129006	.4440857
#1	100.3756	.5163820	507.9126	-2.90455	500.8660	207.7623	20.98406
#2	101.3077	.5195459	509.6920	-1.86218	502.1306	208.7581	21.12281
#3	100.4792	.5199979	511.0265	-3.77319	502.8204	208.9904	21.16240
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
Low	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppm	ppm	ppm
Avge	255.1178	503.1850	499.4942	501.1279	.5382955	17.51163	20.24001
SDev	.7022	1.9559	.8242	1.0106	.0039865	.03485	.07635
%RSD	.2752644	.3887118	.1650133	.2016592	.7405729	.1990224	.3772008
#1	254.4769	501.1355	498.5918	499.9880	.5407255	17.47148	20.15371
#2	255.0081	503.3879	499.6834	501.4817	.5336947	17.52939	20.26758
#3	255.8684	505.0315	500.2074	501.9141	.5404662	17.53402	20.29874
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
Low	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

Elem	Mn2576	Mo2020	Na5889	Ni2316	Sb2068	Pb2203	Se1960
Units	ppb	ppb	ppm	ppb	ppb	ppb	ppb
Avge	503.7531	-7.73149	22.28312	493.3738	515.3892	513.0288	517.6422
SDev	.9630	.57262	.06575	2.1691	4.4402	1.6904	2.9305
%RSD	.1911585	7.406314	.2950746	.4396483	.8615333	.3294897	.5661282
#1	502.6412	-7.10667	22.21200	494.6746	510.5127	511.1687	517.0856
#2	504.3094	-7.85659	22.29565	494.5771	516.4560	514.4710	520.8112
#3	504.3088	-8.23122	22.34170	490.8698	519.1988	513.4468	515.0300
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
Low	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

Elem	Sn1899	Tl1908	Ti3349	V_2924	Zn2138	2203/1	2203/2
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	3.468561	531.7622	.0828250	508.6499	526.3412	509.7585	514.6616
SDev	.722644	8.2954	.0287783	2.3012	1.9261	1.7609	3.0227
%RSD	20.83411	1.559991	34.74586	.4524083	.3659390	.3454398	.5873179
#1	4.302998	522.1896	.0514254	506.1557	524.5574	511.1571	511.1744
#2	3.051392	536.8461	.1079448	509.1035	526.0826	510.3373	516.5347
#3	3.051292	536.2510	.0891050	510.6905	528.3855	507.7810	516.2754
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0

na[redacted]ysis Report   Sun 09-27-98 11:31:22 AM   page 1

[redacted]ethod: TEACT98   Sample Name: 1.0001.000T1806A01   Operator: 419

un Time: 09/27/98 11:24:37

om[redacted]ent:

[redacted] CONC   Corr. Factor: 1

I[redacted]m	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3179 #
Un[redacted]s	ppb	ppm	ppb	ppb	ppb	ppb	ppm 85
Avge	-.307621	.0568636	8.427899	38.90617	1109.681	.4861887	34.23151
SDev	.265729	.0018267	.243059	.53075	3.669	.0766550	.19713
%R[redacted]	86.38202	3.212385	2.883984	1.364180	.3306038	15.76651	.5758854
#1	-.238577	.0558090	8.260308	38.79035	1106.071	.4419319	34.00743
#2[redacted]	-.601058	.0558090	8.316726	38.44289	1109.566	.5747023	34.30886
#3[redacted]	-.083228	.0589729	8.706663	39.48526	1113.406	.4419319	34.37823
E[redacted]rs	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
Hi[redacted]	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
Low	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

I[redacted]m	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790 -74
Un[redacted]s	ppb	ppb	ppb	ppb	ppm	ppm	ppm 24
Avge	1.518179	-.197684	.4457696	.8840620	.5124512	.7285500	7.026186
SD[redacted]	.201299	.274505	.1334117	.1938953	.0006415	.0045234	.028748
%R[redacted]	13.25926	138.8601	29.92841	21.93232	.1251876	.6208757	.4091556
#1[redacted]	1.619994	.0661112	.5913520	1.106800	.5131918	.7308666	7.000693
#2[redacted]	1.648231	-.177392	.3293549	.7530398	.5120659	.7233375	7.020521
#3	1.286311	-.481772	.4166018	.7923462	.5120959	.7314458	7.057345
[redacted]ors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
Low	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

I[redacted]m	Mn2576	Mo2020	Na5889	Ni2316	Sb2068	Pb2203	Se1960
Units	ppb	ppb	ppm	ppb	ppb	ppb	ppb
Av[redacted]e	179.8276	.0598772	9.772751	2.099402	5.519729	.4188569	.3183911
SD[redacted]	1.1569	.5618299	.053330	.097559	1.612058	.5198905	2.100871
%RSD	.6433498	938.3033	.5456975	4.646983	29.20539	124.1213	659.8398
#1[redacted]	178.4917	-.553596	9.733984	2.099402	6.738595	.6813093	-1.80427
#2[redacted]	180.4959	.1838812	9.750698	2.001844	6.128698	-.179943	2.396769
#3	180.4952	.5493460	9.833569	2.196961	3.691893	.7552044	.3626778
E[redacted]ors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
L[redacted]	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

Item	Sn1899	Tl1908	Ti3349	V_2924	Zn2138 35	220371	220372
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Av[redacted]e	3.476028	-9.27771	.9494553	.2230025	17.29899	3.524430	-1.13160
SD[redacted]	2.339564	1.79264	.0713263	.2618008	.19897	.811704	.37834
%RSD	67.30566	19.32204	7.512337	117.3982	1.150184	23.03079	33.43438
#1[redacted]	6.118414	-9.66905	1.031094	.5253040	17.23521	4.015804	-.983438
#2	1.668106	-7.32172	.8992158	.0718521	17.52203	2.587528	-1.56160
#3[redacted]	2.641565	-10.8424	.9180556	.0718513	17.13973	3.969956	-.849762
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High[redacted]	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0

alysis Report   Sun 09-27-98 11:38:12 AM   page 1

thod: IEACI98   Sample Name: 1.0001.000T1806A02   Operator:

420

n Time: 09/27/98 11:31:27

mment:

 * CONC   Corr. Factor: 1

em	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3179
nits	ppb	ppm	ppb	ppb	ppb	ppb	ppm
vge	-.376665	.8775182	-.759837	21.76493	496.1219	.3644830	53.47043
Dev	.107795	.0031639	.893155	1.35687	1.8188	.0383275	.22694
RSD	28.61820	.3605514	117.5456	6.234184	.3665969	10.51558	.4244194
1	-.342143	.8743544	-.110515	22.63357	494.0833	.3423546	53.21656
2	-.290360	.8806822	-.390587	22.45985	496.7044	.3423546	53.54111
3	-.497492	.8775182	-1.77841	20.20137	497.5781	.4087398	53.65361
rrors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

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em	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
nits	ppb	ppb	ppb	ppb	ppm	ppm	ppm
vge	1.314250	.0255273	3.203693	5.365031	2.402127	1.090332	10.84249
Dev	.178164	.1859789	.066645	.060042	.010009	.015694	.02833
RSD	13.55630	728.5485	2.080263	1.119132	.4166844	1.439419	.2613226
1	1.446713	.1878630	3.189223	5.351929	2.395221	1.106741	10.81001
2	1.111701	-.177392	3.276384	5.312622	2.397553	1.088787	10.85533
3	1.384336	.0661112	3.145471	5.430542	2.413606	1.075467	10.86213
ors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

em	Mn2576	Mo2020	Na5889	Ni2316	Sb2068	Pb2203	Se1960
nits	ppb	ppb	ppm	ppb	ppb	ppb	ppb
vge	273.5224	-.348265	16.35615	3.757904	3.278316	3.005783	1.513537
Dev	1.3904	.695184	.02958	.593428	1.277107	.918600	.811323
RSD	.5083286	199.6134	.1808388	15.79146	38.95620	30.56110	53.60449
1	271.9640	.1409832	16.33507	3.074992	4.090860	2.544271	.6333308
2	273.9676	-1.14403	16.38996	4.148140	1.806290	2.409446	2.231442
3	274.6357	-.041747	16.34341	4.050581	3.937797	4.063631	1.675837
rrors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

em	Sn1899	Tl1908	Ti3349	V_2924	Zn2138	2203/1	2203/2
nits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
vge	2.046737	7.12702	7.926456	1.307027	42.80200	3.216911	2.900377
Dev	2.276568	1.17375	.310142	.261922	.52335	1.032536	.868440
RSD	111.2291	16.46907	3.912747	20.03952	1.222733	32.09712	29.94232
1	.0998633	5.95274	7.738059	1.156048	42.55113	2.565288	2.533779
	1.490460	7.12808	7.756898	1.609468	42.45130	2.678043	2.275349
.	4.549887	8.50025	8.284412	1.155565	43.40556	4.407402	3.892003
rrors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	[illegible]00.0	100000.0	100000.0	100000.0	100000.0

na[redacted]ysis Report   Sun 09-27-98 11:45:02 AM   page 1

ethod: IEACT98   Sample Name: 1.0001.00011806A05   Operator:

in[redacted]ime: 09/27/98 11:38:17

om[redacted]ent: 421

CONC   Corr. Factor: 1

[redacted]m	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3179
Un[redacted]s	ppb	ppm	ppb	ppb	ppb	ppb	ppm
Avge	-.048706	31.85614	31.33565	413.8707	8487.284	2.898177	77.94940
SD[redacted]v	.352479	.14214	2.72103	4.1803	14.689	.057491	.61201
%RS[redacted]	723.6798	.4461920	8.683481	1.010055	.1730750	1.983697	.7851384
[redacted]	-.445709	31.69523	33.79426	418.2139	8470.323	2.864984	77.28148
[redacted]	.0721203	31.90857	31.80058	409.8749	8495.914	2.864984	78.08346
	.2274691	31.96462	28.41212	413.5232	8495.615	2.964562	78.48328
r[redacted]rs	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000
[redacted]	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppm	ppm	ppm
Av[redacted]	.4402364	28.86040	41.41940	45.16966	68.68415	19.25973	25.42296
SD[redacted]v	.2712955	.30438	.25971	.41598	.43805	.04458	.13576
%RSD	61.62496	1.054664	.6270225	.9209347	.6377772	.2314492	.5339931
[redacted]	.1282978	28.55602	41.17630	44.69798	68.19823	19.22922	25.27226
#2	.5712662	28.86040	41.38887	45.48412	68.80545	19.23907	25.46091
#3	.6211452	29.16478	41.69302	45.32689	69.04878	19.31088	25.53569
[redacted]rs	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
o[redacted]	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000
Elem	Mn2576	Mo2020	Na5889	Ni2316	Sb2068	Pb2203	Se1960
Un[redacted]s	ppb	ppb	ppm	ppb	ppb	ppb	ppb
Av[redacted]	674.4866	1.218011	209.3161	62.06564	4.891796	11.10171	5.970125
SDEV	3.6926	.482534	2.1454	.36935	3.788639	.91820	1.537407
%RSD	.5474632	39.61656	1.024964	.5950962	77.44883	8.270771	25.75167
[redacted]	670.5919	.6714972	211.7896	61.80549	8.005039	10.41257	5.316381
#2	674.9514	1.585242	207.9594	61.90304	.6734886	10.74851	7.726362
#3[redacted]	677.9567	1.397293	208.1995	62.48840	5.996861	12.14406	4.867632
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
o[redacted]	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000
Elem	Sn1899	Tl1908	Ti3349	V_2924	Zn2138	220.371	220.372
Un[redacted]s	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Av[redacted]	4.229775	-6.25161	93.86101	36.44764	239.5559	1.145551	16.07255
SDEV	4.566225	.95419	.42014	.25078	1.9978	.234958	1.39463
%RS[redacted]	107.9543	15.26307	.4476214	.6880430	.8339587	20.50870	8.677226
#1	.1150980	-7.10496	93.38374	36.15809	237.5575	.9604550	15.13154
[redacted]	9.141203	-6.42853	94.02428	36.59561	240.0500	1.409855	15.41083
	3.455023	-5.22134	94.17500	36.58921	241.2604	1.066345	17.67462
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
Hi[redacted]	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0

nalysis Report   Sun 09-27-98 11:51:52 AM   page 1

ethod: IEACT98   Sample Name: 1.0001.000T1806A06   Operator:
un Time: 09/27/98 11:45:08
omment:
                                                                          422
  · CONC   Corr. Factor: 1

lem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3179
nits	ppb	ppm	ppb	ppb	ppb	ppb	ppm
vge	-.014185	7.827846	59.83495	24.60250	537.4086	.8623702	47.01917
Dev	.119588	.036149	2.21746	.26538	2.0307	.0191635	.12125
RSD	843.0836	.4617945	3.705957	1.078652	.3778680	2.222186	.2578762
1	.1239033	7.786113	58.66618	24.89205	535.1246	.8402422	46.91595
2	-.083228	7.849392	58.44637	24.54459	538.0907	.8734342	47.15270
3	-.083228	7.848035	62.39230	24.37086	539.0104	.8734342	46.98886
rrors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

lem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
nits	ppb	ppb	ppb	ppb	ppm	ppm	ppm
vge	1.515596	6.397203	19.07064	40.16460	18.55549	4.063351	7.934704
Dev	.306553	.426131	.04366	.21649	.02821	.017728	.026453
RSD	20.22654	6.661208	.2289364	.5389954	.1520271	.4363003	.3333871
1	1.386381	6.884210	19.07176	40.05979	18.53135	4.044818	7.904300
2	1.865601	6.214575	19.11372	40.02048	18.58650	4.065089	7.952455
3	1.294805	6.092823	19.02642	40.41355	18.54863	4.080147	7.947356
ors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

lem	Mn2576	Mo2020	Na5889	Ni2316	Sb2068	Pb2203	Se1960
nits	ppb	ppb	ppm	ppb	ppb	ppb	ppb
vge	849.1260	7.543874	54.62980	17.54624	3.065133	26.68515	2.732633
Dev	1.5061	.589419	.58355	.36935	2.218829	.58811	1.943727
RSD	.1773667	7.813211	1.068186	2.105023	72.38932	2.204048	71.13020
1	847.6788	6.871440	53.97483	17.70884	.5273984	26.63612	.9143918
2	850.6848	7.971130	54.82021	17.80639	4.028830	26.11997	4.781304
3	849.0143	7.789053	55.09435	17.12348	4.639172	27.29336	2.502203
rrors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

lem	Sn1899	Tl1908	Ti3349	V_2924	Zn2138	2203/1	2203/2
nits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
vge	1.810787	-9.33953	60.58994	12.74846	257.5398	24.23852	27.90363
Dev	2.450459	1.17120	.16990	.00074	.3924	1.52367	1.35243
RSD	135.3257	12.54021	.2804166	.0058161	.1523559	6.286151	4.846778
1	4.083280	-8.17037	60.41410	12.74909	257.2260	25.92393	26.99168
2	2.134532	-9.33548	60.75322	12.74764	257.9797	23.83301	27.26173
3	-.785453	-10.5128	60.60250	12.74864	257.4137	22.95863	29.45747
rrors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0

a[redacted]ysis Report   Sun 09-27-98 11:58:42 AM   page 1

thod: 1FAC198   Sample Name: 1.0001.000T1806A03   Operator:
n Time: 09/27/98 11:51:58
m[redacted]ent: 423
[redacted] CONC   Corr. Factor: 1

I[redacted]m	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3179
n[redacted]s	ppb	ppm	ppb	ppb	ppb	ppb	ppm
vge	-.255838	.0472213	-1.73097	16.20561	443.9675	.4198038	68.83912
D[redacted]	.079100	.0004520	2.70898	.45964	1.0232	.0191635	.22639
R[redacted]	30.91787	.9571536	156.5003	2.836319	.2304638	4.564871	.3288630
1	-.342143	.0472213	.3059650	16.03188	442.7873	.4087398	68.57845
2[redacted]	-.186794	.0476733	-4.80534	16.72680	444.5117	.4419319	68.98650
3[redacted]	-.238577	.0467693	-.693543	15.85815	444.6037	.4087398	68.95240
r[redacted]rs	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
i[redacted]	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

I[redacted]	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
nits	ppb	ppb	ppb	ppb	ppm	ppm	ppm
vge	1.294075	-.339728	.0530342	-.177220	.2595749	.8443819	16.67222
D[redacted]	.455391	.346155	.1098787	.249632	.0006487	.0066792	.03581
R[redacted]	35.19044	101.8918	207.1848	140.8597	.2499253	.7910200	.2148146
1[redacted]	1.182878	-.725275	.0675896	-.033095	.2592126	.8519110	16.63105
2[redacted]	1.794766	-.055641	.1549097	-.033095	.2603239	.8391694	16.69620
3	.9045817	-.238268	-.063397	-.465470	.2591882	.8420652	16.68941
[redacted]rs	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

I[redacted]m	Mn2576	Mo2020	Na5889	Ni2316	Sb2068	Pb2203	Se1960
nits	ppb	ppb	ppm	ppb	ppb	ppb	ppb
v[redacted]e	92.32287	-.912294	13.85822	1.936804	3.801231	.6147917	1.788918
D[redacted]v	.19218	.732894	.03125	.313608	.719586	.1375750	.667429
RSD	.2081591	80.33521	.2254814	16.19204	18.93033	22.37750	37.30906
1[redacted]	92.10096	-1.64606	13.84427	1.806725	3.242795	.5181724	1.048287
2	92.43375	-.180275	13.89401	2.294520	3.547612	.7723049	1.974680
3	92.43389	-.910548	13.83637	1.709166	4.613287	.5538977	2.343787
r[redacted]rs	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
o[redacted]	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

tem	Sn1899	Tl1908	Ti3349	V_2924	Zn2138	220371	220372
n[redacted]s	ppb	ppb	ppb	ppb	ppb	ppb	ppb
v[redacted]e	1.254484	-8.23812	-.206052	-.148251	17.00850	2.951933	-.552027
Dev	1.112578	1.22065	.096678	.000017	.19783	.980927	.455101
RSD	88.68807	14.81684	46.91942	.0115009	1.163112	33.23000	82.44173
1[redacted]	2.567070	-9.60615	-.099293	-.148241	16.78642	3.529664	-.985316
	1.254466	-7.84787	-.287691	-.148270	17.16586	3.506803	-.592894
[redacted]	.1419150	-7.26033	-.231171	-.148241	17.07323	1.819333	-.077871
rrors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
i[redacted]	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0

alysis Report Sun 09-27-98 12:05:31 PM page 1

ethod: TEACT98 Sample Name: 1.0001.000T1806A03D Operator:
un Time: 09/27/98 11:58:47 424
omment:
: CONC Corr. Factor: 1

tem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3179
nits	ppb	ppm	ppb	ppb	ppb	ppb	ppm
vge	-.445709	.0112131	-3.24858	20.43301	461.0815	.2095845	71.34894
Dev	.089691	.0006904	.67682	1.65118	1.5309	.0331926	.36113
RSD	20.12315	6.157242	20.83449	8.080967	.3320268	15.83733	.5061437
1	-.497492	.0110624	-2.80303	22.11239	459.3188	.1763920	70.96519
2	-.497492	.0119664	-2.91528	20.37510	461.8480	.2427772	71.39951
3	-.342143	.0106105	-4.02741	18.81154	462.0779	.2095842	71.68212
rrors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

tem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
nits	ppb	ppb	ppb	ppb	ppm	ppm	ppm
vge	.9791790	-.339728	.1850050	-.268936	.2868691	.9138811	17.31806
Dev	.2098139	.153201	.1099046	.136162	.0030479	.0182044	.06076
RSD	21.42754	45.09518	59.40629	50.63001	1.062457	1.991988	.3508749
1	1.174421	-.481772	.2868968	-.190323	.2857186	.9300975	17.25196
2	.7573311	-.177392	.0685414	-.426163	.2845640	.8941897	17.33071
3	1.005785	-.360020	.1995766	-.190323	.2903248	.9173560	17.37150
ors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

tem	Mn2576	Mo2020	Na5889	Ni2316	Sb2068	Pb2203	Se1960
nits	ppb	ppb	ppm	ppb	ppb	ppb	ppb
vge	95.53960	-.180727	16.25617	1.676647	1.718998	.4689019	-.250967
Dev	.69428	.366122	.02057	.225303	3.057482	.9693878	2.196175
RSD	.7266922	202.5828	.1265191	13.43770	177.8641	206.7357	875.0868
1	94.76135	.1845181	16.23837	1.416490	-1.47930	.5474958	2.026623
2	95.76208	-.178980	16.25145	1.806725	2.023405	-.537390	-2.35549
3	96.09536	-.547719	16.27868	1.806725	4.612890	1.396600	-.424037
rrors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

tem	Sn1899	Tl1908	Ti3349	V_2924	Zn2138	2203/1	2203/2
nits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
vge	1.950027	-4.91271	-.243731	-.073388	16.84971	1.383896	.0120906
Dev	1.548679	4.10877	.092934	.130961	.21931	1.692923	.7206356
RSD	79.41831	83.63550	38.12989	178.4506	1.301574	122.3302	5960.270
1	2.228191	-1.97668	-.136972	-.148938	16.59647	2.182556	-.268809
2	3.340774	-3.15322	-.287691	.0778331	16.97669	-.560618	-.525794
3	.2811173	-9.60823	-.306531	-.149059	16.97596	2.529751	.8308746
rrors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0

Analysis Report   Sun 09-27-98 12:12:21 PM   page 1

Method: TEACT98   Sample Name: 1.0001.000T1806A038   Operator: 425
Run Time: 09/27/98 12:05:37
Comment:
CONC   Corr   Factor: 1

[redacted]	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3179
[redacted]	ppb	ppm	ppb	ppb	ppb	ppb	ppm
Avge	53.44305	2.039723	41.87444	916.4100	2376.707	52.04520	91.88164
[redacted]	.43428	.005430	2.63303	8.3685	3.185	.25133	.45667
[redacted]	.8125986	.2662155	6.287926	.9131795	.1340191	.4829027	.4970200
#1	52.94249	2.034149	44.47466	925.1543	2375.067	51.75754	91.35456
[redacted]	53.66745	2.040024	41.93889	915.5992	2380.378	52.22223	92.13146
#3	53.71923	2.044996	39.20978	908.4764	2374.676	52.15585	92.15890
[redacted]	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
[redacted]	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
Low	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

[redacted]	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppm	ppm	ppm
[redacted]	5.308735	489.2038	194.9542	248.2152	1.311432	21.55841	37.46634
[redacted]	.316299	2.3913	.7017	.3567	.007911	.01472	.11301
%RSD	5.958077	.4888081	.3599227	.1436896	.6032163	.0682985	.3016240
[redacted]	5.506420	486.5861	194.1538	247.9532	1.303948	21.54934	37.33585
[redacted]	4.943932	491.2736	195.2453	248.6214	1.319709	21.57540	37.53130
#3	5.475853	489.7517	195.4635	248.0711	1.310639	21.55050	37.53186
[redacted]	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
[redacted]	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

Elem	Mn2576	Mo2020	Na5889	Ni2316	Sb2068	Pb2203	Se1960
Units	ppb	ppb	ppm	ppb	ppb	ppb	ppb
[redacted]	580.8088	989.7534	48.61459	478.7400	482.4861	20.02757	10.56731
[redacted]	1.7338	5.4584	.01504	.9821	.5761	1.31805	1.57476
%RSD	.2985109	.5514922	.0309303	.2051367	.1193934	6.581195	14.90214
[redacted]	578.8068	983.7136	48.63133	477.6993	482.8904	21.52367	11.67235
#2	581.8098	994.3337	48.61019	479.6505	481.8265	19.03760	8.764182
[redacted]	581.8098	991.2128	48.60223	478.8701	482.7413	19.52144	11.26539
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
[redacted]	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

Elem	Sn1899	Tl1908	Ti3349	V_2924	Zn2138	2203/1	2203/2
[redacted]	ppb	ppb	ppb	ppb	ppb	ppb	ppb
[redacted]	1009.254	45.93650	967.5875	488.9788	517.9838	20.40346	19.83991
SDev	2.295	3.11911	2.8230	2.0572	1.3482	3.53662	.73877
%RSD	.2274137	6.790046	.2917576	.4207237	.2602717	17.33342	3.723667
[redacted]	1011.155	49.47351	964.3283	486.6[illegible]60	516.7812	24.40833	20.08351
	1006.704	43.57978	969.1700	489.8099	519.4412	19.09268	19.01010
[redacted]	1009.903	44.75621	969.2643	490.4904	517.7291	17.70936	20.42613
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
[redacted]	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0

alysis Report   Sun 09-27-98 12:19:12 PM   page 1

thod: IFACT98   Sample Name: 1 0001.000T1806A03SD   Operator:

n Time: 09/27/98 12:12:27

mment:

CONC   Corr. Factor: 1

420

lem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3179
nits	ppb	ppm	ppb	ppb	ppb	ppb	ppm
vge	52.64905	1.989854	40.28097	978.4890	2354.826	51.76860	92.68466
Dev	.26573	.009944	1.40970	10.5974	6.336	.24467	.57872
RSD	.5047217	.4997153	3.499659	1.083040	.2690453	.4726136	.6243949
1	52.42465	1.979910	39.19605	989.7814	2347.798	51.49200	92.06325
2	52.58001	1.989854	41.87437	968.7603	2356.581	51.85711	92.78252
3	52.94249	1.999798	39.77251	976.9255	2360.099	51.95669	93.20821
rrors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

lem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
nits	ppb	ppb	ppb	ppb	ppm	ppm	ppm
vge	5.643791	481.7566	196.5421	246.1713	1.312606	21.78023	36.75534
Dev	.287850	2.3454	.8076	.8097	.008595	.00924	.16237
RSD	5.100289	.4868389	.4109282	.3289171	.6547694	.0424031	.4417623
1	5.311430	479.2201	195.7273	245.3196	1.308932	21.77579	36.57670
2	5.812995	482.2031	196.5567	246.2630	1.306459	21.79085	36.79538
3	5.806949	483.8467	197.3424	246.9312	1.322427	21.77405	36.89395
ors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

lem	Mn2576	Mo2020	Na5889	Ni2316	Sb2068	Pb2203	Se1960
nits	ppb	ppb	ppm	ppb	ppb	ppb	ppb
vge	575.8115	988.1402	65.50615	466.5126	490.9690	19.85740	10.09531
Dev	1.8569	4.8479	.14156	1.2276	2.1161	.47601	1.07666
RSD	.3224924	.4906071	.2160970	.2631405	.4310045	2.397121	10.66491
1	573.8104	983.3232	65.38616	467.6508	489.9008	19.63849	11.33559
2	576.1447	988.0789	65.47001	466.6751	493.4062	20.40348	9.549098
3	577.4792	993.0184	65.66227	465.2118	489.5999	19.53023	9.401236
rrors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

lem	Sn1899	Tl1908	Ti3349	V_2924	Zn2138	2203/1	2203/2
nits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
vge	1005.268	38.73124	966.7083	486.7113	500.3945	23.08352	18.24676
Dev	4.347	3.32909	4.0422	2.7239	3.1938	1.06027	1.05492
RSD	.4324701	8.595357	.4181374	.5596454	.6382611	4.593189	5.781417
1	1001.281	37.76959	962.3312	483.9150	496.8005	24.30716	17.30765
	1004.619	35.98898	967.4933	486.8627	501.4750	22.43711	19.38819
	1009.903	42.43516	970.3004	489.3564	502.9079	22.50629	18.04443
rrors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0

nalysis Report   QC Standard   Sun 09-27-98 12:26:05 PM   page 1

ethod: IEACT98   Sample Name: CCV2   Operator:

un Time: 09/27/98 12:19:19

427

omment:

CONC   Corr   Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3179
Units	ppb	ppm	ppb	ppb	ppb	ppb	ppm
Avge	50.11168	5.600463	502.8418	512.5486	484.5721	495.6298	51.52375
SDev	.02990	.007595	4.5258	5.7593	.6736	.4332	.02611
%RSD	.0596623	.1356070	.9000483	1.123656	.1390121	.0874012	.0506704
#1	50.09442	5.592177	504.1048	518.9765	483.8057	495.6740	51.49853
#2	50.09442	5.602121	506.6020	507.8579	485.0703	496.0391	51.55067
#3	50.14621	5.607092	497.8187	510.8113	484.8403	495.1762	51.52205
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	50.00000	5.500000	500.0000	500.0000	500.0000	500.0000	51.00000
Range	10.00000	10.00000	10.00000	10.00000	10.00000	10.00000	10.00000

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppm	ppm	ppm
Avge	492.5124	486.6876	487.4652	493.2797	5.738809	51.73417	51.10372
SDev	1.2399	.7314	.9407	.6868	.003980	.08711	.02785
%RSD	.2517525	.1502759	.1929856	.1392413	.0693461	.1683777	.0545046
#1	491.5016	486.6470	486.4029	492.5197	5.738423	51.68301	51.07464
#2	492.1397	487.4384	487.8000	493.4631	5.742967	51.83475	51.13016
#3	493.8959	485.9774	488.1928	493.8562	5.735036	51.68475	51.10637
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	500.0000	500.0000	500.0000	500.0000	5.500000	53.00000	51.00000
Range	10.00000	10.00000	10.00000	10.00000	10.00000	10.00000	10.00000

Elem	Mn2576	Mo2020	Na5889	Ni2316	Sb2068	Pb2203	Se1960
Units	ppb	ppb	ppm	ppb	ppb	ppb	ppb
Avge	490.2172	486.3705	51.94497	482.1870	495.5295	512.1042	510.8311
SDev	.1929	2.4121	.08733	1.1502	6.6594	1.5879	2.0944
%RSD	.0393583	.4959454	.1681112	.2385397	1.343889	.3100788	.4099899
#1	490.3292	489.1372	51.85180	481.2115	490.8050	510.3227	509.7045
#2	490.3281	485.2651	51.95814	483.4553	503.1460	513.3708	509.5412
#3	489.9944	484.7090	52.02495	481.8944	492.6375	512.6192	513.2476
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	500.0000	500.0000	51.00000	500.0000	500.0000	500.0000	500.0000
Range	10.00000	10.00000	10.00000	10.00000	10.00000	10.00000	10.00000

Elem	Sn1899	Tl1908	Ti3349	V_2924	Zn2138	220371	220372
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	506.0665	536.8895	487.7005	493.2468	502.8598	506.0346	515.1210
SDev	1.8238	5.9098	.5748	.7288	.6662	2.9048	1.0264
%RSD	.3603902	1.100742	.1178685	.1477569	.1324787	.5740393	.1992534
#1	504.1197	543.1502	487.4367	493.5492	503.1506	503.0482	513.9412
#2	506.5446	531.4079	488.3599	493.7758	503.3311	508.8503	515.6141
#3	507.7553	536.1104	487.3048	492.4155	502.0976	506.2051	515.8079
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	NOCHECK	NOCHECK
Value	500.0000	500.0000	500.0000	500.0000	500.0000		

thod: TEACT98   Sample Name: CC82   Operator:

un Time: 09/27/98 12:26:12

mment:

428

: CONC   Corr. Factor: 1

tem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3179
nits	ppb	ppm	ppb	ppb	ppb	ppb	ppm
vge	Q.2447301	Q-.000840	Q-3.41575	1.786127	Q.1763227	Q.3202262	Q-.004776
Dev	.1077947	.001711	1.00287	1.084936	.0702429	.0690955	.002395
RSD	44.04639	203.7545	29.36018	60.74236	39.83769	21.57708	50.14832
1	Q.1239033	Q-.001593	Q-2.30294	3.002228	Q.2529639	Q.3755467	Q-.002685
2	Q.3310350	Q.0011188	Q-4.24962	.9174831	Q.1609944	Q.2427772	Q-.004253
3	Q.2792520	Q-.002045	Q-3.69470	1.438669	Q.1150097	Q.3423546	Q-.007389
rrors	QC Fail	QC Fail	QC Fail	NOCHECK	QC Fail	QC Fail	QC Fail
alue	.0000000	.0000000	.0000000		.0000000	.0000000	.0000000
ange	10.00000	10.00000	10.00000		10.00000	10.00000	10.00000

tem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
nits	ppb	ppb	ppb	ppb	ppm	ppm	ppm
vge	Q.0972636	Q.0255273	Q.2581074	Q-.596492	Q.0059896	Q.0352959	Q.0046745
Dev	.3712333	.4053315	.1968986	.045388	.0017751	.0043726	.0024694
RSD	381.6777	1587.835	76.28554	7.609101	29.63577	12.38827	52.82740
1	Q-.311609	Q-.177392	Q.4619032	Q-.622697	Q.0079182	Q.0358751	Q.0075071
2	Q.4131964	Q.4922424	Q.2434991	Q-.544083	Q.0044243	Q.0393500	Q.0029749
3	Q.1902035	Q-.238268	Q.0689198	Q-.622697	Q.0056263	Q.0306627	Q.0035415
ors	QC Fail	QC Fail	QC Fail	QC Fail	QC Fail	QC Fail	QC Fail
alue	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000	.0000000
ange	10.00000	10.00000	10.00000	10.00000	10.00000	10.00000	10.00000

tem	Mn2576	Mo2020	Na5889	Ni2316	Sb2068	Pb2203	Se1960
nits	ppb	ppb	ppm	ppb	ppb	ppb	ppb
vge	Q-.446719	.9184967	Q.0054968	Q-.372091	Q2.185849	Q-.436417	Q-.391520
Dev	.000049	.3638261	.0043760	.298048	1.908961	.637852	2.384196
RSD	.0110565	39.61103	79.60982	80.10064	87.33268	146.1567	608.9583
1	Q-.446775	1.282213	Q.0101585	Q-.632249	Q4.166397	Q-1.15434	Q-1.61203
2	Q-.446685	.9187158	Q.0048543	Q-.046895	Q2.033551	Q-.219930	Q2.355826
3	Q-.446696	.5545612	Q.0014776	Q-.437131	Q.3575994	Q.0650166	Q-1.91835
rrors	QC Fail	NOCHECK	QC Fail	QC Fail	QC Fail	QC Fail	QC Fail
alue	.0000000		.0000000	.0000000	.0000000	.0000000	.0000000
ange	10.00000		10.00000	10.00000	10.00000	10.00000	10.00000

tem	Sn1899	Tl1908	Ti3349	V_2924	Zn2138	2203/1	2203/2
nits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
vge	2.463999	2.585143	.0891050	Q.2363174	Q-5.58339	-1.48597	.0875746
Dev	.562037	2.442296	.1235407	.1309006	.38037	.78526	.5854200
RSD	22.80997	94.47431	138.6463	55.39187	6.812481	52.84472	668.4812
1	3.066633	3.368428	.2209833	Q.3118469	Q-5.96394	-2.39230	-.536284
2	2.371275	4.539701	.0702652	Q.3119388	Q-5.20320	-1.00913	.1740774
3	1.954090	.152700	-.0239.34	Q.0851664	Q-5.58303	-1.05649	.6249302
rrors	NOCHECK	NOCHECK	NOCHECK	QC Fail	QC Fail	NOCHECK	NOCHECK
alue				.0000000	.0000000		

thod: IEAC198   Sample Name: 1.0001.000T1806A07   Operator:

n Time: 09/27/98 12:33:04   429

[redacted]nt:

[redacted] CONC   Corr. Factor: 1

1e[redacted]	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3179
ni[redacted]s	ppb	ppm	ppb	ppb	ppb	ppb	ppm
vge	.0548594	7.672665	58.55295	23.67595	550.3916	.9066270	45.10372
De[redacted]	.3288657	.032790	3.03516	2.11350	1.6580	.0663847	.16201
R[redacted]	599.4707	.4273633	5.183615	8.926785	.3012397	7.322165	.3591834
1	-.135011	7.636054	61.48055	26.10815	548.5522	.8402422	44.92001
2[redacted]	-.135011	7.682609	58.75769	22.63357	550.8514	.9730116	45.22615
3[redacted]	.4346008	7.699332	55.42060	22.28612	551.7712	.9066273	45.16500
rr[redacted]rs	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
i[redacted]	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

le[redacted]	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
nits	ppb	ppb	ppb	ppb	ppm	ppm	ppm
vge	1.924302	6.397202	11.25858	38.50062	18.85050	2.969318	8.010807
De[redacted]	.0835559	.161062	.34708	.30021	.05867	.003065	.026591
RS[redacted]	4.342283	2.517700	3.082831	.7797576	.3112232	.1032115	.3319357
1[redacted]	2.019865	6.275451	11.39057	38.17306	18.79425	2.970477	7.980215
2[redacted]	1.864997	6.579830	11.52031	38.56613	18.91132	2.965843	8.023837
3	1.888042	6.336327	10.86486	38.76266	18.84591	2.971635	8.028370
[redacted]rs	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

le[redacted]	Mn2576	Mo2020	Na5889	Ni2316	Sb2068	Pb2203	Se1960
nits	ppb	ppb	ppm	ppb	ppb	ppb	ppb
v[redacted]	863.4908	1.914939	4.422690	17.80639	2.628521	25.89914	.7975159
De[redacted]	2.2241	.104280	.021780	.19512	2.198692	1.16741	1.780570
RSD	.2575674	5.445589	.4924603	1.095775	83.64747	4.507519	223.2645
1[redacted]	861.0414	2.035217	4.400727	18.00151	5.067840	26.87553	.0197753
2	865.3859	1.849884	4.423061	17.61128	.7993219	26.21582	2.834649
3	864.0473	1.859716	4.444282	17.80639	2.018403	24.60606	-.461876
rr[redacted]rs	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
o[redacted]	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

lem	Sn1899	Tl1908	Ti3349	V_2924	Zn2138	220371	220372
n[redacted]s	ppb	ppb	ppb	ppb	ppb	ppb	ppb
v[redacted]	3.987954	-7.74419	61.71405	12.51396	179.6216	23.46523	27.11426
Dev	1.606174	.892255	.34379	.00154	.5369	2.35110	.58153
RSD	40.27584	11.52253	.5570767	.0123285	.2989225	10.01952	2.144720
[redacted]	4.916421	-7.554822	62.10968	12.51544	179.0248	25.32873	27.64776
	4.914098	-8.71600	61.48797	12.51236	179.7746	24.24321	27.20065
3[redacted]	2.133285	-6.96175	61.54449	12.51408	180.0655	20.82374	26.49438
rrors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
ig[redacted]	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0

thod: IFACI98   Sample Name: 1.0001.000T1806A08   Operator:
in Time: 09/27/98 12:39:55
mment:
: CONC   Corr. Factor: 1

430

lem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3179
nits	ppb	ppm	ppb	ppb	ppb	ppb	ppm
vge	-.169533	4.516000	2.522482	13.48386	159.2223	.5525739	63.11641
Dev	.149484	.011291	.861481	.98786	.3827	.0383275	.11998
RSD	88.17407	.2500163	34.15211	7.326263	.2403332	6.936174	.1900876
1	-.083228	4.503344	3.150619	14.29459	158.7854	.5747023	62.98380
2	-.083228	4.519616	1.540407	13.77341	159.3832	.5747023	63.21742
3	-.342143	4.525040	2.876420	12.38358	159.4982	.5083171	63.14803
rrors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000
lem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
nits	ppb	ppb	ppb	ppb	ppm	ppm	ppm
vge	.7625146	3.130197	11.35836	12.47955	10.84719	1.702117	12.86347
Dev	.2451992	.185979	.21569	.19784	.01454	.017490	.03175
RSD	32.15666	5.941444	1.898923	1.585314	.1340606	1.027556	.2468383
1	1.027348	3.292533	11.60615	12.50576	10.83417	1.718334	12.82797
2	.5433803	3.170781	11.21271	12.66298	10.86288	1.704434	12.88915
3	.7168150	2.927278	11.25623	12.26992	10.84453	1.683584	12.87329
ors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000
lem	Mn2576	Mo2020	Na5889	Ni2316	Sb2068	Pb2203	Se1960
nits	ppb	ppb	ppm	ppb	ppb	ppb	ppb
vge	351.6617	1.974571	7.386883	11.53010	2.194893	8.091130	2.485021
Dev	.5097	1.195896	.022749	.34262	3.593296	.463940	1.322636
RSD	.1449376	60.56484	.3079628	2.971490	163.7116	5.733933	53.22435
1	351.1057	.7482762	7.361116	11.56262	5.953074	7.730927	1.570001
2	352.1067	2.037885	7.395342	11.85530	1.838573	7.927822	1.883560
3	351.7729	3.137552	7.404191	11.17239	-1.20697	8.614642	4.001502
rrors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000
lem	Sn1899	Tl1908	Ti3349	V_2924	Zn2138	2203/1	2203/2
nits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
vge	1.643047	-3.73135	39.70918	6.451205	108.3549	8.510275	7.881874
Dev	2.050575	2.64823	.21727	.130551	.5238	.863917	1.037744
RSD	124.8032	70.97240	.5471557	2.023674	.4833757	10.15146	13.16621
1	3.961298	-6.47268	39.46426	6.375967	108.6109	9.507807	6.843821
2	.0666193	-3.55409	39.87873	6.601953	108.7013	8.018623	7.882491
3	.9012235	-1.18726	39.78454	6.375695	107.7525	8.004395	8.919310
rrors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0

alysis Report   Sun 09-27-98 12:53:31 PM   page 1

[redacted]thod: 1EAC198   Sample Name: 1.0001.0001806A09   Operator:

n Time: 09/27/98 12:46:46

431

m[redacted]nt: ___

[redacted] CONC   Corr   Factor: 1

I[redacted]	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3179
ni[redacted]s	ppb	ppm	ppb	ppb	ppb	ppb	ppm
vge	-.428448	.3398064	-1.48417	23.73386	73.23844	.3534183	49.66174
Dev[redacted]	.215589	.0005219	1.71768	1.51785	.24369	.0383275	.31813
RS[redacted]	50.31872	.1535936	115.7329	6.395289	.3327368	10.84480	.6406007
1	-.497492	.3392038	.3697413	23.32849	72.97786	.3091615	49.31719
2[redacted]	-.601058	.3401078	-1.80067	25.41323	73.27676	.3755467	49.72367
3[redacted]	-.186794	.3401078	-3.02160	22.45985	73.46070	.3755467	49.94435
rr[redacted]rs	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
ig[redacted]	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

