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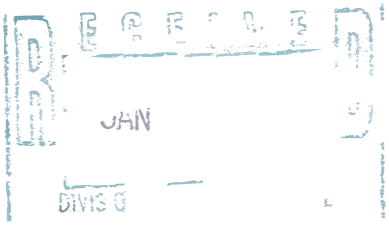
STEUBEN COUNTY
DEPARTMENT OF PUBLIC WORKS

ERWIN TOWN LANDFILL
INACTIVE HAZARDOUS WASTE SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

FINAL
REMEDIAL INVESTIGATION
REPORT

JANUARY, 2002



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1. INTRODUCTION

The Erwin Town Landfill is designated by the New York State Department of Environmental Conservation (NYSDEC) as a Class 2 Inactive Hazardous Waste Disposal Site, and has been listed in the Registry of Inactive Hazardous Waste Disposal Sites in New York under site number 8-51-003. The landfill and its immediate vicinity are the focus of this Remedial Investigation Report.

Steuben County was approved for funding under the New York State Department of Environmental Conservation Title 3 Program to pursue an investigation to characterize the site conditions and to evaluate appropriate remedial actions, if necessary.

In April of 2001, Barton & Loguidice, P.C. submitted the Final Work Plan for the Erwin Town Landfill Remedial Investigation/Feasibility Study (RI/FS), including separately bound appendices (A – Sampling and Analysis Plan, B – Health and Safety Plan, and C – Citizen Participation Plan) to the NYSDEC for approval. These documents provided the basis for conducting the RI/FS in accordance with NYSDEC Hazardous Waste Landfill closure requirements.

1.1 Project Scope and Objectives

The approved Work Plan detailed specific work items and objectives to be followed throughout the Remedial Investigation. A summary of those work items and objectives is presented below.

- determine the horizontal limits of waste associated with the landfill;
- determine the potential presence and extent of combustible gases within the subsurface at the landfill perimeter;
- identify and sample leachate seeps along the sideslopes or at the perimeter of the landfill;
- determine the level of radioactivity at the landfill surface relative to background site conditions;
- determine the nature and extent of surface soil, surface water and sediment contamination;
- characterize the nature and extent of groundwater contamination within the immediate vicinity of the landfill, specifically identifying: a) the type and concentrations of contaminants; b) the potential direction and rate of their migration, and; c) their areal extent;

- perform a residential well survey to identify nearby residences served by public/private water supplies;
- perform a fish and wildlife impact analysis; and
- perform a qualitative health assessment relative to the contaminants identified on site. This assessment includes an evaluation of site contaminants, possible exposure pathways (i.e., inhalation, ingestion, absorption) and the potential health risks associated with each media and pathway identified.

1.2 Site Location

The Erwin Town Landfill is located within the corporate limits of the Village of Painted Post, Steuben County, New York. The landfill encompasses an area of approximately 13 acres. The Cohocton and Tioga Rivers are located to the northeast and south, respectively, of the landfill, where they merge approximately 1,000 feet east of the site forming the Chemung River (NYSDEC, 1992). The Village of Painted post is located approximately ¼ mile northeast and across the Cohocton River. To the southwest is the commercialized Village of Gang Mills. The nearest residence is located approximately 1,200 feet north/northwest of the limits of waste on Canada Road. A Site Location Map is presented as Figure 1-1.

Man-made flood levees (constructed in 1938 by the US Army Corps of Engineers) border the landfill to the north, east and south; U.S. Route 15 is located to the west and northwest; the Town of Erwin Wastewater Treatment Plant to the east; and the Erie-Lackawanna railroad line runs parallel with the southern levee. The natural topography of the site is a flat river valley with an average elevation of 935 feet above sea level. Hills surrounding the river valley reach elevations up to 1,800 feet above sea level. The landfill itself forms a gently sloping, rectangular mound, extending approximately 35 feet above the surrounding topography (NYSDEC, 1995).

PROJECT LOCATION

ERWIN TOWN LANDFILL
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

SITE LOCATION

STEUBEN COUNTY NEW YORK

Figure
1–1

Project No.
268.012

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1.3 Summary of Site History

Aerial photographs obtained from the Town of Erwin's Tax Assessor's Office were reviewed by Ecology and Environment Engineering in 1992, indicating prior use of the site for agricultural purposes and as a borrow pit. Prior to the commencement of landfilling activities in 1966, a 4-foot layer of foundry sand from the Ingersoll-Rand Company was placed on the site for use as a landfill base. Additional information suggested the potential presence of a soil berm, within which wastes were disposed following its construction.

The landfill was first owned and operated by the Town of Erwin from 1966 to 1978. Debris deposited within the landfill at that time consisted of household and industrial solid waste. In 1978 the landfill was leased to Steuben County, which took over operations of the landfill until its closure in 1983. During the period between 1978 and 1983, the main contributors to the landfill were Steuben County, Ingersoll-Rand Company, and Coming Glass Works. Steuben County's primary use of the landfill was for disposal of stumps and brush. The Ingersoll-Rand Company's main waste was foundry sand, which consisted of scrap iron, scrap steel, shot blast dust, silica sand, organic sand binders, ferrous and non-ferrous alloys, firebrick, clay binder sand, refractory washes, and occasional loads of broken concrete. The Corning Glass Works waste included ceramic logs, cullet, wood pallets, sawdust, construction debris including bricks and concrete blocks, cardboard, paper, grinding wastes composed of pumice and cerium-oxide, and sand. Upon closure of the landfill, all responsibilities of the landfill were reverted to the Town of Erwin, who covered the wastes with 2 feet of soil. This activity was performed in accordance with the NYSEC Part 360 closure regulations in effect at that time.

1.4 Report Organization

This report provides the information obtained from, and interpretations based on, the Remedial Investigation activities performed in accordance with the Work Plan. The report incorporates associated tables, figures, plates (folded in the back) and appendices, and is comprised of 10 sections, as indicated below:

- Section 2 details the methodologies employed during the field activities;
- Section 3, 4 and 5 discuss the regional, local and site specific physical, geologic and hydrogeologic settings, respectively;
- Section 6 summarizes the results of the on-site investigations and various analytical testing programs, with an emphasis on the determination of the nature and extent of specific media contamination identified at the site;
- Section 7 discusses the Fate and Transport of identified site contaminants;
- Section 8 presents the Fish and Wildlife Impact Analysis and the quantitative human health risk analysis;
- Section 9 summarizes the findings of the Remedial Investigation; and
- References are provided in Section 10.

The RI/FS Work Plan originally identified that a detailed review of past disposal records including interviews with former Corning Glass Works and Ingersoll Rand employees would be conducted. However, the detailed accounts of past site activities already presented in available site investigation documents, was sufficient to satisfy this task. As a result, further research in this area was not warranted.

1.5 Project Consultants

Barton & Loguidice, P.C. (B&L) is the primary Engineering Consultant for the Remedial Investigation/Feasibility Study. B&L staff dedicated to this project included professional engineers, senior and staff hydrogeologists and geologists, environmental scientists and technicians, and computer aided design specialists. Assistance to B&L was provided by the following technical and professional subcontractors:

EcoLogic conducted the Fish and Wildlife Impact Analysis for this project. Their findings have been incorporated with Section 8 of this report.

Topographic mapping for the site vicinity was taken from recent NYSDOT mapping performed as part of the 2000 NYSDOT Detailed Site Investigation. Surveying services required to provide horizontal coordinates and elevation for current investigation locations (new monitoring wells, test pits, soil sampling locations, staff gauges) was provided by Weiler Associates.

Geologic NY, Inc. provided test pit, soil boring and monitoring well installation services.

Chemtech Consulting Group was retained to perform laboratory analytical testing of groundwater and surface soil samples. O'Brien & Gere Laboratories, Inc. provided specific laboratory services associated with supplemental soil samples collected for radioactivity analysis.

Third-party data validation regarding laboratory analytical reporting was performed by EnviroAnalytics. The data validation report is presented as Appendix C.

2.0 FIELD METHODS/ACTIVITIES FOR REMEDIAL INVESTIGATION

The primary objective of the Remedial Investigation was to define the nature and extent of potential environmental impacts associated with the former Erwin Town Landfill. Several separate investigations and site activities were performed to characterize these conditions and the level of action required to mitigate environmental concerns. Field activities began on May 14th, 2001 with the delineation of waste limits of the landfill.

This section describes the methods used to complete each task associated with the field activities. The approved Remedial Investigation/Feasibility Study Work Plan (Barton & Loguidice, April, 2001), Sampling and Analysis, and Health and Safety plans detailed the proposed work methodologies to be utilized throughout the Remedial Investigation. A detailed discussion of the completed field activities is provided herein. All on-site activities were monitored and controlled using the guidelines set forth in the approved Health and Safety Plan.