I[redacted]	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
nits	ppb	ppb	ppb	ppb	ppm	ppm	ppm
vge	1.038947	-.502064	.6564610	.4254832	.6604096	1.334930	8.274997
De[redacted]	.179493	.126723	.1533622	.0600419	.0060760	.006129	.037344
RS[redacted]	17.27641	25.24047	23.36197	14.11145	.9200290	.4591401	.4512925
1[redacted]	.8651761	-.603523	.8020313	.4778924	.6535221	1.341880	8.234585
2[redacted]	1.223661	-.360020	.6710083	.4385849	.6626962	1.330297	8.282172
3	1.028004	-.542648	.4963435	.3599723	.6650106	1.332613	8.308232
[redacted]rs	LC Pass	LC Pass	LC Pas-	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

I[redacted]	Mn2576	Mo2020	Na5889	Ni2316	Sb2068	Pb2203	Se1960
nits	ppb	ppb	ppm	ppb	ppb	ppb	ppb
v[redacted]	53.62367	-.248928	16.06010	2.587197	2.418095	.8677138	1.731099
De[redacted]	.19232	.741341	.00981	.168977	1.365108	1.332933	1.218760
RSD	.3586414	297.8139	.0610975	6.531275	56.45385	153.6144	70.40382
1[redacted]	53.51311	.1767911	16.05511	2.489638	1.555596	2.289931	1.636642
2[redacted]	53.51217	-1.10495	16.07141	2.489638	3.991969	.6661982	2.994339
3	53.84574	.1813764	16.05380	2.782315	1.706721	-.352988	.5623163
rr[redacted]rs	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
o[redacted]	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

Iem	Sn1899	Tl1908	Ti3349	V_2924	Zn2138	220371	220372
nits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
v[redacted]	1.429908	I -10.0853	3.323268	.6725942	14.02692	2.857850	-.125862
De[redacted]	2.555586	.5868	.010877	.1309610	.19883	2.135457	1.274028
RSD	177.3111	5.818497	.3273038	19.47103	1.417482	74.72250	1012.239
1[redacted]	4.165107	I -10.0862	3.310709	.7483556	13.96439	4.197729	1.337462
2	.9662968	-9.49811	3.329548	.5213736	14.24950	3.980596	-.988516
3[redacted]	-.841679	I -10.6717	3.329548	.7480535	13.86688	.3952255	-.726534
rrors	LC Pass	LC Low	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0

[redacted]

)alysis Report Sun 09-27-98 01:00:22 PM page 1

athod: IEACT98 Sample Name: 1.0001.000T1806A10 Operator:
un Time: 09/27/98 12:53:36
omment:

432

: CONC Corr Factor: 1

lem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3179
Inits	ppb	ppm	ppb	ppb	ppb	ppb	ppm
vge	-.376665	.1388236	-1.22707	20.66465	68.76259	.3423543	50.65644
DEV	.130318	.0006904	1.96245	.70212	.05786	.0331926	.28007
RSD	34.59772	.4973317	159.9294	3.397668	.0841466	9.695393	.5528910
1	-.393926	.1380703	-1.52291	21.41747	68.70128	.3091615	50.33672
2	-.497492	.1389743	-3.02480	20.02764	68.77025	.3423546	50.85844
3	-.238577	.1394263	.8665000	20.54883	68.81624	.3755467	50.77416
rrors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

lem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Inits	ppb	ppb	ppb	ppb	ppm	ppm	ppm
vge	.7592666	-.502064	.4581120	.2551537	.3459269	1.311378	8.374517
DEV	.3201603	.070293	.2001183	.1636469	.0063859	.008218	.028948
RSD	42.16705	14.00089	43.68326	64.13661	1.846030	.6266522	.3456713
1	1.120692	-.542648	.6764633	.1241311	.3470710	1.312922	8.341091
2	.6458693	-.420896	.2834432	.2027449	.3516634	1.318714	8.391512
3	.5112385	-.542648	.4144296	.4385849	.3390462	1.302497	8.390945
ors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

lem	Mn2576	Mo2020	Na5889	Ni2316	Sb2068	Pb2203	Se1960
Inits	ppb	ppb	ppm	ppb	ppb	ppb	ppb
vge	44.82368	.2430788	16.65931	1.286411	4.103921	.4180877	1.076859
DEV	.33410	.1030466	.05648	.406170	3.231934	.4843648	2.259146
RSD	.7455592	42.39225	.3390017	31.57392	78.75234	115.8525	209.7903
1	44.82435	.3620613	16.59571	1.611608	.4996728	.1134177	.8854015
2	45.15744	.1845699	16.70358	.8311358	5.067928	.1642313	3.425641
3	44.48925	.1826051	16.67865	1.416490	6.744163	.9766140	-1.08047
rrors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

lem	Sn1899	Tl1908	Ti3349	V_2924	Zn2138	2203/1	2203/2
Inits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
vge	.6955977	-6.60509	1.137853	.3029607	13.40597	.7214235	.2666471
DEV	1.158412	1.55288	.125442	.0001679	.14641	1.413955	1.260960
RSD	165.6595	23.51038	11.02440	.0554142	1.092118	195.9952	472.8571
1	1.669102	-8.36580	.9934147	.3029306	13.24590	2.354084	-1.00524
	.556137	-5.43086	1.219492	.3028099	13.43890	-.085662	.2889905
	.9738281	-6.01861	1.200652	.3031416	13.53311	-.104151	1.516186
rrors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0

[redacted]ethod: TEACT98   Sample Name: 1.0001.000T1806A14   Operator:
un Time: 09/27/98 13:00:27
omment:[redacted]
CONC   Corr. Factor: 1

433

I[redacted]	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3179
Un[redacted]s	ppb	ppm	ppb	ppb	ppb	ppb	ppm
vge	-.290360	32.94165	11.59636	17.88499	263.6383	2.632637	177.3811
SDe[redacted]	.089691	.13222	1.91573	1.47755	1.1049	.066385	1.1144
RS[redacted]	30.88945	.4013902	16.52013	8.261371	.4191024	2.521626	.6282363
1	-.238577	32.81073	13.18484	18.98527	262.5040	2.566251	176.1196
2[redacted]	-.238577	32.93910	12.13539	18.46409	263.6997	2.699022	177.7921
3[redacted]	-.393926	33.07514	9.468862	16.20561	264.7113	2.632637	178.2315
r[redacted]rs	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
i[redacted]g	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

I[redacted]	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Ini[redacted]s	ppb	ppb	ppb	ppb	ppm	ppm	ppm
vge	-.842761	34.25806	48.33302	80.32299	87.46512	10.63256	59.70433
SDe[redacted]	.216132	.33528	.13105	.27886	.51399	.04670	.27168
RS[redacted]	25.64566	.9786818	.2711384	.3471793	.5876518	.4392315	.4550413
1[redacted]	-.982267	34.09573	48.30744	80.07405	86.88427	10.62176	59.40370
2[redacted]	-.593798	34.03485	48.21664	80.27058	87.64995	10.59222	59.77704
3	-.952219	34.64361	48.47497	80.62434	87.86113	10.68372	59.93226
[redacted]rs	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

I[redacted]	Mn2576	Mo2020	Na5889	Ni2316	Sb2068	Pb2203	Se1960
Inits	ppb	ppb	ppm	ppb	ppb	ppb	ppb
v[redacted]	3075.322	.0751153	21.13053	79.39862	3.295223	54.96472	8.379297
SD[redacted]	14.832	.2136018	.07064	.50064	1.376669	.69492	1.522383
RSD	.4822998	284.3651	.3342991	.6305345	41.77771	1.264310	18.16839
1[redacted]	3059.069	.1977568	21.07383	78.97586	3.112169	54.63292	9.915970
2[redacted]	3078.773	.1991187	21.10810	79.26854	2.019240	54.49789	6.871618
3	3088.125	-.171530	21.20966	79.95145	4.754262	55.76335	8.350303
r[redacted]rs	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
o[redacted]	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

tem	Sn1899	Tl1908	Ti3349	V_2924	Zn2138	220371	220372
In[redacted]s	ppb	ppb	ppb	ppb	ppb	ppb	ppb
v[redacted]	4785825	1-17.2846	116.0794	42.83170	307.1933	42.92748	60.97433
De[redacted]	3.105838	1.7549	.2302	.33484	1.8692	1.58824	1.68637
RSD	648.9661	10.15293	.1983555	.7817500	.6084801	3.699817	2.765700
1[redacted]	-2.24653	1-15.7903	115.8784	42.46.06	305.0550	44.66453	59.60965
	3.860187	1-19.2171	116.0292	43.12915	308.2878	42.56836	60.45373
[redacted]	-.177912	1-16.8465	116.3306	42.89687	308.2571	41.54955	62.85961
rrors	LC Pass	LC Low	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
i[redacted]	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0

alysis Report   Sun 09-27-98 01:14:02 PM   page 1

thod: 1EACT98   Sample Name: 1.0001.000T1806A15   Operator:
in Time: 09/27/98 13:07:18
mment: 434
: CONC   Corr. Factor: 1

tem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3179
nits	ppb	ppm	ppb	ppb	ppb	ppb	ppm
vge	-.411187	4.227181	24.67973	48.75079	734.8365	.5968304	167.4804
Dev	.255439	.019686	2.08035	1.04719	3.2686	.0383270	.5595
RSD	62.12237	.4656961	8.429378	2.148040	.4448065	6.421753	.3340569
1	-.290360	4.205938	25.43912	49.73526	731.3186	.6410865	166.8631
2	-.238577	4.230797	22.32658	47.65051	735.4113	.5747023	167.6243
3	-.704624	4.244809	26.27370	48.86661	737.7795	.5747023	167.9539
rrors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

tem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
nits	ppb	ppb	ppb	ppb	ppm	ppm	ppm
vge	1.339421	4.915890	10.58017	17.78596	17.05137	3.803308	14.55870
Dev	.067860	.517743	.24861	.02269	.04167	.028450	.06271
RSD	5.066390	10.53204	2.349732	.1275871	.2444025	.7480278	.4307424
1	1.316739	5.301437	10.65352	17.81217	17.01306	3.798096	14.48676
2	1.415717	4.327423	10.78385	17.77286	17.04530	3.777825	14.58760
3	1.285807	5.118809	10.30314	17.77286	17.09575	3.834004	14.60176
ors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

tem	Mn2576	Mo2020	Na5889	Ni2316	Sb2068	Pb2203	Se1960
nits	ppb	ppb	ppm	ppb	ppb	ppb	ppb
vge	1522.765	.4580213	3.905045	13.67640	2.841328	10.57578	5.098228
Dev	5.044	.2838483	.024417	.39428	.548334	.66167	.038999
RSD	.3312189	61.97273	.6252795	2.882922	19.29852	6.256422	.7649432
1	1517.420	.3957922	3.877523	14.09915	2.233586	11.19150	5.053375
2	1523.432	.2104505	3.913503	13.31868	3.299009	10.65966	5.124126
3	1527.441	.7678212	3.924110	13.61136	2.991390	9.876173	5.117183
rrors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

tem	Sn1899	Tl1908	Ti3349	V_2924	Zn2138	2203/1	2203/2
nits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
vge	1.840526	I -12.3406	36.55037	5.456714	118.4466	8.428035	11.64804
Dev	.765461	1.4767	.23556	.130775	.7115	.682917	1.17242
RSD	41.58924	11.96597	.6444889	2.396590	.6006865	8.102926	10.06538
1	1.795021	I -12.1467	36.31801	5.533301	117.7189	7.743598	12.91287
2	1.098833	I -10.9704	36.54409	5.305713	118.4801	9.109423	11.43361
3	2.627724	I -13.9046	36.78901	5.531128	119.1407	8.431084	10.59764
rrors	LC Pass	LC Low	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	[illegible]	100000.0	100000.0	100000.0	100000.0

alysis Report   Sun 09-27-98 01:20:53 PM   page 1

th[redacted]d: TEACT98   **Sample Name: 1.0001.000T1806A16**   Operator:
n Time: 09/27/98 13:14:08
mm[redacted]nt: 435
[redacted] CONC   Corr. Factor: 1

Item	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3179
ni[redacted]s	ppb	ppm	ppb	ppb	ppb	ppb	ppm
vg[redacted]	.4518618	.0318538	10.41490	74.05727	413.4720	.3644826	170.1742
Dev	.1581994	.0011959	.39072	1.65726	.8788	.0507027	1.2240
RS[redacted]	35.01058	3.754177	3.751575	2.237814	.2125517	13.91087	.7192787
1	.5899496	.0332097	10.41681	74.23100	412.4603	.3091615	168.7963
2[redacted]	.2792520	.0314018	10.02323	75.62083	414.0468	.3755467	170.5908
3[redacted]	.4863837	.0309498	10.80467	72.31999	413.9088	.4087398	171.1356
rrors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
ig[redacted]	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000
Ite[redacted]	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
ni[redacted]s	ppb	ppb	ppb	ppb	ppm	ppm	ppm
vge	1.046329	.3704906	.9122175	.3730740	5.226905	2.915264	22.41414
De[redacted]	.186073	.1610624	.1817646	.1380409	.022165	.015544	.10538
RS[redacted]	17.78343	43.47274	19.92558	37.00093	.4240551	.5331974	.4701707
1	.9904484	.4313665	1.115956	.2420512	5.201624	2.903294	22.29290
2[redacted]	.8945999	.4922424	.8540081	.5171987	5.236089	2.932831	22.46569
3[redacted]	1.253940	.1878630	.7666879	.3599723	5.243002	2.909665	22.48382
[redacted]rs	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
ig[redacted]	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000
Ite[redacted]	Mn2576	Mo2020	Na5889	Ni2316	Sb2068	Pb2203	Se1960
nits	ppb	ppb	ppm	ppb	ppb	ppb	ppb
vge	2940.646	-.986311	6.647614	3.595306	2.260757	-.123796	1.401091
De[redacted]	15.033	1.246975	.024272	.149024	.837906	.970253	1.293691
RSD	.5112307	126.4282	.3651276	4.144958	37.06308	783.7523	92.33459
1[redacted]	2923.498	-.011305	6.620110	3.757905	1.399044	.9927281	2.738678
2[redacted]	2946.881	-2.39140	6.666032	3.465228	3.072632	-.762191	.1562915
3	2951.558	-.556226	6.656700	3.562787	2.310595	-.601925	1.308302
[redacted]rs	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000
Ite[redacted]	Sn1899	Tl1908	Ti3349	V_2924	Zn2138	220371	220372
nits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
vg[redacted]	2.067367	-13.8170	-.287691	-.127681	23.72055	2.017367	-1.19277
De[redacted]	1.750055	3.2555	.056519	.131276	.19114	1.732048	.59290
RSD	84.65043	23.56119	19.64587	102.8155	.8058149	85.85685	49.70764
1[redacted]	2.299481	-17.3238	-.344210	-.0514[illegible]	23.72232	3.999016	-.508162
2	3.689762	-13.2362	-.231171	-.052342	23.91050	.7924638	-1.53835
3	.2128583	-10.8911	-.287691	-.279265	23.52823	1.260623	-1.53180
[redacted]							
r[redacted]rs	LC Pass	LC Low	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0

[redacted]

nalysis Report   Sun 09-27-98 01:27:44 PM   page 1

ethod: IEACT98   Sample Name: 1.0001.000T1806A18   Operator:

un Time: 09/27/98 13:20:59   43C

omment:

: CONC   Corr. Factor: 1

lem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3179
nits	ppb	ppm	ppb	ppb	ppb	ppb	ppm
vge	-.117750	.0720805	.0403258	14.12087	282.6224	.4308675	43.39118
Dev	.181856	.0004520	1.974976	.30091	.1436	.0507023	.05079
RSD	154.4417	.6270675	4897.548	2.130937	.0508103	11.76750	.1170423
1	.0721203	.0720805	2.042132	14.46832	282.7833	.3755467	43.43443
2	-.290360	.0725325	-1.90668	13.94714	282.5764	.4419319	43.40386
3	-.135011	.0716285	-.014476	13.94714	282.5074	.4751240	43.33526
rrors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

lem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
nits	ppb	ppb	ppb	ppb	ppm	ppm	ppm
vge	.7180359	-.380312	.9256868	5.627076	7.346681	2.695955	5.598354
Dev	.1591023	.448723	.1653063	.157227	.011521	.019200	.004950
RSD	22.15799	117.9882	17.85769	2.794112	.1568256	.7121666	.0884146
1	.7461338	-.725275	.8529098	5.469849	7.345942	2.709276	5.602509
2	.5467565	-.542648	1.114895	5.784303	7.358554	2.673947	5.599676
3	.8612175	.1269871	.8092558	5.627076	7.335547	2.704643	5.592878
ors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

lem	Mn2576	Mo2020	Na5889	Ni2316	Sb2068	Pb2203	Se1960
nits	ppb	ppb	ppm	ppb	ppb	ppb	ppb
vge	412.2794	-.252966	29.45223	2.652236	3.507506	3.230345	-1.35735
Dev	.3857	.907104	.06067	.394280	2.590749	.640974	.58592
RSD	.0935564	358.5871	.2060055	14.86594	73.86298	19.84229	43.16656
1	412.7248	.1760279	29.48519	3.074992	5.436658	3.634651	-1.37361
2	412.0566	-1.29500	29.48929	2.294520	.5628398	3.565081	-.763474
3	412.0568	.3600694	29.38221	2.587197	4.523019	2.491302	-1.93498
rrors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000

lem	Sn1899	Tl1908	Ti3349	V_2924	Zn2138	2203/1	2203/2
nits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
vge	3.799253 I	-10.4693	.2775028	.4968121	124.7298	3.785678	2.954093
Dev	1.212534	4.7786	.1130387	.1306555	.0539	1.939669	.530161
RSD	31.91507	45.64443	40.73426	26.29877	.0431811	51.26411	17.94666
1	2.964828	-7.14274	.2775028	.5724118	124.7603	3.831185	3.536532
2	3.242793 I	-15.9452	.1644641	.5720802	124.7616	5.699156	2.499643
3	5.190139	-8.31994	.3905416	.3459443	124.6676	1.820692	2.826104
rrors	LC Pass	LC Low	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
igh	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0

n[redacted]ysis Report   Sun 09-27-98 01:34:34 PM   page 1

ethod: TEAC198   Sample Name: 1.0001.000T1806A19   Operator: 437
[redacted] Time: 09/27/98 13:27:49
[redacted]ent:
[redacted] : CONC   Corr. Factor: 1

-[redacted]m	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3179
[redacted]ts	ppb	ppm	ppb	ppb	ppb	ppb	ppm
Avge	-.514755	.4005231	-2.41036	21.24374	114.6401	.5193812	98.39613
SD[redacted]v	.209278	.0026484	2.20036	1.67538	.5978	.0191635	.42579
%[redacted]D	40.65606	.6612354	91.28754	7.886458	.5214593	3.689673	.4327320
#[redacted]	-.290360	.3975099	-2.24278	20.02764	114.0422	.5415092	97.93622
#[redacted]	-.704624	.4024817	-4.68972	20.54883	114.6401	.5083171	98.47558
#3	-.549275	.4015777	-.298584	23.15476	115.2378	.5083171	98.77661
-[redacted]ors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
Hi[redacted]h	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
ow	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000
-[redacted]m	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppm	ppm	ppm
A[redacted]e	1.102315	-.502064	.7421541	.9102662	.7112619	1.054810	27.23319
SD[redacted]v	.227627	.195689	.0252565	.1713341	.0049726	.005505	.10957
%RSD	20.64995	38.97685	3.403134	18.82242	.6991175	.5218501	.4023521
#[redacted]	1.259303	-.420896	.7567908	1.106800	.7135284	1.060409	27.11800
#[redacted]	.8412546	-.360020	.7129905	.7923462	.7146973	1.054617	27.24547
#3	1.206386	-.725275	.7566810	.8316525	.7055598	1.049405	27.33611
[redacted]ors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
[redacted]	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000
-[redacted]em	Mn2576	Mo2020	Na5889	Ni2316	Sb2068	Pb2203	Se1960
Units	ppb	ppb	ppm	ppb	ppb	ppb	ppb
A[redacted]e	31.41655	-.433600	11.07118	2.814835	3.431987	.5165742	.0000460
SD[redacted]v	.00219	.381644	.05891	.588057	3.257502	.8482781	.7091903
%RSD	.0069751	88.01762	.5321140	20.89137	94.91590	164.2122	1542221.
#[redacted]	31.41885	-.005917	11.00409	2.879874	4.142747	.0005414	.3517888
#2	31.41631	-.555420	11.09497	2.196961	-.122210	1.495603	-.816262
#[redacted]	31.41449	-.739462	11.11448	3.367669	6.275424	.0535786	.4646108
[redacted]ors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0
[redacted]	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000	-10.0000
-[redacted]em	Sn1899	Tl1908	Ti3349	V_2924	Zn2138	220371	220372
[redacted]ts	ppb	ppb	ppb	ppb	ppb	ppb	ppb
A[redacted]e	1.752778	-8.387641	3.216510	.1421955	73.60821	2.960987	-.703800
SDev	1.365005	2.11601	.580375	.1310387	.19755	.827689	.891650
%[redacted]D	77.87665	25.33861	18.04364	92.15389	.2683807	27.95312	126.6908
#[redacted]	3.528950	-8.28954	2.990432	.0665556	73.44881	2.751164	-1.37271
	.9646226	-11.2240	2.783195	.0665249	73.54660	3.873394	.3084892
#[redacted]	.9647619	-7.11592	3.875902	.2935059	73.82922	2.258404	-1.04718
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
Hi[redacted]h	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0	100000.0

END OF DATA PACKAGE

Analytical Assurance Associates, Inc.
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TAL METAL ANALYSES
QUALITY ASSURANCE DATA REVIEW

STEARNS & WHELER
SITE: FARWELL LANDFILL
CASE NO.: 7098-1806A/ SDG NO.: A1806

REPORTED BY:
ANALYTICAL ASSURANCE ASSOCIATES (A^3)
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REVIEWED BY:
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NOVEMBER 16, 1998

STEARNS & WHELER
SITE: FARWELL LANDFILL
CASE NO.:7098-1806A/ SDG NO. A1806

INTRODUCTION

This quality assurance review is based upon a review of all data generated from fourteen (14) water samples collected on 09-02,3,8,9-98. The samples were analyzed by Severn Trent Laboratories according to criteria set forth in SOW3,90 (ILM03.0) for total & dissolved metals.

The following samples are included in this report:

MW-16I	MW-18D	MW-19	MW-9D	SH-1
MW-15S	MW-18S	DW1A	MW-10S	MW-16S
MW-15I	DUP	MW-10D	FW1A*	

* The sample was not analyzed for dissolved analysis
The QA/QC samples (MS, MD and serial dilution) were analyzed on sample MW-15I.

All data have been validated with regard to usability according to the quality assurance set forth in NYSDEC ASP for Evaluating Inorganic analyses. If you have any questions or comments on this data review, please call Zohreh Hamid at (610) 269-9989.

QUALITY ASSURANCE REVIEW

The finding offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Times
- Calibrations & CRDL Analyses
- Blanks
- ICP Interference Check Sample
- Matrix Spike Analysis
- Matrix Duplicate Analysis
- Laboratory Control Sample Analysis
- ICP Serial Dilution Analysis
- Instrument Detection Limits
- Field Duplicate Results
- Sample Results

DATA COMPLETENESS

The data package completeness was satisfactory. Sample FW1A "09-dissolved" was not analyzed/reported with this data package. However, the raw data for mercury was found. The laboratory stated that this sample was not received by the laboratory.

HOLDING TIME

All samples were digested/analyzed within the NYSDEC requirement holding times.

CALIBRATIONS & CRDL Analyses

The recoveries for all analyses in the initial and continuing calibrations were within the control limits of 90-110% with the exception of CCV4 for Cd (89.4%). The data were not impacted since the deviation was marginal.

The CRDL sample analysis was performed prior and after all samples. The %recoveries were within the control limits of 80-120% with the exception of the following:

Analyte	% Recovery Initial/final	Associated sample
Tl	57.9/62.8	All Total Samples
Pb Tl Zn	-/129 74.6/63.8 171.4/290	All Dissolved l Samples except 07
Pb Tl Zn	-/126 78/- 190/175	None
Pb Tl Zn	-/131 47/58.8 135.7/139.7	07 Dissolved

The positive results up to 3x CRDLs for the CRDL exceeded 120% and positive results and non-detected values for CRDL below 80% were qualified estimated.

BLANKS

One preparation blank was reported for total and dissolved samples. However, two blanks were prepared along with the samples. This issue should be clarified by the laboratory. The laboratory preparation blank was free of target analytes.

ICP INTERFERENCE CHECK SAMPLE

The final recovery for nickel (77.1%) in one of four different ICS sample analyses were below the lower control limit of 80%. The data were not impacted since the initial ICS recovery was within the control limits.

MATRIX SPIKE/SPIKE DUPLICATE ANALYSIS

Matrix spike analysis was performed for both total and dissolved analyses. The recoveries were within the QC limits of 75-125%.

MATRIX DUPLICATE ANALYSIS

The matrix duplicate analysis was also performed for all analyses The RPDs for all compounds were within the analysis and validation control limits.

LABORATORY CONTROL SAMPLE

The recoveries for all analytes were within the control limits.

ICP SERIAL DILUTION

The %Ds for all ICP metals in total and dissolved samples were within the control limits.

INSTRUMENT DETECTION LIMITS

All analytes with the exception of mercury were analyzed with ICP. The reported IDLs were below the CRDL.

DUPLICATE ANALYSIS

Duplicate analysis was analyzed on samples MW-18S/Dup for total and dissolved sample analyses. The RPDs were within the control limits with the exception of Al (187%), Cr (200%) and Ca (185%) in dissolved sample analysis. The data were qualified estimated in these field duplicate samples.

SAMPLE RESULTS

The reported sample results were considered reliable. All analysis was performed at one-fold dilutions. The comparison of total and dissolved sample was considered satisfactory.

SUMMARY

The cooler temperature was within control limit of 2-6 °C. Samples were preserved at the pH< 2 unit. Overall, major problems were not encountered during the sample analyses. The minor issues have been discussed. The reported data were summarized on the data summary with the applied qualifier codes.

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2- butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICCATION.

CODES RELATING TO QUATITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED. THE REPORTED QUATITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ANALYTICAL ASSURANCE ASSOCIATES (A3)
TOTAL WATER METAL ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
SITE: FARWELL LANDFILL
STL ID: 7098-1806A
SDG NO.: A1806

CLIENT SAMPLE ID:		**MW-16I**	**MW-15S**	**MW-15I**	**MW-18D**	**MW-18S**	**DUP**	**MW-19**
LAB SAMPLE ID:		T981806A-01	T981806A-02	T981806A-03	T981806A-05	T981806A-06	T981806A-07	T981806A-08
TARGET COMPOUNDS:								
	IDL							
Aluminum	6.0	56.9	878	47.2	31800	7830	7670	4520
Antimony	5.0	5.5						
Arsenic	3.0	8.4			31.3	59.8	58.6	
Barium	1.0	1110	496	444	8490	537	550	159
Beryllium	1.0				2.9			
Cadmium	1.0	1.5	1.3	1.3		1.5	1.9	
Calcium	4.0	34200	53500	68800	77900	47000	45100	63100
Chromium	1.0		3.2		41.4	19.1	11.2	11.4
Cobalt	1.0				28.9	6.4	6.4	3.1
Copper	2.0		5.4		45.2	40.2	38.5	12.5
Iron	7.0	512	2400	260	68700	18600	18800	10800
Lead	2.0	UJ	3.0 J	UJ	11.1 J	26.7 J	25.9 J	8.1 J
Magnesium	5.0	7030	10800	16700	25400	7930	8010	12900
Manganese	1.0	180	274	92.3	674	849	863	352
Mercury	0.1				0.13			0.18
Nickel	5.0				62.1	17.5	17.8	11.5
Potassium	29.0	728	1090	844	19200	4060	2970	1700
Selenium	3.0				6.0			
Silver	1.0							
Sodium	15.0	9770	16400	13800	209000	54600	4420	7390
Thallium	6.0							
Vanadium	1.0		1.3		36.4	12.7	12.5	6.4
Zinc	1.0	17.3	42.8	17.0	240	258	180	108

ANALYTICAL ASSURANCE ASSOCIATES (A3)
TOTAL WATER METAL ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
SITE: FARWELL LANDFILL
STL ID: 7098-1806A
SDG NO.: A1806

CLIENT SAMPLE ID:		**FW1A**	**DW1A**	**MW-9D**	**MW-10S**	**MW-10D**	**SH-1**	**MW-16S**
LAB SAMPLE ID:		T981806A-09	T981806A-10	T981806A-14	T981806A-15	T981806A-16	T981806A-18	T981806A-19
TARGET COMPOUNDS:	IDL							
Aluminum	6.0	340	139	32900	4230	31.8	72.1	400
Antimony	5.0							
Arsenic	3.0			11.6	24.7	10.4		
Barium	1.0	73.2	68.8	264	735	413	283	115
Beryllium	1.0			2.6				
Cadmium	1.0	1.0			1.3	1.0		1.1
Calcium	4.0	49700	50600	177000	167000	170000	43400	98400
Chromium	1.0			48.3	10.6			
Cobalt	1.0			34.2	4.9			
Copper	2.0			80.3	17.8		5.6	
Iron	7.0	660	346	87500	17000	5230	7350	711
Lead	2.0	UJ	UJ	55.0 J	10.6 J	UJ	3.2 J	UJ
Magnesium	5.0	8270	8370	59700	14600	22400	5600	27200
Manganese	1.0	53.6	44.8	3080	1520	2940	412	31.4
Mercury	0.1							
Nickel	5.0			79.4	13.7			
Potassium	29.0	1330	1310	10600	3800	2920	2700	1050
Selenium	3.0			8.4	5.1			
Silver	1.0							
Sodium	15.0	16100	16600	21100	3900	6650	29400	11100
Thallium	6.0							
Vanadium	1.0			42.8	5.4			
Zinc	1.0	14.0	13.4	307	118	23.7	125	73.6

ANALYTICAL ASSURANCE ASSOCIATES (A3)
DISSOLVED WATER METAL ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
SITE: FARWELL LANDFILL
STL ID: 7098-1806A
SDG NO.: A1806

CLIENT SAMPLE ID:		MW-16I		MW-15S		MW-15I		MW-18D		MW-18S		DUP		MW-19	
LAB SAMPLE ID:		F981806A-01		F981806A-02		F981806A-03		F981806A-05		F981806A-06		F981806A-07		F981806A-08	
TARGET COMPOUNDS:	IDL														
Aluminum	6.0	14.8		15.4		20.0		55.8		18.9	J	578	J	30.0	
Antimony	5.0	5.1										7.4			
Arsenic	3.0	8.5								51.3		52.4			
Barium	1.0	1130		471		471		6660		427		406		105	
Beryllium	1.0														
Cadmium	1.0	1.0										1.2		1.2	
Calcium	4.0	32800		52200		68000		66000		27900		27800		49600	
Chromium	1.0										UJ	49.5	J		
Cobalt	1.0														
Copper	2.0											6.2			
Iron	7.0	377		519		246		259		150	J	3660	J	27.2	
Lead	2.0														
Magnesium	5.0	6730		10500		16400		14400		3400		3340		9690	
Manganese	1.0	163		165		97.4		202		329		331		55.8	
Mercury	0.1														
Nickel	5.0							5.8				12.8			
Potassium	29.0	638		758		881		16000		1610		1540		865	
Selenium	3.0														
Silver	1.0														
Sodium	15.0	7670		12300		14300		215000		4060		3950		6830	
Thallium	6.0		UJ		UJ		UJ		UJ		UJ		UJ		UJ
Vanadium	1.0														
Zinc	1.0	74.1		125		47.7	J	43.4	J	30.0	J	27.0	J	52.7	J

ANALYTICAL ASSURANCE ASSOCIATES (A3)
DISSOLVED WATER METAL ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
SITE: FARWELL LANDFILL
STL ID: 7098-1806A
SDG NO.: A1806

CLIENT SAMPLE ID:		**DW1A**	**MW-9D**	**MW-10S**	**MW-10D**	**SH-1**	**MW-16S**
LAB SAMPLE ID:		F981806A-10	F981806A-14	F981806A-15	F981806A-16	F981806A-18	F981806A-19
TARGET COMPOUNDS:							
	IDL						
Aluminum	6.0	128	13.4	10.5	13.6	19.1	15.1
Antimony	5.0			5.0	5.6		
Arsenic	3.0			19.7	6.7		
Barium	1.0	69.2	187	725	415	284	114
Beryllium	1.0						
Cadmium	1.0						1.3
Calcium	4.0	49300	129000	159000	170000	43100	99800
Chromium	1.0			2.5			
Cobalt	1.0		5.9	9.4	8.2		4.3
Copper	2.0				1.1		
Iron	7.0	288	3320	6550	4290	320	28.9
Lead	2.0						
Magnesium	5.0	8240	38700	11400	22800	5650	27700
Manganese	1.0	43.4	728	1410	2960	335	31.0
Mercury	0.1						
Nickel	5.0			5.6			
Potassium	29.0	1250	7900	3430	2970	2740	934
Selenium	3.0						
Silver	1.0						
Sodium	15.0	14400	16100	2040	5390	26900	8050
Thallium	6.0	UJ	UJ	UJ	UJ	UJ	UJ
Vanadium	1.0						
Zinc	1.0	21.5 J	43.6 J	42.1 J	23.1 J	45.2 J	31.6 J

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-16I

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 1806 SAS No.: ______ SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: T981806A-01

Level (low/med): LOW Date Received: 09/03/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	56.9	B		P
7440-36-0	Antimony	5.5	B		P
7440-38-2	Arsenic	8.4	B		P
7440-39-3	Barium	1110			P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.5	B		P
7440-70-2	Calcium	34200			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	1.0	U		P
7439-89-6	Iron	512.			P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	7030			P
7439-96-5	Manganese	180.			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	728.	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	9770			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	17.3	B		P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture: ______

Color After: COLORLESS Clarity After: CLEAR Artifacts: ______

Comments:

Total Metals

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-15S

Lab Name: STL Contract: ___

Lab Code: STL Case No.: 1806 SAS No.: ___ SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: T981806A-02

Level (low/med): LOW Date Received: 09/03/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	878.			P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	496.			P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.3	B		P
7440-70-2	Calcium	53500			P
7440-47-3	Chromium	3.2	B		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	5.4	B		P
7439-89-6	Iron	2400			P
7439-92-1	Lead	3.0			P
7439-95-4	Magnesium	10800			P
7439-96-5	Manganese	274.			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	1090	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	16400			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.3	B		P
7440-66-6	Zinc	42.8			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: ___

Comments:
Total Metals

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-15I

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806 SAS No.: SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: T981806A-03

Level (low/med): LOW Date Received: 09/03/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	47.2	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	444.			P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.3	B		P
7440-70-2	Calcium	68800			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	1.0	U		P
7439-89-6	Iron	260.			P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	16700			P
7439-96-5	Manganese	92.3			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	844.	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	13800			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	17.0	B		P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
Total Metals

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-18D

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806 SAS No.: SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: T981806A-05

Level (low/med): LOW Date Received: 09/04/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	31800			P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	31.3			P
7440-39-3	Barium	8490			P
7440-41-7	Beryllium	2.9	B		P
7440-43-9	Cadmium	1.0	U		P
7440-70-2	Calcium	77900			P
7440-47-3	Chromium	41.4			P
7440-48-4	Cobalt	28.9	B		P
7440-50-8	Copper	45.2			P
7439-89-6	Iron	68700			P
7439-92-1	Lead	11.1			P
7439-95-4	Magnesium	25400			P
7439-96-5	Manganese	674.			P
7439-97-6	Mercury	0.13	B		CV
7440-02-0	Nickel	62.1			P
7440-09-7	Potassium	19200			P
7782-49-2	Selenium	6.0			P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	209000			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	36.4	B		P
7440-66-6	Zinc	240.			P
57-12-5	Cyanide				NR

Color Before: GREY Clarity Before: OPAQUE Texture:

Color After: YELLOW Clarity After: OPAQUE Artifacts:

Comments:
Total Metals

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-18S

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 1806 SAS No.: ______ SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: T981806A-06

Level (low/med): LOW Date Received: 09/04/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7830			P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	59.8			P
7440-39-3	Barium	537.			P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.5	B		P
7440-70-2	Calcium	47000			P
7440-47-3	Chromium	19.1			P
7440-48-4	Cobalt	6.4	B		P
7440-50-8	Copper	40.2			P
7439-89-6	Iron	18600			P
7439-92-1	Lead	26.7			P
7439-95-4	Magnesium	7930			P
7439-96-5	Manganese	849.			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	17.5	B		P
7440-09-7	Potassium	4060	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	54600			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	12.7	B		P
7440-66-6	Zinc	258.			P
57-12-5	Cyanide				NR

Color Before: BROWN Clarity Before: OPAQUE Texture: ______

Color After: COLORLESS Clarity After: OPAQUE Artifacts: ______

Comments:
Total Metals

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

DUP

Lab Name: STL Contract: ____

Lab Code: STL Case No.: 1806 SAS No.: ____ SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: T981806A-07

Level (low/med): LOW Date Received: 09/04/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7670			P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	58.6			P
7440-39-3	Barium	550.			P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.9	B		P
7440-70-2	Calcium	45100			P
7440-47-3	Chromium	11.2			P
7440-48-4	Cobalt	6.4	B		P
7440-50-8	Copper	38.5			P
7439-89-6	Iron	18800			P
7439-92-1	Lead	25.9			P
7439-95-4	Magnesium	8010			P
7439-96-5	Manganese	863.			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	17.8	B		P
7440-09-7	Potassium	2970	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	4420	B		P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	12.5	B		P
7440-66-6	Zinc	180.			P
57-12-5	Cyanide				NR

Color Before: BROWN Clarity Before: OPAQUE Texture: ____

Color After: COLORLESS Clarity After: OPAQUE Artifacts: ____

Comments:

Total Metals

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-19

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806 SAS No.: SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: T981806A-08

Level (low/med): LOW Date Received: 09/04/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4520			P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	159.	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.0	U		P
7440-70-2	Calcium	63100			P
7440-47-3	Chromium	11.4			P
7440-48-4	Cobalt	3.1	B		P
7440-50-8	Copper	12.5	B		P
7439-89-6	Iron	10800			P
7439-92-1	Lead	8.1			P
7439-95-4	Magnesium	12900			P
7439-96-5	Manganese	352.			P
7439-97-6	Mercury	0.18	B		CV
7440-02-0	Nickel	11.5	B		P
7440-09-7	Potassium	1700	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	7390			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	6.4	B		P
7440-66-6	Zinc	108.			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
Total Metals

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U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

FW1A

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806 SAS No.: SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: T981806A-09

Level (low/med): LOW Date Received: 09/04/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	340.			P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	73.2	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.0	B		P
7440-70-2	Calcium	49700			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	1.0	U		P
7439-89-6	Iron	660.			P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	8270			P
7439-96-5	Manganese	53.6			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	1330	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	16100			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	14.0	B		P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

Total Metals

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

DW1A

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 1806 SAS No.: ______ SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: T981806A-10

Level (low/med): LOW Date Received: 09/04/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	139.	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	68.8	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.0	U		P
7440-70-2	Calcium	50600			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	1.0	U		P
7439-89-6	Iron	346.			P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	8370			P
7439-96-5	Manganese	44.8			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	1310	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	16600			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	13.4	B		P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture: ______

Color After: COLORLESS Clarity After: CLEAR Artifacts: ______

Comments:
Total Metals

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-9D

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806 SAS No.: SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: T981806A-14

Level (low/med): LOW Date Received: 09/09/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	32900			P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	11.6			P
7440-39-3	Barium	264.			P
7440-41-7	Beryllium	2.6	B		P
7440-43-9	Cadmium	1.0	U		P
7440-70-2	Calcium	177000			P
7440-47-3	Chromium	48.3			P
7440-48-4	Cobalt	34.2	B		P
7440-50-8	Copper	80.3			P
7439-89-6	Iron	87500			P
7439-92-1	Lead	55.0			P
7439-95-4	Magnesium	59700			P
7439-96-5	Manganese	3080			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	79.4			P
7440-09-7	Potassium	10600			P
7782-49-2	Selenium	8.4			P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	21100			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	42.8	B		P
7440-66-6	Zinc	307.			P
57-12-5	Cyanide				NR

Color Before: BROWN Clarity Before: OPAQUE Texture:

Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:
Total Metals

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-10S

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806 SAS No.: SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: T981806A-15