2.1 Site Base Map

A full survey of the entire landfill and investigation area was completed in 2000 as part of the Interstate 86/Route 15 Interchange and Route 15/Gang Mills Interchange Report prepared by The Sear-Brown Group, Inc. for the New York State Department of Transportation. This survey included the locations and elevation of the existing monitoring wells installed during the 1995 NYSDEC Preliminary Site Assessment and the 2000 NYSDOT Site Assessment. For the purpose of the Remedial Investigation, each new investigation location (e.g., wells, test pits) was surveyed and combined with the existing topographic survey to create the site base map used for this investigation. Supplemental survey services were provided by Weiler Associates. The Site Investigation Layout is presented as Plate 1 (folded in back pocket of this report).

2.2 Site Reconnaissance

On May 3, 2001, personnel from B&L conducted a preliminary site reconnaissance to become familiar with the layout of the landfill site and to identify preliminary investigation locations in accordance with the approved scope of work presented in the Work Plan. A second site reconnaissance was conducted on May 16th, 2001 with representatives from B&L, the New York State Department of Environmental Conservation (NYSDEC) and the Steuben County Department of Public Works to discuss the investigation findings and any adjustments, deletions or additions to the scope of work as a result of these preliminary findings.

2.3 Site Access

The majority of field activities performed during the Remedial Investigation were completed within the limits of the property owned by the Town of Erwin. This property (shown on Plate 1) encompasses the landfill, the Town Sewage Treatment Plant and the Town Composting Facility. The on-site roadways on the project site provided adequate access for heavy machinery during the test pit excavation and well boring and installation phases of the investigation. There was no need to construct new site access, nor did any heavy vegetation need to be removed to allow for access to site investigation areas.

2.4 Decontamination Area

A temporary decontamination pad was constructed in a designated area adjacent to the landfill (see Plate 1) to accommodate the steam cleaning of excavation and well drilling equipment. The decontamination pad was constructed along the bottom of the landfill slope within an area approximately 25 feet wide by 25 feet long. The plastic sheeting used to line the decontamination pad was draped and secured over three 2" x 8" pieces of lumber along the downhill end and on each side of the pad. The up-slope end of the decontamination area was left open to allow equipment (e.g., backhoe and drilling equipment) access to the pad. The decontamination water collected during steam cleaning was pumped into a 55-gallon barrel for later analysis and appropriate disposal. The

decontamination pad was disassembled and removed from the site. The 55-gallon barrel was placed along the side of the white maintenance garage adjacent to the Town's composting area. Samples will be collected from the barrel prior to site remediation to evaluate disposal options.

2.5 Stream Elevation Data

Two stream gauging stations (staff gauges) were installed within the Tioga and Cohocton rivers to collect stream elevation data adjacent to the site (Plate 1). The data collected at these stations was used in combination with groundwater elevation data to help characterize hydrologic conditions within the study area. Gauging stations consisted of a wooden stake driven into the streambed such that water levels could be recorded as measured from the top of the stake. The stream gauges were marked in 1/10-foot increments from the top to provide accurate stream elevation monitoring. The stakes were surveyed for both elevation and horizontal location so that recorded stream level data could be shown relative to on-site groundwater elevation data to assist in the determination of groundwater recharge/discharge conditions. These conditions are discussed later in Section 5.0.

2.6 Limits of Waste Investigation

A total of 16 test pits were excavated along the perimeter of the landfill to delineate the extent of waste materials on the property. The test pits were spaced at distances ranging from 100 to 200 feet apart depending on accessibility to the perimeter of the landfill (Plate 1). The test pits were excavated using a four-wheel drive, rubber-tired backhoe, operated by Geologic, Inc. Each test pit was advanced from its initial position, either up-slope or down-slope until the edge of waste was identified. Test pits were logged, staked, and numbered for survey purposes. Test pits were backfilled to the surface upon completion in accordance with the Work Plan. Each test pit was monitored for combustible gases, hydrogen sulfide, volatile organic compounds, and radioactive particles.

Test pits were specifically located adjacent to existing wells MW-2 and MW-3 to determine if these wells had been installed within the landfill waste limits, and if it would be necessary to relocate them for post-closure monitoring purposes. It was not possible to complete any test pits adjacent to MW-5 due

to on-site construction activities associated with the Town of Erwin Sewage Treatment Plant, making the location inaccessible.

Test pits were also completed within the vicinity of wells MW-A3 and MW-A6 to determine the extent of waste noted on the boring logs completed during their installation (NYSDOT, 2000). The data obtained from these test pits will be used to evaluate remedial options for this area of waste.

2.7 Combustible Gas Survey

Landfills associated with the disposal of household, commercial and industrial wastes typically produce combustible gases as a result of waste decomposition. Without proper venting, or in the presence of barriers impeding their upward vertical migration, these gases will often migrate horizontally within the subsurface, occasionally collecting within basements or other structures.

A subsurface gas survey was conducted along the landfill perimeter to assess whether these conditions were present at the Erwin Town Landfill. The survey consisted of a total of 17 shallow probes installed into the shallow subsurface at spacings of approximately 100 feet along the edge of the landfill (Plate1). Five of the existing monitoring wells (MW-A3, MW-A5, MW-A6, MW-A7, MW-5) were also monitored for gases during the survey where surface conditions did not allow the probes to be installed.

At each gas probe location a hole was drilled into the ground with a hand auger to a depth of approximately 2 feet. A 2-inch diameter PVC pipe was then inserted into the hole and the top of the pipe was covered with Parafilm®. Additional Parafilm® was wrapped around the base of the PVC probe creating a seal at the ground surface preventing vapors from escaping. After the gas level in the pipe was allowed to equilibrate, the Parafilm® was punctured with the probe of a Gas Tech GT Land Surveyor combustible gas indicator (CGI). A photoionization detector (PID) was also used to record organic vapor concentrations, if any. Three rounds of data were collected from the 22 gas survey locations on May 16, 17, and 23, 2001. These results are discussed later in Section 6.2.

2.8 Radioactivity Survey

To assess the presence and extent of airborne radiation within the vicinity of the landfill, a radioactivity survey was conducted. This survey consisted of a full-coverage screening of the landfill surface using a Victoreen Model 190 handheld radioactivity meter. The meter was equipped with two separate probes; one for detecting alpha/beta (Model 489-80) and the other for high gamma radiation (Model 489-120 2-inch Sodium Iodide Crystal Scintillation Probe). The survey was performed as a continuous walkover survey, completed in a series of concentric rings around the landfill progressing upwards from the perimeter to the top of the landfill. The meter was held near to ground level and swept slowly across the path, covering an approximate 6-foot swath. A series of flags were placed along the uphill side of the survey to mark the downhill edge of the next path to be surveyed.

Prior to the walk-over, background measurements were taken off-site in order to determine a range of natural radioactivity for the area. This included measurements taken, in two parking lots within the Village of Painted Post, and at the entrance to the site. During the survey, locations that registered a response greater than twice that of background were flagged for additional investigation and subsequent soil sampling and analysis. Plate 2 illustrates the layout of the radioactivity survey, background measurement locations and locations identified for soil radiochemistry analysis.

Four locations within the limits of waste were detected with readings greater than twice that of background, and flagged for sampling and analysis (Plate 2). These areas were sampled on June 1, 2001, along with one additional sample (for a total of five) collected to represent background conditions. The background sample was taken from an area off-site, immediately north of the entrance to the landfill property. These samples were analyzed for gross alpha/beta and for gamma by spectroscopy. The results of this analysis are presented in Section 6.3.

2.9 Supplemental Soil Boring and Monitoring Well Installation

Two new groundwater-monitoring wells (MW-8 and MW-9) were installed along the western and southern perimeters of the landfill to address gaps in the existing monitoring well network (see Plate 1).

The soil borings were advanced using 4-1/4" hollow-stem augers and continuously sampled using 2" split spoon-sampling methods.

Samples collected from the split spoon samplers were stored in sealable glass jars. A slight headspace was allowed in each of the sample jars for organic vapor volatilization. Each sample was analyzed for the presence of volatile organic vapors using a Mini-Rae Plus Photoionization Detector. Organic compounds with ionization potentials less than 11.7 electron-volts (the amount of energy emitted by the instrument's light source) were recorded as readings of parts per million (ppm) on the Mini-Rae's readout. The subsurface stratigraphy and all pertinent soil boring data are presented in the subsurface logs included as Appendix A and well installation details.

Wells were constructed of 2-inch diameter PVC riser and screen. Each well was set at a depth of approximately 18-19 feet with a 10-foot section of .01 slotted screens. The screen was sand packed with #1 morie and a bentonite and grout seal were applied to complete the installation. Each well stick-up was covered with a steel protective casing with a locking cover.