Level (low/med): LOW Date Received: 09/09/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4230			P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	24.7			P
7440-39-3	Barium	735.			P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.3	B		P
7440-70-2	Calcium	167000			P
7440-47-3	Chromium	10.6			P
7440-48-4	Cobalt	4.9	B		P
7440-50-8	Copper	17.8	B		P
7439-89-6	Iron	17000			P
7439-92-1	Lead	10.6			P
7439-95-4	Magnesium	14600			P
7439-96-5	Manganese	1520			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	13.7	B		P
7440-09-7	Potassium	3800	B		P
7782-49-2	Selenium	5.1			P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	3900	B		P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	5.4	B		P
7440-66-6	Zinc	118.			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
Total Metals

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-10D

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806 SAS No.: SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: T981806A-16

Level (low/med): LOW Date Received: 09/09/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	31.8	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	10.4			P
7440-39-3	Barium	413.			P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.0	B		P
7440-70-2	Calcium	170000			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	1.0	U		P
7439-89-6	Iron	5230			P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	22400			P
7439-96-5	Manganese	2940			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	2920	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	6650			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	23.7			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
Total Metals

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SH-1

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 1806 SAS No.: ______ SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: T981806A-18

Level (low/med): LOW Date Received: 09/10/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	72.1	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	283.			P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.0	U		P
7440-70-2	Calcium	43400			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	5.6	B		P
7439-89-6	Iron	7350			P
7439-92-1	Lead	3.2			P
7439-95-4	Magnesium	5600			P
7439-96-5	Manganese	412.			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	2700	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	29400			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	125.			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture: ______

Color After: COLORLESS Clarity After: CLEAR Artifacts: ______

Comments:

Total Metals

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-16S

Lab Name: STL Contract: ____

Lab Code: STL Case No.: 1806 SAS No.: ____ SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: T981806A-19

Level (low/med): LOW Date Received: 09/10/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	400.			P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	115.	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.1	B		P
7440-70-2	Calcium	98400			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	1.0	U		P
7439-89-6	Iron	711.			P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	27200			P
7439-96-5	Manganese	31.4			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	1050	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	11100			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	73.6			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture: ____

Color After: COLORLESS Clarity After: CLEAR Artifacts: ____

Comments:
Total Metals

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-16I

Lab Name: STL Contract: ______

ab Code: STL Case No.: 1806 SAS No.: ______ SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: F981806A-01

evel (low/med): LOW Date Received: 09/03/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	14.8	B		P
7440-36-0	Antimony	5.1	B		P
7440-38-2	Arsenic	8.5	B		P
7440-39-3	Barium	1130			P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.0	B		P
7440-70-2	Calcium	32800			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	1.0	U		P
7439-89-6	Iron	377.			P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	6730			P
7439-96-5	Manganese	163.			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	638.	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	7670			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	74.1			P
57-12-5	Cyanide				NR

olor Before: COLORLESS Clarity Before: CLEAR Texture: ______

olor After: COLORLESS Clarity After: CLEAR Artifacts: ______

Comments:
Filtered Metals

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-15S

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 1806 SAS No.: ______ SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: F981806A-02

Level (low/med): LOW Date Received: 09/03/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	15.4	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	471.			P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.0	U		P
7440-70-2	Calcium	52200			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	1.0	U		P
7439-89-6	Iron	519.			P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	10500			P
7439-96-5	Manganese	165.			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	758.	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	12300			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	125.			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture: ______

Color After: COLORLESS Clarity After: CLEAR Artifacts: ______

Comments:
Filtered Metals

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-15I

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806 SAS No.: SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: F981806A-03

Level (low/med): LOW Date Received: 09/03/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	20.0	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	471.			P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.0	U		P
7440-70-2	Calcium	68000			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	1.0	U		P
7439-89-6	Iron	246.			P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	16400			P
7439-96-5	Manganese	97.4			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	881.	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	14300			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	47.7			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
Filtered Metals

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-18D

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 1806 SAS No.: ______ SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: F981806A-05

Level (low/med): LOW Date Received: 09/04/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	55.8	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	6660			P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.0	U		P
7440-70-2	Calcium	66000			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	1.0	U		P
7439-89-6	Iron	259.			P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	14400			P
7439-96-5	Manganese	202.			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.8	B		P
7440-09-7	Potassium	16000			P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	215000			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	43.4			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture: ______

Color After: COLORLESS Clarity After: CLEAR Artifacts: ______

Comments:
Filtered Metals

FORM I - IN ILM03.0

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-18S

Lab Name: STL Contract: ____

Lab Code: STL Case No.: 1806 SAS No.: ____ SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: F981806A-06

Level (low/med): LOW Date Received: 09/04/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	18.9	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	51.3			P
7440-39-3	Barium	427.			P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.0	U		P
7440-70-2	Calcium	27900			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	1.0	U		P
7439-89-6	Iron	150.			P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	3400	B		P
7439-96-5	Manganese	329.			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	1610	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	4060	B		P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	30.0			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture: ____

Color After: COLORLESS Clarity After: CLEAR Artifacts: ____

Comments:
Filtered Metals

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

DUP

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806 SAS No.: SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: F981806A-07

Level (low/med): LOW Date Received: 09/04/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	578.			P
7440-36-0	Antimony	7.4	B		P
7440-38-2	Arsenic	52.4			P
7440-39-3	Barium	406.			P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.2	B		P
7440-70-2	Calcium	27800			P
7440-47-3	Chromium	49.5			P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	6.2	B		P
7439-89-6	Iron	3660			P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	3340	B		P
7439-96-5	Manganese	331.			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	12.8	B		P
7440-09-7	Potassium	1540	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	3950	B		P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	27.0			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
Filtered Metals

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-19

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 1806 SAS No.: ______ SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: F981806A-08

Level (low/med): LOW Date Received: 09/04/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	30.0	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	105.	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.2	B		P
7440-70-2	Calcium	49600			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	1.0	U		P
7439-89-6	Iron	27.2	B		P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	9690			P
7439-96-5	Manganese	55.8			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	865.	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	6830			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	52.7			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture: ______

Color After: COLORLESS Clarity After: CLEAR Artifacts: ______

Comments:
Filtered Metals

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

DW1A

Lab Name: STL   Contract:

Lab Code: STL   Case No.: 1806   SAS No.:   SDG No.: A1806

Matrix (soil/water): WATER   Lab Sample ID: F981806A-10

Level (low/med): LOW   Date Received: 09/04/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	128.	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	69.2	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.0	U		P
7440-70-2	Calcium	49300			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	1.0	U		P
7439-89-6	Iron	288.			P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	8240			P
7439-96-5	Manganese	43.4			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	1250	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	14400			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	21.5			P
57-12-5	Cyanide				NR

Color Before: COLORLESS   Clarity Before: CLEAR   Texture:

Color After: COLORLESS   Clarity After: CLEAR   Artifacts:

Comments:

Filtered Metals

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-9D

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 1806 SAS No.: ______ SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: F981806A-14

Level (low/med): LOW Date Received: 09/09/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	13.4	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	187.	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.0	U		P
7440-70-2	Calcium	129000			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	5.9	B		P
7440-50-8	Copper	1.0	U		P
7439-89-6	Iron	3320			P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	38700			P
7439-96-5	Manganese	728.			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	7900			P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	16100			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	43.6			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture: ______

Color After: COLORLESS Clarity After: CLEAR Artifacts: ______

Comments:

Filtered Metals

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-10S

Lab Name: STL   Contract:

Lab Code: STL   Case No.: 1806   SAS No.:   SDG No.: A1806

Matrix (soil/water): WATER   Lab Sample ID: F981806A-15

Level (low/med): LOW   Date Received: 09/09/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	10.5	B		P
7440-36-0	Antimony	5.0	B		P
7440-38-2	Arsenic	19.7			P
7440-39-3	Barium	725.			P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.0	U		P
7440-70-2	Calcium	159000			P
7440-47-3	Chromium	2.5	B		P
7440-48-4	Cobalt	9.4	B		P
7440-50-8	Copper	1.0	U		P
7439-89-6	Iron	6550			P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	11400			P
7439-96-5	Manganese	1410			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.6	B		P
7440-09-7	Potassium	3430	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	2040	B		P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	42.1			P
57-12-5	Cyanide				NR

Color Before: COLORLESS   Clarity Before: CLEAR   Texture:

Color After: COLORLESS   Clarity After: CLEAR   Artifacts:

Comments:
Filtered Metals

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-10D

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806 SAS No.: SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: F981806A-16

Level (low/med): LOW Date Received: 09/09/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	13.6	B		P
7440-36-0	Antimony	5.6	B		P
7440-38-2	Arsenic	6.7	B		P
7440-39-3	Barium	415.			P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.0	U		P
7440-70-2	Calcium	170000			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	8.2	B		P
7440-50-8	Copper	1.1	B		P
7439-89-6	Iron	4290			P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	22800			P
7439-96-5	Manganese	2960			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	2970	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	5390			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	23.1			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
Filtered Metals

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SH-1

Lab Name: STL Contract:

Lab Code: STL Case No.: 1806 SAS No.: SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: F981806A-18

Level (low/med): LOW Date Received: 09/10/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	19.1	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	284.			P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.0	U		P
7440-70-2	Calcium	43100			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	1.0	U		P
7439-89-6	Iron	320.			P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	5650			P
7439-96-5	Manganese	335.			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	2740	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	26900			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	45.2			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:
Filtered Metals

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1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MW-16S

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 1806 SAS No.: ______ SDG No.: A1806

Matrix (soil/water): WATER Lab Sample ID: F981806A-19

Level (low/med): LOW Date Received: 09/10/98

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	15.1	B		P
7440-36-0	Antimony	5.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	114.	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	1.3	B		P
7440-70-2	Calcium	99800			P
7440-47-3	Chromium	1.0	U		P
7440-48-4	Cobalt	4.3	B		P
7440-50-8	Copper	1.0	U		P
7439-89-6	Iron	28.9	B		P
7439-92-1	Lead	2.0	U		P
7439-95-4	Magnesium	27700			P
7439-96-5	Manganese	31.0			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.0	U		P
7440-09-7	Potassium	934.	B		P
7782-49-2	Selenium	3.0	U		P
7440-22-4	Silver	1.0	U		P
7440-23-5	Sodium	8050			P
7440-28-0	Thallium	6.0	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	31.6			P
57-12-5	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture: ______

Color After: COLORLESS Clarity After: CLEAR Artifacts: ______

Comments:

Filtered Metals

END OF DATA PACKAGE

Analytical Assurance Associates, Inc.
600 Rock Raymond Road
Downingtown, PA 19335
Phone: 610 - 269 - 9989
Fax: 610 - 269 - 9989

ORGANIC ANALYSES
QUALITY ASSURANCE DATA REVIEW

STEARNS & WHELER
SITE: FARWELL LANDFILL
CASE NO.: 7098-1806A/ SDG NO.: A1806

REPORTED BY:
ANALYTICAL ASSURANCE ASSOCIATES (A^3)
600 ROCK RAYMOND ROAD
DOWNINGTOWN, PA 19335

REVIEWED BY:
ZOHREH HAMID, Ph.D.
NOVEMBER 20, 1998

STEARNS & WHELER
SITE: FARWELL LANDFILL
CASE NO.: 7098-1806A/SDG NO.: A1806

INTRODUCTION

This quality assurance review is based upon a review of all data generated from eighteen (18) water samples including four trip blanks and one set of field duplicate samples collected on 09-2,3,8,9,-98. The samples received by Severn Trent Laboratories (STL) and analyzed according to criteria set forth in NYSDEC ASP, Method USEPA CLP protocols, OLM03.2 for the TCL Volatile target compounds.

The following samples are contained within this report:

MW-16I	MW-18S	TB090398	SH-1
MW-15S	DUP	MW-9D	MW-16S
MW-15I	MW-19	MW-10S	TB090998
TB090298	FW1A	MW-10D	
MW-18D	DW1A	TB090898	

Samples MW-15I was assigned as the QC (MS/MSD) samples.

All data have been validated with regard to usability according to the quality assurance set forth in NYSDEC ASP for Evaluating Organic analyses. If you have any questions or comments on this data review, please call Zohreh Hamid at (610) 269-9989.

QUALITY ASSURANCE REVIEW

The finding offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Times
- Calibrations
- Blanks
- Surrogate Recoveries
- Internal Standards Recovery
- Matrix Spike/Spike Duplicate/Blank Spike Analyses
- Instrument Performance
- Field Duplicate Results
- Sample Results

DATA COMPLETENES

The incorrect quantitation reports and chromatograms were included in the data package for the initial calibration analyzed on 09-04-98. The date on the chromatograms was listed as 09-03-98 and the file IDs for five point calibration standards did not match the file IDs reported on form V & VI. The laboratory has been contacted. The corresponding documents were re-submitted and included in appendix D of this data review package.

HOLDING TIME

All samples were analyzed within CLP method requirements.

CALIBRATIONS

All RRFs were with in the control limits in the initial and continuing calibrations. Also, %RSD in initial calibration dated 09-04-98 and all %Ds in continuing calibrations analyzed on 9-09 &13-98 were within the QC limits. The following %RSDs & %Ds were outside the control limits of 30% and 25% respectively.

Compound Name	IC 08-26-98	IC 09-11-98	CC 09-04-98	CC 09-14-98
Acetone	34.5	33	37.6	
2-Hexanone	34			
4-Methy-2-pentanone		53		35.5
Associated Samples: 981806A-	01-11	14,15	01-11	16-20

IC= Initial Calibration & CC= Continuing Calibration

The reported sample results and non-detected values were qualified estimated (J & UJ) for the aforementioned compounds in the corresponding samples.

BLANKS

The method blanks had acetone and 2-butanone at levels less than 2XCRQLs. The reported sample results were elevated to the corresponding CRQLs and were qualified "U" on the data summery for these compounds. The trip blanks had bromomethane, methylenechloride, acetone and 4-methl-2-pentanone at levels below the CRQLs. The reported sample results were qualified "U" in the data summary.

SURROGATE RECOVERIES

All samples and the corresponding QC samples were spiked with three surrogate compounds as required by the Method. The recoveries were within the control limits.

MATRIX SPIKE/SPIKE DUPLICATE ANALYSIS

Matrix spike/spike duplicate samples were analyzed on samples MW-15I. The recoveries and RPDs for all compounds were within the control limits.

INTERNAL STANDARD

All internal standard recoveries and retention times were within the control limits established by the laboratory.

DUPLICATE ANALYSIS

Duplicate analysis was performed on samples MW-18S/DUP-1. The positive target compounds were not detected at levels above the CRQL in these two samples.

SAMPLE RESULTS

All samples were analyzed at one-fold dilutions.

Up to two TICs (unknown siloxane, and halogenated methane) were reported in the samples.

SUMMARY

The cooler temperatures within the control limits of 2-6 °C. Samples were not preserved, however; the data were not impacted since all samples were analyzed within 5-days from VTSR. The sample results below the CRQLs were qualified estimated, due to the uncertainty near the detection limits. Overall, major problems were not encountered during the sample analyses. The minor issues have been discussed. The reported data were summarized on the data summary with the applied qualifier codes.

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2- butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICCATION.

CODES RELATING TO QUATITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED. THE REPORTED QUATITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ANALYTICAL ASSURANCE ASSOCIATES (A3)
VOLATILE WATER ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
SITE: FARWELL LANDFILL
STL ID: 7098-1806A
SDG NO.: A1806

CLIENT SAMPLE ID:		**MW-16I**	**MW-15S**	**MW-15I**	**TB 090298**	**MW-18D**	**MW-18S**	**DUP**
LAB SAMPLE ID:		981806A-01	981806A-02	981806A-03	981806A-04	981806A-05	981806A-06	981806A-07
DILUTION FACTOR:		**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**
TARGET COMPOUNDS:	CRQL							
Chloromethane	10							
Bromomethane	10	10 U	10 U	10 U	0.6 J	10 U	10 U	10 U
Vinyl Chloride	10							
Chloroethane	10	0.6 J		1 J				
Methylene Chloride	10				0.5 J		0.7 J	
Acetone	10	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	UJ	10 UJ
Carbon Disulfide	10							
1,1-Dichloroethene	10							
1,1-Dichloroethane	10	6 J	1 J	4 J				
1,2-Dichloroethene (total)	10			0.5 J				
Chloroform	10							
1,2-Dichloroethane	10							
2-Butanone	10		10 U	10 U		10 U		
1,1,1-Trichloroethane	10							
Carbon Tetrachloride	10							
Bromodichloromethane	10							
1,2-Dichloropropane	10							
cis-1,3-Dichloropropene	10							
Trichloroethene	10							
Dibromochloromethane	10							
1,1,2-Trichloroethane	10							
Benzene	10							
Trans-1,3-Dichloropropene	10							
Bromoform	10							
4-Methyl-2-pentanone	10	10 U			0.5 J	10 U		
2-Hexanone	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Tetrachloroethene	10							
1,1,2,2-Tetrachloroethane	10							
Toluene	10							
Chlorobenzene	10							
Ethylbenzene	10							
Styrene	10							
Xylene (total)	10							

ANALYTICAL ASSURANCE ASSOCIATES (A3)
VOLATILE WATER ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
SITE: FARWELL LANDFILL
STL ID: 7098-1806A
SDG NO.: A1806

CLIENT SAMPLE ID:		**MW-19**	**FW1A**	**DW1A**	**TB 090398**	**MW-9D**	**MW-10S**
LAB SAMPLE ID:		981806A-08	981806A-09	981806A-10	981806A-11	981806A-14	981806A-15
DILUTION FACTOR:		1.0	1.0	1.0	1.0	1.0	1.0
TARGET COMPOUNDS:							
	CRQL						
Chloromethane	10						
Bromomethane	10			10 U	10 U		
Vinyl Chloride	10	10 U				4 J	
Chloroethane	10	9 J				12	
Methylene Chloride	10	10 U					
Acetone	10	10 UJ	10 UJ	10 UJ	10 UJ	UJ	UJ
Carbon Disulfide	10						
1,1-Dichloroethene	10	0.7 J				2 J	
1,1-Dichloroethane	10	20				160	20
1,2-Dichloroethene (total)	10	3 J				11	
Chloroform	10						
1,2-Dichloroethane	10						
2-Butanone	10				10 U		
1,1,1-Trichloroethane	10	12				13	
Carbon Tetrachloride	10						
Bromodichloromethane	10						
1,2-Dichloropropane	10						
cis-1,3-Dichloropropene	10						
Trichloroethene	10	0.7 J				4 J	
Dibromochloromethane	10						
1,1,2-Trichloroethane	10						
Benzene	10						
Trans-1,3-Dichloropropene	10						
Bromoform	10						
4-Methyl-2-pentanone	10				2 J	UJ	UJ
2-Hexanone	10	UJ	UJ	UJ	UJ		
Tetrachloroethene	10						
1,1,2,2-Tetrachloroethane	10						
Toluene	10						
Chlorobenzene	10						
Ethylbenzene	10						
Styrene	10						
Xylene (total)	10						

ANALYTICAL ASSURANCE ASSOCIATES (A3)
VOLATILE WATER ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
SITE: FARWELL LANDFILL
STL ID: 7098-1806A
SDG NO.: A1806

CLIENT SAMPLE ID:		**MW-10D**	**TB 090898**	**SH-1**	**MW-16S**	**TB 090998**
LAB SAMPLE ID:		981806A-16	981806A-17	981806A-18	981806A-19	981806A-20
DILUTION FACTOR:		**1.0**	1.0	1.0	1.0	1.0
TARGET COMPOUNDS:						
	CRQL					
Chloromethane	10					
Bromomethane	10					
Vinyl Chloride	10	4 J				
Chloroethane	10	8 J			5 J	
Methylene Chloride	10					
Acetone	10	UJ				
Carbon Disulfide	10					
1,1-Dichloroethene	10					
1,1-Dichloroethane	10	50			48	
1,2-Dichloroethene (total)	10	3 J			9 J	
Chloroform	10					
1,2-Dichloroethane	10					
2-Butanone	10					
1,1,1-Trichloroethane	10				15	
Carbon Tetrachloride	10					
Bromodichloromethane	10					
1,2-Dichloropropane	10					
cis-1,3-Dichloropropene	10					
Trichloroethene	10				5 J	
Dibromochloromethane	10					
1,1,2-Trichloroethane	10					
Benzene	10					
Trans-1,3-Dichloropropene	10					
Bromoform	10					
4-Methyl-2-pentanone	10	UJ	UJ	UJ	UJ	UJ
2-Hexanone	10					
Tetrachloroethene	10					
1,1,2,2-Tetrachloroethane	10					
Toluene	10					
Chlorobenzene	10					
Ethylbenzene	10					
Styrene	10					
Xylene (total)	10					

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

MW-16I

Lab Name: STL/CT Contract: ______

Lab Code: IEACT Case No.: 1806A SAS No.: ______ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-01

Sample wt/vol: 5 (g/mL) ML Lab File ID: >K0471

Level: (low/med) LOW Date Received: 09/03/98

% Moisture: not dec. ______ Date Analyzed: 09/05/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	.6	J
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	.6	J
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	5	JB
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	6	J
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	1	J
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

MW-15S

Lab Name: STL/CT Contract: ______

Lab Code: IEACT Case No.: 1806A SAS No.: ______ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-02

Sample wt/vol: 5 (g/mL) ML Lab File ID: >K0472

Level: (low/med) LOW Date Received: 09/03/98

% Moisture: not dec. ______ Date Analyzed: 09/05/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	.6	J
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	4	JB
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	1	J
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	1	JB
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

MW-15I

Lab Name: STL/CT Contract: ______

Lab Code: IEACT Case No.: 1806A SAS No.: ______ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-03

Sample wt/vol: 5 (g/mL) ML Lab File ID: >K0473

Level: (low/med) LOW Date Received: 09/03/98

% Moisture: not dec. ______ Date Analyzed: 09/05/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	.6	J
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	1	J
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	4	JB
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	4	J
540-59-0	1,2-Dichloroethene (total)	.5	J
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	2	JB
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

TB 090298

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 1806A SAS No.: ______ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-04

Sample wt/vol: 5 (g/mL) ML Lab File ID: >K0467

Level: (low/med) LOW Date Received: 09/03/98

% Moisture: not dec. ______ Date Analyzed: 09/04/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ________(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	.6	J
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	.5	J
67-64-1	Acetone	4	JB
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	.5	J
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

MW-18D

Lab Name: STL/CT Contract: ______

Lab Code: IEACT Case No.: 1806A SAS No.: _____ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-05

Sample wt/vol: 5 (g/mL) ML Lab File ID: >K0474

Level: (low/med) LOW Date Received: 09/04/98

% Moisture: not dec. ______ Date Analyzed: 09/05/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _______ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	.6	J
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	4	JB
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	5	JB
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	.7	J
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

MW-18S

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 1806A SAS No.: ______ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-06

Sample wt/vol: 5 (g/mL) ML Lab File ID: >K0475

Level: (low/med) LOW Date Received: 09/04/98

% Moisture: not dec. ______ Date Analyzed: 09/05/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ________ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	.5	J
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	.7	J
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

DUP

Lab Name: STL/CT Contract: ______

Lab Code: IEACT Case No.: 1806A SAS No.: ______ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-07

Sample wt/vol: 5 (g/mL) ML Lab File ID: >K0476

Level: (low/med) LOW Date Received: 09/04/98

% Moisture: not dec. ______ Date Analyzed: 09/05/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	.6	J
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	5	JB
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

MW-19

Lab Name: STL/CT Contract: ______

Lab Code: IEACT Case No.: 1806A SAS No.: ______ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-08

Sample wt/vol: 5 (g/mL) ML Lab File ID: >K0477

Level: (low/med) LOW Date Received: 09/04/98

% Moisture: not dec. ______ Date Analyzed: 09/05/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______(uL) Soil Aliquot Volume: ______(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	.6	J
75-00-3	Chloroethane	9	J
75-09-2	Methylene Chloride	.7	J
67-64-1	Acetone	4	JB
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	.7	J
75-34-3	1,1-Dichloroethane	20	
540-59-0	1,2-Dichloroethene (total)	3	J
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	12	
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	.7	J
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

FW1A

Lab Name: STL/CT Contract: ______

Lab Code: IEACT Case No.: 1806A SAS No.: ______ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-09

Sample wt/vol: 5 (g/mL) ML Lab File ID: >K0478

Level: (low/med) LOW Date Received: 09/04/98

% Moisture: not dec. ______ Date Analyzed: 09/05/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	4	JB
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

DW1A

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 1806A SAS No.: ______ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-10

Sample wt/vol: 5 (g/mL) ML Lab File ID: >K0479

Level: (low/med) LOW Date Received: 09/04/98

% Moisture: not dec. ______ Date Analyzed: 09/05/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ________(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	.5	J
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	3	JB
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

TB 090398

Lab Name: STL/CT   Contract: ______

Lab Code: IEACT   Case No.: 1806A   SAS No.: ______   SDG No.: A1806

Matrix: (soil/water) WATER   Lab Sample ID: 981806A-11

Sample wt/vol: 5 (g/mL) ML   Lab File ID: >K0469

Level: (low/med) LOW   Date Received: 09/04/98

% Moisture: not dec. ______   Date Analyzed: 09/04/98

GC Column: 007-624   ID: 0.53 (mm)   Dilution Factor: 1.0

Soil Extract Volume: ______ (uL)   Soil Aliquot Volume: ______ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	.5	J
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	5	JB
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	1	JB
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	2	J
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

MW-9D

Lab Name: STL/CT Contract: ________

Lab Code: IEACT Case No.: 1806A SAS No.: _____ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-14

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0636

Level: (low/med) LOW Date Received: 09/09/98

% Moisture: not dec. ______ Date Analyzed: 09/13/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _______ (uL) Soil Aliquot Volume: ____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	4	J
75-00-3	Chloroethane	12	
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	2	J
75-34-3	1,1-Dichloroethane	160	
540-59-0	1,2-Dichloroethene (total)	11	
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	13	
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	4	J
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

MW-10S

Lab Name: STL/CT   Contract: ____________

Lab Code: IEACT   Case No.: 1806A   SAS No.: _____   SDG No.: A1806

Matrix: (soil/water) WATER   Lab Sample ID: 981806A-15

Sample wt/vol: 5 (g/mL) ML   Lab File ID: >L0637

Level: (low/med) LOW   Date Received: 09/09/98

% Moisture: not dec. ______   Date Analyzed: 09/14/98

GC Column: 007-624   ID: 0.53 (mm)   Dilution Factor: 1.0

Soil Extract Volume: _______(uL)   Soil Aliquot Volume: ____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	20	
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

MW-10D

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 1806A SAS No.: ______ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-16

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0655

Level: (low/med) LOW Date Received: 09/09/98

% Moisture: not dec. ______ Date Analyzed: 09/14/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _______ (uL) Soil Aliquot Volume: ____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	4	J
75-00-3	Chloroethane	8	J
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	50	
540-59-0	1,2-Dichloroethene (total)	3	J
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

NYSDEC SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

TB 090898

Lab Name: STL/CT Contract: ______

Lab Code: IEACT Case No.: 1806A SAS No.: _____ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-17

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0656

Level: (low/med) LOW Date Received: 09/09/98

% Moisture: not dec. ______ Date Analyzed: 09/14/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

SH-1

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 1806A SAS No.: _____ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-18

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0657

Level: (low/med) LOW Date Received: 09/10/98

% Moisture: not dec. ______ Date Analyzed: 09/14/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _______ (uL) Soil Aliquot Volume: ____ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

MW-16S

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 1806A SAS No.: _____ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-19

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0660

Level: (low/med) LOW Date Received: 09/10/98

% Moisture: not dec. ______ Date Analyzed: 09/14/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _______ (uL) Soil Aliquot Volume: ____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	5	J
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	48	
540-59-0	1,2-Dichloroethene (total)	9	J
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	15	
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	5	J
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

TB 090998

Lab Name: STL/CT Contract: ________

Lab Code: IEACT Case No.: 1806A SAS No.: _____ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-20

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0661

Level: (low/med) LOW Date Received: 09/10/98

% Moisture: not dec. ______ Date Analyzed: 09/14/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _______ (uL) Soil Aliquot Volume: ____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

NYSDEC SAMPLE NO.

MW-16I

Lab Name: STL/CT   Contract: ______

Lab Code: IEACT   Case No.: 1806A   SAS No.: ______   SDG No.: A1806

Matrix: (soil/water) WATER   Lab Sample ID: 981806A-01

Sample wt/vol: 5 (g/mL) ML   Lab File ID: >K0471

Level: (low/med) LOW   Date Received: 09/03/98

% Moisture: not dec. ______   Date Analyzed: 09/05/98

GC Column: 007-624   ID: 0.53 (mm)   Dilution Factor: 1.0

Soil Extract Volume: ______ (uL)   Soil Aliquot Volume: ______ (uL)

Number TICs Found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.				
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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

NYSDEC SAMPLE NO.

MW-15S

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 1806A SAS No.: _____ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-02

Sample wt/vol: 5 (g/mL) ML Lab File ID: >K0472

Level: (low/med) LOW Date Received: 09/03/98

% Moisture: not dec. ______ Date Analyzed: 09/05/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ________(uL) Soil Aliquot Volume: ____(uL)

Number TICs Found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.				
02.				
03.				
04.				
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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

NYSDEC SAMPLE NO.

MW-15I

Lab Name: STL/CT   Contract: ____________

Lab Code: IEACT   Case No.: 1806A   SAS No.: _____   SDG No.: A1806

Matrix: (soil/water) WATER   Lab Sample ID: 981806A-03

Sample wt/vol: 5 (g/mL) ML   Lab File ID: >K0473

Level: (low/med) LOW   Date Received: 09/03/98

% Moisture: not dec. ______   Date Analyzed: 09/05/98

GC Column: 007-624 ID: 0.53 (mm)   Dilution Factor: 1.0

Soil Extract Volume: _______(uL)   Soil Aliquot Volume: ____(uL)

Number TICs Found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.				
02.				
03.				
04.				
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06.				
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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

NYSDEC SAMPLE NO.

TB 090298

Lab Name: STL/CT   Contract: ______

Lab Code: IEACT   Case No.: 1806A   SAS No.: ______   SDG No.: A1806

Matrix: (soil/water) WATER   Lab Sample ID: 981806A-04

Sample wt/vol: 5 (g/mL) ML   Lab File ID: >K0467

Level: (low/med) LOW   Date Received: 09/03/98

% Moisture: not dec. ______   Date Analyzed: 09/04/98

GC Column: 007-624   ID: 0.53 (mm)   Dilution Factor: 1.0

Soil Extract Volume: ______ (uL)   Soil Aliquot Volume: ______ (uL)

Number TICs Found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.				
02.				
03.				
04.				
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VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

NYSDEC SAMPLE NO.

MW-18D

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 1806A SAS No.: _____ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-05

Sample wt/vol: 5 (g/mL) ML Lab File ID: >K0474

Level: (low/med) LOW Date Received: 09/04/98

% Moisture: not dec. _______ Date Analyzed: 09/05/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _______ (uL) Soil Aliquot Volume: _____ (uL)

Number TICs Found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.				
02.				
03.				
04.				
05.				
06.				
07.				
08.				
09.				
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11.				
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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

NYSDEC SAMPLE NO.

MW-18S

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 1806A SAS No.: _____ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-06

Sample wt/vol: 5 (g/mL) ML Lab File ID: >K0475

Level: (low/med) LOW Date Received: 09/04/98

% Moisture: not dec. ______ Date Analyzed: 09/05/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _______(uL) Soil Aliquot Volume: ____(uL)

CONCENTRATION UNITS:
Number TICs Found: 0 (ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.				
02.				
03.				
04.				
05.				
06.				
07.				
08.				
09.				
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VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

NYSDEC SAMPLE NO.

DUP

Lab Name: STL/CT Contract: ______

Lab Code: IEACT Case No.: 1806A SAS No.: ______ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-07

Sample wt/vol: 5 (g/mL) ML Lab File ID: >K0476

Level: (low/med) LOW Date Received: 09/04/98

% Moisture: not dec. ______ Date Analyzed: 09/05/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______(uL) Soil Aliquot Volume: ______(uL)

Number TICs Found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.				
02.				
03.				
04.				
05.				
06.				
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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

NYSDEC SAMPLE NO.

MW-19

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 1806A SAS No.: _____ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-08

Sample wt/vol: 5 (g/mL) ML Lab File ID: >K0477

Level: (low/med) LOW Date Received: 09/04/98

% Moisture: not dec. ______ Date Analyzed: 09/05/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _______ (uL) Soil Aliquot Volume: ____ (uL)

Number TICs Found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.75-43-4	METHANE, DICHLOROFLUORO-	5.39	5	JN
02.				
03.				
04.				
05.				
06.				
07.				
08.				
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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

NYSDEC SAMPLE NO.

FW1A

Lab Name: STL/CT   Contract: ____

Lab Code: IEACT   Case No.: 1806A   SAS No.: ____   SDG No.: A1806

Matrix: (soil/water) WATER   Lab Sample ID: 981806A-09

Sample wt/vol: 5 (g/mL) ML   Lab File ID: >K0478

Level: (low/med) LOW   Date Received: 09/04/98

% Moisture: not dec. ____   Date Analyzed: 09/05/98

GC Column: 007-624 ID: 0.53 (mm)   Dilution Factor: 1.0

Soil Extract Volume: ____ (uL)   Soil Aliquot Volume: ____ (uL)

Number TICs Found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.556-67-2	CYCLOTETRASILOXANE, OCTAMETH	20.44	8	JN
02.				
03.				
04.				
05.				
06.				
07.				
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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

NYSDEC SAMPLE NO.

DW1A

Lab Name: STL/CT Contract: ______

Lab Code: IEACT Case No.: 1806A SAS No.: ______ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-10

Sample wt/vol: 5 (g/mL) ML Lab File ID: >K0479

Level: (low/med) LOW Date Received: 09/04/98

% Moisture: not dec. ______ Date Analyzed: 09/05/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______(uL) Soil Aliquot Volume: ______(uL)

Number TICs Found: 2

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.556-67-2	CYCLOTETRASILOXANE, OCTAMETH	20.44	18	JN
02.	UNKNOWN SILOXANE	22.49	6	J
03.				
04.				
05.				
06.				
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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

NYSDEC SAMPLE NO.

TB 090398

Lab Name: STL/CT   Contract: ________

Lab Code: IEACT   Case No.: 1806A   SAS No.: ____   SDG No.: A1806

Matrix: (soil/water) WATER   Lab Sample ID: 981806A-11

Sample wt/vol: 5 (g/mL) ML   Lab File ID: >K0469

Level: (low/med) LOW   Date Received: 09/04/98

% Moisture: not dec. ______   Date Analyzed: 09/04/98

GC Column: 007-624 ID: 0.53 (mm)   Dilution Factor: 1.0

Soil Extract Volume: ______ (uL)   Soil Aliquot Volume: ____ (uL)

Number TICs Found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.				
02.				
03.				
04.				
05.				
06.				
07.				
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09.				
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VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

NYSDEC SAMPLE NO.

MW-9D

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 1806A SAS No.: _____ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-14

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0636

Level: (low/med) LOW Date Received: 09/09/98

% Moisture: not dec. ______ Date Analyzed: 09/13/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _______ (uL) Soil Aliquot Volume: ____ (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs Found: 1

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01. 75-43-4	METHANE, DICHLOROFLUORO-	4.68	7	JN
02.				
03.				
04.				
05.				
06.				
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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

NYSDEC SAMPLE NO.

MW-10S

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 1806A SAS No.: ______ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-15

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0637

Level: (low/med) LOW Date Received: 09/09/98

% Moisture: not dec. ______ Date Analyzed: 09/14/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _______ (uL) Soil Aliquot Volume: _____ (uL)

Number TICs Found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.75-45-6	METHANE, CHLORODIFLUORO-	3.37	5	JN
02.				
03.				
04.				
05.				
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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

NYSDEC SAMPLE NO.

MW-10D

Lab Name: STL/CT Contract: ______

Lab Code: IEACT Case No.: 1806A SAS No.: ______ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-16

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0655

Level: (low/med) LOW Date Received: 09/09/98

% Moisture: not dec. ______ Date Analyzed: 09/14/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

Number TICs Found: 2

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01. 75-45-6	METHANE, CHLORODIFLUORO-	3.34	15	JN
02. 75-43-4	METHANE, DICHLOROFLUORO-	4.69	10	JN
03.				
04.				
05.				
06.				
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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

NYSDEC SAMPLE NO.

TB 090898

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 1806A SAS No.: _____ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-17

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0656

Level: (low/med) LOW Date Received: 09/09/98

% Moisture: not dec. ______ Date Analyzed: 09/14/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _______ (uL) Soil Aliquot Volume: ____ (uL)

Number TICs Found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.				
02.				
03.				
04.				
05.				
06.				
07.				
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09.				
10.				
11.				
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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

NYSDEC SAMPLE NO.

SH-1

Lab Name: STL/CT Contract: ________

Lab Code: IEACT Case No.: 1806A SAS No.: ______ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-18

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0657

Level: (low/med) LOW Date Received: 09/10/98

% Moisture: not dec. ______ Date Analyzed: 09/14/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ________(uL) Soil Aliquot Volume: _____(uL)

CONCENTRATION UNITS:
Number TICs Found: 0 (ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.				
02.				
03.				
04.				
05.				
06.				
07.				
08.				
09.				
10.				
11.				
12.				
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30.				

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

NYSDEC SAMPLE NO.

MW-16S

Lab Name: STL/CT Contract: ________

Lab Code: IEACT Case No.: 1806A SAS No.: ______ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-19

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0660

Level: (low/med) LOW Date Received: 09/10/98

% Moisture: not dec. ______ Date Analyzed: 09/14/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ________(uL) Soil Aliquot Volume: ____(uL)

Number TICs Found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.				
02.				
03.				
04.				
05.				
06.				
07.				
08.				
09.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30.				

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

NYSDEC SAMPLE NO.

TB 090998

Lab Name: STL/CT Contract: ________

Lab Code: IEACT Case No.: 1806A SAS No.: _____ SDG No.: A1806

Matrix: (soil/water) WATER Lab Sample ID: 981806A-20

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L0661

Level: (low/med) LOW Date Received: 09/10/98

% Moisture: not dec. ______ Date Analyzed: 09/14/98

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _______(uL) Soil Aliquot Volume: ____(uL)

Number TICs Found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
01.				
02.				
03.				
04.				
05.				
06.				
07.				
08.				
09.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30.				

AEN

CORRECTIVE ACTION FORM

Client Inquiry____

A. Originator Information

Client: Adams & Whelen
Date/time: 11/18/98 8:30
Client/Lab Contact: D. Plunkett

Job/Case: 7098-1806A
Sample Number(s): NA
Date/Time Response Due: ASAP

Detailed Description of Potential Problem: The chromatogram & quant report for VOA initial cal. on 9/4/98 doesn't match the form 6

L0553 - L0554 - 55 - 56 - 58

B. Quality Assurance Information

Corrective Action ID# 7453

Recommended Corrective Action: (Replaces pgs 223 - 237)

Groups Involved:

_Sample Control
_Gas Chromatography
_Client Service
_ Wet Chemistry
X Mass Spectrometry
_ Sample Preparation
_ Metals
_ Report Generation
_Systems

C. Final Resolution

Describe What Happened and Long Term Corrective Action Taken:

Replaced Quant reports.

Supervisor Signature: ____ Date____ Date/Time Client Notified:____

D. Quality Assurance Final Approval (QA Manager use only)

Corrective Action Approved: ____
Date Finalized: ____

AEN Doc # QAF00201 CT

Data File : L:\HPCHEM\MSL\L0553.D Vial: 4
Acq On : 4 Sep 98 18:36 hrs Operator: L.Decker
Sample : VSTD020 Inst : HP5971:L
Misc : VSTD020 ; 8260B ; 1 ; LLW ; L0043 Multiplr: 1.00
Quant Time: Sep 4 20:10 1998

Method : C:\HPCHEM\1\METHODS\L8260BW.M
Title : CLP Purgeables Calibration
Last Update : Fri Nov 06 23:30:14 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
1) Bromochloromethane	8.44	128	1050064	50.00 ug/kg		0.05
33) 1,4-Difluorobenzene	9.92	114	5816055	50.00 ug/kg		0.03
53) Chlorobenzene-d5	14.44	117	4658283	50.00 ug/kg		0.02
System Monitoring Compounds						%Recovery
32) 1,2-Dichloroethane-d4	9.33	65	779740	22.51 ug/kg		45.01%
60) Toluene-d8	12.08	98	1940094	21.05 ug/kg		42.11%
73) Bromofluorobenzene	16.09	95	1279965	17.83 ug/kg		35.67%
Target Compounds						Qvalue
2) Dichlorodifluoromethane	3.33	85	948616	24.84 ug/l		99
3) Chloromethane	3.66	50	964282	28.06 ug/l		100
4) Bromomethane	4.31	94	761247	28.03 ug/l		99
5) Vinyl Chloride	3.81	62	924325	28.40 ug/l		100
6) Chloroethane	4.44	64	661010	31.16 ug/l		100
7) Ethyl Ether	5.11	43	127070	32.77 ug/l	#	86
8) Methylene Chloride	6.13	84	819656	25.68 ug/l		89
9) Ethyl Acetate	6.42	43	445638	33.16 ug/l	#	36
10) Acetone	5.59	43	181666	24.84 ug/l		100
11) 1,1,2-Trichlorotrifluoroet	5.35	101	1533337	24.85 ug/l		100
12) Acrolein	6.42	56	109320	35.04 ug/l		100
13) Iodomethane	5.70	142	1237106	19.53 ug/l		98
14) Tert-Butyl-Methylether	6.42	73	2215349	31.84 ug/l		98
15) Carbon Disulfide	5.75	76	2527455	26.61 ug/l		100
16) Acrylonitrile	7.22	53	1522778	30.83 ug/l		100
17) 1,1-Dichloroethene	5.44	96	753681	25.99 ug/l		100
18) Trichlorofluoromethane	4.74	101	1391742	25.09 ug/l		99
19) 3-Chloro-1-Propene	8.01	41	859725	24.11 ug/l		97
20) 1,1-Dichloroethane	7.14	63	1877179	29.15 ug/l		98
21) 1,2-Dichloroethene (total)	6.43	96	882974	26.00 ug/l		99
22) 1,2-Dichloroethene (total)	8.05	96	820063	22.42 ug/l		100
23) 2,2-Dichloropropane	8.01	77	1339002	23.73 ug/l		100
24) 2-Methyl-2-Propenenitrile	8.49	41	647749	31.35 ug/l		97
25) Chloroform	8.49	83	1700919	24.66 ug/l		99
26) Tetrahydrofuran	8.48	42	314915	31.97 ug/l	#	82
27) 1,1-Dichloropropene	8.99	75	1441061	26.47 ug/l		98
28) 1,2-Dichloroethane	9.45	62	1116043	27.51 ug/l		99
29) 2-Butanone	8.12	43	421997	28.51 ug/l		100
30) Chloropicrin	8.96	117	1134808	23.65 ug/l		99
31) Dibromomethane	10.88	93	726342	21.61 ug/l		91
34) 2-Chloro-1,3-Butadiene	7.22	53	1522778	27.30 ug/l		96
35) 1,1,1-Trichloroethane	8.77	97	1379623	21.90 ug/l		99
36) Carbon Tetrachloride	8.96	117	1134808	20.94 ug/l		98
37) Vinyl Acetate	7.15	43	2005053	29.32 ug/l		100

(#)=qualifier out of range (m)=manual integration (E)=exceeded max. cal.

Data File : L:\HPCHEM\MSL\L0553.D Vial: 4
Acq On : 4 Sep 98 18:36 hrs Operator: L.Decker
Sample : VSTD020 Inst : HP5971:L
Misc : VSTD020 ; 8260B ; 1 ; LLW ; L0043 Multiplr: 1.00
Quant Time: Sep 4 20:10 1998

Method : C:\HPCHEM\1\METHODS\L8260BW.M
Title : CLP Purgeables Calibration
Last Update : Fri Nov 06 23:30:14 1998
Response via : Multiple Level Calibration

	Compound	R.T.	QIon	Response	Conc	Unit		Qvalue
38)	Bromodichloromethane	11.08	83	1746050	20.18	ug/l		100
39)	1,2-Dichloropropane	10.71	63	1335153	24.04	ug/l		96
40)	cis-1,3-Dichloropropene	11.75	75	1816455	23.38	ug/l		99
41)	Trichloroethene	10.28	130	936975	21.30	ug/l		99
42)	1,3-Dichloropropane	13.16	76	1710838	23.41	ug/l		95
43)	Methylmethacrylate	12.61	41	1150265	27.70	ug/l		94
44)	Dibromochloromethane	13.48	129	1074282	18.14	ug/l		100
45)	2-Nitropropane	9.20	43	82125	20.88	ug/l		89
46)	1,1,2-Trichloroethane	12.88	97	859476	21.52	ug/l		100
47)	Benzene	9.32	78	3209561	25.78	ug/l		100
48)	trans-1,3-Dichloropropene	11.75	75	1816455	23.38	ug/l		100
49)	Bromoform	15.71	173	593460	17.16	ug/l		100
50)	1,2-Dibromoethane	13.72	107	1066470	19.33	ug/l		95
51)	2-Chloroethylvinylether	11.51	63	783054	25.12	ug/l		99
52)	1,1,1,2-Tetrachloroethane	14.63	131	819209	19.81	ug/l		100
54)	4-Methyl-2-Pentanone	11.98	43	1122243	26.71	ug/l		100
55)	2-Hexanone	13.23	43	775025	27.07	ug/l		100
56)	Tetrachloroethene	12.95	164	786392	19.42	ug/l		95
57)	1,1,2,2-Tetrachloroethane	16.28	83	1273060	20.33	ug/l		100
58)	Ethyl Methacrylate	12.61	69	1447021	26.11	ug/l		95
59)	Toluene	12.18	91	2924158	25.44	ug/l		100
61)	Chlorobenzene	14.50	112	1982976	22.19	ug/l		95
62)	Ethylbenzene	14.60	106	1008426	24.64	ug/l		92
63)	Styrene	15.41	104	2259580	25.20	ug/l		100
64)	Xylene (total)mp	14.79	106	2741378	57.04	ug/l		100
65)	Xylene (total)o	15.37	106	1294604	24.44	ug/l		100
66)	1,2,3-Trichloropropane	16.37	75	1433060	22.37	ug/l		98
67)	1,4-Dichloro-2-Butene	16.01	53	396725	23.52	ug/l	#	1
68)	1,2-Dibromo-3-chloropropan	18.68	75	332656	19.66	ug/l	m	0
69)	1,3-Dichlorobenzene	17.33	146	1274807	20.72	ug/l	m	0
70)	1,4-Dichlorobenzene	17.41	146	1495060	22.60	ug/l		100
71)	1,2-Dichlorobenzene	17.83	146	1285848	21.16	ug/l		100
72)	Pentachloroethane	16.98	167	323816	17.29	ug/l		92

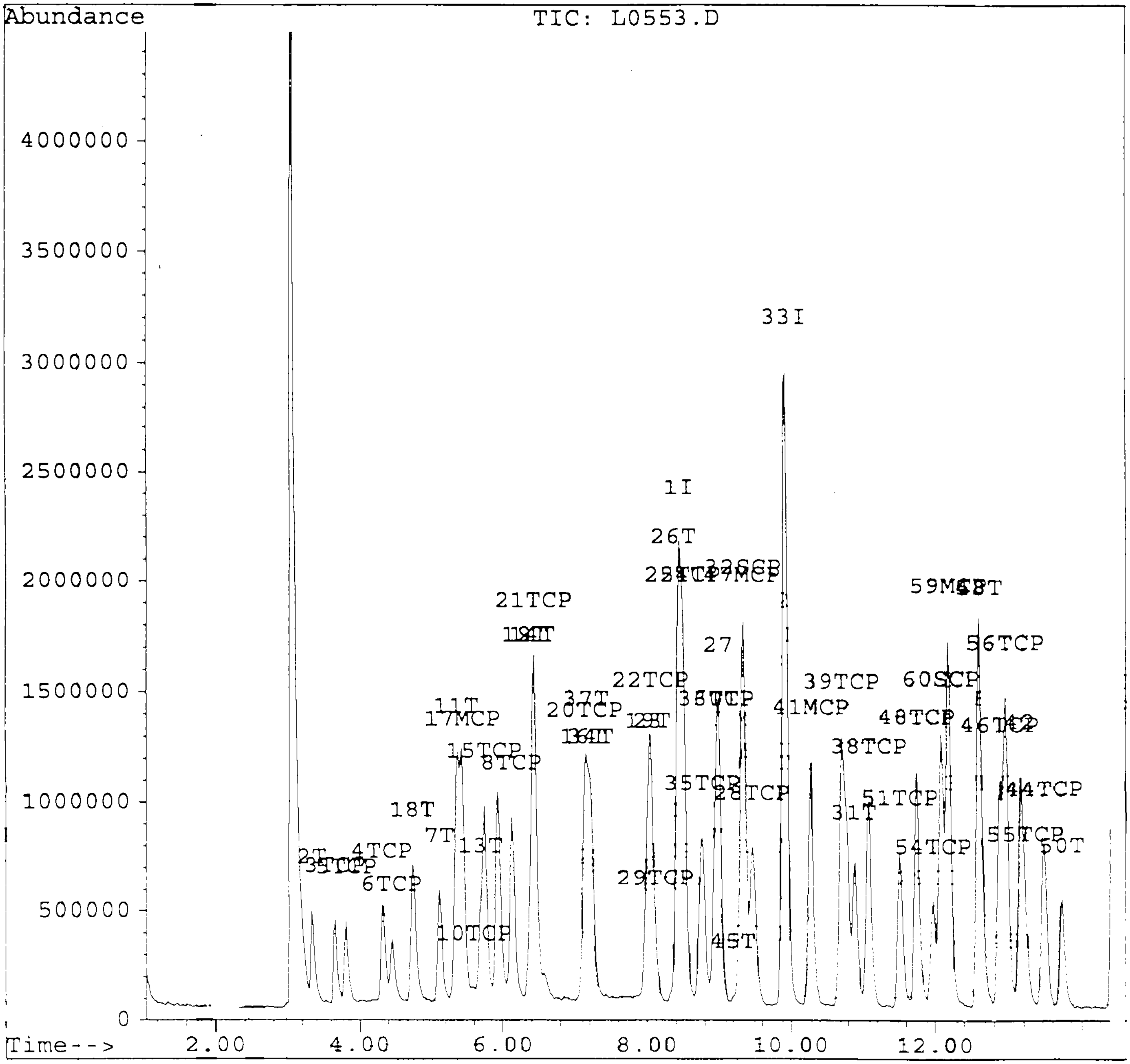
11/18/98

(#)=qualifier out of range (m)=manual integration (E)=exceeded max. cal.

Data File : L:\HPCHEM\MSL\L0553.D
Acq On : 4 Sep 98 18:36 hrs
Sample : VSTD020
Misc : VSTD020 ; 8260B ; 1 ; LLW ; L0043
Quant Time: Sep 4 20:10 1998

Vial: 4
Operator: L.Decker
Inst : HP5971:L
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\L8260BW.M
Title : CLP Purgeables Calibration
Last Update : Fri Nov 06 23:30:14 1998
Response via : Multiple Level Calibration



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Data File : L:\HPCHEM\MSL\L0553.D                    Vial: 4
Acq On    :  4 Sep 98  18:36 hrs                  Operator: L.Decker
Sample    : VSTD020                               Inst    : HP5971:L
Misc      : VSTD020 ; 8260B ;  1  ; LLW ; L0043   Multiplr: 1.00
Quant Time: Sep  4 20:10 1998

Method         : C:\HPCHEM\1\METHODS\L8260BW.M
Title          : CLP Purgeables Calibration
Last Update    : Fri Nov 06 23:30:14 1998
Response via   : Multiple Level Calibration
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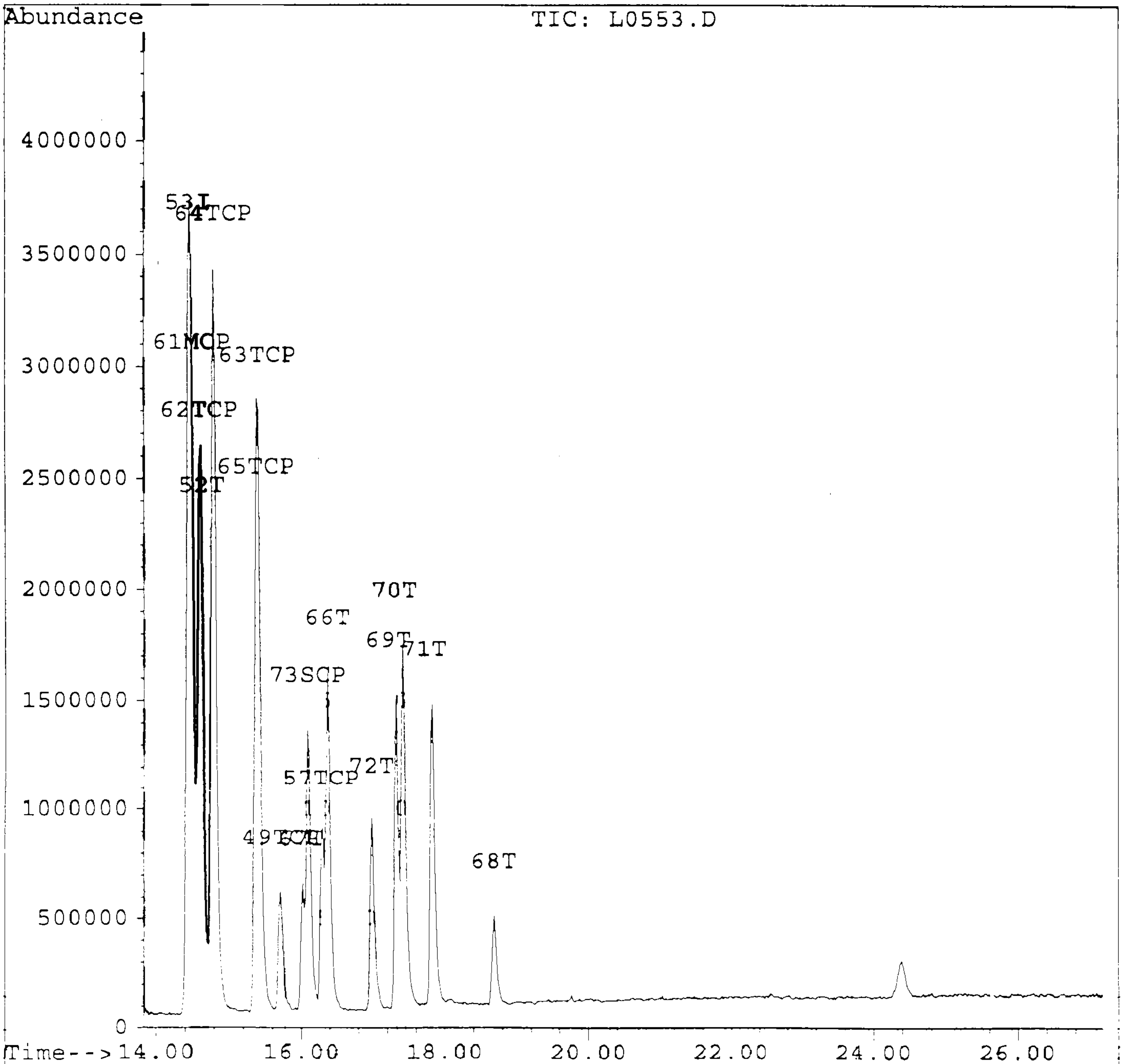


Data File : L:\HPCHEM\MSL\L0554.D Vial: 5
Acq On : 4 Sep 98 19:10 hrs Operator: L.Decker
Sample : VSTD050 Inst : HP5971:L
Misc : VSTD050 ; 8260B ; 1 ; LLW ; L0043 Multiplr: 1.00
Quant Time: Sep 4 19:57 1998

Method : C:\HPCHEM\1\METHODS\L8260BW.M
Title : CLP Purgeables Calibration
Last Update : Fri Nov 06 23:30:14 1998
Response via : Multiple Level Calibration

11/18/98

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane	8.43	128	1139800	50.00	ug/kg	0.03
33) 1,4-Difluorobenzene	9.90	114	6383545	50.00	ug/kg	0.02
53) Chlorobenzene-d5	14.45	117	5002086	50.00	ug/kg	0.02
System Monitoring Compounds						%Recovery
32) 1,2-Dichloroethane-d4	9.34	65	1936701	51.50	ug/kg	103.00%
60) Toluene-d8	12.08	98	4742228	47.92	ug/kg	95.85%
73) Bromofluorobenzene	16.10	95	3142054	40.77	ug/kg	81.53%
Target Compounds						Qvalue
2) Dichlorodifluoromethane	3.33	85	2314057	55.82	ug/l	98
3) Chloromethane	3.66	50	2333407	62.55	ug/l	100
4) Bromomethane	4.31	94	1749531	59.34	ug/l	96
5) Vinyl Chloride	3.81	62	2269485	64.23	ug/l	98
6) Chloroethane	4.44	64	1604321	69.68	ug/l	98
7) Ethyl Ether	5.11	43	318190	75.60	ug/l #	92
8) Methylene Chloride	6.13	84	2023541	58.41	ug/l	95
9) Ethyl Acetate	6.42	43	1114283	76.38	ug/l #	16
10) Acetone	5.59	43	437371	55.09	ug/l	100
11) 1,1,2-Trichlorotrifluoroet	5.35	101	3731354	55.71	ug/l	100
12) Acrolein	6.42	56	242306	71.55	ug/l	100
13) Iodomethane	5.70	142	3348133	48.71	ug/l	99
14) Tert-Butyl-Methylether	6.42	73	5481046	72.57	ug/l	97
15) Carbon Disulfide	5.75	76	6210464	60.25	ug/l m	100
16) Acrylonitrile	7.22	53	3709840	69.20	ug/l	100
17) 1,1-Dichloroethene	5.44	96	1862032	59.17	ug/l	95
18) Trichlorofluoromethane	4.74	101	3428966	56.96	ug/l	97
19) 3-Chloro-1-Propene	8.00	41	2077005	53.67	ug/l #	73
20) 1,1-Dichloroethane	7.14	63	4671822	66.84	ug/l	99
21) 1,2-Dichloroethene (total)	6.44	96	2230594	60.50	ug/l	99
22) 1,2-Dichloroethene (total)	8.05	96	2025585	51.01	ug/l	100
23) 2,2-Dichloropropane	8.01	77	3242613	52.95	ug/l	100
24) 2-Methyl-2-Propenenitrile	8.49	41	1589769	70.87	ug/l	96
25) Chloroform	8.49	83	4228810	56.49	ug/l	99
26) Tetrahydrofuran	8.48	42	717584	67.11	ug/l	99
27) 1,1-Dichloropropene	8.99	75	3544729	60.00	ug/l	99
28) 1,2-Dichloroethane	9.46	62	2678359	60.81	ug/l	98
29) 2-Butanone	8.12	43	1009941	62.86	ug/l	100
30) Chloropicrin	8.94	117	2788463	53.54	ug/l	98
31) Dibromomethane	10.88	93	1813504	49.71	ug/l	97
34) 2-Chloro-1,3-Butadiene	7.22	53	3709840	60.59	ug/l	97
35) 1,1,1-Trichloroethane	8.75	97	3396126	49.13	ug/l	99
36) Carbon Tetrachloride	8.94	117	2788463	46.89	ug/l	98
37) Vinyl Acetate	7.16	43	4754810	63.34	ug/l	100

(#)=qualifier out of range (m)=manual integration (E)=exceeded max. cal.

227

Data File : L:\HPCHEM\MSL\L0554.D
Acq On : 4 Sep 98 19:10 hrs
Sample : VSTD050
Misc : VSTD050 ; 8260B ; 1 ; LLW ; L0043
Quant Time: Sep 4 19:57 1998

Vial: 5
Operator: L.Decker
Inst : HP5971:L
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\L8260BW.M
Title : CLP Purgeables Calibration
Last Update : Fri Nov 06 23:30:14 1998
Response via : Multiple Level Calibration

	Compound	R.T.	QIon	Response	Conc	Unit		Qvalue
38)	Bromodichloromethane	11.07	83	4366082	45.98	ug/l		100
39)	1,2-Dichloropropane	10.71	63	3343087	54.84	ug/l		97
40)	cis-1,3-Dichloropropene	11.74	75	4529173	53.12	ug/l		98
41)	Trichloroethene	10.26	130	2315235	47.96	ug/l		97
42)	1,3-Dichloropropane	13.16	76	4220584	52.62	ug/l		96
43)	Methylmethacrylate	12.61	41	2814218	61.74	ug/l		96
44)	Dibromochloromethane	13.47	129	2745296	42.23	ug/l		100
45)	2-Nitropropane	9.20	43	195399	45.26	ug/l	#	72
46)	1,1,2-Trichloroethane	12.87	97	2129111	48.58	ug/l		100
47)	Benzene	9.32	78	8007816	58.59	ug/l		100
48)	trans-1,3-Dichloropropene	11.74	75	4529173	53.12	ug/l		100
49)	Bromoform	15.70	173	1502510	39.57	ug/l	m	0
50)	1,2-Dibromoethane	13.73	107	2704659	44.65	ug/l		100
51)	2-Chloroethylvinylether	11.51	63	1947693	56.92	ug/l		98
52)	1,1,1,2-Tetrachloroethane	14.62	131	2084983	45.93	ug/l	m	0
54)	4-Methyl-2-Pentanone	11.96	43	2841016	62.97	ug/l		100
55)	2-Hexanone	13.21	43	1912052	62.19	ug/l		100
56)	Tetrachloroethene	12.96	164	2061443	47.40	ug/l		97
57)	1,1,2,2-Tetrachloroethane	16.29	83	3124299	46.47	ug/l		100
58)	Ethyl Methacrylate	12.61	69	3550678	59.67	ug/l		96
59)	Toluene	12.18	91	7182573	58.20	ug/l		100
61)	Chlorobenzene	14.50	112	4926790	51.33	ug/l		96
62)	Ethylbenzene	14.60	106	2521170	57.36	ug/l		97
63)	Styrene	15.41	104	5536173	57.50	ug/l		100
64)	Xylene (total)mp	14.79	106	6816350	132.09	ug/l		100
65)	Xylene (total)o	15.38	106	3203258	56.32	ug/l		100
66)	1,2,3-Trichloropropane	16.37	75	3540090	51.47	ug/l		99
67)	1,4-Dichloro-2-Butene	16.01	53	969721	53.55	ug/l	#	1
68)	1,2-Dibromo-3-chloropropan	18.67	75	779561	42.91	ug/l		95
69)	1,3-Dichlorobenzene	17.32	146	3180957	48.16	ug/l		100
70)	1,4-Dichlorobenzene	17.42	146	3526804	49.65	ug/l	m	100
71)	1,2-Dichlorobenzene	17.83	146	3163455	48.48	ug/l	m	100
72)	Pentachloroethane	16.99	167	756971	37.63	ug/l		99

11/18/98

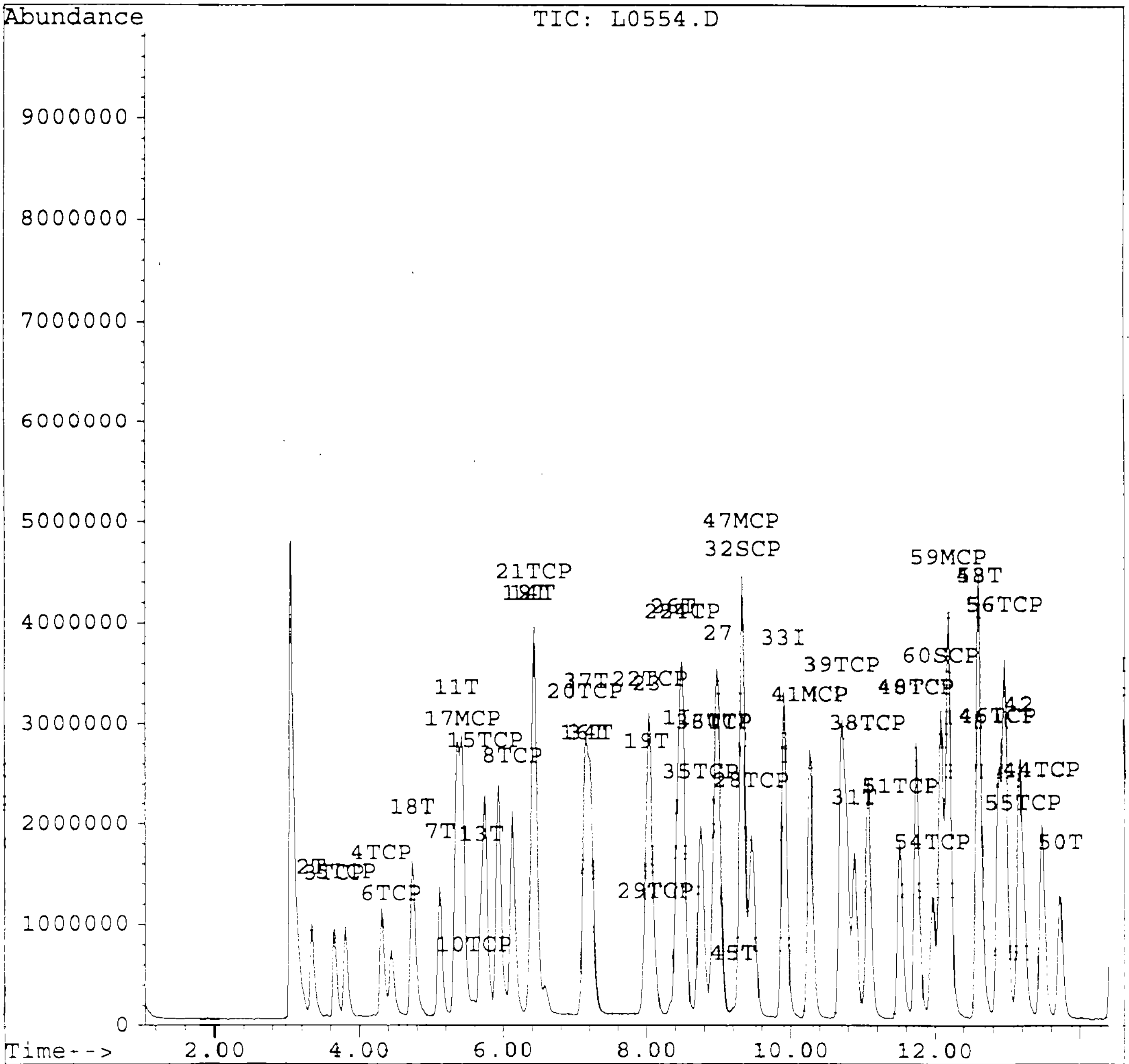
(#)=qualifier out of range (m)=manual integration (E)=exceeded max. cal.

428

Data File : L:\HPCHEM\MSL\L0554.D
Acq On : 4 Sep 98 19:10 hrs
Sample : VSTD050
Misc : VSTD050 ; 8260B ; 1 ; LLW ; L0043
Quant Time: Sep 4 19:57 1998

Vial: 5
Operator: L.Decker
Inst : HP5971:L
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\L8260BW.M
Title : CLP Purgeables Calibration
Last Update : Fri Nov 06 23:30:14 1998
Response via : Multiple Level Calibration



Quantitation Report

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Data File : L:\HPCHEM\MSL\L0554.D                          Vial: 5
Acq On    :  4 Sep 98  19:10 hrs                       Operator: L.Decker
Sample    : VSTD050                                    Inst    : HP5971:L
Misc      : VSTD050 ; 8260B ;  1  ; LLW ; L0043        Multiplr: 1.00
Quant Time: Sep  4 19:57 1998

Method          : C:\HPCHEM\1\METHODS\L8260BW.M
Title           : CLP Purgeables Calibration
Last Update     : Fri Nov 06 23:30:14 1998
Response via    : Multiple Level Calibration
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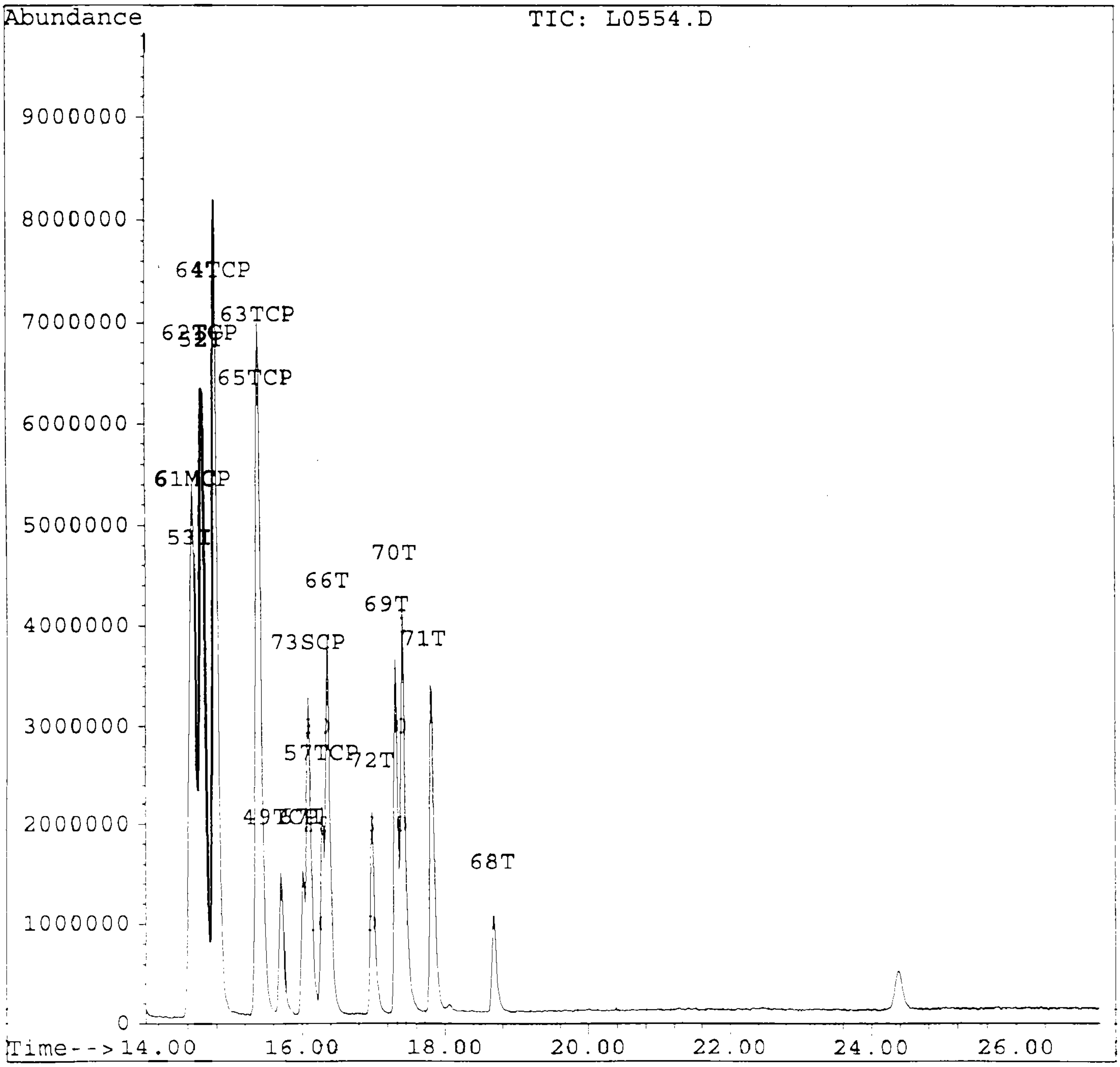

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Data File : L:\HPCHEM\MSL\L0555.D
Acq On : 4 Sep 98 19:45 hrs
Sample : VSTD100
Misc : VSTD100 ; 8260B ; 1 ; LLW ; L0043
Quant Time: Sep 4 20:30 1998

Vial: 6
Operator: L.Decker
Inst : HP5971:L
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\L8260BW.M
Title : CLP Purgeables Calibration
Last Update : Fri Nov 06 23:30:14 1998
Response via : Multiple Level Calibration

11/18/98

Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
1) Bromochloromethane	8.43	128	1101570	50.00 ug/kg		0.04
33) 1,4-Difluorobenzene	9.90	114	6213747	50.00 ug/kg		0.02
53) Chlorobenzene-d5	14.45	117	4863876	50.00 ug/kg		0.02
System Monitoring Compounds						%Recovery
32) 1,2-Dichloroethane-d4	9.34	65	3910875	107.60 ug/kg		215.20%
60) Toluene-d8	12.08	98	9736921	101.19 ug/kg		202.39%
73) Bromofluorobenzene	16.10	95	6419856	85.66 ug/kg		171.32%
Target Compounds						Qvalue
2) Dichlorodifluoromethane	3.33	85	4334210	108.18 ug/l		96
3) Chloromethane	3.64	50	4570413	126.76 ug/l		100
4) Bromomethane	4.29	94	3260704	114.43 ug/l		97
5) Vinyl Chloride	3.81	62	4425628	129.60 ug/l		97
6) Chloroethane	4.43	64	3041572	136.68 ug/l		98
7) Ethyl Ether	5.11	43	590455	145.15 ug/l	#	84
8) Methylene Chloride	6.13	84	3915653	116.96 ug/l		96
9) Ethyl Acetate	6.40	43	2114343	149.95 ug/l		93
10) Acetone	5.59	43	845380	110.17 ug/l		100
11) 1,1,2-Trichlorotrifluoroet	5.35	101	7214661	111.46 ug/l		97
12) Acrolein	6.40	56	471552	144.07 ug/l		100
13) Iodomethane	5.68	142	6714445	101.07 ug/l		99
14) Tert-Butyl-Methylether	6.42	73	10509769	143.99 ug/l		98
15) Carbon Disulfide	5.75	76	12056544	121.02 ug/l		100
16) Acrylonitrile	7.22	53	7343619	141.73 ug/l		100
17) 1,1-Dichloroethene	5.42	96	3673699	120.78 ug/l		99
18) Trichlorofluoromethane	4.74	101	6709691	115.33 ug/l		98
19) 3-Chloro-1-Propene	8.01	41	4046206	108.18 ug/l	#	80
20) 1,1-Dichloroethane	7.14	63	8954446	132.56 ug/l		99
21) 1,2-Dichloroethene (total)	6.44	96	4361747	122.41 ug/l		98
22) 1,2-Dichloroethene (total)	8.05	96	4028942	104.99 ug/l		100
23) 2,2-Dichloropropane	8.01	77	6251202	105.62 ug/l		99
24) 2-Methyl-2-Propenenitrile	8.49	41	3056543	140.99 ug/l		96
25) Chloroform	8.49	83	8210235	113.49 ug/l		98
26) Tetrahydrofuran	8.48	42	1399275	135.39 ug/l		93
27) 1,1-Dichloropropene	8.99	75	6899754	120.83 ug/l		99
28) 1,2-Dichloroethane	9.46	62	5259788	123.57 ug/l	m	79
29) 2-Butanone	8.12	43	2092985	134.78 ug/l		100
30) Chloropicrin	8.94	117	5506497	109.41 ug/l		99
31) Dibromomethane	10.88	93	3525208	99.97 ug/l		96
34) 2-Chloro-1,3-Butadiene	7.22	53	7343619	123.22 ug/l		98
35) 1,1,1-Trichloroethane	8.75	97	6678479	99.25 ug/l		99
36) Carbon Tetrachloride	8.94	117	5508364	95.15 ug/l		99
37) Vinyl Acetate	7.16	43	8976415	122.84 ug/l		100

(#)=qualifier out of range (m)=manual integration (E)=exceeded max. cal.

 230

Data File : L:\HPCHEM\MSL\L0555.D Vial: 6
Acq On : 4 Sep 98 19:45 hrs Operator: L.Decker
Sample : VSTD100 Inst : HP5971:L
Misc : VSTD100 ; 8260B ; 1 ; LLW ; L0043 Multiplr: 1.00
Quant Time: Sep 4 20:30 1998

Method : C:\HPCHEM\1\METHODS\L8260BW.M
Title : CLP Purgeables Calibration
Last Update : Fri Nov 06 23:30:14 1998
Response via : Multiple Level Calibration

	Compound	R.T.	QIon	Response	Conc	Unit		Qvalue
38)	Bromodichloromethane	11.07	83	8511479	92.09	ug/l		100
39)	1,2-Dichloropropane	10.71	63	6501956	109.57	ug/l		99
40)	cis-1,3-Dichloropropene	11.74	75	8842185	106.54	ug/l		96
41)	Trichloroethene	10.28	130	4565255	97.14	ug/l		99
42)	1,3-Dichloropropane	13.17	76	8276732	106.01	ug/l		97
43)	Methylmethacrylate	12.62	41	5372473	121.09	ug/l		96
44)	Dibromochloromethane	13.47	129	5410185	85.50	ug/l		100
45)	2-Nitropropane	9.20	43	372142	88.55	ug/l		84
46)	1,1,2-Trichloroethane	12.87	97	4141789	97.09	ug/l		100
47)	Benzene	9.32	78	15540380	116.82	ug/l		100
48)	trans-1,3-Dichloropropene	11.74	75	8842185	106.54	ug/l		100
49)	Bromoform	15.71	173	3049951	82.53	ug/l		98
50)	1,2-Dibromoethane	13.71	107	5274841	89.47	ug/l		97
51)	2-Chloroethylvinylether	11.52	63	3845692	115.46	ug/l		100
52)	1,1,1,2-Tetrachloroethane	14.62	131	4126495	93.38	ug/l		99
54)	4-Methyl-2-Pentanone	11.96	43	5540742	126.30	ug/l		100
55)	2-Hexanone	13.22	43	3698503	123.71	ug/l		100
56)	Tetrachloroethene	12.96	164	4181655	98.8[illegible]	ug/l		99
57)	1,1,2,2-Tetrachloroethane	16.29	83	6010108	91.93	ug/l		100
58)	Ethyl Methacrylate	12.62	69	6785111	117.27	ug/l		97
59)	Toluene	12.19	91	13735874	114.46	ug/l		100
61)	Chlorobenzene	14.50	112	9580360	102.66	ug/l		96
62)	Ethylbenzene	14.61	106	4972474	116.35	ug/l		96
63)	Styrene	15.41	104	10632272	113.57	ug/l		100
64)	Xylene (total)mp	14.80	106	13085844	260.79	ug/l		100
65)	Xylene (total)o	15.38	106	6277777	113.51	ug/l		100
66)	1,2,3-Trichloropropane	16.38	75	6728762	100.62	ug/l		99
67)	1,4-Dichloro-2-Butene	16.02	53	1893183	107.51	ug/l	#	1
68)	1,2-Dibromo-3-chloropropan	18.68	75	1527242	86.45	ug/l		99
69)	1,3-Dichlorobenzene	17.32	146	5550384	86.42	ug/l		100
70)	1,4-Dichlorobenzene	17.42	146	7256068	105.05	ug/l		100
71)	1,2-Dichlorobenzene	17.82	146	6059842	95.52	ug/l		100
72)	Pentachloroethane	16.99	167	1361745	69.62	ug/l		99

BS
11/18/98

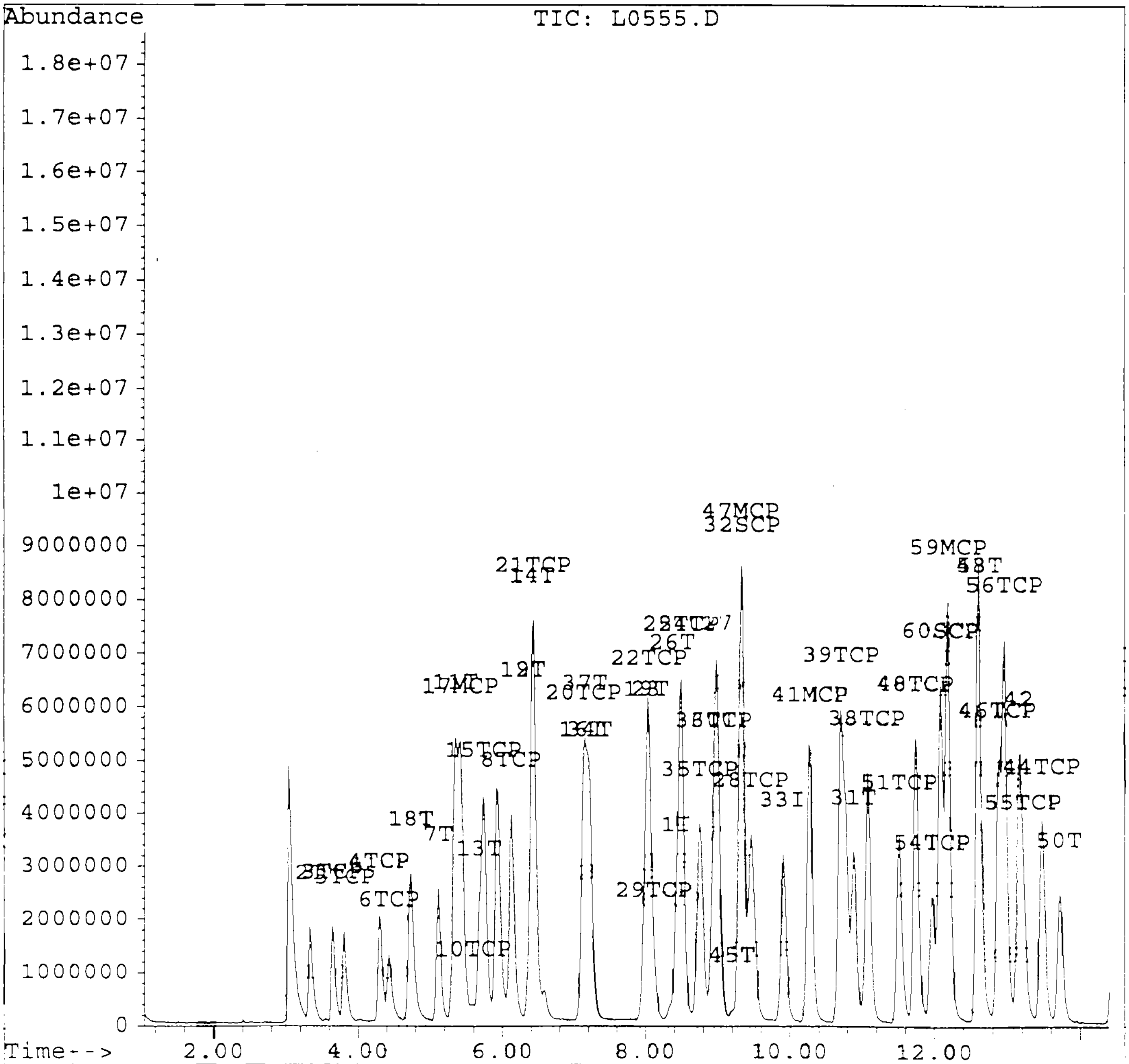
(#)=qualifier out of range (m)=manual integration (E)=exceeded max. cal.