2.9.1 Air Monitoring

Prior to the drilling program, an air quality survey was conducted at each borehole location and around the entire perimeter of the landfill. This was performed in an attempt to identify possible zones where the concentrations of air-borne contaminants might dictate an upgrade in personal protective equipment.

Periodic evaluation of the breathing zone was maintained throughout borehole advancement and well installation to monitor any possible influence from subsurface conditions. Air quality monitoring was conducted using a Mini-Rae Plus Photoionization Detector, a GT Land Surveyor Portable Gas Monitor, and a Minigas MK5 Hydrogen Sulfide (H_2S) Meter.

Additionally, site perimeter monitoring was performed continuously as part of the Community Air Monitoring Plan, described in the RI/FS Work Plan, to detect elevated airborne contaminants or dust, which may travel off-site. Perimeter monitoring was performed using a dedicated Mini-Rae Plus Photoionization Detector and a Dusttrak Particulate Monitor.

Real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e. dust) in the downwind and upwind perimeter of each designated intrusive work area was conducted periodically. The intent of this monitoring was to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site or nearby workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The results of the site air monitoring program are presented in Section 6.7.

2.9.2 Well Development

MW-8 and MW-9 were developed using 1-inch O.D. Waterra® tubing and foot-valves. Each well was developed for approximately 3 hours removing 80 gallons per well. The action of the Waterra® system removes suspended particles and sediments from the well screen annulus and sand filter pack, resulting in the preferential sorting and distribution of natural formation particles as they are drawn into the sand pack. Since the existing site monitoring wells had been developed during the 2000 NYSDOT Detailed Site Investigation, it was determined that further development was not necessary for these wells.

During the development process, field parameters including turbidity, specific conductivity and pH were continually monitored. The intent was to continue development until the field measured properties stabilized and values of turbidity were less than 50 NTU. Although stable pH and specific conductivity was attained, neither well achieved values of turbidity less than 50 NTU due to the continued influx of suspended fines into the well annulus. Well development information is presented on the subsurface boring logs included as Appendix A.

2.10 Water Level Monitoring

Two rounds of water level readings were collected from the new and existing monitoring wells during the weeks of May 14th and 21st, 2001. Water levels were determined by measuring from the top of PVC to the static water level within the well using a Solinst water level meter. Historical and recent survey data of the top of PVC within each well provided the necessary elevations to calculate the water table surface. Stream elevations were also measured at this time. Groundwater and stream elevation data were used to help characterize local hydrologic conditions within vicinity of the Erwin Town Landfill, and to determine flow directions and distribution away from the landfill. These conditions are discussed later in Section 5.2.2.

2.11 Characterization of Suspected Contaminated Media

A comprehensive program for evaluating existing potential site contamination was conducted through the analysis of groundwater and surface soil samples. Sample locations are shown on Plate 1 of this report. The following discussion describes the sampling and analysis procedures used to complete these activities.

2.11.1 Groundwater Sampling

A total of sixteen (16) existing and new groundwater-monitoring wells were purged prior to sample withdrawal to remove the water standing within the well casing, using the Waterra® groundwater extraction system. This allowed fresh formation water to recharge the well. Wells that recharged rapidly were continuously purged until three times the volume of water in the well was removed. Wells that bailed dry were allowed to fully recharge then purged dry again before samples were taken.

Groundwater samples were collected on May 21, 2001. Sample bottles were filled in the following order: VOCs, total metals, SVOCs and PCBs. Sample bottles designated for the analysis of organic compounds were filled first in order to prevent possible premature volatilization. Field parameters were recorded for each location during the sampling

process. Samples were packed into refrigerated coolers in preparation for shipping to the laboratory.

2.11.2 Surface Water and Sediment Sampling

There were no areas on-site where flowing surface water was observed during the Remedial Investigation. As a result, there were no surface water or sediment samples collected for analysis.

2.11.3 Leachate Sampling

There were no leachate seeps observed either along the landfill sideslopes or at the landfill perimeter during the Remedial Investigation. As a result, there were no leachate samples collected for analysis.

2.11.4 Surface Soil Sampling

A limited surface soil sampling program was conducted on May 22, 2001 to confirm conditions identified during prior investigations. One sample was collected within the drainage ditch along the western landfill perimeter in an area where previous leachate outbreaks had been observed. Another was taken at the northeast landfill perimeter where evidence of PCB contamination was detected during previous investigations. The remaining two surface soil samples were collected from background locations to the north of the landfill property. These sample locations are indicated on Plate 1.