231

Data File : L:\HPCHEM\MSL\L0555.D
Acq On : 4 Sep 98 19:45 hrs
Sample : VSTD100
Misc : VSTD100 ; 8260B ; 1 ; LLW ; L0043
Quant Time: Sep 4 20:30 1998

Vial: 6
Operator: L.Decker
Inst : HP5971:L
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\L8260BW.M
Title : CLP Purgeables Calibration
Last Update : Fri Nov 06 23:30:14 1998
Response via : Multiple Level Calibration

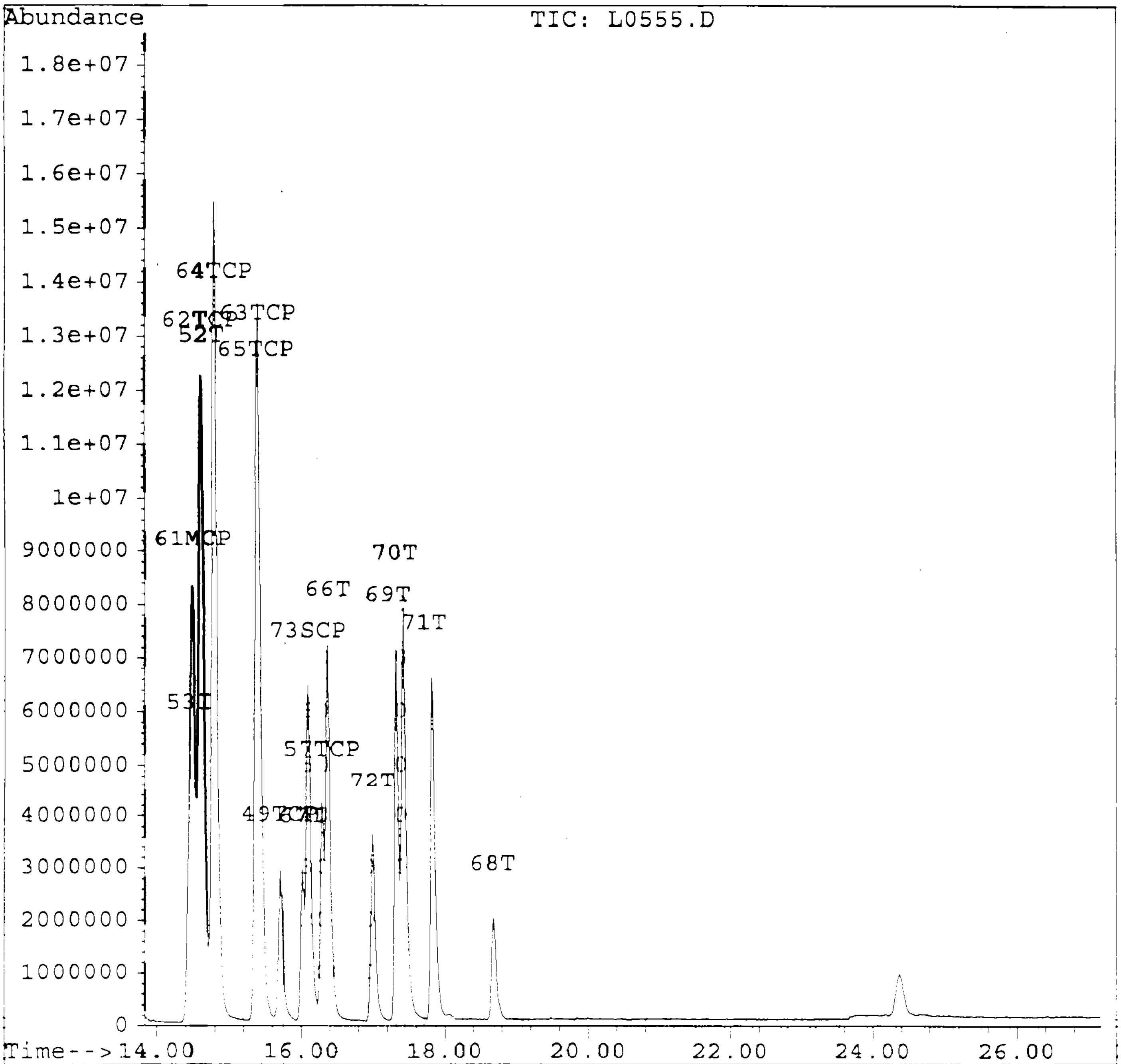


231N

Data File : L:\HPCHEM\MSL\L0555.D
Acq On : 4 Sep 98 19:45 hrs
Sample : VSTD100
Misc : VSTD100 ; 8260B ; 1 ; LLW ; L0043
Quant Time: Sep 4 20:30 1998

Vial: 6
Operator: L.Decker
Inst : HP5971:L
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\L8260BW.M
Title : CLP Purgeables Calibration
Last Update : Fri Nov 06 23:30:14 1998
Response via : Multiple Level Calibration



Data File : L:\HPCHEM\MSL\L0556.D
Acq On : 4 Sep 98 20:20 hrs
Sample : VSTD200
Misc : VSTD200 ;-8260B ; 1 ; LLW ; L0043
Quant Time: Sep 4 21:39 1998

Vial: 7
Operator: L.Decker
Inst : HP5971:L
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\L8260BW.M
Title : CLP Purgeables Calibration
Last Update : Fri Nov 06 23:30:14 1998
Response via : Multiple Level Calibration

11/18/98

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane	8.43	128	1055946	50.00	ug/kg	0.04
33) 1,4-Difluorobenzene	9.91	114	5879713	50.00	ug/kg	0.02
53) Chlorobenzene-d5	14.46	117	4548680	50.00	ug/kgm	0.03

System Monitoring Compounds	R.T.	QIon	Response	Conc	Units	%Recovery
32) 1,2-Dichloroethane-d4	9.34	65	7404053	212.51	ug/kg	425.02%
60) Toluene-d8	12.09	98	18154572	201.75	ug/kgm	403.50%
73) Bromofluorobenzene	16.10	95	12076705	172.31	ug/kgm	344.61%

Target Compounds	R.T.	QIon	Response	Conc	Units	Qvalue
2) Dichlorodifluoromethane	3.33	85	7827722	203.82	ug/l E	96
3) Chloromethane	3.64	50	8483339	245.46	ug/l E	100
4) Bromomethane	4.29	94	5971056	218.61	ug/l E	99
5) Vinyl Chloride	3.81	62	8496837	259.57	ug/l E	96
6) Chloroethane	4.41	64	4890773	229.28	ug/l E	98
7) Ethyl Ether	5.12	43	1069019	274.15	ug/l E	88
8) Methylene Chloride	6.13	84	7397222	230.50	ug/l E	96
9) Ethyl Acetate	6.42	43	4010180	296.69	ug/l E	1
10) Acetone	5.61	43	1685443	229.14	ug/l E	100
11) 1,1,2-Trichlorotrifluoroet	5.34	101	13154518	212.00	ug/l E	96
12) Acrolein	6.42	56	872927	278.23	ug/l E	100
13) Iodomethane	5.68	142	12716601	199.68	ug/l	98
14) Tert-Butyl-Methylether	6.42	73	19349915	276.56	ug/l E	97
15) Carbon Disulfide	5.73	76	21915056	229.48	ug/l E	100
16) Acrylonitrile	7.21	53	13806344	277.97	ug/l E	100
17) 1,1-Dichloroethene	5.42	96	6865126	235.46	ug/l E	97
18) Trichlorofluoromethane	4.72	101	12413815	222.59	ug/l E	100
19) 3-Chloro-1-Propene	8.02	41	7486329	208.80	ug/l E	59
20) 1,1-Dichloroethane	7.14	63	16634721	256.90	ug/l E	97
21) 1,2-Dichloroethene (total)	6.44	96	8130711	238.05	ug/l E	96
22) 1,2-Dichloroethene (total)	8.05	96	7712614	209.67	ug/l E	100
23) 2,2-Dichloropropane	8.02	77	11576092	204.05	ug/l E	99
24) 2-Methyl-2-Propenenitrile	8.50	41	5995860	288.53	ug/l E	97
25) Chloroform	8.50	83	15119177	218.02	ug/l E	95
26) Tetrahydrofuran	8.48	42	2782817	280.90	ug/l E	88
27) 1,1-Dichloropropene	9.00	75	13038574	238.20	ug/l E	99
28) 1,2-Dichloroethane	9.46	62	9715746	238.11	ug/l m E	76
29) 2-Butanone	8.12	43	4266181	286.60	ug/l E	100
30) Chloropicrin	8.94	117	10310333	213.70	ug/l E	98
31) Dibromomethane	10.89	93	6617228	195.77	ug/l	99
34) 2-Chloro-1,3-Butadiene	7.21	53	13806344	244.81	ug/l E	99
35) 1,1,1-Trichloroethane	8.76	97	12450884	195.55	ug/l	99
36) Carbon Tetrachloride	8.94	117	10311817	188.25	ug/l	99
37) Vinyl Acetate	7.16	43	16320103	236.03	ug/l E	100

(#)=qualifier out of range (m)=manual integration (E)=exceeded max. cal.

233

Data File : L:\HPCHEM\MSL\L0556.D
Acq On : 4 Sep 98 20:20 hrs
Sample : VSTD200
Misc : VSTD200 ; 8260B ; 1 ; LLW ; L0043
Quant Time: Sep 4 21:39 1998

Vial: 7
Operator: L.Decker
Inst : HP5971:L
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\L8260BW.M
Title : CLP Purgeables Calibration
Last Update : Fri Nov 06 23:30:14 1998
Response via : Multiple Level Calibration

	Compound	R.T.	QIon	Response	Conc	Unit		Qvalue
38)	Bromodichloromethane	11.07	83	15848939	181.23	ug/l		100
39)	1,2-Dichloropropane	10.71	63	12212908	217.51	ug/l	E	100
40)	cis-1,3-Dichloropropene	11.74	75	16512419	210.25	ug/l	E	94
41)	Trichloroethene	10.27	130	8605705	193.53	ug/l		96
42)	1,3-Dichloropropane	13.17	76	15659819	211.96	ug/l	E	94
43)	Methylmethacrylate	12.60	41	10331996	246.11	ug/l	E	92
44)	Dibromochloromethane	13.48	129	10443912	174.42	ug/l		100
45)	2-Nitropropane	9.20	43	849671	213.67	ug/l	E	86
46)	1,1,2-Trichloroethane	12.88	97	7967762	197.38	ug/l		100
47)	Benzene	9.32	78	28724288	228.19	ug/l	E	100
48)	trans-1,3-Dichloropropene	11.74	75	16512419	210.25	ug/l	E	100
49)	Bromoform	15.72	173	6119311	174.98	ug/l		97
50)	1,2-Dibromoethane	13.72	107	10024533	179.69	ug/l		95
51)	2-Chloroethylvinylether	11.52	63	7496398	237.85	ug/l	E	98
52)	1,1,1,2-Tetrachloroethane	14.63	131	10567264	252.73	ug/l	E	100
54)	4-Methyl-2-Pentanone	11.97	43	11305874	275.57	ug/l	m E	100
55)	2-Hexanone	13.22	43	7569070	270.72	ug/l	m E	100
56)	Tetrachloroethene	12.96	164	8193611	207.17	ug/l	m E	99
57)	1,1,2,2-Tetrachloroethane	16.29	83	12020197	196.60	ug/l	m	100
58)	Ethyl Methacrylate	12.62	69	12970219	239.69	ug/l	m E	98
59)	Toluene	12.19	91	25315776	225.58	ug/l	m E	100
61)	Chlorobenzene	14.51	112	22743264	260.60	ug/l	m E	93
62)	Ethylbenzene	14.61	106	9447134	236.37	ug/l	m E	1
63)	Styrene	15.41	104	19795357	226.09	ug/l	m E	100
64)	Xylene (total)mp	14.78	106	12440315	265.10	ug/l	m	100
65)	Xylene (total)o	15.38	106	11926631	230.60	ug/l	m E	100
66)	1,2,3-Trichloropropane	16.37	75	13348848	213.44	ug/l	m E	100
67)	1,4-Dichloro-2-Butene	16.37	53	3738675	227.03	ug/l	m E	92
68)	1,2-Dibromo-3-chloropropan	18.68	75	3080662	186.47	ug/l	m	97
69)	1,3-Dichlorobenzene	17.34	146	11456134	190.73	ug/l	m	100
70)	1,4-Dichlorobenzene	17.42	146	12789979	197.99	ug/l	m	100
71)	1,2-Dichlorobenzene	17.84	146	11557692	194.80	ug/l	m	100
72)	Pentachloroethane	16.99	167	2497164	136.52	ug/l	m	97

11/18/98

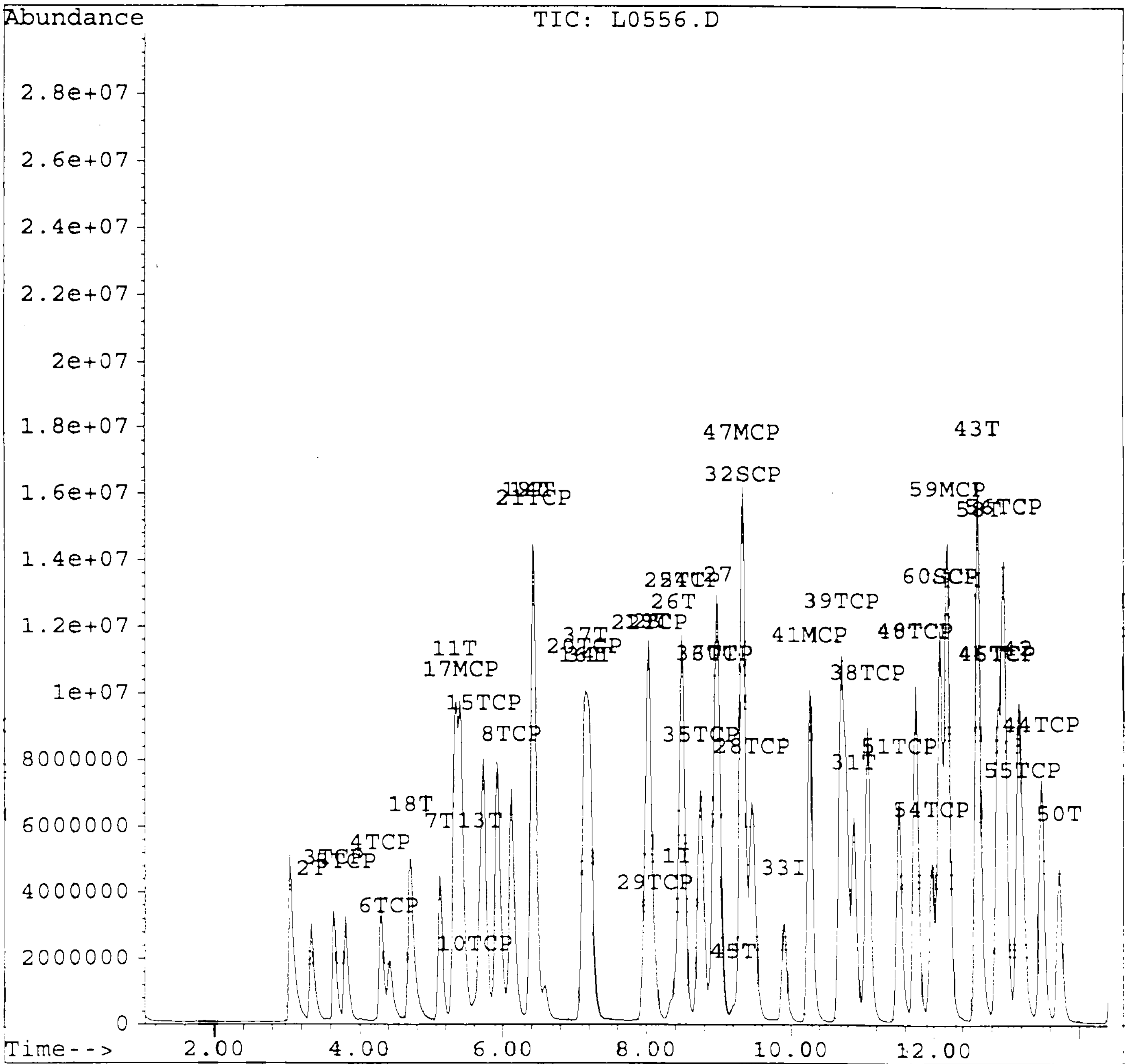
(#)=qualifier out of range (m)=manual integration (E)=exceeded max. cal.

234

Data File : L:\HPCHEM\MSL\L0556.D
Acq On : 4 Sep 98 20:20 hrs
Sample : VSTD200
Misc : VSTD200 ; 8260B ; 1 ; LLW ; L0043
Quant Time: Sep 4 21:39 1998

Vial: 7
Operator: L.Decker
Inst : HP5971:L
Multiplr: 1.00

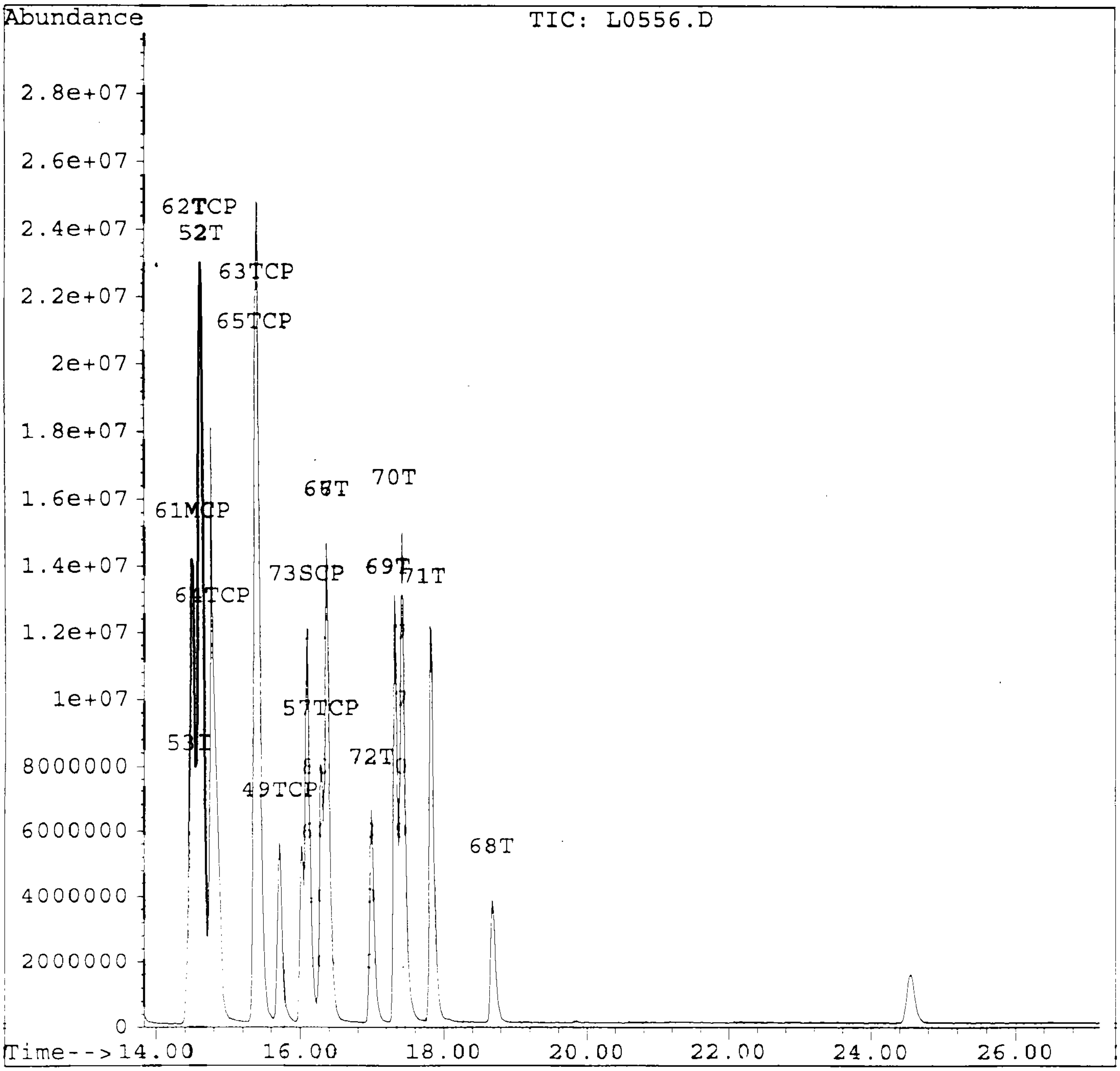
Method : C:\HPCHEM\1\METHODS\L8260BW.M
Title : CLP Purgeables Calibration
Last Update : Fri Nov 06 23:30:14 1998
Response via : Multiple Level Calibration



Data File : L:\HPCHEM\MSL\L0556.D
Acq On : 4 Sep 98 20:20 hrs
Sample : VSTD200
Misc : VSTD200 ; 8260B ; 1 ; LLW ; L0043
Quant Time: Sep 4 21:39 1998

Vial: 7
Operator: L.Decker
Inst : HP5971:L
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\L8260BW.M
Title : CLP Purgeables Calibration
Last Update : Fri Nov 06 23:30:14 1998
Response via : Multiple Level Calibration



Data File : L:\HPCHEM\MSL\L0558.D   Vial: 4
Acq On   : 4 Sep 98 22:54 hrs   Operator: L.Decker
Sample   : VSTD010   Inst   : HP5971:L
Misc   : VSTD010 ; 8260B ;—1 ; LLW ; L0043   Multiplr: 1.00
Quant Time: Sep 5 0:37 1998

Method   : C:\HPCHEM\1\METHODS\L8260BW.M
Title   : CLP Purgeables Calibration
Last Update   : Fri Nov 06 23:30:14 1998
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane	8.44	128	967477	50.00 ug/kg	0.05
33) 1,4-Difluorobenzene	9.91	114	4849903	50.00 ug/kg	0.03
53) Chlorobenzene-d5	14.45	117	3811242	50.00 ug/kg	0.02
System Monitoring Compounds					%Recovery
32) 1,2-Dichloroethane-d4	9.35	65	398155	10.72 ug/kg	21.44%
60) Toluene-d8	12.09	98	836842	10.26 ug/kg	20.52%
73) Bromofluorobenzene	16.10	95	571176	10.53 ug/kg	21.07%
Target Compounds					Qvalue
2) Dichlorodifluoromethane	3.33	85	340209	8.20 ug/l	99
3) Chloromethane	3.66	50	419149	9.86 ug/l	100
4) Bromomethane	4.32	94	311638	9.63 ug/l	98
5) Vinyl Chloride	3.81	62	347975	8.45 ug/l	95
6) Chloroethane	4.44	64	280174	9.86 ug/l	100
8) Methylene Chloride	6.12	84	391798	10.54 ug/l	88
9) Ethyl Acetate	6.41	43	213676	10.45 ug/l #	78
10) Acetone	5.59	43	104577	10.78 ug/l	100
11) 1,1,2-Trichlorotrifluoroet	5.37	101	561073	8.36 ug/l	99
13) Iodomethane	5.69	142	586742	10.26 ug/l	97
14) Tert-Butyl-Methylether	6.41	73	1098964	10.86 ug/l	98
15) Carbon Disulfide	5.74	76	981035	8.85 ug/l	100
16) Acrylonitrile	7.22	53	608109	9.10 ug/l	100
17) 1,1-Dichloroethene	5.44	96	294873	8.73 ug/l	96
18) Trichlorofluoromethane	4.74	101	514260	8.39 ug/l	92
19) 3-Chloro-1-Propene	8.03	41	327518	8.62 ug/l #	17
20) 1,1-Dichloroethane	7.15	63	840820	10.08 ug/l	99
21) 1,2-Dichloroethene (total)	6.45	96	362447	9.04 ug/l	99
22) 1,2-Dichloroethene (total)	8.04	96	395397	10.62 ug/l	100
23) 2,2-Dichloropropane	8.01	77	517932	8.90 ug/l	99
24) 2-Methyl-2-Propenenitrile	8.49	41	312543	9.74 ug/l	97
25) Chloroform	8.51	83	765762	9.98 ug/l	99
26) Tetrahydrofuran	8.47	42	163320	10.83 ug/l #	75
27) 1,1-Dichloropropene	8.99	75	567200	8.88 ug/l	97
28) 1,2-Dichloroethane	9.45	62	511245	10.37 ug/l	97
29) 2-Butanone	8.11	43	223848	10.43 ug/l	100
30) Chloropicrin	8.95	117	432509	8.65 ug/l	96
31) Dibromomethane	10.89	93	339356	10.17 ug/l	98
34) 2-Chloro-1,3-Butadiene	7.22	53	608109	10.13 ug/l	93
35) 1,1,1-Trichloroethane	8.76	97	555465	10.10 ug/l	99
36) Carbon Tetrachloride	8.95	117	432509	9.62 ug/l	94
37) Vinyl Acetate	7.15	43	822540	10.75 ug/l	100
38) Bromodichloromethane	11.08	83	800561	11.31 ug/l	100
39) 1,2-Dichloropropane	10.70	63	630393	11.59 ug/l	94

(#)=qualifier out of range (m)=manual integration (E)=exceeded max. cal.

Quantitation Report 236

Data File : L:\HPCHEM\MSL\L0558.D
Acq On : 4 Sep 98 22:54 hrs
Sample : VSTD010
Misc : VSTD010 ; 8260B ; 1 ; LLW ; L0043
Quant Time: Sep 5 0:37 1998

Vial: 4
Operator: L.Decker
Inst : HP5971:L
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\L8260BW.M
Title : CLP Purgeables Calibration
Last Update : Fri Nov 06 23:30:14 1998
Response via : Multiple Level Calibration

	Compound	R.T.	QIon	Response	Conc	Unit		Qvalue
40)	cis-1,3-Dichloropropene	11.74	75	795721	10.90	ug/l		99
41)	Trichloroethene	10.27	130	388305	9.99	ug/l		94
42)	1,3-Dichloropropane	13.17	76	784172	11.20	ug/l		92
43)	Methylmethacrylate	12.60	41	564570	11.57	ug/l		94
44)	Dibromochloromethane	13.48	129	489869	11.03	ug/l		100
45)	2-Nitropropane	9.21	43	41980	10.42	ug/l	m	0
46)	1,1,2-Trichloroethane	12.88	97	391708	11.06	ug/l		100
47)	Benzene	9.33	78	1403507	10.94	ug/l		100
48)	trans-1,3-Dichloropropene	11.74	75	795721	10.90	ug/l		100
49)	Bromoform	15.70	173	264427	10.56	ug/l		98
50)	1,2-Dibromoethane	13.71	107	490841	11.09	ug/l		99
51)	2-Chloroethylvinylether	11.50	63	373243	11.46	ug/l		94
52)	1,1,1,2-Tetrachloroethane	14.62	131	352694	9.81	ug/l		99
54)	4-Methyl-2-Pentanone	11.97	43	592600	11.49	ug/l		100
55)	2-Hexanone	13.22	43	378389	10.57	ug/l		100
56)	Tetrachloroethene	12.96	164	396220	11.61	ug/l		99
57)	1,1,2,2-Tetrachloroethane	16.29	83	591435	11.34	ug/l		100
58)	Ethyl Methacrylate	12.60	69	689320	11.35	ug/l		95
59)	Toluene	12.17	91	1240363	10.59	ug/l		100
61)	Chlorobenzene	14.50	112	817486	9.68	ug/l		97
62)	Ethylbenzene	14.61	106	402578	9.71	ug/l		98
63)	Styrene	15.41	104	918924	10.25	ug/l		100
64)	Xylene (total)mp	14.79	106	1068531	21.36	ug/l		100
65)	Xylene (total)o	15.38	106	515738	9.80	ug/l		100
66)	1,2,3-Trichloropropane	16.37	75	680260	11.16	ug/l		96
67)	1,4-Dichloro-2-Butene	16.01	53	181646	11.15	ug/l	#	9
68)	1,2-Dibromo-3-chloropropan	18.67	75	172873	12.15	ug/l		86
69)	1,3-Dichlorobenzene	17.32	146	477569	9.61	ug/l		100
70)	1,4-Dichlorobenzene	17.42	146	639243	10.68	ug/l		100
71)	1,2-Dichlorobenzene	17.83	146	546559	10.57	ug/l		100
72)	Pentachloroethane	16.99	167	53539	4.47	ug/l	m	0

PS
11/15/98

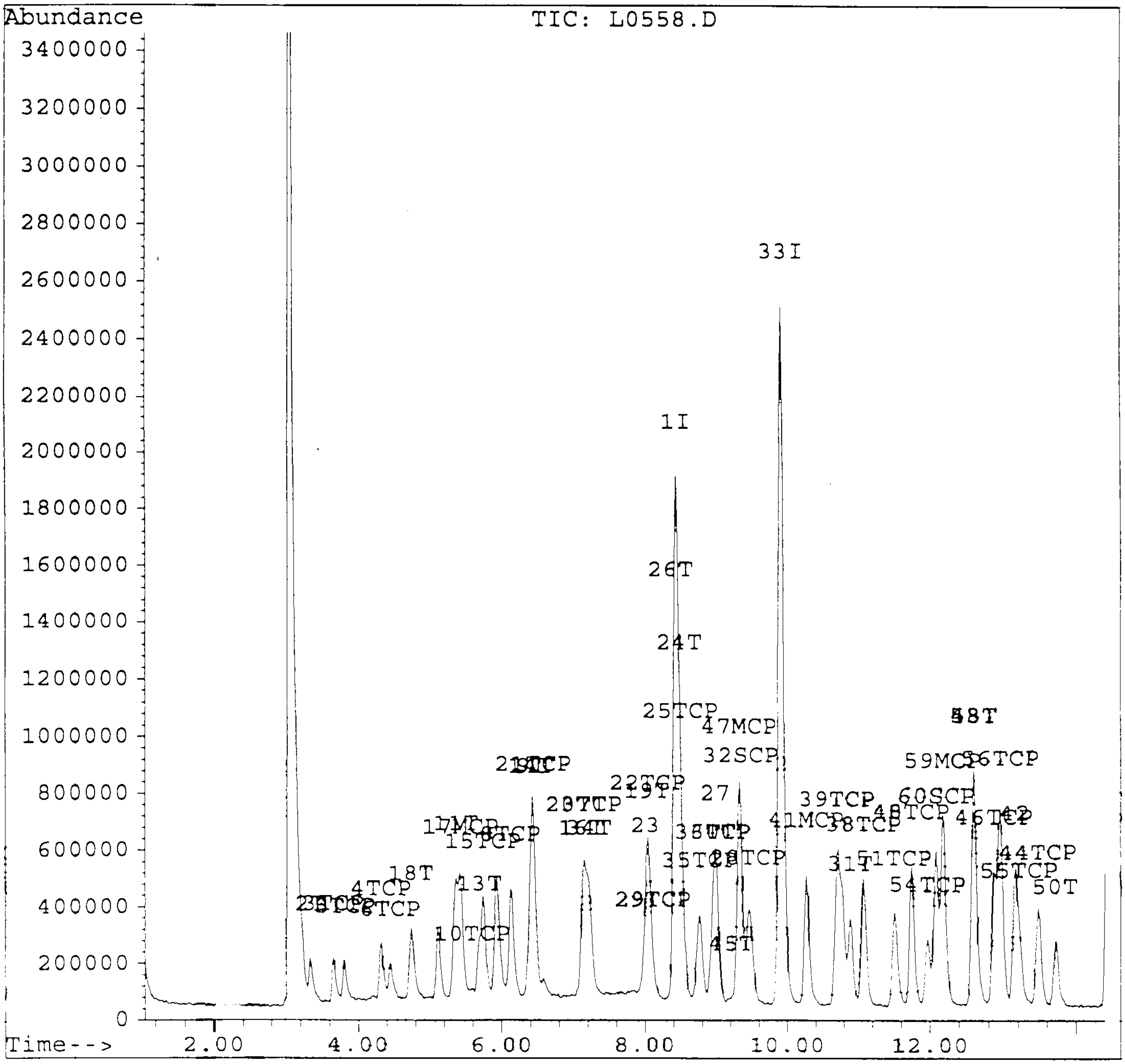
(#)=qualifier out of range (m)=manual integration (E)=exceeded max. cal.

-237

Data File : L:\HPCHEM\MSL\L0558.D
Acq On : 4 Sep 98 22:54 hrs
Sample : VSTD010
Misc : VSTD010 ; 8260B ; 1 ; LLW ; L0043
Quant Time: Sep 5 0:37 1998

Vial: 4
Operator: L.Decker
Inst : HP5971:L
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\L8260BW.M
Title : CLP Purgeables Calibration
Last Update : Fri Nov 06 23:30:14 1998
Response via : Multiple Level Calibration

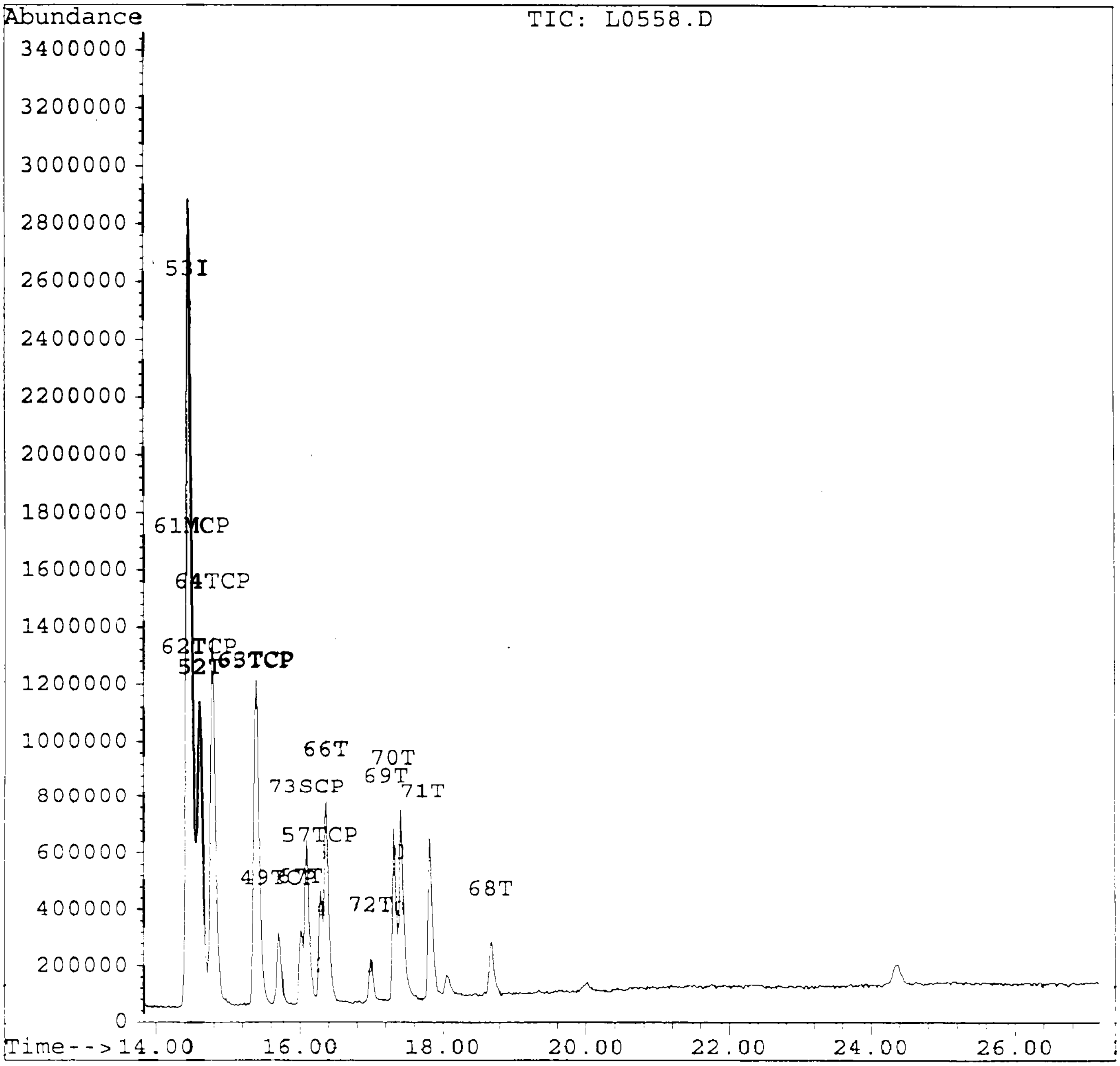


0374

Data File : L:\HPCHEM\MSL\L0558.D
Acq On : 4 Sep 98 22:54 hrs
Sample : VSTD010
Misc : VSTD010 ; 8260B ; 1 ; LLW ; L0043
Quant Time: Sep 5 0:37 1998

Vial: 4
Operator: L.Decker
Inst : HP5971:L
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\L8260BW.M
Title : CLP Purgeables Calibration
Last Update : Fri Nov 06 23:30:14 1998
Response via : Multiple Level Calibration



END OF DATA PACKAGE

Committed To *Your* Success

Severn Trent Laboratories
200 Monroe Turnpike
Monroe, Connecticut 06468

Tel: (203) 261-4458
Fax: (203) 261-5346
www.stl-inc.com

October 08, 1999

Mr. Dan Ours
STEARNS & WHELER
One Remington Park Drive
Cazenovia, NY 13035

Dear Mr. Ours :

Please find enclosed the analytical results of 3 sample(s) received at our laboratory on September 14, 1999. This report contains sections addressing the following information at a minimum:

- sample summary
- analytical methodology
- state certifications
- definition of data qualifiers and terminology
- analytical results
- chain-of-custody

STL Report #7099-2256A	
Project ID: FARWELL LANDFILL	

Copies of this analytical report and supporting data are maintained in our files for a minimum of five years unless special arrangements have been made. Unless specifically indicated, all analytical testing was performed at this laboratory location and no portion of the testing was subcontracted.

We appreciate your selection of our services and welcome any questions or suggestions you may have relative to this report. Please contact your customer service representative at (203) 261-4458 for any additional information. Thank you for utilizing our services; we hope you will consider us for your future analytical needs.

I have reviewed and approved the enclosed data for final release.

Very truly yours,

Jeffrey C. Curran
Laboratory Manager

JCC

7099-2256A
STEARNS & WHELER

Case Narrative

Classical Chemistry - Listed below are the wet chemistry analyte methods and references for the samples analyzed in this SDG. The LCS recovery and the prep blank were above criteria limits for TDS analysis. No other analytical problems were encountered and all holding times were met.

Analyte	Method	Reference
Alkalinity	310.1	1
Ammonia	350.2	1
BOD5	405.1	1
Bromide	320.1	1
Chloride	325.2	1
COD	410.4	1
Hardness	2340B	3
Nitrate	353.2	1
Phenols	420.2	1
Sulfate	375.2	1
TDS	160.1	1
TKN	351.2	1
TOCD	9060	2

References:

1. Methods of Chemical Analysis of Water and Wastes, EPA 600, 1983.
2. Test Methods for the Evaluation of Solid Waste, SW846, 3rd ed., 1986.
3. Standard Methods for the Examination of Water and Wastewater. 18th edition, 1992.

Metals - ICAP metals were determined using a JA61E trace ICAP; mercury was determined by the cold vapor technique utilizing a Leeman Labs mercury analyzer using guidance provided in SW846 according to the following Methods: ICAP-3010A/6010B; mercury-7470A.

No problems occurred during analysis. All appropriate protocols were employed. All data appears to be consistent.

Volatile Organics - Volatile organics were determined by purge and trap GC/MS using guidance provided in Method 5030B/8260B. The instrumentation used was a Tekmar Model 2000/2016 Concentrator interfaced with a Hewlett-Packard Model 5971A GC/MS/DS.

No problems were encountered.

Miscellaneous - Subcontracted to Microseeps, 220 William Pitt Way, Pittsburgh, PA 15238.

TABLE VO-1.0
7099-2256A
STEARNS & WHELER
TCL VOLATILE ORGANICS

Aqueous

All values are ug/L.

Client Sample I.D.	Method Blank	MW-19S	MW-20D	Quant. Limits with no Dilution
Lab Sample I.D.	VBLKOH	992256A-01	992256A-02	
Method Blank I.D.	VBLKOH	VBLKOH	VBLKOH	
Quant. Factor	1.00	1.00	1.00	
Chloromethane	U	U	U	10
Bromomethane	U	U	U	10
Vinyl Chloride	U	U	U	10
Chloroethane	U	U	U	10
Methylene Chloride	1J	U	U	5.0
Acetone	7J	U	5JB	10
Carbon Disulfide	U	U	U	5.0
Vinyl Acetate	U	U	U	10
1,1-Dichloroethene	U	U	U	5.0
1,1-Dichloroethane	U	.3J	U	5.0
cis-1,2-Dichloroethene	U	U	U	5.0
trans-1,2-Dichloroethene	U	U	U	5.0
Chloroform	U	U	U	5.0
1,2-Dichloroethane	U	U	U	5.0
2-Butanone	2J	2JB	2JB	10
1,1,1-Trichloroethane	U	U	U	5.0
Carbon Tetrachloride	U	U	U	5.0
Bromodichloromethane	U	U	U	5.0
1,2-Dichloropropane	U	U	U	5.0
cis-1,3-Dichloropropene	U	U	U	5.0
Trichloroethene	U	U	U	5.0
Dibromochloromethane	U	U	U	5.0
1,1,2-Trichloroethane	U	U	U	5.0
Benzene	U	U	U	5.0
trans-1,3-Dichloropropene	U	U	U	5.0
Bromoform	U	U	U	5.0
4-Methyl-2-Pentanone	U	U	U	10
2-Hexanone	U	U	U	10
Tetrachloroethene	U	U	U	5.0
Toluene	U	U	U	5.0
1,1,2,2-Tetrachloroethane	U	U	U	5.0
Chlorobenzene	U	U	U	5.0
Ethylbenzene	U	U	U	5.0
Styrene	U	U	U	5.0
Xylene (total)	U	U	U	5.0
Date Received		09/14/99	09/14/99	
Date Extracted	N/A	N/A	N/A	
Date Analyzed	09/15/99	09/15/99	09/15/99	

See Appendix for qualifier definitions
Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

Aqueous

TABLE VO-1.1
7099-2256A
STEARNS & WHELER
TCL VOLATILE ORGANICS

All values are ug/L.

Client Sample I.D.	TRIP BLANK			Quant. Limits with no Dilution
Lab Sample I.D.	992256A-03			
Method Blank I.D.	VBLKOH			
Quant. Factor	1.00			
Chloromethane	U			10
Bromomethane	U			10
Vinyl Chloride	U			10
Chloroethane	U			10
Methylene Chloride	1JB			5.0
Acetone	2JB			10
Carbon Disulfide	U			5.0
Vinyl Acetate	U			10
1,1-Dichloroethene	U			5.0
1,1-Dichloroethane	U			5.0
cis-1,2-Dichloroethene	U			5.0
trans-1,2-Dichloroethene	U			5.0
Chloroform	U			5.0
1,2-Dichloroethane	U			5.0
2-Butanone	1JB			10
1,1,1-Trichloroethane	U			5.0
Carbon Tetrachloride	U			5.0
Bromodichloromethane	U			5.0
1,2-Dichloropropane	U			5.0
cis-1,3-Dichloropropene	U			5.0
Trichloroethene	U			5.0
Dibromochloromethane	U			5.0
1,1,2-Trichloroethane	U			5.0
Benzene	U			5.0
trans-1,3-Dichloropropene	U			5.0
Bromoform	U			5.0
4-Methyl-2-Pentanone	U			10
2-Hexanone	U			10
Tetrachloroethene	U			5.0
Toluene	U			5.0
1,1,2,2-Tetrachloroethane	U			5.0
Chlorobenzene	U			5.0
Ethylbenzene	U			5.0
Styrene	U			5.0
Xylene (total)	U			5.0
Date Received	09/14/99			
Date Extracted	N/A			
Date Analyzed	09/15/99			

See Appendix for qualifier definitions
Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE AS-1.0
7099-2256A
STEARNS & WHELER
TAL METALS

Aqueous

All values are ug/L.

Client Sample I.D.	MW-19S	MW-20D		
Lab Sample I.D.	992256A-01	992256A-02		
Aluminum	3150	3570		
Antimony	60.0U	60.0U		
Arsenic	10.0U	10.0U		
Barium	224.	3970		
Beryllium	5.0U	5.0U		
Cadmium	5.0U	6.1		
Calcium	36500	52300		
Chromium	10.0U	11.0		
Cobalt	50.0U	50.0U		
Copper	25.0U	25.0U		
Iron	5370	10500		
Lead	34.9	25.9		
Magnesium	7920	9710		
Manganese	253.	270.		
Mercury	0.20U	0.20U		
Nickel	40.0U	40.0U		
Potassium	5000U	5000U		
Selenium	5.0U	5.0U		
Silver	10.0U	10.0U		
Sodium	5000U	57400		
Thallium	10.0U	10.0U		
Vanadium	50.0U	50.0U		
Zinc	21.8	32.3		

See Appendix for qualifier definitions

COVER PAGE - WET CHEM ANALYSES DATA PACKAGE

Lab Name: STL Contract:

Lab Code: STL Case No.: 2256A SAS No.: SDG No.: A2256

SOW No.:

Sample No.	Lab Sample ID
MW-19S	992256A-01
MW-20D	992256A-02

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: [signature] Name: Daniel W. Helfrich

Date: 10/4/99 Title: Group Leader

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

MW-19S

Lab Name: STL Contract:

Lab Code: STL Case No.: 2256A SAS No.: SDG No.: A2256

Matrix (soil/water): WATER Lab Sample ID: 992256A-01

% Solids: 0 Date Received: 09/14/99

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	114.		mg/L		T
7727-37-9	Ammonia	0.0400	U	mg/L		L
	BOD5	2.00	U	mg/L		P
24959-67-9	Bromide	2.00	U	mg/L		T
16887-00-6	Chloride	5.87		mg/L		L
	COD	10.0	U	mg/L		C
	Hardness	124.		mg/L		
14797-55-8	Nitrate	0.100	U	mg/L		L
	Phenols	0.0500	U	mg/L		L
	Sulfate	10.0	U	mg/L		L
	TDS	188.		mg/L		G
	TKN	0.109		mg/L		L
	TOC	1.00	U	mg/L		D

Comments:

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

MW-20D

Lab Name: STL Contract: ____

Lab Code: STL Case No.: 2256A SAS No.: ____ SDG No.: A2256

Matrix (soil/water): WATER Lab Sample ID: 992256A-02

% Solids: 0 Date Received: 09/14/99

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	286.		mg/L		T
7727-37-9	Ammonia	0.218		mg/L		L
	BOD5	6.72		mg/L		P
24959-67-9	Bromide	2.00	U	mg/L		T
16887-00-6	Chloride	93.4		mg/L		L
	COD	10.0	U	mg/L		C
	Hardness	171.		mg/L		
14797-55-8	Nitrate	0.100	U	mg/L		L
	Phenols	0.0500	U	mg/L		L
	Sulfate	10.0	U	mg/L		L
	TDS	415.		mg/L		G
	TKN	0.680		mg/L		L
	TOC	7.58		mg/L		D

Comments:

ORGANICS APPENDIX

U - Indicates that the compound was analyzed for but not detected.

J - Indicates that the compound was analyzed for and determined to be present in the sample. The mass spectrum of the compound meets the identification criteria of the method. The concentration listed is an estimated value, which is less than the specified minimum detection limit but is greater than zero.

B - This flag is used when the analyte is found in the blanks as well as the sample. It indicates possible sample contamination and warns the data user to use caution when applying the results of this analyte.

N - Indicates that the compound was analyzed for but not requested as an analyte. Value will not be listed on tabular result sheet.

S - Estimated due to surrogate outliers.

X - Matrix spike compound.

(1) - Cannot be separated.

(2) - Decomposes to azobenzene. Measured and calibrated as azobenzene.

A - This flag indicates that a TIC is a suspected aldol condensation product.

E - Indicates that it exceeds calibration curve range.

D - This flag identifies all compounds identified in an analysis at a secondary dilution factor.

C - Confirmed by GC/MS.

T - Compound present in TCLP blank.

P - This flag is used for a pesticide/aroclor target analyte when there is a greater than 25 percent difference for detected concentrations between the two GC columns (see Form X).

INORGANICS APPENDIX

C - Concentration qualifiers

U - Indicates analyte was not detected at method reporting limit.

B - Indicates analyte result between IDL and contract required detection limit (CRDL)

Q - QC qualifiers

E - Reported value is estimated because of the presence of interference

M - Duplicate injection precision not met

N - Spiked sample recovery not within control limits

S - The reported value was determined by the method of standard additions (MSA)

W - Post-digest spike recovery furnace analysis was out of 85-115 percent control limit, while sample absorbance was less than 50 percent of spike absorbance

* - Duplicate analysis not within control limit

+ - Correlation coefficient for MSA is less than 0.995

M - Method codes

P - ICP

A - Flame AA

F - Furnace AA

CV - Cold vapor AA (manual)

C - Cyanide

NR - Not Required

NC - Not Calculated as per protocols

STATE CERTIFICATIONS

In some instances it may be necessary for environmental data to be reported to a regulatory authority with reference to a certified laboratory. For your convenience, the laboratory identification numbers for Severn Trent Laboratories-Connecticut are provided in the following table. Many states certify laboratories for specific parameters or tests within a category (i.e. method 325.2 for wastewater). The information in the following table indicates the lab is certified in a general category of testing such as drinking water or wastewater analysis. The laboratory should be contacted directly if parameter-specific certification information is required.

Severn Trent-Connecticut
Certification Summary (as of March 1999)

State	Responsible Agency	Certification	Lab Number
Connecticut	Department of Health Services	Drinking Water, Wastewater	PH-0497
Kansas	Department of Health and Environment	Drinking Water, Wastewater/Solid, Hazardous Waste	E-10210
Maine	Department of Human Services	Wastewater	CT023
Massachusetts	Department of Environmental Protection	Potable/Non-Potable Water	CT023
New Hampshire	Department of Environmental Services	Drinking Water, Wastewater	2528
New Jersey	Department of Environmental Protection	Drinking Water, Wastewater	46410
New York	Department of Health	CLP, Drinking Water, Wastewater, Solid/ Hazardous Waste	10602
North Carolina	Division of Environmental Management	Wastewater Hazardous Waste	388
Oklahoma	Department of Environmental Quality	General Water Quality/ Sludge Testing	9614
Rhode Island	Department of Health	Chemistry...Non-Potable Water and Wastewater	A43
Washington	Department of Ecology	Wastewater/ Hazardous Waste	C231
Wisconsin	Department of Natural Resources	Wastewater/ Hazarous Waste	998355710

7099-2256A
STEARNS & WHELER
SAMPLE SUMMARY

CLIENT ID	LAB ID	MATRIX	DATE COLLECTED	DATE RECEIVED
MW-19S	992256A-01	WATER	09/13/99	09/14/99
MW-20D	992256A-02	WATER	09/13/99	09/14/99
TRIP BLANK	992256A-03	WATER	09/13/99	09/14/99

IEA-CT ANALYTICAL SUMMARY

Client ID: MW-19S, MW-20D, TRIP BLANK
Job Number: 7099-2256A

Date: 10/8/99

Qty	Matrix	Analysis	Description
1	None	DISK	Diskette Prep.
2	WATER	ALK-N310.1	Alkalinity
2	WATER	AMMONIA-N350.2	Ammonia
2	WATER	BOD5-N405.1	Biochemical Oxygen D
2	WATER	BROMIDE-N320.1	Bromide
2	WATER	CHLORIDE-N325.2	Chloride
2	WATER	COD-N410.4	Chemical Oxygen Dema
2	WATER	HARDNESS-N130.2	Hardness
2	WATER	MET-NSW846-TAL	TAL Metals
2	WATER	NITRATE-N353.2	Nitrate-Nitrogen
2	WATER	PHENOLS-N420.2	Phenols
2	WATER	RSK-175	METHANE, ETHANE, ETH
2	WATER	SULFATE-N375.3	Sulfate
2	WATER	TDS-N160.1	Total Dissolved Soli
2	WATER	TKN-N351.2	Total Kjeldahl Nitro
2	WATER	TOC-N9060-DUP	Total Organic Carbon
3	WATER	VOA-N8260B-TCL	TCL Volatile Organic

MICROSEEPS

University of Pittsburgh Applied Research Center
220 William Pitt Way, Pittsburgh, PA 15238
(412) 826-5245
FAX (412) 826-3433

October 5, 1999

Mr. Paul Hobart
Severn Trent Laboratories
200 Monroe Turnpike
Monroe, CT 06468

Dear Mr. Hobart:

Attached are the final data listings for the samples we received on September 16 , 1999, your project #7099-2256A.

Please give me a call if you have questions or I can be of further assistance. Thank you for using MICROSEEPS.

Sincerely,

Rebecca J. Hans

RJH/lsp

Attachment: ST51-993351

ST51-993351

---- SEVERN TRENT LABORATORIES ----
---- PROJECT: 7099-2256A ----

Sample Names	Carbon Dioxide mg/l	Oxygen mg/l	Methane mg/l	Methane ug/l	Lab ID	Date Sampled	Date Received	Date Analyzed	Analyst
MW-19S	1.54	3.19	*	0.023	X8 291	09/13/99	09/16/99	09/27/99	RCW
MW-20D	17.86	0.92	35.92	*	X8 292	09/13/99	09/16/99	09/27/99	RCW
DETECTION LIM	0.60mg/l	0.15mg/l	0.07mg/l	0.015ug/l					

* Result taken from alternate detector

ANALYST INITIALS RCW

REVIEW nl.

---- QUALITY CONTROL ----

ST51-993351

----- SEVERN TRENT LABORATORIES -----
---- PROJECT: 7099-2256A -----

CONTINUING CALIBRATION STANDARDS 09/27/99

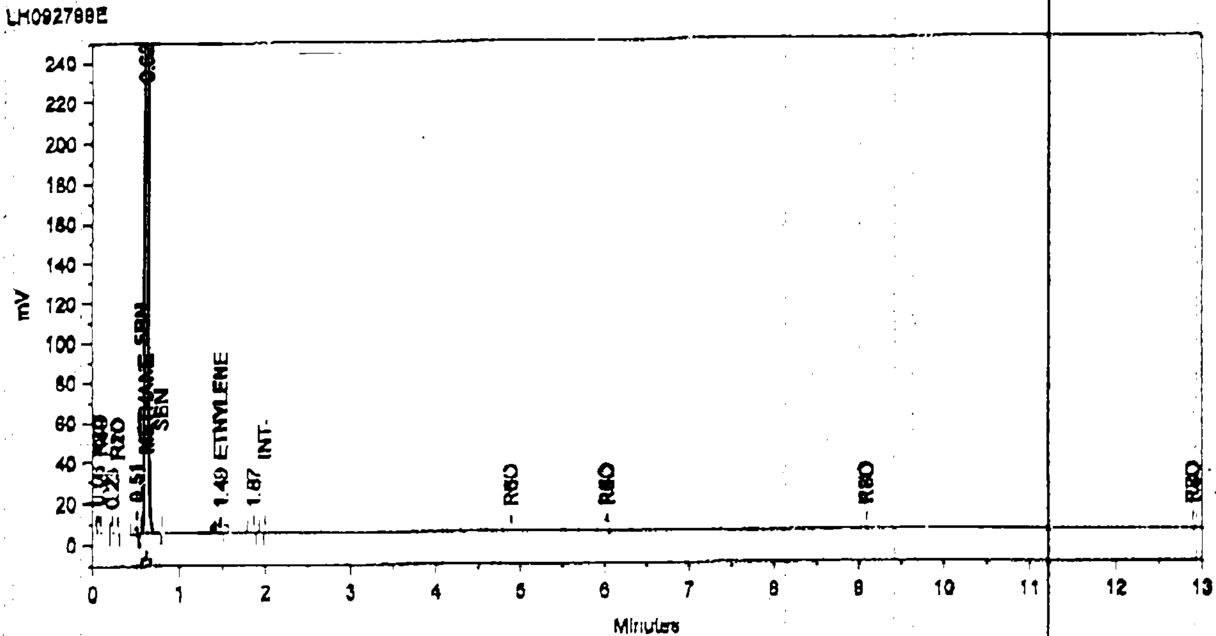
COMPOUND	FILE ID	TRUE CONC.	MEASURED	% DIFF.
CARBON DIOXIDE	X8 282	159.62	151.82	4.89
OXYGEN	X8 282	16.96	16.83	0.75
METHANE (TCD)	X8 282	5.48	5.11	6.71
METHANE (FID)	X8 288	21.924	22.363	2.00

METHOD BLANK 09/27/99

COMPOUND	FILE ID	DET. LIMIT	MEASURED
CARBON DIOXIDE	X8 290	0.60mg/l	ND
OXYGEN	X8 290	0.15mg/l	ND
METHANE (TCD)	X8 290	0.07 mg/l	ND
METHANE (FID)	X8 290	0.015 ug/l	ND

ANALYST INITIALS RCW

REVIEW ML.



Sample Name: LH092799E
Acquired from Chrom1--Det1A via port 1 on 9/27/99 01:02:10pm by RCW
FID

Data File: C:\CPWIN\X8\X8A2.88R
Date Stamp: 9/27/99 01:02:10pm
Sequence File: X8A.SEQ #288
Method File: C:\CPWIN\X8\X8A_W3.MET
Version 2. Date Stamp: 9/27/99 12:47:24pm
Calibration File: C:\CPWIN\X8\X8A_W3.CAL
Version 4. Date Stamp: 9/28/99 05:36:56pm

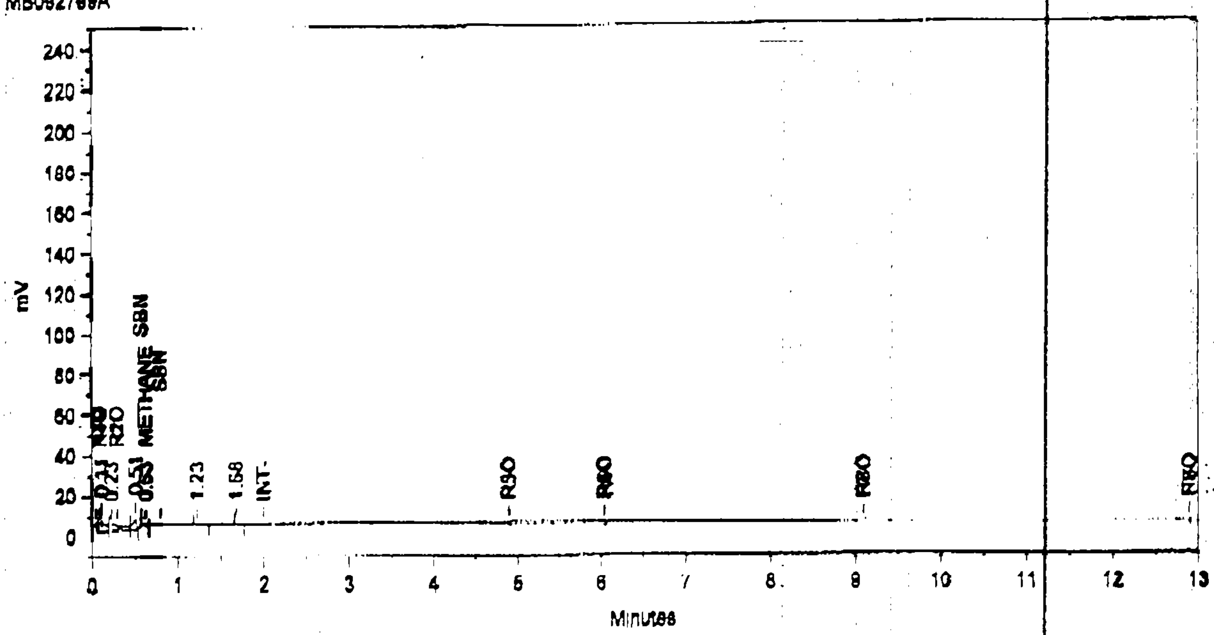
Run Time = 13.0 min Sample Rate = 3.0 per sec.
Amount Inj. = 0.000 Dilution Factor = 0.000
Sample Weight = 0.000 Int Std Amount = 0.000

Starting Peak Width = 0.05 min. Peak Threshold = 1 Area Reject = 100

PK#	Ret Time	Name	Amount	Amount%	Area	Area%	Type	Width	Height	Height%
1	0.061		0.0703	0.262	4360.3	0.310	BV	0.039	1860.14	0.227
2	0.229		0.0830	0.310	5147.6	0.366	VB	0.094	917.42	0.112
3	0.506		0.1851	0.690	11471.2	0.815	BB	0.039	4861.38	0.594
4	0.622	METHANE	22.3625	83.429	1386225.0	98.483	BB	0.029	810405.20	99.051
5	1.488	ETHYLENE	4.1005	15.298	205.5	0.014	BB	0.047	72.74	0.009
6	1.870		0.0028	0.010	173.2	0.012	BB	0.057	50.98	0.006

Total Area = 1407580.0, Total Amount = 26.804, Total Height = 818167.9, Sample Units = ug&mg/L

MB092799A



Sample Name: **MB092799A**
Acquired from Chrom1--Det1A via port 1 on 9/27/99 01:31:15pm by RCW
FID

Data File: C:\CPWIN\X8\X8A2.90R
Date Stamp: 9/27/99 01:31:14pm
Sequence File: X8A.SEQ #290
Method File: C:\CPWIN\X8\X8A_W3.MET
Version 2. Date Stamp: 9/27/99 12:47:24pm
Calibration File: C:\CPWIN\X8\X8A_W3.CAL
Version 4. Date Stamp: 9/28/99 05:36:56pm

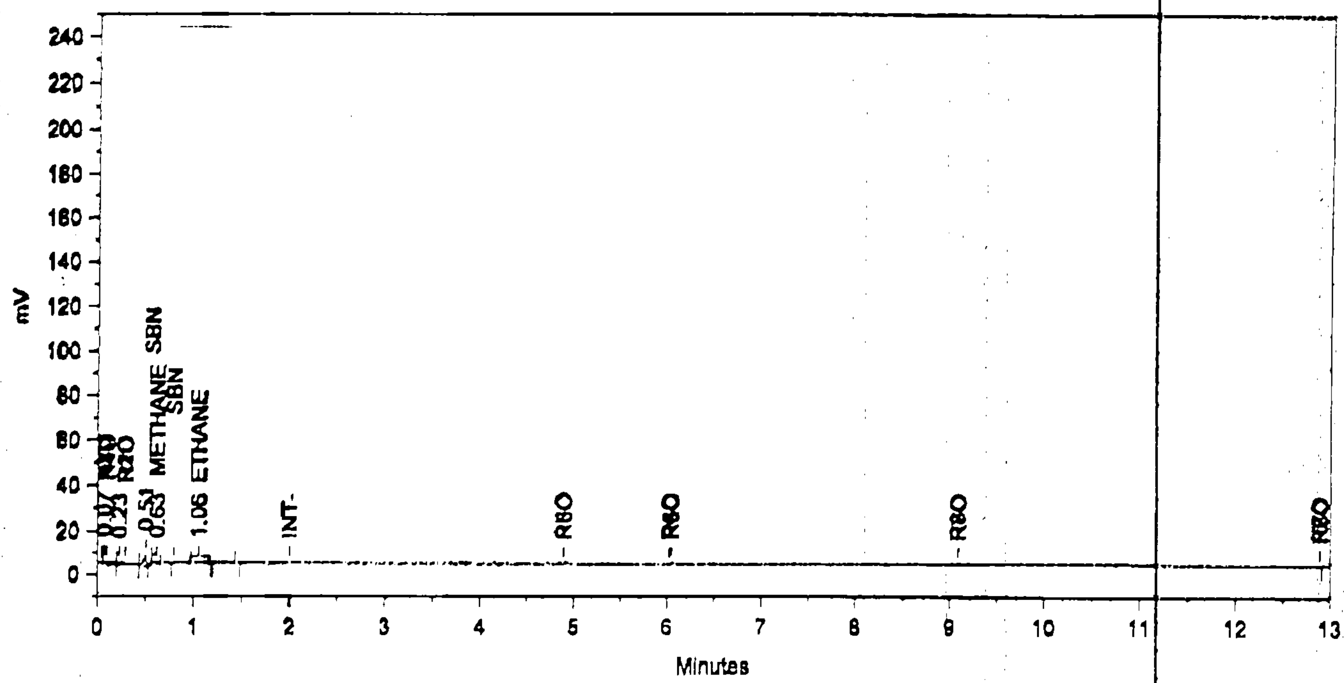
Run Time = 13.0 min Sample Rate = 3.0 per sec.
Amount Inj. = 0.000 Dilution Factor = 0.000
Sample Weight = 0.000 Int Std Amount = 0.000

Starting Peak Width = 0.05 min. Peak Threshold = 1 Area Reject = 100

PK#	Ret Time	Name	Amount	Amount%	Area	Area%	Type	Width	Height	Height%
1	0.111		0.4012	32.720	24871.7	32.720	DV	0.076	5420.02	38.358
2	0.226		0.5480	44.685	33966.9	44.685	VV	0.195	2910.60	20.599
3	0.509		0.2632	21.466	16317.6	21.466	VB	0.049	5591.01	39.569
4	0.625	METHANE	0.0055	0.449	341.4	0.449	BB	0.056	101.41	0.718
5	1.229		0.0054	0.438	332.9	0.438	BB	0.100	55.55	0.393
6	1.679		0.0030	0.242	183.7	0.242	BB	0.060	51.35	0.363

Total Area = 76014.3, Total Amount = 1.226, Total Height = 14129.93, Sample Units = ug/kg/L

ST51 MW-18S



Sample Name: **ST51 MW-19S**
Acquired from Chrom1--Det1A via port 1 on 9/27/99 02:00:58pm by RCW
FID

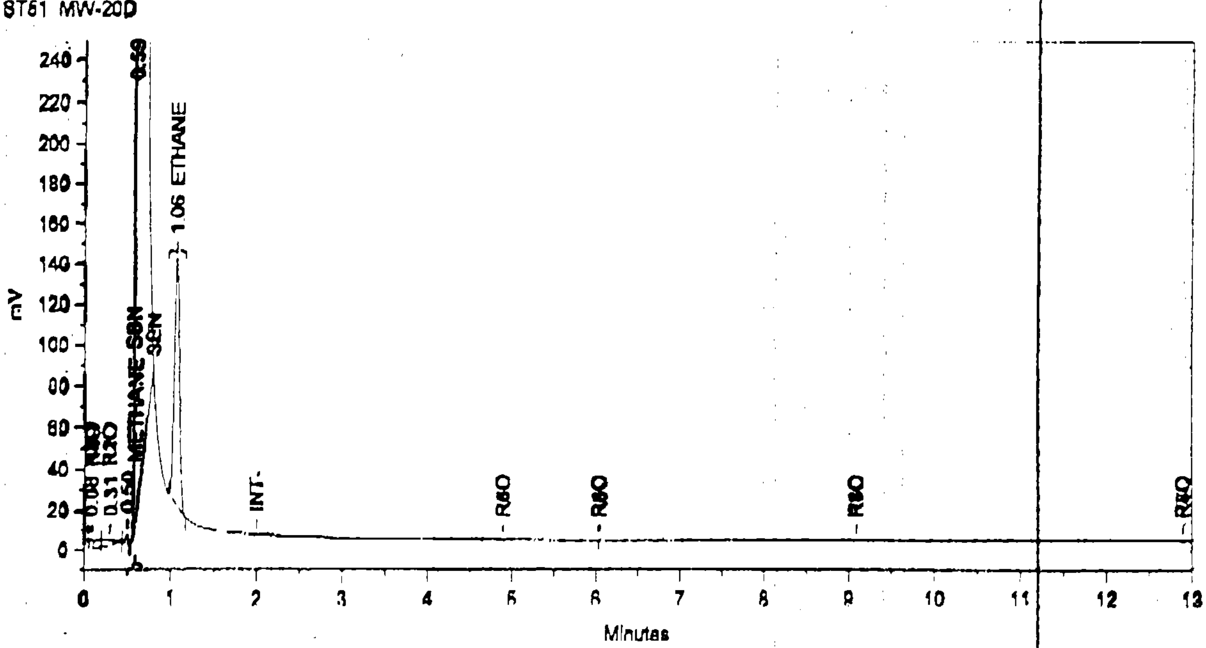
Data File: C:\CPWIN\X8\X8A2.91R
Date Stamp: 9/27/99 02:00:58pm
Sequence File: X8A.SEQ #291
Method File: C:\CPWIN\X8\X8A_W3.MET
Version 2. Date Stamp: 9/27/99 12:47:24pm
Calibration File: C:\CPWIN\X8\X8A_W3.CAL
Version 4. Date Stamp: 9/28/99 05:36:56pm

Run Time = 13.0 min Sample Rate = 3.0 per sec.
Amount Inj. = 0.000 Dilution Factor = 0.000
Sample Weight = 0.000 Int Std Amount = 0.000

Starting Peak Width = 0.05 min. Peak Threshold = 1 Area Reject = 100

PK#	Ret Time	Name	Amount	Amount%	Area	Area%	Type	Width	Height	Height%
1	0.067		0.0464	0.532	2877.2	14.385	BV	0.035	1364.05	18.175
2	0.228		0.0802	0.919	4969.1	24.843	VB	0.126	659.51	8.788
3	0.509		0.1647	1.887	10208.9	51.040	BB	0.035	4915.62	65.499
4	0.626	METHANE	0.0234	0.268	1448.2	7.240	BB	0.050	485.94	6.475
5	1.056	ETHANE	8.4109	96.394	498.5	2.492	BB	0.104	79.76	1.063

Total Area = 20001.8, Total Amount = 8.726, Total Height = 7504.89, Sample Units = ug&mg/L



Sample Name: **ST51 MW-20D**

Acquired from Chrom1--Det1 A via port 1 on 9/27/99 02:22:19pm by RCW

FID

Data File:	**C:\CPWIN\X8\X8A2.92R**
	Date Stamp: 9/27/99 02:22:18pm
Sequence File:	X8A.SEQ #292
Method File:	C:\CPWIN\X8\X8A_W3.MET
	Version 2. Date Stamp: 9/27/99 12:47:24pm
Calibration File:	C:\CPWIN\X8\X8A_W3.CAL
	Version 4. Date Stamp: 9/28/99 05:36:56pm

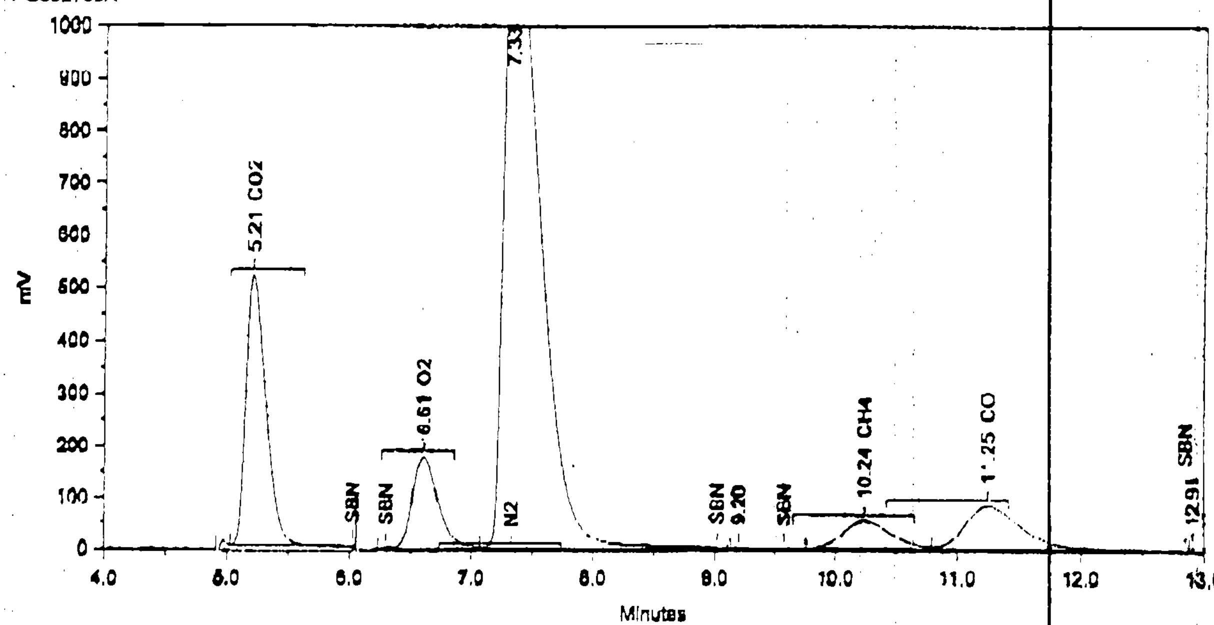
Run Time	= 13.0 min	Sample Rate	= 3.0 per sec.
Amount Inj.	= 0.000	Dilution Factor	= 0.000
Sample Weight	= 0.000	Int Std Amount	= 0.000

Starting Peak Width = 0.05 min. Peak Threshold = 1 Area Reject = 100

PK#	Ret Time	Name	Amount	Amount%	Area	Area%	Type	Width	Height	Height%
1	0.081		0.5134	0.006	31825.8	0.198	BY	0.115	4595.01	0.212
2	0.306		0.3825	0.004	23712.0	0.147	VB	0.158	2503.00	0.115
3	0.503		0.1461	0.002	9056.8	0.056	HB	0.033	4551.05	0.210
4	0.592	METHANE	250.1563	2.837	15506860.0	96.440	BB	0.127	2036633.00	93.908
5	1.065	ETHANE	8567.6230	97.152	507748.1	3.158	BB	0.070	120470.80	5.555

Total Area = 16079200.0, Total Amount = 8818.821, Total Height = 2168754.0, Sample Units = ug/ug/L

PG092799A



Sample Name: PG092799A
Acquired from Chrom1--Det1B via port 2 on 9/27/99 11:04:56am by RCW
TCD

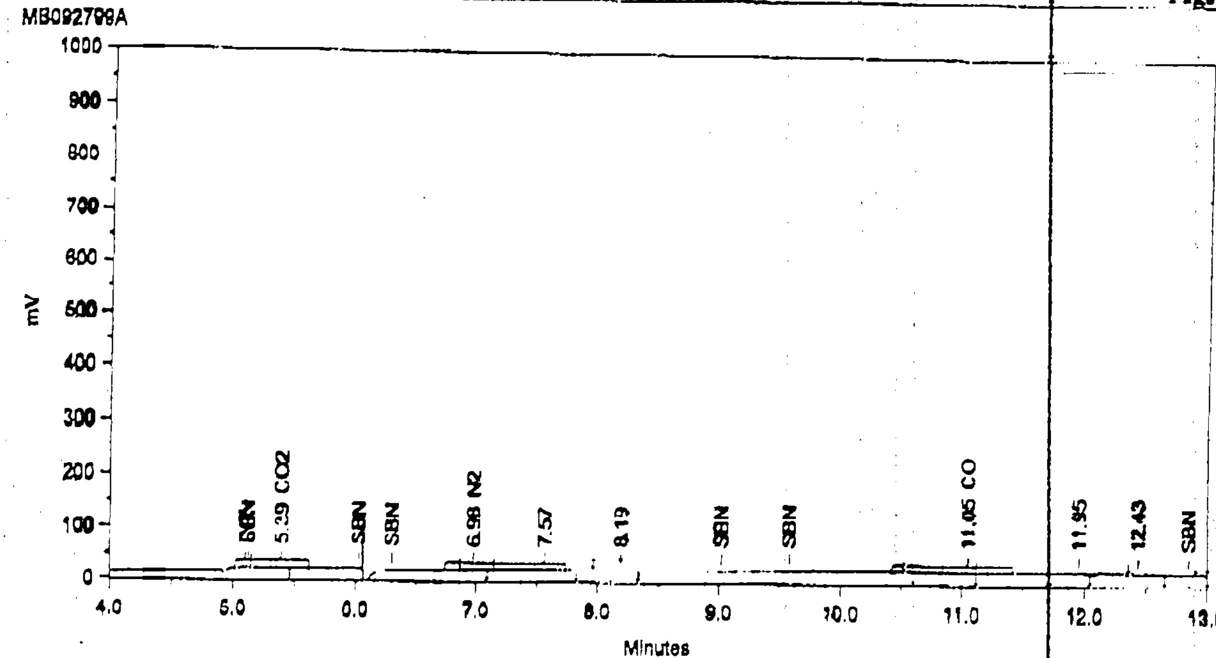
Data File: C:\CPWIN\X8\X8B2.82R
Date Stamp: 9/27/99 11:04:56am
Sequence File: X8A.SEQ #282
Method File: C:\CPWIN\X8\X8B_W3.MET
Version 8. Date Stamp: 9/30/99 04:32:18pm
Calibration File: C:\CPWIN\X8\X8B_W3.CAL
Version 6. Date Stamp: 9/30/99 04:33:40pm

Run Time = 13.0 min Sample Rate = 3.0 per sec.
Amount Inj. = 0.000 Dilution Factor = 0.000
Sample Weight = 0.000 Int Std Amount = 0.000

Starting Peak Width = 0.1 min. Peak Threshold = 1 Area Reject = 0
* Some peaks have been manually integrated.

PK#	Ret Time	Name	Amount	Amount%	Area	Area%	Type	Width	Height	Height%
1	5.207	CO2	151.8166	47.297	5918162.0	15.491	BB	0.190	518843.30	24.260
2	6.608	O2	16.8327	5.244	2650917.0	6.939	BV	0.251	176283.30	8.243
3	7.330	N2	132.9118	41.407	25490060.0	66.723	VB	0.327	1299835.00	60.777
4	9.199		0.2519	0.078	9820.5	0.026	BB	0.228	717.31	0.034
5	10.239	CH4	5.1128	1.593	1488016.0	3.895	BV	0.465	53349.14	2.494
6	11.250	CO	13.9971	4.361	2643489.0	6.920	VB	0.524	84125.75	3.934
7	12.906		0.0642	0.020	2501.0	0.007	BB	0.008	5540.85	0.259

Total Area = 38202900.0, Total Amount = 320.987, Total Height = 2138094.0, Sample Units = mg/L
* Some peaks have been manually integrated.



Sample Name: MB092799A
Acquired from Chrom1--Dct1B via port 2 on 9/27/99 01:31:15pm by RCW
TCD

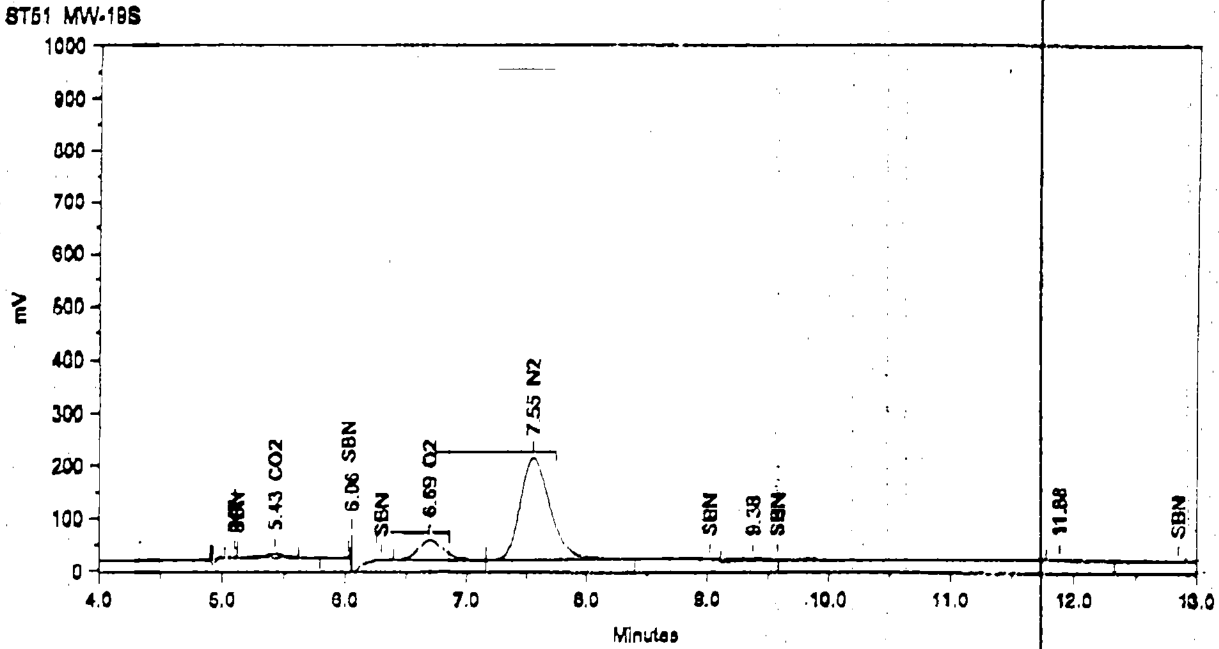
Data File: C:\CPWIN\X8\X8B2.90R
Date Stamp: 9/27/99 01:31:14pm
Sequence File: X8A.SEQ #290
Method File: C:\CPWIN\X8\X8B_W3.MET
Version 8, Date Stamp: 9/30/99 04:32:18pm
Calibration File: C:\CPWIN\X8\X8B_W3.CAL
Version 6, Date Stamp: 9/30/99 04:33:40pm

Run Time = 13.0 min Sample Rate = 3.0 per sec.
Amount Inj. = 0.000 Dilution Factor = 0.000
Sample Weight = 0.000 Int Std Amount = 0.000

Starting Peak Width = 0.1 min. Peak Threshold = 1 Area Reject = 0
* Some peaks have been manually integrated.

PK#	Ret Time	Name	Amount	Amount%	Area	Area%	Type	Width	Height	Height%
1	5.395	CO2	0.0420	4.937	1635.9	4.393	BB	0.194	140.88	8.444
2	6.979	N2	0.0046	0.541	881.6	2.368	DD	0.103	143.02	8.572
3	7.566		0.2155	25.356	8402.3	22.565	BB	0.308	454.81	27.259
4	8.193		0.0371	4.362	1445.3	3.881	BB	0.169	142.13	8.518
5	11.049	CO	0.0227	2.666	4280.5	11.495	BV	0.418	170.48	10.218
6	11.955		0.4638	54.560	18079.5	48.554	VV	0.793	379.79	22.763
7	12.434		0.0644	7.578	2511.1	6.744	VB	0.176	237.37	14.227

Total Area = 37236.2, Total Amount = 0.85, Total Height = 1668.48; Sample Units = mg/L
* Some peaks have been manually integrated.



Sample Name: ST51 MW-19S
Acquired from Chrom1--Det1B via port 2 on 9/27/99 02:00:58pm by RCW
TCD

Data File: C:\CPWIN\X8\X8B2.91R
Date Stamp: 9/27/99 02:00:58pm
Sequence File: X8A.SEQ #291
Method File: C:\CPWIN\X8\X8B_W3.MET
Version 8. Date Stamp: 9/30/99 04:32:18pm
Calibration File: C:\CPWIN\X8\X8B_W3.CAL
Version 6. Date Stamp: 9/30/99 04:33:40pm

Run Time = 13.0 min Sample Rate = 3.0 per sec.
Amount Inj. = 0.000 Dilution Factor = 0.000
Sample Weight = 0.000 Int Std Amount = 0.000

Starting Peak Width = 0.1 min. Peak Threshold = 1 Area Reject = 0
* Some peaks have been manually integrated.

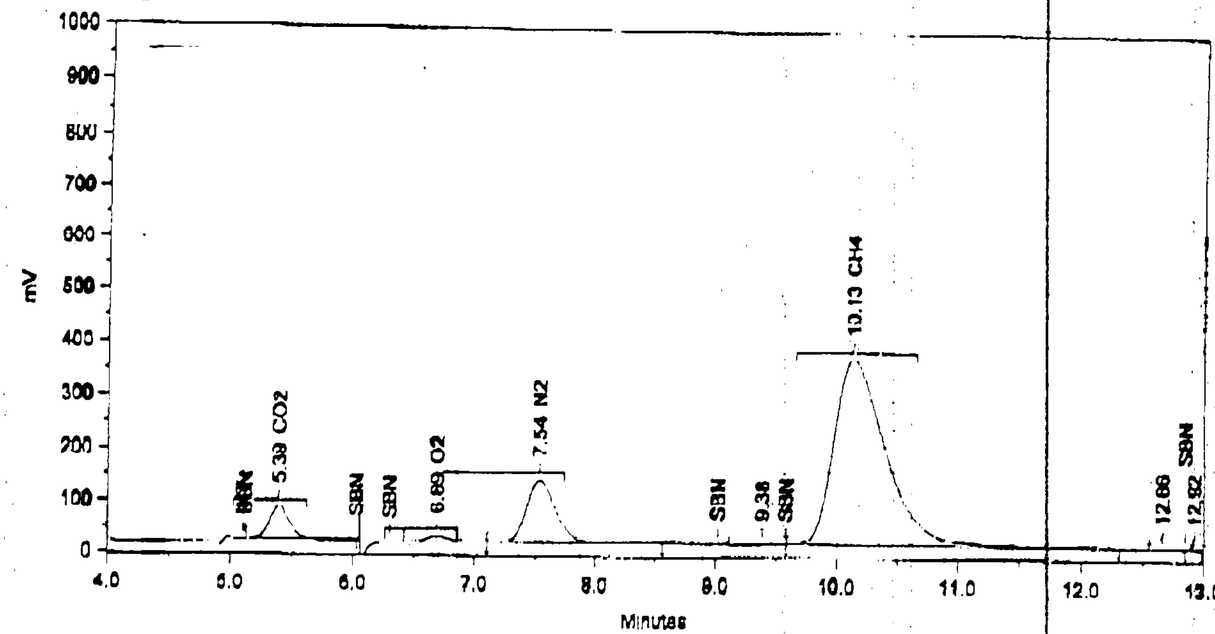
Pk#	Ret Time	Name	Amount	Amount%	Area	Area%	Type	Width	Height	Height%
1	5.428	CO2	1.5396	6.264	60018.3	1.520	BB	0.188	5322.41	1.703
2	6.055		0.8432	3.430	32868.0	0.832	BB	0.007	75923.23	24.291
3	6.692	O2	3.1900	12.979	502381.5	12.722	BV	0.230	36364.41	11.634
4	7.551	N2	17.0997	69.571	3279418.0	83.044	VB	0.284	192359.10	61.544
5	9.378		1.8093	7.361	70529.9	1.786	BB	0.496	2368.41	0.758
6	11.882		0.0971	0.395	3785.3	0.096	BB	0.285	221.18	0.071

Total Area = 3949001.0, Total Amount = 24.579, Total Height = 312557.7, Sample Units = mg/L
* Some peaks have been manually integrated.

ST51 MW-20D

Page1

ST51 MW-20D



Sample Name: ST51 MW-20D
Acquired from Chrom1--Det1B via port 2 on 9/27/99 02:22:19pm by RCW
TCD

Data File: C:\CPWIN\X8\X8B2.92R
Date Stamp: 9/27/99 02:22:20pm
Sequence File: X8A.SEQ #292
Method File: C:\CPWIN\X8\X8B_W3.MET
Version 8. Date Stamp: 9/30/99 04:32:18pm
Calibration File: C:\CPWIN\X8\X8B_W3.CAL
Version 6. Date Stamp: 9/30/99 04:33:40pm

Run Time	= 13.0 min	Sample Rate	= 3.0 per sec.
Amount Inj.	= 0.000	Dilution Factor	= 0.000
Sample Weight	= 0.000	Int Std Amount	= 0.000

Starting Peak Width = 0.1 min. Peak Threshold = 1 Area Reject = 0
* Some peaks have been manually integrated.

PK#	Ret Time	Name	Amount	Amount%	Area	Area%	Type	Width	Height	Height%
1	5.392	CO2	17.8605	26.618	696245.6	5.201	BB	0.190	61139.84	11.913
2	6.692	O2	0.9258	1.377	143489.7	1.087	BV	0.224	10808.86	1.982
3	7.537	N2	10.5114	15.665	2015903.0	15.060	VB	0.282	119041.40	21.831
4	9.384		1.8182	2.710	70876.5	0.529	HB	0.494	2391.78	0.439
5	10.125	CH4	35.9242	53.538	10455240.0	78.105	BB	0.426	351238.70	64.415
6	12.659		0.0308	0.046	1199.3	0.009	BB	0.125	159.42	0.029
7	12.922		0.0311	0.046	1213.7	0.009	BB	0.041	495.34	0.091

Total Area = 13386170.0, Total Amount = 67.1, Total Height = 545275.4, Sample Units = mg/L
* Some peaks have been manually integrated.

STL
Committed To Your Success

SEVERN TRENT LABORATORIES SUBCONTRACTING REQUISITION FORM

993350-ST51

A. PROJECT INFORMATION

PAGE 1 OF 1

1. P.O. NUMBER: CT 7930	2. VERBAL DUE DATE: —	3. FAX DUE DATE: —	4. HARDCOPY DUE DATE: 10/1/99
5. INTERNAL PROJECT NUMBER: 7099-2256A	6. SDG COMPLETE? ☒ YES ☐ NO	7. PENALTY JOB? ☐ YES ☒ NO	8. SDG #: A2256
REGULATORY METHODS: RSK175	10. QC BILLABLE? ☐ YES ☒ NO	11. VTSR DATE: 9/14/99	12. REQUIRED CERTIFICATIONS? IF YES, LIST
EA PROJECT MANAGER: Paul Hobart	16. TELEPHONE NO.	17. REPORTING LEVEL REQUIRED: 1 (2) 3 4	18. REPORTING FORMAT?
19. PERCENT DISCOUNT	20. RUSH MULTIPLIER	21. DISKETTE REQUIRED? ☒ YES ☐ NO	22. DISKETTE FORMAT?

13. CERT. AGENCY: NY
14. CATEGORY:

CLIENT SAMPLE ID	24. LAB ID	25. DATE AND TIME	26. MATRIX	27. PARAMETER/METHOD/PRES.	28. BOTTLE TYPE & NO.	29. NET PRICE
MW-19S	-01	9/13/99 0830	WA	CO_2, O_2, Methane	3x40ml VoA	[illegible]
MW-20D	-02	↓ 1200	↓	↓	↓	↓

30. SAMPLES RELINQUISHED BY (SIGNATURE)	31. DATE AND TIME	32. SAMPLES RECEIVED BY (SIGNATURE)	33. DATE AND TIME	34. REMARKS ON SAMPLE RECEIPT
[signature]	9/14/99 1515	[signature]	9/15/99 0930	☐ Bottle Intact ☐ Preserved ☐ Chilled ☐ Custody Seals ☐ Seals Intact ☐ See Remarks
SAMPLES RELINQUISHED BY (SIGNATURE): [signature]	DATE AND TIME: 9/15/99 1645	SAMPLES RECEIVED BY (SIGNATURE): Brian Camillo	DATE AND TIME: 9-16-99 1100	REMARKS ON SAMPLE RECEIPT: ☐ Bottle Intact ☐ Preserved ☐ Chilled ☐ Custody Seals ☐ Seals Intact ☐ See Remarks

35. SPECIAL INSTRUCTIONS?/REMARKS (ATTACH SEPARATE SHEET IF NECESSARY)

SHIPPING INSTRUCTIONS

SHIP TO: STL - ~~Pensacola~~ VT

37. SHIP DATE: 9/14/99

(Circle One)

Economy Standard Priority 1 Saturday Delivery

C. REPORTING INSTRUCTIONS

BILL TO: STL, CT

39. REPORT TO

40. TOTAL NUMBER OF COPIES 1

41. USE FOR REPORTING? CLIENT OR LAB ID'S

D. APPROVALS

42. INITIATOR APPROVAL: [signature]	DATE: 9/14/99	44. SENDING LABORATORY
43. RECEIVING LAB APPROVAL	DATE	45. RECEIVING LABORATORY

Severn Trent Laboratories
200 Monroe Turnpike
Monroe CT 06468
Tel (203) 261 4458
Fax (203) 268 5346
Committed to Your Success

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1 NO. P7099-2256A

STL JOB #: 7099-2256A

CLIENT: STEARNS & WHELER

PROJECT NO: S78070-FARNELL L.P.

PAUL HOBART

DUE DATE

BOTTLE SET #	CLIENT SAMPLE ID	DATE / TIME SAMPLED	MATRIX	LAB ID	QC Y / N	CHLORIDE BROMIDE NITRATE TDS SULFATE ALK	TKN COD AMMONIA	BOD5	MET-TAL HARDNESS	PHENOLS	RSK 175	TOC-DUP	VOA-TCL
Bottle type and preservation						PL1000	H2SO4 PL1000	PL1000	HNO3 PL1000	H2SO4 GL500	UNP SEPTA	H2SO4 VOAVIAL	UNP VOAVIAL
Field filtered - circle Y or N						Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
01	MW-19S	9/13/99 / 8:30	WA	01	N	1	2	1	1	1	3	2	2
02	MW-20D	/ 12:00	WA	02	N	1	2	1	1	1	3	2	2
03			WA	03	N								2

GENERAL REMARKS

* Unable to fill Bottle for BOD, and (TKN, COD, Ammonia) at MW-20D, Try to get out of other Bott

SAMPLE REMARKS

03: Trip Blank

PASSED RAD SCREEN

4°C

MATRIX CODES

BOTTLES PREPARED BY: Rich Chandler DATE / TIME: 9/9/99 12:00

SIGNATURE:

SAMPLES COLLECTED BY: Robert A Sortello DATE / TIME: 9/13/99

SIGNATURE: 9/13/99

BOTTLES REC'D BY DATE / TIME

SIGNATURE

RECEIVED IN LAB BY DATE / TIME

SIGNATURE 9/14/99 1000

REMARKS ON SAMPLE RECEIPT

[ ] BOTTLES INTACT [ ] CUSTODY SEALS

[ ] PRESERVED [ ] SEALS INTACT

[ ] CHILLED [ ] SEE REMARKS

Severn Trent
200 Monroe T
Monroe CT 0
Tel: (203) 26
Fax: (203) 26

STL

mitted To *Your* Success

CHAIN OF CUSTODY
ATOMIC SPECTROSCOPY DEPARTMENT

b Number 7099-2256A Sample Numbers 01-22

WATER - SOIL - SLUDGE - EPTOX/TCLP

confirm that I have performed the preparation below following SOP guidelines
thorize the release of this preparation:

Sample Prep	Chemist	Date(s)	
		9/21/99	ICP/FI
			FURN
		9/15/99	MERCUR

I confirm that I have performed the analysis below following SOP guidelines and a
thorize the release of all associated data:

Analysis	Chemist	Date(s)	
		09/23/99	ICP
			FLAME
			FURN
		9/16/99	MERCUR

I have reviewed and authorize the release of this job:

Complete ______ Supervisor 9/24/99 Date

Batch Assignment 8911

Other Laboratory Locations:

a part of Severn Trent Services Inc.

IEA / CT
LABORATORY CHRONICLE

SAMPLE PREPARATION AND ANALYSIS SUMMARY
INORGANIC ANALYSIS

JOB #: 7099-2256A

SAMPLE ID	MATRIX	LIST REQUESTED	DATE RECEIVED	DATE DIGESTED	DATE ANALYZED
MW-19S	WATER	MET-NSW846-TAL	09/14/99	9/21/99	9/23/99
MW-20D	WATER	MET-NSW846-TAL	09/14/99	↓	↓

Section Supervisor (signature) [signature]

Review & Approval (printed name) [illegible]

(Date) 9/24/99

QC Supervisor (signature) ____________

Review & Approval (printed name) ____________

(Date) ___/___/___

2A

WATER VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 2256A SAS No.: _____ SDG No.: A2256

	EPA SAMPLE NO.	SMC1 (TOL) #	SMC2 (BFB) #	SMC3 (DCE) #	OTHER	TOT OUT
01	VBLKOH	106	100	99		0
02	TRIP BLANK	105	101	94		0
03	MW-19S	104	100	94		0
04	MW-20D	102	98	96		0
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

		QC LIMITS
SMC1 (TOL)	= Toluene-d8	(88-110)
SMC2 (BFB)	= Bromofluorobenzene	(86-115)
SMC3 (DCE)	= 1,2-Dichloroethane-d4	(76-114)

Column to be used to flag recovery values

* Values outside of contract required QC limits

3-ASP

WATER VOLATILE SPIKE/SPIKE DUPLICATE RECOVERY SUMMARY

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: ~~2208A~~ 3256A SAS No.: _____ SDG No.: ~~A2208~~ A2256

Matrix Spike - EPA Sample No.: SDB-2D

PS
09/24/99

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	SPIKE CONCENTRATION (ug/L)	SPIKE % REC #	QC. LIMITS REC.
Chloromethane	50	0	46	92	22-140
Bromomethane	50	0	38	76	30-135
Vinyl Chloride	50	0	46	92	30-148
Chloroethane	50	0	45	90	28-174
Methylene Chloride	50	.5	43	85	58-141
Acetone	50	1	26	50	0-262
Carbon Disulfide	50	0	39	78	30-148
Vinyl Acetate	50	0	130	260 *	0-190
1,1-Dichloroethene	50	0	46	92	63-134
1,1-Dichloroethane	50	0	55	110	73-130
1,2-Dichloroethene (total)	100	0	95	95	73-127
Chloroform	50	1	53	104	73-129
1,2-Dichloroethane	50	0	50	100	68-133
2-Butanone	50	0	58	116	21-215
1,1,1-Trichloroethane	50	0	49	98	68-134
Carbon Tetrachloride	50	0	50	100	53-132
Bromodichloromethane	50	0	49	98	71-129
1,2-Dichloropropane	50	0	54	108	74-137
cis-1,3-Dichloropropene	50	0	53	106	73-119
Trichloroethene	50	0	47	94	66-121
Dibromochloromethane	50	0	50	100	59-136
1,1,2-Trichloroethane	50	0	56	112	75-131
Benzene	50	0	52	104	73-124
trans-1,3-Dichloropropene	50	0	54	108	71-117
Bromoform	50	0	54	108	53-133
4-Methyl-2-Pentanone	50	0	56	112	42-163
2-Hexanone	50	0	22	44	17-202
Tetrachloroethene	50	0	40	80	68-124
Toluene	50	0	51	102	72-123
1,1,2,2-Tetrachloroethane	50	0	67	134	64-147

Column to be used to flag recovery with an asterisk

* Values outside of QC limits.

Spike Recovery: ~~0~~ 2 out of 68 outside limits

COMMENTS: ______________________________

FORM III VOA-1 8260

3-ASP

WATER VOLATILE SPIKE/SPIKE DUPLICATE RECOVERY SUMMARY

Lab–Name: STL/CT Contract: ______

Lab Code: IEACT Case No.: ~~2208A~~ 2256A SAS No.: ______ SDG No.: ~~A2208~~ A2256

Matrix Spike - EPA Sample No.: SDB-2D

PSJ
09/24/99

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	SPIKE CONCENTRATION (ug/L)	SPIKE % REC #	QC. LIMITS REC.
Chlorobenzene	50	0	50	100	83-121
Ethylbenzene	50	0	50	100	86-121
Styrene	50	0	51	102	77-126
Xylene (total)	150	0	150	100	82-122
					-
					-
					-
					-
					-
					-
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					-
					-
					-

Column to be used to flag recovery with an asterisk

* Values outside of QC limits.

Spike Recovery: ~~0~~ 2 out of 68 outside limits

COMMENTS: ______

3-ASP
WATER VOLATILE SPIKE/SPIKE DUPLICATE RECOVERY SUMMARY

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: ~~2208A~~ 2256A SAS No.: _____ SDG No.: ~~A2208~~ A2256

Matrix Spike - EPA Sample No.: SDB-2D

PS
09/24/99

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Chloromethane	50	51	102	10	20	22-140
Bromomethane	50	45	90	17	20	30-135
Vinyl Chloride	50	49	98	6	20	30-148
Chloroethane	50	47	94	4	20	28-174
Methylene Chloride	50	58	115	30*	20	58-141
Acetone	50	26	50	0	20	0-262
Carbon Disulfide	50	51	102	27*	20	30-148
Vinyl Acetate	50	130	260*	0	20	0-190
1,1-Dichloroethene	50	48	96	4	20	63-134
1,1-Dichloroethane	50	60	120	9	20	73-130
1,2-Dichloroethene (total)	100	110	110	15	20	73-127
Chloroform	50	54	106	2	20	73-129
1,2-Dichloroethane	50	51	102	2	20	68-133
2-Butanone	50	61	122	5	20	21-215
1,1,1-Trichloroethane	50	49	98	0	20	68-134
Carbon Tetrachloride	50	51	102	2	20	53-132
Bromodichloromethane	50	50	100	2	20	71-129
1,2-Dichloropropane	50	54	108	0	20	74-137
cis-1,3-Dichloropropene	50	53	106	0	20	73-119
Trichloroethene	50	47	94	0	20	66-121
Dibromochloromethane	50	51	102	2	20	59-136
1,1,2-Trichloroethane	50	55	110	2	20	75-131
Benzene	50	53	106	2	20	73-124
trans-1,3-Dichloropropene	50	54	108	0	20	71-117
Bromoform	50	55	110	2	20	53-133
4-Methyl-2-Pentanone	50	55	110	2	20	42-163
2-Hexanone	50	22	44	0	20	17-202
Tetrachloroethene	50	41	82	2	20	68-124
Toluene	50	51	102	0	20	72-123
1,1,2,2-Tetrachloroethane	50	68	136	2	20	64-147

Column to be used to flag recovery with an asterisk

* Values outside of QC limits.

RPD: 2 out of 34 outside limits
Spike Recovery: ~~0~~ 2 out of 68 outside limits
COMMENTS: ____________

3-ASP
WATER VOLATILE SPIKE/SPIKE DUPLICATE RECOVERY SUMMARY

Lab Name: STL/CT Contract: ______

Lab Code: IEACT Case No.: ~~2208A~~ 2256A SAS No.: ______ SDG No.: ~~A2208~~ A2256

Matrix Spike - EPA Sample No.: SDB-2D

09/24/99

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS	
					RPD	REC.
Chlorobenzene	50	51	102	2	20	83-121
Ethylbenzene	50	50	100	0	20	86-121
Styrene	50	51	102	0	20	77-126
Xylene (total)	150	150	100	0	20	82-122
						-
						-
						-
						-
						-
						-
						-
						-
						-
						-
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						-
						-
						-
						-
						-
						-
						-
						-

Column to be used to flag recovery with an asterisk

* Values outside of QC limits.

RPD: 2 out of 34 outside limits
Spike Recovery: 0 out of 68 outside limits
COMMENTS: ______

FORM III VOA-1 8260

U.S. EPA - CLP

3
BLANKS

Lab Name: STL Contract: ______

Lab Code: STL Case No.: ______ SAS No.: ______ SDG No.: A2256

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum									200.000	U	P
Antimony									60.000	U	P
Arsenic									10.000	U	P
Barium									200.000	U	P
Beryllium									5.000	U	P
Cadmium									5.000	U	P
Calcium									5000.000	U	P
Chromium									10.000	U	P
Cobalt									50.000	U	P
Copper									25.000	U	P
Iron									100.000	U	P
Lead									3.000	U	P
Magnesium									5000.000	U	P
Manganese									15.000	U	P
Mercury									0.200	U	CV
Nickel									40.000	U	P
Potassium									5000.000	U	P
Selenium									5.000	U	P
Silver									10.000	U	P
Sodium									5000.000	U	P
Thallium									10.000	U	P
Vanadium									50.000	U	P
Zinc									20.000	U	P
Cyanide											NR

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

MW-20DS

Lab Name: STL Contract: ________

Lab Code: STL Case No.: 2256A SAS No.: ______ SDG No.: A2256

Matrix: WATER Level (low/med): LOW

% Solids for Sample: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum	75-125	5463.1410		3566.4570		2000.00	94.8		P
Antimony	75-125	349.4069		60.0000	U	500.00	69.9		P
Arsenic	75-125	37.3873		10.0000	U	40.00	93.5		P
Barium	75-125	5463.2750		3969.0490		2000.00	74.7		P
Beryllium	75-125	36.9127		5.0000	U	50.00	73.8		P
Cadmium	75-125	5.7917		6.0798		5.00	-5.8		P
Calcium				52335.1200		0.00	0.0		P
Chromium	75-125	160.7956		11.0420		200.00	74.9		P
Cobalt	75-125	381.6974		50.0000	U	500.00	76.3		P
Copper	75-125	222.9439		25.0000	U	250.00	89.2		P
Iron		10523.6900		10474.3000		1000.00	4.9		P
Lead	75-125	41.2883		25.9330		20.00	76.8		P
Magnesium				9712.7600		0.00	0.0		P
Manganese	75-125	641.1671		270.5742		500.00	74.1		P
Mercury									NR
Nickel	75-125	396.0775		40.0000	U	500.00	79.2		P
Potassium				5000.0000	U	0.00	0.0		P
Selenium	75-125	5.0000	U	5.0000	U	10.00	50.0		P
Silver	75-125	39.1459		10.0000	U	50.00	78.3		P
Sodium				57380.5900		0.00	0.0		P
Thallium	75-125	36.0976		10.0000	U	50.00	72.2		P
Vanadium	75-125	373.9958		50.0000	U	500.00	74.8		P
Zinc	75-125	429.8497		32.2806		500.00	79.5		P
Cyanide									NR

Comments:

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

091399-17S

Lab Name: STL Contract:

Lab Code: STL Case No.: 2256A SAS No.: SDG No.: A2256

Matrix: WATER Level (low/med): LOW

% Solids for Sample: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony									NR
Arsenic									NR
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead									NR
Magnesium									NR
Manganese									NR
Mercury	75-125	1.2300		0.2000	U	1.00	123.0		CV
Nickel									NR
Potassium									NR
Selenium									NR
Silver									NR
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR

Comments:

U.S. EPA - CLP

6
DUPLICATES

EPA SAMPLE NO.

MW-20DD

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 2256A SAS No.: ______ SDG No.: A2256

Matrix: WATER Level (low/med): LOW

% Solids for Sample: 0.0 % Solids for Duplicate: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		3566.4570		3173.2340		11.7		P
Antimony		60.0000	U	60.0000	U			P
Arsenic		10.0000	U	10.0000	U			P
Barium		3969.0490		3640.1980		8.6		P
Beryllium		5.0000	U	5.0000	U			P
Cadmium	.0	6.0798		5.0000	U	200.0		P
Calcium		52335.1200		48410.6400		7.8		P
Chromium	.0	11.0420		10.3102		6.8		P
Cobalt		50.0000	U	50.0000	U			P
Copper		25.0000	U	25.0000	U			P
Iron		10474.3000		9233.4380		12.6		P
Lead		25.9330		19.0405		30.6		P
Magnesium	.0	9712.7600		8870.1930		9.1		P
Manganese		270.5742		245.8541		9.6		P
Mercury								NR
Nickel		40.0000	U	40.0000	U			P
Potassium		5000.0000	U	5000.0000	U			P
Selenium		5.0000	U	5.0000	U			P
Silver		10.0000	U	10.0000	U			P
Sodium		57380.5900		51504.1100		10.8		P
Thallium		10.0000	U	10.0000	U			P
Vanadium		50.0000	U	50.0000	U			P
Zinc	.0	32.2806		30.9572		4.2		P
Cyanide								NR

U.S. EPA - CLP

6
DUPLICATES

EPA SAMPLE NO.

091399-17D

Lab Name: STL Contract:

Lab Code: STL Case No.: 2256A SAS No.: SDG No.: A2256

Matrix: WATER Level (low/med): LOW

% Solids for Sample: 0.0 % Solids for Duplicate: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum								NR
Antimony								NR
Arsenic								NR
Barium								NR
Beryllium								NR
Cadmium								NR
Calcium								NR
Chromium								NR
Cobalt								NR
Copper								NR
Iron								NR
Lead								NR
Magnesium								NR
Manganese								NR
Mercury		0.2000	U	0.2000	U			CV
Nickel								NR
Potassium								NR
Selenium								NR
Silver								NR
Sodium								NR
Thallium								NR
Vanadium								NR
Zinc								NR
Cyanide								NR

U.S. EPA - CLP

7

LABORATORY CONTROL SAMPLE

Lab Name: STL   Contract: ______

Lab Code: STL   Case No.: ______   SAS No.: ______   SDG No.: A2256

Solid LCS Source: ______

Aqueous LCS Source: INORG. VENT.

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum	3000.0	2830.26	94.3						
Antimony	1000.0	1012.65	101.3						
Arsenic	1000.0	1001.38	100.1						
Barium	300.0	303.07	101.0						
Beryllium	100.0	101.08	101.1						
Cadmium	300.0	301.97	100.7						
Calcium	18250.0	14755.05	80.8						
Chromium	300.0	303.59	101.2						
Cobalt	300.0	302.87	101.0						
Copper	300.0	307.50	102.5						
Iron	12500.0	12536.37	100.3						
Lead	1000.0	1027.69	102.8						
Magnesium	7500.0	7389.87	98.5						
Manganese	200.0	204.15	102.1						
Mercury	5.0	5.55	111.0						
Nickel	300.0	308.40	102.8						
Potassium	16000.0	15287.27	95.6						
Selenium	500.0	497.76	99.6	jv 9/24/97					
Silver	300.0	269.70	89.9						
Sodium	2500.0	~~5000.00~~	~~200.0~~	2830	113.2				
Thallium	1000.0	1041.74	104.2						
Vanadium	300.0	295.33	98.4						
Zinc	300.0	308.17	102.7						
Cyanide									

WET CHEM ANALYSIS

3
BLANKS

Lab Name: STL Contract:

Lab Code: STL Case No.: 2256A SAS No.: SDG No.: A2256

Analyte	Initial Calib. Blank	C	Continuing Calibration Blank 1	C	2	C	3	C	Preparation Blank	C	units	M
Alkalinity									2.0	U	mg/L	T
Ammonia									0.0400	U	mg/L	L
BOD5									2.00	U	mg/L	P
Bromide									2.00	U	mg/L	T
Chloride									3.00	U	mg/L	L
COD									10.0	U	mg/L	C
Hardness									1.00	U	mg/L	ML
Nitrate									0.100	U	mg/L	L
Phenols									0.0500	U	mg/L	L
Sulfate									10.0	U	mg/L	L
TDS									29.0		mg/L	G
TKN									0.100	U	mg/L	L
TOC									1.00	U	mg/L	D

4A
SPIKE SAMPLE RECOVERY

SAMPLE NO.

MW-02 UNFILTERED

Lab Name: STL Contract:

Lab Code: STL Case No.: 2256A SAS No.: SDG No.: A2256

Matrix: WATER

Solids for Sample: 0

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	Units	M
Ammonia	75-125	1.98		.04	U	2	99		mg/L	L

Comments:

FORM IV (PART 1) - WC

4A
SPIKE SAMPLE RECOVERY

SAMPLE NO.

MW-03 UNFILTERED

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 2 SAS No.: _ SDG No.: A

Matrix: WATER

% Solids for Sample: 0

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	Units	M
Chloride	75-125	271		146		120	104.1		mg/L	L
COD	75-125	145		28.1		100	116.9		mg/L	C
Phenols	75-125	.436		.05	U	.4	109		mg/L	L
Sulfate	75-125	295		151		150	95.7		mg/L	L

Comments:

FORM IV (PART 1) - WC

4A
SPIKE SAMPLE RECOVERY

SAMPLE NO.

SMW-3

Lab Name: STL Contract:

Lab Code: STL Case No.: SAS No.: SDG No.:

Matrix: WATER

Solids for Sample: 0

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	Units	M
Bromide	75-125	10.9		2	U	10	109		mg/L	T
T[illegible]N	75-125	3.34		1.09		2	112.4		mg/L	L

Comments:

FORM IV (PART 1) - WC

4A
SPIKE SAMPLE RECOVERY

SAMPLE NO.

MW-19S

Lab Name: STL Contract:

Lab Code: STL Case No.: SAS No.: SDG No.:

Matrix: WATER

% Solids for Sample: 0

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	Units	M
BOD5	75-125	32.9		2	U	38	86.5		mg/L	P
Nitrate	75-125	.415		.1	U	.4	103.8		mg/L	L

Comments:

FORM IV (PART 1) - WC

4A

SPIKE SAMPLE RECOVERY

SAMPLE NO.

MW-20D

Lab Name: STL Contract:

Lab Code: STL Case No.: SAS No.: SDG No.:

Matrix: WATER

% Solids for Sample: 0

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	Units	M
Hardness	75-125	267		171		92.4	103.9		mg/L	ML

Comments:

FORM IV (PART 1) - WC

4A
SPIKE SAMPLE RECOVERY

SAMPLE NO.

REC.STREAM

Lab Name: STL　　Contract:

Lab Code: STL　　Case No.:　　SAS No.:　　SDG No.:

Matrix: WATER

% Solids for Sample: 0

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	Units	M
TOC	75-125	28.5		8.39		20	100.6		mg/L	D

Comments:

FORM IV (PART 1) - WC

5
DUPLICATES

SAMPLE NO.

MW-03 UNFILTERE

Lab Name: STL   Contract:

Lab Code: STL   Case No.: 2256A   SAS No.:   SDG No.: A2256

% Solids for Sample: 0   % Solids for Duplicate: 0

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	Units	M
Alkalinity	20	512		501		2.2		mg/L	T
Ammonia	20	.04	U	.04	U			mg/L	L
Chloride	20	146		143		1.6		mg/L	L
COD	20	28.1		28.1		0		mg/L	C
Phenols	20	.05	U	.05	U			mg/L	L
Sulfate	20	151		148		1.9		mg/L	L

5
DUPLICATES

SAMPLE NO.

SMW-3

Lab Name: STL Contract: ____

Lab Code: STL Case No.: 2256A SAS No.: ____ SDG No.: A2256

% Solids for Sample: 0 % Solids for Duplicate: 0

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	Units	M
Bromide	20	2	U	2	U			mg/L	T
TKN	20	1.09		1.02		6.4		mg/L	L

FORM V - WC

5

DUPLICATES

SAMPLE NO.

MW-19S

Lab Name: STL Contract:

Lab Code: STL Case No.: 2256A SAS No.: SDG No.: A2256

% Solids for Sample: 0 % Solids for Duplicate: 0

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	Units	M
BOD5	20	2	U	2	U			mg/L	P
Nitrate	20	.1	U	.1	U			mg/L	L
TDS	20	188		180		4.3		mg/L	G

FORM V - WC

5
DUPLICATES

SAMPLE NO.

MW-20D

Lab Name: STL Contract:

Lab Code: STL Case No.: 2256A SAS No.: SDG No.: A2256

% Solids for Sample: 0 % Solids for Duplicate: 0

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	Units	M
Hardness	20	171		157		8.5		mg/L	ML

FORM V - WC

5
DUPLICATES

SAMPLE NO.

REC.STREAM

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 2256A SAS No.: ______ SDG No.: A2256

% Solids for Sample: 0 % Solids for Duplicate: 0

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	Units	M
TOC	20	8.39		8.24		1.8		mg/L	D

FORM V - WC

LABORATORY CONTROL SAMPLE

Lab Name: STL Contract:

Lab Code: STL Case No.: 2256A SAS No.: SDG No.: A2256

Analyte	True	LCS Found	%R	units	LCS Source
Phenols	.4	.374	93.5	mg/L	

LABORATORY CONTROL SAMPLE

Lab Name: STL Contract:

Lab Code: STL Case No.: 2256A SAS No.: SDG No.: A2256

Analyte	True	LCS Found	%R	units	LCS Source
TOC	34.9	34.8	99.8	mg/L	

6
LABORATORY CONTROL SAMPLE

Lab Name: STL Contract:

Lab Code: STL Case No.: 2256A SAS No.: SDG No.: A2256

Analyte	True	LCS Found	%R	units	LCS Source
COD	87.6	76.8	87.7	mg/L	

FORM VI - WC

6

LABORATORY CONTROL SAMPLE

Lab Name: STL Contract:

Lab Code: STL Case No.: 2256A SAS No.: SDG No.: A2256

Analyte	True	LCS Found	%R	units	LCS Source
Alkalinity	118	125	105.9	mg/L	

FORM VI - WC

LABORATORY CONTROL SAMPLE

Lab Name: STL Contract:

Lab Code: STL Case No.: 2256A SAS No.: SDG No.: A2256

Analyte	True	LCS Found	%R	units	LCS Source
Nitrate	12.21	12.6	103.6	mg/L	

LABORATORY CONTROL SAMPLE

Lab Name: STL Contract:

Lab Code: STL Case No.: 2256A SAS No.: SDG No.: A2256

Analyte	True	LCS Found	%R	units	LCS Source
TKN	17.91	18.6	103.8	mg/L	

6
LABORATORY CONTROL SAMPLE

Lab Name: STL Contract:

Lab Code: STL Case No.: 2256A SAS No.: SDG No.: A2256

Analyte	True	LCS Found	%R	units	LCS Source
Chloride	185.3	187	101	mg/L	

FORM VI - WC

6

LABORATORY CONTROL SAMPLE

Lab Name: STL Contract:

Lab Code: STL Case No.: 2256A SAS No.: SDG No.: A2256

Analyte	True	LCS Found	%R	units	LCS Source
TDS	190.4	232	121.8	mg/L	

FORM VI - WC

LABORATORY CONTROL SAMPLE

Lab Name: STL Contract:

Lab Code: STL Case No.: 2256A SAS No.: SDG No.: A2256

Analyte	True	LCS Found	%R	units	LCS Source
Ammonia	2.1	2	95	mg/L	

6

LABORATORY CONTROL SAMPLE

Lab Name: STL Contract:

Lab Code: STL Case No.: 2256A SAS No.: SDG No.: A2256

Analyte	True	LCS Found	%R	units	LCS Source
Sulfate	40.68	37.9	93.1	mg/L	

FORM VI - WC

LABORATORY CONTROL SAMPLE

Lab Name: STL Contract:

Lab Code: STL Case No.: 2256A SAS No.: SDG No.: A2256

Analyte	True	LCS Found	%R	units	LCS Source
Hardness	68.34	67.4	98.6	mg/L	

HOLD TIME REPORT

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 2256A SAS No.: ______ SDG No.: A2256

Analyte : Alkalinity

Client Sample ID	Date Received	Date Prepped	Date Analyzed
MW-19S	09/14/99	09/20/99	09/20/99
MW-20D	09/14/99	09/20/99	09/20/99
MW-03 UNFILTERED	09/11/99	09/20/99	09/20/99
MW-03 UNFILTERED	09/11/99	09/20/99	09/20/99

HOLD TIME REPORT

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 2256A SAS No.: ______ SDG No.: A2256

Analyte : Ammonia

Client Sample ID	Date Received	Date Prepped	Date Analyzed
MW-19S	09/14/99	09/21/99	09/23/99
MW-20D	09/14/99	09/21/99	09/23/99
MW-03 UNFILTERED	09/11/99	09/17/99	09/23/99
MW-03 UNFILTERED	09/11/99	09/17/99	09/23/99
992194A-01S		09/17/99	09/23/99
MW-02 UNFILTERED	09/11/99	09/17/99	09/23/99

HOLD TIME REPORT

Lab Name: STL Contract:

Lab Code: STL Case No.: 2256A SAS No.: SDG No.: A2256

Analyte : BOD5

Client Sample ID	Date Received	Date Prepped	Date Analyzed
MW-19S	09/14/99	09/14/99	09/14/99
MW-20D	09/14/99	09/14/99	09/14/99
992256A-01D		09/14/99	09/14/99
992256A-01S		09/14/99	09/14/99

HOLD TIME REPORT

Lab Name: STL Contract: ___________

Lab Code: STL Case No.: 2256A SAS No.: ______ SDG No.: A2256

Analyte : Bromide

Client Sample ID	Date Received	Date Prepped	Date Analyzed
MW-19S	09/14/99	09/28/99	09/28/99
MW-20D	09/14/99	09/28/99	09/28/99
SMW-3	09/09/99	09/28/99	09/28/99
SMW-3	09/09/99	09/28/99	09/28/99
SMW-3	09/09/99	09/28/99	09/28/99

HOLD TIME REPORT

Lab Name: STL　　　　Contract: ______

Lab Code: STL　　Case No.: 2256A　　SAS No.: ______　　SDG No.: A2256

Analyte : Chloride

Client Sample ID	Date Received	Date Prepped	Date Analyzed
MW-19S	09/14/99	09/27/99	09/27/99
MW-20D	09/14/99	09/27/99	09/27/99
MW-03 UNFILTERED	09/11/99	09/27/99	09/27/99
MW-03 UNFILTERED	09/11/99	09/27/99	09/27/99
MW-03 UNFILTERED	09/11/99	09/27/99	09/27/99

HOLD TIME REPORT

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 2256A SAS No.: ______ SDG No.: A2256

Analyte : COD

Client Sample ID	Date Received	Date Prepped	Date Analyzed
MW-19S	09/14/99	09/20/99	09/20/99
MW-20D	09/14/99	09/20/99	09/20/99
MW-03 UNFILTERED	09/11/99	09/20/99	09/20/99
MW-03 UNFILTERED	09/11/99	09/20/99	09/20/99
MW-03 UNFILTERED	09/11/99	09/20/99	09/20/99

HOLD TIME REPORT

Lab Name: STL Contract: ___________

Lab Code: STL Case No.: 2256A SAS No.: _______ SDG No.: A2256

Analyte : Hardness

Client Sample ID	Date Received	Date Prepped	Date Analyzed
MW-19S	09/14/99	09/23/99	09/23/99
MW-20D	09/14/99	09/23/99	09/23/99
992256A-02D		09/23/99	09/23/99
992256A-02S		09/23/99	09/23/99

HOLD TIME REPORT

Lab Name: STL　　Contract: ____

Lab Code: STL　　Case No.: 2256A　　SAS No.: ____　　SDG No.: A2256

Analyte : Nitrate

Client Sample ID	Date Received	Date Prepped	Date Analyzed
MW-19S	09/14/99	09/15/99	09/15/99
MW-20D	09/14/99	09/15/99	09/15/99
992256A-01D		09/15/99	09/15/99
992256A-01S		09/15/99	09/15/99

HOLD TIME REPORT

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 2256A SAS No.: ______ SDG No.: A2256

Analyte : Phenols

Client Sample ID	Date Received	Date Prepped	Date Analyzed
MW-19S	09/14/99	09/23/99	09/29/99
MW-20D	09/14/99	09/23/99	09/29/99
MW-03 UNFILTERED	09/11/99	09/23/99	09/29/99
MW-03 UNFILTERED	09/11/99	09/23/99	09/29/99
MW-03 UNFILTERED	09/11/99	09/23/99	09/29/99

HOLD TIME REPORT

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 2256A SAS No.: ______ SDG No.: A2256

Analyte : Sulfate

Client Sample ID	Date Received	Date Prepped	Date Analyzed
MW-19S	09/14/99	09/24/99	09/24/99
MW-20D	09/14/99	09/24/99	09/24/99
MW-03 UNFILTERED	09/11/99	09/24/99	09/24/99
MW-03 UNFILTERED	09/11/99	09/24/99	09/24/99
MW-03 UNFILTERED	09/11/99	09/24/99	09/24/99

HOLD TIME REPORT

Lab Name: STL Contract:

Lab Code: STL Case No.: 2256A SAS No.: SDG No.: A2256

Analyte : TDS

Client Sample ID	Date Received	Date Prepped	Date Analyzed
MW-19S	09/14/99	09/15/99	09/15/99
MW-20D	09/14/99	09/15/99	09/15/99
992256A-01D		09/15/99	09/15/99

HOLD TIME REPORT

Lab Name: STL Contract: ____

Lab Code: STL Case No.: 2256A SAS No.: ____ SDG No.: A2256

Analyte : TKN

Client Sample ID	Date Received	Date Prepped	Date Analyzed
MW-19S	09/14/99	09/22/99	09/23/99
MW-20D	09/14/99	09/22/99	09/23/99
SMW-3	09/09/99	09/22/99	09/23/99
SMW-3	09/09/99	09/22/99	09/23/99
SMW-3	09/09/99	09/22/99	09/23/99

HOLD TIME REPORT

Lab Name: STL Contract: ____________

Lab Code: STL Case No.: 2256A SAS No.: ______ SDG No.: A2256

Analyte : TOC

Client Sample ID	Date Received	Date Prepped	Date Analyzed
MW-19S	09/14/99	09/29/99	09/29/99
MW-20D	09/14/99	09/29/99	09/29/99

APPENDIX C

Water Well Survey Results

Page 1 This report contains 29 records
Date 9/28/98

KARN, MR. JOHN
2058 KNOLLSHIRE RD SE
CEDAR RAPIDS IA 52407
*PUBLIC
67.002-13,10

GOODYEAR, MR JEFFERY
336 SOUTH SHORE RD
NEW DURHAM NH 03855
*PUBLIC
67.04-11

PETTENGILL, ROGER & DAVID
AND SUE WINTER
5321 DUTCH HILL ROAD
HINSDALE NY 14743
*PUBLIC
67.004-12

DAVIS, MR DOUGLAS
HINSDALE NY 14743
*PUBLIC
67.004-13

ALPHA NOVA, LTD
266 GREASY BRANCH RD
BRYSON CITY NC 28713-9691
*PUBLIC
68.001-15.1,16 68.003-7

ROMEJKO, MR EDWARD W.
5105 NYS RT 16
HINSDALE NY 14743-9725
*PUBLIC
68.001-21

WHITTAKER, MR ALVIN R.
4863 ROUTE 16
HINSDALE NY 14743
*PUBLIC
68.003-2

WESOLOWSKI, MR ROBERT E.
4864FNYS RT 16
HINSDALE NY 14743
*PUBLIC
68.003-3

GOTKOWSKI, EDWARD & CHRISTINE
71 COCHRAN STREET
BUFFALO NY 14206
*PUBLIC
68.003-4

BUSHNELL, DOUGLAS & SHARON
4832 ROUTE 16
HINSDALE NY 14743
*PUBLIC
68.003-5.1,5.8

CORNELIUS, BEVERLY J
4873 IDE ROAD
LOCKPORT NY 14094
*PUBLIC
68.003-5.2

JOHNSON, HELEN M
217 1/2 N 2nd STREET
OLEAN NY 14760
*PUBLIC
68.003-5.4

MAUROUARD, JOSEPH & JOAN
4115 NINE MILE RD
ALLEGANY NY 14706
*PUBLIC
68.003-5.5

KOHL, DOUGLAS & GENEVIEV
1250 JOHNSON HOLLOW ROAD
HINSDALE NY 14743
*PUBLIC
68.003-5.6

MEYER, MR MATHEW
13239 BRECKENRIDGE DRIVE
EAGLE RIVER AK 99577
*PUBLIC
68.003-5.7

DUNLAP, MR QUENTIN
ROSICK HILL ROAD
MACHIAS NY 14101
*PUBLIC
68.003-5.9

WILKOSZ, MR RICHARD J
8041 CLINTON STREET
ELMA NY 14059-8811
*PUBLIC
68.003-5.10

DAUBNER, WAYNE & CHERYL
14 DIANE DRIVE
CHEEKTOWAGA NY 14225
*PUBLIC
68.003-5.11

FLORIANO, DAVID SIEGEL, JOHN
BRUCE REILLY & TIM VETTER
810 KNABB ROAD
ELMA NY 14059
*PUBLIC
68.003-12

LINDERMAN, GENE & ARLENE
1320 JOHNSON HOLLOW ROAD
HINSDALE NY 14743
*PUBLIC
68.003-13

BLOUNT, MS PENNY JOHNSON
266 GREASY BRANCH ROAD
BRYSON CITY NC 28713
*PUBLIC
68.003-14.1

GRAVES, JULIA & DON
1259 JOHNSON-HOLLOW ROAD
HINSDALE NY 14743
*PUBLIC
68.003-14.2

KENDA NEFF, KRISTEN WILBER,
KARA LINDERMAN
P.O. BOX 72
HINSDALE NY 14743
*PUBLIC
68.003-16

ROSENOW, MS CAROLINE
147 MAIN STREET
SPRINGVILLE NY 14141
*PUBLIC
68.003-17.1

BRAUN, JAMES & BARBARA
36 DELLWOOD STREET
EGGERTSVILLE NY 14226
*PUBLIC
68.003-17.2

INC., SCOTT ROTARY SEALS
4775 NYS RT 16
HINSDALE NY 14743
*PUBLIC
68.003-17.5

KEESLER, TODD & LORRIE
c/O TRANSAMERICA REAL ESTATE TAX
SERVICE
1983 MARCUS AVENUE, #210
LAKE SUCCESS NY 11042
*PUBLIC
68.003-17.7

KHARDT, GUENTER H
5960 BROADWAY
LANCASTER NY 14086
*PUBLIC
68.003-22

BENNETT, GORDON & CAROLINE
4976 NYS RT 16
HINSDALE NY 14743
*PUBLIC
68.003-23

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

WATER WELL SURVEY

1. Well Owner's Name: Mr & Mrs. Wayne Daubner

2. Year Well Drilled: —

3. Usage of Well (water supply, barn, irrigation, laundry only, drinking water, etc.) —

4. Is the well completed in bedrock or soil? —

5. Well construction details (depth of well, length of casing, length of screen, etc.)

6. Well yield (gallons per minute): —

7. Perceived groundwater quality (odors, staining, taste, etc.) —

8. Additional comments: We do not have a well on our property - we bring our water to the mobile home when we are visiting.

Thank you for your assistance.

Please return in the enclosed envelope to:

Mr. Dan P. Ours, CPG
Stearns & Wheler, LLC
One Remington Park Drive
Cazenovia, NY 13035

WATER WELL SURVEY

1. Well Owner's Name: DAVID PETTENGILL
2. Year Well Drilled: 1990
3. Usage of Well (water supply, barn, irrigation, laundry only, drinking water, etc.)
4. Is the well completed in bedrock or soil? ?
5. Well construction details (depth of well, length of casing, length of screen, etc.)
   70' DEEP, 20' CASING
6. Well yield (gallons per minute): ALOT
7. Perceived groundwater quality (odors, staining, taste, etc.)
   ODOR, STAINING
8. Additional comments: WATER SOFTENER

Thank you for your assistance.

Please return in the enclosed envelope to:

Mr. Dan P. Ours, CPG
Stearns & Wheler, LLC
One Remington Park Drive
Cazenovia, NY 13035

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

WATER WELL SURVEY

1. ~~Well Owner's~~ Property owner's Name: Name Helen M Johnson

2. Year Well Drilled: None

3. Usage of Well (water supply, barn, irrigation, laundry only, drinking water, etc.)
None

4. Is the well completed in bedrock or soil? None

5. Well construction details (depth of well, length of casing, length of screen, etc.)
None

6. Well yield (gallons per minute): None

7. Perceived groundwater quality (odors, staining, taste, etc.) None

8. Additional comments: acreage has no buildings & no well

Thank you for your assistance.

H M Johnson
217 1/2 N 2nd St
Olean, N.Y 14760

Please return in the enclosed envelope to:

Mr. Dan P. Ours, CPG
Stearns & Wheler, LLC
One Remington Park Drive
Cazenovia, NY 13035

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

WATER WELL SURVEY

1. Well Owner's Name: ______________________

2. Year Well Drilled: ______________________

3. Usage of Well (water supply, barn, irrigation, laundry only, drinking water, etc.)
____

4. Is the well completed in bedrock or soil? ______________________

5. Well construction details (depth of well, length of casing, length of screen, etc.)
____

6. Well yield (gallons per minute): ______________________

7. Perceived groundwater quality (odors, staining, taste, etc.)
____

8. Additional comments: We do not have a home in Ischua, NY.

Guenter H. Burkhardt
5960 Broadway
Lancaster, NY. 14086

Thank you for your assistance.

Please return in the enclosed envelope to:

Mr. Dan P. Ours, CPG
Stearns & Wheler, LLC
One Remington Park Drive
Cazenovia, NY 13035

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Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

WATER WELL SURVEY

1. Well Owner's Name: Don Graves

2. Year Well Drilled: 1992

3. Usage of Well (water supply, ~~barn irrigation~~, laundry only, drinking water, etc.)

4. Is the well completed in bedrock or soil? Bedrock

5. Well construction details (depth of well, length of casing, length of screen, etc.)
   110' casing 95'

6. Well yield (gallons per minute): 12

7. Perceived groundwater quality (odors, staining, taste, etc.)
   None

8. Additional comments: None

Thank you for your assistance.

Please return in the enclosed envelope to:

Mr. Dan P. Ours, CPG
Stearns & Wheler, LLC
One Remington Park Drive
Cazenovia, NY 13035

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

WATER WELL SURVEY

1. Well Owner's Name: Jeff Goodyear

2. Year Well Drilled: 1915 - 1920

3. Usage of Well (water supply, barn, irrigation, laundry only, drinking water, etc.)

4. Is the well completed in bedrock or soil? Bedrock

5. Well construction details (depth of well, length of casing, length of screen, etc.)
110' Deep 70' pipe No screen

6. Well yield (gallons per minute): 3? gallons

7. Perceived groundwater quality (odors, staining, taste, etc.)
Clean

8. Additional comments: Good water.
Please send a report on the results of your testing.

Thank you for your assistance.

Please return in the enclosed envelope to:

Mr. Dan P. Ours, CPG
Stearns & Wheler, LLC
One Remington Park Drive
Cazenovia, NY 13035

Please contact me at 603-749-1004 EXT 13
I have two homes on Gile Hollow rd. which well are you testing
The one in Hinsdale where Lisa Goodyear lives
Or the one in Ischua where Doug Colley lives?

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Best regards,
Jeff Goodyear

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

WATER WELL SURVEY

1. Well Owner's Name: Gordon W Bennett

2. Year Well Drilled: 1970

3. Usage of Well (water supply, barn, irrigation, laundry only, drinking water, etc.)
   drinking water & etc

4. Is the well completed in bedrock or soil? don't Know

5. Well construction details (depth of well, length of casing, length of screen, etc.)
   deep well

6. Well yield (gallons per minute): don't Know

7. Perceived groundwater quality (odors, staining, taste, etc.)
   all of above

8. Additional comments: It is hard to drink the water

Thank you for your assistance.

Please return in the enclosed envelope to:

Mr. Dan P. Ours, CPG
Stearns & Wheler, LLC
One Remington Park Drive
Cazenovia, NY 13035

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Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

WATER WELL SURVEY

1. Well Owner's Name: SCOTT ROTARY SEALS INC.

2. Year Well Drilled: N/A

3. Usage of Well (water supply, barn, irrigation, laundry only, drinking water, etc.)
RESTROOMS & DRINKING

4. Is the well completed in bedrock or soil? N/A

5. Well construction details (depth of well, length of casing, length of screen, etc.)
N/A

6. Well yield (gallons per minute): N/A

7. Perceived groundwater quality (odors, staining, taste, etc.)
GOOD

8. Additional comments: TESTED BY FLI IN WAVERLY, NY 4/10/98. RESULTS ON FILE. WATER QUALITY IN COMPLIANCE WITH THE BACTERIOLOGICAL DRINKING WATER STANDARDS.

Thank you for your assistance.

Please return in the enclosed envelope to:

Mr. Dan P. Ours, CPG
Stearns & Wheler, LLC
One Remington Park Drive
Cazenovia, NY 13035

CH Good
CHARLES GOODWIN
PRODUCTION SERVICES MANAGER
10/05/98

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Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

WATER WELL SURVEY

1. Well Owner's Name: James Braun

2. Year Well Drilled: Spring

3. Usage of Well (water supply, barn, irrigation, laundry only, drinking water, etc.)
cleaning

4. Is the well completed in bedrock or soil?

5. Well construction details (depth of well, length of casing, length of screen, etc.)

6. Well yield (gallons per minute): 1 gpm

7. Perceived groundwater quality (odors, staining, taste, etc.)

8. Additional comments: Spring hasn't been tested in several yrs

Thank you for your assistance.

Please return in the enclosed envelope to:

Mr. Dan P. Ours, CPG
Stearns & Wheler, LLC
One Remington Park Drive
Cazenovia, NY 13035

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

WATER WELL SURVEY

1. Well Owner's Name: G. PAUL LINDERMAN

2. Year Well Drilled: 1965

3. Usage of Well (water supply, barn, irrigation, laundry only, drinking water, etc.)

4. Is the well completed in bedrock or soil? UNK.

5. Well construction details (depth of well, length of casing, length of screen, etc.)
   148' DEEP UNK UNK

6. Well yield (gallons per minute): UNK

7. Perceived groundwater quality (odors, staining, taste, etc.)
   SULFUR IRON STAINS SULFUR TASTE

8. Additional comments:

Thank you for your assistance.

Please return in the enclosed envelope to:

Mr. Dan P. Ours, CPG
Stearns & Wheler, LLC
One Remington Park Drive
Cazenovia, NY 13035

Bruce T. Reilly
810 Knabb Rd.
Elma, Ny 14059

January 4, 1998

Dan P. Ours
One Remington Park Dr.
Cazenovia, NY 13035

Re: Water Well Survey

Dear Mr. Ours:

Please note at this time there is no drilled well on our property in Ischua, NY. There is a spring that is used to supply water to residents on Rt. 16. You will have to contact these people for your survey.

I would like to know the information as a result of this survey for future water usage on this property.

You may send only one letter to Bruce Reilly. John Floriano, Dave Seigel, Tim Vetter and myself are all owners of this property and share all bills and information.

Very truly yours,

Bruce T. Reilly

Bruce T. Reilly

BTR/dr

Enclosures

FIRST CLASS MAIL

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

One Remington Park Drive
Cazenovia, New York 13035

TODD & LORRIE KEESLER
TRANAMERICA REAL ESTATE TAX SERVICE
1983 MARCUS AVE, #210
LAKE SUCCESS, NY 11042

RETURNED TO SENDER

NOT DELIVERABLE
AS ADDRESSED
UNABLE TO FORWARD

NOT DELIVERABLE
AS ADDRESSED
UNABLE TO FORWARD

RETURN POSTAGE GUARANTEED

OCT-1'98

FIRST CLASS MAIL

DPO

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

One Remington Park Drive
Cazenovia, New York 13035

Ms Beverly J. Cornelius
4873 Ide Rd
Lockport, NY 14094

NO SUCH STREET
LOCKPORT, NY 14094

RETURN TO SENDER

RETURN POSTAGE GUARANTEED

APPENDIX D

Fish & Wildlife Impact Analysis

APPENDIX D-1

Photographic Log

See Photo Location Map for Photo Orientation.

PHOTO LOG

FISH & WILDLIFE IMPACT ASSESSMENT

S&W No. 80189FA

See Photo Location Map for Photo Orientation.

PHOTO LOG

FISH & WILDLIFE IMPACT ASSESSMENT

S&W No. 80189FA

See Photo Location Map for Photo Orientation.

PHOTO LOG

FISH & WILDLIFE IMPACT ASSESSMENT

See Photo Location Map for Photo Orientation.

PHOTO LOG

FISH & WILDLIFE IMPACT ASSESSMENT

S&W No. 80189FA

See Photo Location Map for Photo Orientation.

See Photo Location Map for Photo Orientation.

PHOTO LOG

FISH & WILDLIFE IMPACT ASSESSMENT

See Photo Location Map for Photo Orientation.

PHOTO LOG
FISH & WILDLIFE IMPACT ASSESSMENT

See Photo Location Map for Photo Orientation.

PHOTO LOG

FISH & WILDLIFE IMPACT ASSESSMENT

See Photo Location Map for Photo Orientation.

PHOTO LOG

FISH & WILDLIFE IMPACT ASSESSMENT

S&W No. 80189FA

See Photo Location Map for Photo Orientation.

PHOTO LOG

FISH & WILDLIFE IMPACT ASSESSMENT

See Photo Location Map for Photo Orientation.

PHOTO LOG

FISH & WILDLIFE IMPACT ASSESSMENT

See Photo Location Map for Photo Orientation.

APPENDIX D-2

Plant Species

FARWELL LANDFILL FWIA
PLANT LIST
Town of Ischua, Cattaraugus County, NY
October 6, 1998

S&W No. 80189FA0900

COMMON NAME	BOTANICAL/SCIENTIFIC NAME	INDICATOR STATUS
FERNS, CLUBMOSSES & HORSETAILS IDENTIFIED ON SITE		
FERNS		
Bracken Fern	Pteridium aquilinum	FACU
Christmas Fern	Polystichum acrostichoides	FACU
Cinnamon Fern	Osmunda cinnamomea	FACW
Hayscented Fern	Dennstaedtia punctilobula	FACU
Interrupted Fern	Osmunda claytoniana	FAC
Lady Fern	Athyrium filixfemina	FAC
New York Fern	Thelypteris noveboracensis	FAC
Sensitive Fern	Onoclea sensibilis	FACW
HORSETAILS		
Field Horsetail	Equisetum arvense	FAC
GRASSES, RUSHES & SEDGES IDENTIFIED ON-SITE		
Bluegrass	Poa spp.	----
Annual Bluegrass	Poa annua	FACU
Kentucky Bluegrass	Poa pratensis	FACU
Wool Grass	Scirpus cyperinus	FACW
Broad leaved Cattail	Typha latifolia	OBL
Corn	Zea mays	UPL
Crab Grass	Digitaria sanguinalis	FACU
Deer Tongue Grass	Dichanthelium clandestinum	FAC
Fall Panicum	Panicum dichotomiflorum	FACW
Fescue	Festuca spp.	----
Foxtail	Alopecurus spp.	FACU
Foxtail Grass	Setaria spp.	----
Nut Sedge (Chufa)	Cyperus esculentus	FACW
Old Witch Grass	Panicum capillare	FAC
Orchard Grass	Dactylis glomerata	FACU
Panic Grass	Panicum spp.	----

COMMON NAME	BOTANICAL/SCIENTIFIC NAME	INDICATOR STATUS
GRASSES, RUSHES & SEDGES IDENTIFIED ON-SITE (Continued)		
Redtop	Agrostis alba	FACW
Reed (Phragmites)	Phragmites australis	FACW
Reed Canary Grass	Phalaris arundinacea	FACW
Rice Cutgrass	Leersia oryzoides	OBL
Path Rush	Juncus tenuis	FAC
Soft Rush	Juncus effusus	FACW
Spike Rush	Eleocharis spp.	----
Rye Grass (Perennial)	Lolium spp.	FAC
Fox Sedge	Carex vulpinoidea	----
Spikerush	Eleocharis spp.	----
Switch Grass	Panicum virgatum	FAC
Timothy	Phleum pratense	FACU
Umbrella Sedge	Cyperus strigosus	FACW
Witch Grass (Quack Grass)	Agropyron repens	FACU
SHRUBS & VINES IDENTIFIED ON SITE		
Black Raspberry	Rubus occidentalis	FAC
Blackberry	Rubus allegheniensis	FACU
Highbush Blueberry	Vaccinium corymbosum	FACW
Bramble	Rubus spp.	FACU/FAC
Green Brier (Common)	Smilax rotundifolia	FAC
Buckthorn	Rhamnus spp.	----
Canada Serviceberry	Amelanchier canadensis	FAC
Red-Osier Dogwood (Red Stem Dogwood)	Cornus stolonifera	FACW
Silky Dogwood (Swamp Dogwood)	Cornus amomum	FACW
Elderberry	Sambucus canadensis	FACW
Grape	Vitis spp.	----
Fox Grape	Vitis labrusca	FACU
Summer Wild Grape	Vitis aestivalis	FACU
Tartarian Honeysuckle	Lonicera tatarica	FACU
Autumn Olive	Elaeagnus umbellata	UPL
Poison Ivy	Toxicodendron radicans	FAC
Multiflora Rose	Rosa multiflora	FACU
Prairie Rose	Rosa setigera	FACU
Spirea	Spirea spp.	----
Smooth Sumac	Rhus glabra	UPL
Staghorn Sumac	Rhus typhina	FACU

COMMON NAME	BOTANICAL/SCIENTIFIC NAME	INDICATOR STATUS
SHRUBS & VINES IDENTIFIED ON SITE (Continued)		
Arrowwood Viburnum (Northern)	Viburnum recognitum	FACW
Virginia Creeper	Parthenocissus quinquefolia	FACU
Willow (Shrub)	Salix spp.	FACW
Witch-Hazel	Hamamelis virginiana	FAC
TREES IDENTIFIED ON SITE		
Speckled Alder	Alnus rugosa	FACW
American Beech	Fagus grandifolia	FACU
Green Ash (Red Ash)	Fraxinus pennsylvanica	FACW
White Ash	Fraxinus americana	FACU
Basswood (American Linden)	Tilia americana	FACU
Birch	Betula spp.	----
Paper Birch (White or Canoe)	Betula papyrifera	FACU
River Birch (Red Birch)	Betula nigra	FACW
Black Cherry	Prunus serotina	FACU
Crabapple	Malus spp.	UPL
American Elm	Ulmus americana	FACW
Flowering Dogwood	Cornus florida	FACU
Hawthorn	Crateagus spp.	----
Norway Maple	Acer platanoides	FACU
Red Maple (Swamp Maple)	Acer rubrum	FAC
Sugar Maple	Acer saccharum	FACU
Chestnut Oak	Quercus montana (prinus)	UPL
Red Oak	Quercus rubra (borealis)	FACU
White Oak	Quercus alba	FACU
Scots Pine	Pinus sylvestris	UPL
White Pine	Pinus strobus	FACU
Cottonwood	Populus deltoides	FAC
Large-toothed Aspen/Poplar	Populus grandidentata	FACU
Quaking Aspen	Populus tremuloides	FACU
Shadblow	Amelanchier spp.	----
Norway Spruce	Picea abies	FACU
Black Willow	Salix nigra	FACW
Pussywillow	Salix discolor	FACW
Shrub Willow	Salix spp.	FACW

COMMON NAME	BOTANICAL/SCIENTIFIC NAME	INDICATOR STATUS

WILDFLOWERS IDENTIFIED ON SITE

Alfalfa	Medicago sativa	UPL
Artemisia	Artemisia spp.	UPL
New England Aster	Aster novaeangliae	FACW
Bedstraw	Galium spp.	----
Beggarticks	Bidens spp.	FACW
Bindweed (Field)	Convolvus arvensis	UPL
Birdsfoot Trefoil	Lotus corniculatus	FACU
Black-Eyed Susan	Rudbeckia hirta	FACU
Boneset	Eupatorium perfoliatum	FACW
Burdock (Common)	Arctium minus	UPL
Butter-and-Eggs (Toadflax)	Linaria vulgaris	UPL
Chicory	Cichorium intybus	UPL
Cinquefoil (Common)	Potentilla simplex	FACU
Red Clover	Trifolium pratense	FACU
Coltsfoot	Tussilago farfara	FACU
Crown Vetch (Axseed)	Coronilla varia	UPL
Curled Dock	Rumex crispus	FACU
Daisy Fleabane	Erigeron spp.	FACU
Dandelion	Taraxacum officinale	FACU
Deadly Nightshade	Solanum dulcamara	FAC
Spreading Dogbane	Apocynum androsaemifolium	UPL
Garlic Mustard	Alliaria petiolata	FACU
Gill-Over-The-Ground	Glechoma hederacea	FACU
Canada Goldenrod	Solidago canadensis	FACU
Early Goldenrod	Solidago juncea	UPL
Grass Leaved Goldenrod	Solidago gramnifolia	FACW
Lance-leaved Goldenrod	Euthamia graminifolia	FAC
Rough-stemmed Goldenrod	Solidago rugosa	FAC
Slender Fragrant Goldenrod	Euthamia galetorium	FAC
Tall Goldenrod	Solidago altissima	FACU
Heal All	Prunella vulgaris	FACW
Indian Hemp (Dogbane)	Apocynum cannabinum	FACU
Spotted Touch-Me-Not	Impatiens capensis	FACW
Joe-Pye-Weed	Eupatorium spp.	FACW
Knapweed	Centaurea spp.	UPL
Lamb's Quarters (Pigweed)	Chenopodium album	FACU
Purple Loosestrife	Lythrum salicaria	FACW

COMMON NAME	BOTANICAL/SCIENTIFIC NAME	INDICATOR STATUS
WILDFLOWERS IDENTIFIED ON SITE (Continued)		
Common Milkweed	Asclepias syrica	UPL
Moth Mullein	Verbascum blattaria	UPL
Mugwort	Artemisia vulgaris	UPL
Mullein (Giant/Common)	Verbascum thapsus	UPL
Stinging Nettle	Urtica dioica	FACU
Partridge Pea	Cassia fasciculata	FACU
Pokeweed	Phytolacca americana	FACU
Purple Milkwort	Polygala sanguinea	FACU
Ragweed (Common)	Ambrosia artemisiifolia	FACU
Smartweed	Polygonum spp.	----
Tearthumb (Arrow-leaved)	Polygonum safittartum	OBL
Spearmint	Mentha spicata	FACW
Marsh St. Johnswort	Hypericum virginicum	OBL
Strawberry, Wild	Fragaria virginiana	FACU
Tall Meadow Rue	Thalictrum pubescens	FACW
Teasel	Dipsacus sylvestris	UPL
Thistle	Cirsium spp.	----
Bull Thistle	Cirsium vulgare	FACU
Canada Thistle	Cirsium arvense	FACU
Trout Lily (Dogtooth Violet)	Erythronium americanum	FAC
Crown Vetch	Coronilla varia	UPL
Wood Sorrel (Yellow)	Oxalis stricta	UPL
Yarrow	Achillea millefolium	FACU

---end of list---

APPENDIX D-3

Wildlife Species

FARWELL LANDFILL
SITE WILDLIFE SPECIES
Cattaraugus County (Ischua)
October 6, 1998

S&W No. 80189FA0900

This list includes wildlife species that were observed during the several site visits and those species that are considered to have the potential to inhabit the site or use the property for nesting, resting, breeding, or feeding.

BIRDS

Canada Goose
Mallard Duck
Red-tailed Hawk
American Woodcock
Eastern Screech-Owl
Ruby-throated Hummingbird
Downy Woodpecker
Northern Flicker
Turkey Vulture
Wild Turkey
Mourning Dove
Rock Dove
Great Horned Owl
Belted Kingfisher
Yellow-bellied Sapsucker
Northern Rough-winged Swallow
American Crow
American Robin
Cedar Waxwing
European Starling
Rose-breasted Grosbeak
White-throated Sparrow
American Goldfinch
Flycatcher
Blue Jay
Black-capped Chickadee
House Wren
Warblers (Seasonal)
Northern Cardinal
Song Sparrow
Dark-eyed Junco
Common Grackle
House Finch
House Sparrow
Gray Catbird
Tree Sparrow
Field Sparrow

MAMMALS

Virginia Opossum
Eastern Chipmunk
White-footed Mouse
Striped Skunk
Red/Gray Fox
Gray Squirrel
Meadow Vole
Raccoon
White-tailed Deer
Muskrat
Mole
Woodchuck

REPTILES

Eastern Garter Snake
Northern Water Snake
Eastern Milk Snake

AMPHIBIANS

American Toad
Green Frog
Red Spotted Newt
N. Leopard Frog

INSECTS

Monarch Butterfly
Cabbage Butterfly
Pearly Crescentspot Butterfly
Whirligig Beetles
Water Strider
Damsel Fly
Dragonfly

LARVAE

Woolybear Caterpillar
Stonefly Nymph
Mayfly Nymph
Caddisfly Nymph

APPENDIX D-4

Correspondence

8c1E

RECEIVED
STEARNS & WHELER L.L.C.

OCT 1 3 1998

New York State Department of Environmental Conservation
Division of Fish, Wildlife and Marine Resources, Region 9
128 South Street, Olean, New York 14760-3632
Phone: (716) 372-0645 FAX: (716) 372-2113

John P. Cahill
Commissioner

October 8, 1998

Michael S. Fishman
Stearns & Wheler, LLC
One Remington Park Drive
Cazenovia, NY 13035

RE: **Fish and Wildlife Impact Assessment**
Farwell Landfill, Town of Ischua
Cattaraugus County, New York
S&W No. 80189FA.0

Dear Mr. Fishman:

Your September 30th letter to Stephen Mooradian has been assigned to me for a response.

Please find summaries of four different surveys of Ischua Creek conducted within the two-mile circle indicated on your map. These surveys should enable you to construct a reasonably complete list of the species of fish to be encountered in the creek in this area. With regard to fish kills, we have no records of any mortalities in the circle of interest nor any related specifically to the landfill.

If you have any further questions on the subject, you may refer them to me.

Sincerely,

James K. Pomeroy

James K. Pomeroy
Sr. Aquatic Biologist
Region 9 Fisheries Unit

New York State Department of Environmental Conservation
Division of Fish, Wildlife & Marine Resources
Wildlife Resources Center - New York Natural Heritage Program
700 Troy-Schenectady Road, Latham, New York 12110-2400
Phone: (518) 783-3932 FAX: (518) 783-3916

John P. Cahill
Commissioner

October 16, 1998

RECEIVED
STEARNS & WHELER L.L.C.
OCT 19 1998

Michael Fishman
Stearns & Wheler
1 Remington Park Drive
Cazenovia, NY 13035

Dear Mr. Fishman:

We have reviewed the New York Natural Heritage Program files with respect to your recent request for biological information concerning the Farwell Landfill Assessment, including a 2-mile radius, area as indicated on your enclosed map, located in the Town of Ischua, Cattaraugus County.

Enclosed is a computer printout covering the area you requested to be reviewed by our staff. The information contained in this report is considered sensitive and may not be released to the public without permission from the New York Natural Heritage Program.

Our files are continually growing as new habitats and occurrences of rare species and communities are discovered. In most cases, site-specific or comprehensive surveys for plant and animal occurrences have not been conducted. For these reasons, we can only provide data which have been assembled from our files. We cannot provide a definitive statement on the presence or absence of species, habitats or natural communities. This information should not be substituted for on-site surveys that may be required for environmental assessment.

This response applies only to known occurrences of rare animals and/or significant wildlife habitats. Please contact the appropriate NYS DEC Regional Office, Division of Environmental Permits, at the address enclosed for information regarding any regulated areas or permits that may be required (e.g., regulated wetlands) under State Law.

If this proposed project is still active one year from now we recommend that you contact us again so that we may update this response. Kindly address your requests to the above address,

Sincerely,

Teresa Mackey

Teresa Mackey, Information Services
NY Natural Heritage Program

Encs

cc: Reg. 9, Wildlife Mgr.
Reg. 9, Fisheries Mgr.

NATURAL HERITAGE REPORT on RARE SPECIES and ECOLOGICAL COMMUNITIES

Prepared 14 OCT 1998 by NY Natural Heritage Program, NYS DEC, Latham, New York.

Records with a PRECISION value of "S" are known to be in a location which may be impacted by the proposed action.
Records with a PRECISION value of "M" may possibly occur within the project area in appropriate habitat.
This report contains SENSITIVE information which should be treated in a sensitive manner -- Please see cover letter.

REFER TO THE USERS GUIDE FOR EXPLANTIONS OF CODES, RANKS, AND FIELDS.

* LOCATION SCIENTIFIC NAME & Common Name	NY LEGAL STATUS & HERITAGE RANK	FEDERAL STATUS	PRECISION & ACRES	EORANK & LAST SEEN	GENERAL HABITAT AND QUALITY	TOWN(S) & DETAILED LOCATION	USGS TOPO QUAD LAT & LONG	OFFICE USE
* ISCHUA CREEK								
ETHEOSTOMA VARIATUM Variegate darter FISH	UNPROTECTED G5 S2		M	E 1975	DRAINAGE: ALLEGHENY. VEG:ALGAE ON ROCKS. WATER:SLIGHTLY TURBID. SHORE:WOODED. BOTTOM:GRAVEL 80%, ROCK 15%, DEBRIS 5%.DISFROM SHORE 25'.DEPTH:TO 4'.CUR:SLOW-SWIFT.TIME 1:30-3 PM.	ISCHUA. ISCHUA CREEK ABOUT. 2.0 MI S OF ISCHUA.	HINSDALE 42 13 24 N 78 22 50 W	4207824 1

1 Records Processed

Faxed 11/4/98

United States Department of the Interior

RECEIVED
STEARNS & WHELER L.L.C.

FISH AND WILDLIFE SERVICE
3817 LUKER ROAD
CORTLAND, NY 13045

NOV 5 1998

November 3, 1998

Mr. Michael S. Fishman
Project Scientist
Stearns & Wheler, LLC
One Remington Park Drive
Cazenovia, NY 13035

Dear Mr. Fishman:

This responds to your letter of October 5, 1998, requesting information on the presence of endangered or threatened species in the vicinity of the Farwell Landfill in the Town of Ischua, Cattaraugus County, New York. The information will be used in the preparation of a Fish and Wildlife Impact Assessment as part of a Remedial Investigation/Feasibility Study for the site.

Except for occasional transient individuals, no Federally listed or proposed endangered or threatened species under our jurisdiction are known to exist in the project impact area. Therefore, no Biological Assessment or further Section 7 consultation under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) is required with the U.S. Fish and Wildlife Service (Service). Should project plans change, or if additional information on listed or proposed species becomes available, this determination may be reconsidered.

The above comments pertaining to endangered species under our jurisdiction are provided pursuant to the Endangered Species Act. This response does not preclude additional Service comments under the Fish and Wildlife Coordination Act or other legislation.

For additional information on fish and wildlife resources or State-listed species, we suggest you contact:

New York State Department of
Environmental Conservation
Region 9
128 South Street
Olean, NY 14760
(716) 851-7000

New York State Department of
Environmental Conservation
Wildlife Resources Center - Information
Services
New York Natural Heritage Program
700 Troy-Schenectady Road
Latham, NY 12110-2400
(518) 783-3932

National Wetlands Inventory (NWI) maps may or may not be available for the project area. However, while the NWI maps are reasonably accurate, they should not be used in lieu of field surveys for determining the presence of wetlands or delineating wetland boundaries for Federal regulatory purposes. Copies of specific NWI maps can be obtained from:

Cornell Institute for Resource Information Systems
302 Rice Hall
Cornell University
Ithaca, NY 14853
Telephone: (607) 255-4864

Work in certain waters and wetlands of the United States may require a permit from the U.S. Army Corps of Engineers (Corps). If a permit is required, in reviewing the application pursuant to the Fish and Wildlife Coordination Act, the Service may concur, with or without stipulations, or recommend denial of the permit depending upon the potential adverse impacts on fish and wildlife resources associated with project implementation. The need for a Corps permit may be determined by contacting Mr. Paul Leuchner, Chief, Regulatory Branch, U.S. Army Corps of Engineers, 1776 Niagara Street, Buffalo, NY 14207 (telephone: [716] 879-4321).

If you require additional information please contact Michael Stoll at (607) 753-9334.

Sincerely,

Mark W. Clough
ACTING FOR

Sherry W. Morgan
Field Supervisor

cc: NYSDEC, Olean, NY (Environmental Permits)
NYSDEC, Latham, NY
COE, Buffalo, NY

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

COPY

September 30, 1998

Mr. Russell Biss
Regional Wildlife Manager
NYSDEC – Region 9
128 South Street
Olean, NY 14760-3632

Re: Fish & Wildlife Impact Assessment (FWIA)
Farwell Landfill, Town of Ischua
Cattaraugus County, New York
S&W No. 80189FA.0

Dear Mr. Biss:

Stearns & Wheler is performing a Fish & Wildlife Impact Assessment (FWIA) on the above-referenced site as part of a Remedial Investigation/Feasibility Study (RI/FS). For Step 1 of the FWIA process, we are collecting data regarding the fish & wildlife resources within a two-mile radius of the site. The enclosed map shows the site boundaries and the two-mile radius line.

Please send me information regarding the location and identity of any of the following resources that fall within the delineated two-mile radius of the site:

- Regulated Freshwater Wetlands (please include wetland classification information)
- Wild, Scenic, and Recreational Rivers
- Streams & Lakes (please include stream classification information)
- Significant Coastal Zones
- List(s) of wildlife species and their associated cover types typically found in the area

I would also appreciate your sending any records of wildlife mortality that occurred within the two-mile radius or that was directly associated with the subject site.

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One Remington Park Drive
Cazenovia, New York 13035
(315) 655-8161 Fax (315) 655-4180

New York • Connecticut • Maryland • Massachusetts

All of this information can be sent directly to me at the address below. If you have any questions regarding this request, please feel free to contact me directly at (315) 655-8161, extension 384. Thank you very much for your prompt response to this request.

Very truly yours,

Michael S. Fishman
Project Scientist, Wetlands & Wildlife

MSF/smp

Enclosure: site location map

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

COPY

September 30, 1998

Ms. Kathy Schneider
Information Services
Significant Habitat Unit
NYSDEC
700 Troy-Schenectady Road
Latham, NY 12110

Re: Fish & Wildlife Impact Assessment (FWIA)
Farwell Landfill, Town of Ischua,
Cattaraugus County, New York (NYSDEC Region 9)
S&W No. 80189FA.0

Dear Ms. Schneider:

Stearns & Wheler, LLC is performing a Fish & Wildlife Impact Assessment (FWIA) on the above referenced site as part of a Remedial Investigation/Feasibility Study (RI/FS). For Step 1 of the FWIA process, we are collecting data regarding the fish & wildlife resources within a 2-mile radius of the site. The enclosed map shows the site boundaries and the 2-mile radius line.

Please send me information regarding the location and identity of any of the following resources that fall within the delineated two-mile radius of the site:

- NYSDEC Significant Habitats
- Natural Heritage Program Elements
- Recorded Incidence or Habitats of Rare, Threatened, Endangered, or Special Concern Species

I would appreciate your sending to me any available information regarding these elements. In addition, I would appreciate your sending me a copy of *Ecological Communities of New York State* (1990), which defines significant habitats and covertypes.

This information can be sent directly to me at the address listed below. If you have any questions regarding this request, please feel free to contact me directly at (315) 655-8161, extension 384.

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One Remington Park Drive
Cazenovia, New York 13035
(315) 655-8161 Fax (315) 655-4180

New York • Connecticut • Maryland • Massachusetts

Thank you very much for your prompt response to this request.

Very truly yours,

Michael S. Fishman
Project Scientist, Wetlands & Wildlife

MSF/amm

Enclosure

pc: Dan Ours, CPG, Project Hydrogeologist, Stearns & Wheler, LLC

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

COPY

September 30, 1998

Mr. Stephen Mooradian
Regional Fisheries Manager
NYSDEC - Region 9
128 South Street
Olean, NY 14760-3632

Re: Fish & Wildlife Impact Assessment (FWIA)
Farwell Landfill, Town of Ischua
Cattaraugus County, New York
S&W No. 80189FA.0

Dear Mr. Mooradian:

Stearns & Wheler is performing a Fish & Wildlife Impact Assessment (FWIA) on the above referenced site as part of a Remedial Investigation/Feasibility Study (RI/FS). For Step 1 of the FWIA process, we are collecting data regarding the fish & wildlife resources within a two-mile radius of the site. The enclosed map shows the site boundaries and the two-mile radius line.

I would appreciate your sending to me any records of fish mortality that occurred within the two-mile radius, especially on Ischua Creek, or that was directly associated with the subject site. Any information regarding species of fish typically found in waters within the two-mile radius would also be appreciated.

This information can be sent directly to me at the address below. If you have any questions regarding this request, please feel free to contact me directly at (315) 655-8161, extension 384. Thank you very much for your prompt response to this request.

Very truly yours,

Michael S. Fishman
Project Scientist, Wetlands & Wildlife

MSF/smp

Enclosure: site location map

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One Remington Park Drive
Cazenovia, New York 13035
(315) 655-8161 Fax (315) 655-4180

New York • Connecticut • Maryland • Massachusetts

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

COPY

October 5, 1998

Mr. Mike Stoll, Fish & Wildlife Biologist
U.S. Fish & Wildlife Service
3817 Luker Road
Cortland, NY 13045

Re: Fish & Wildlife Impact Assessment (FWIA)
Farwell Landfill, Town of Ischua, Cattaraugus County, Ny
S&W No. 80189FA.0

Dear Mr. Stoll:

Stearns & Wheler is performing a Fish & Wildlife Impact Assessment (FWIA) on the above-referenced site as part of a Remedial Investigation/Feasibility Study (RI/FS). For Step 1 of the FWIA process, we are collecting data regarding the fish & wildlife resources within a two-mile radius of the site. The enclosed map shows the site boundaries and the two-mile radius line.

Please send me information regarding the location and identity of any of the following resources that fall within the delineated two-mile radius of the site:

- Wetlands identified on the National Wetland Inventory (NWI) maps (photocopies of appropriate map sections would be helpful).
- List of any rare, threatened, endangered, or special concern species of plants or animals known to inhabit or use the area.

All of this information can be sent directly to me at the address below. If you have any questions regarding this request, please feel free to contact me directly at (315) 655-8161, extension 384. Thank you very much for your prompt response to this request.

Very truly yours,

Michael S. Fishman
Project Scientist
Wetlands & Wildlife

MSF/smp
Enclosure: site location map

pc: Dan Ours, CPG, Project Hydrogeologist, Stearns & Wheler, LLC

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