A clean stainless steel scoop was used to obtain a sample from the upper two inches of soil at location SS-3. At locations SS-1, SS-2 and SS-4, the root system of the surface vegetation extended to approximately four inches below the ground surface. At these locations the surface soil sample was collected from four-six inches below ground surface. Soil samples were packed into refrigerated coolers in preparation for shipping to the

laboratory. Soil samples were also analyzed for VOCs, SVOCs, total metals, and PCBs. The results of this limited sampling program is presented in Section 6.5.

2.11.5 Quality Assurance/Quality Control

Several steps were taken in the field to ensure that samples were representative of site conditions. In general, samples were collected from anticipated background locations to apparent impacted locations to reduce the potential for cross-contamination. Additionally, groundwater samples were collected using non-dedicated, disposable bailers, and soil samples were retrieved using disposable stainless-steel scoops.

Additional practices relating to maintaining the integrity of task specific items are discussed below.

2.11.5.1 Decontamination Procedures

The decontamination of non-dedicated equipment and tools used during drilling, well installation and sampling activities, was performed in accordance with procedures outlined in the Sampling and Analysis Plan. Upon the completion of each boring, all drilling equipment and down-hole tools were cleaned with a high-pressure steam system and allowed to air dry. These procedures were conducted at designated on-site areas, created to collect wash water and residual sediment generated during the decontamination process.

2.11.5.2 Field Blanks/Trip Blanks

Wash blanks were taken on equipment used to collect surface soil and groundwater samples. Wash blanks were subsequently analyzed for the same set of parameters used to analyze the groundwater and soil samples, in order to develop a baseline of data for the sampling equipment. Wash blanks were obtained by pouring

deionized water over the particular piece of equipment, and collecting the run-off in appropriate sample bottles. The deionized water was supplied by the laboratory.

Trip blanks were provided by the laboratory, upon sample bottle receipt, to be included with the shipment of each cooler once sampling was complete. One set of trip blanks included two 40 ml vials for volatile organic analysis, pre-filled with deionized water. Trip blanks were analyzed to monitor conditions within each cooler during shipping.

2.11.5.3 Documentation

Samples were packed in refrigerated coolers and shipped to the laboratory using overnight delivery. Completed and signed chain of custody records accompanied each cooler. All information relative to the sampling activities was provided, including: sampling date and time, sample identification, number of bottles filled at each sampling location, preservatives, bottle size, method/date/time of shipment, trip blanks and release signature.

Sampling data sheets were maintained in the field for each sampling location. All pertinent data, including sample location, date, volume purged, static water level, total well depth, weather conditions, sample appearance, parameters to be analyzed, and the results of field parameter determinations, were appropriately recorded. These data sheets are provided in Appendix B.

2.12 Laboratory Analysis

Prior to their approval as the contract laboratory for this project, Chemtech submitted to the NYSDEC full documentation of their current lab QA/QC program. Review of this program was to identify the ability of the laboratory to provide required full Contract Laboratory Procedures in

accordance with 1995 NYSDEC ASP (Analytical Services Protocols) and NYSDOH ELAP (Environmental Laboratory Approval Program) certifications.

The laboratory provided all sample bottles with appropriate preservatives, coolers, and chain of custody forms, custody seals, trip blanks and quantities of deionized water to prepare field blanks. Following sample receipt, the laboratory was responsible for providing analytical data results using test methods specified in the Sampling and Analysis Plan, and supporting quality control data in accordance with the 1995 NYSDEC ASP. All original laboratory including the full Category B deliverables will be retained at the offices of Barton & Loguidice, P.C. throughout the completion of the project.

2.13 Data Validation

Analytical data and laboratory QA/QC data generated from groundwater and surface soil samples were submitted to EnviroAnalytics for third party data validation. Data validation was performed to verify that the analytical results were obtained by following the protocols specified in NYSDEC approved CLP reporting packages. The data validation report is provided in Appendix C.

2.14 Determination of Site Hydrogeologic Condition

In-situ determination of horizontal hydraulic conductivity were performed on May 23, 2001 at each existing and new monitoring well. The testing was conducted using the variable head (slug test) method. Testing equipment included the Waterra® tubing and footvalve system, water level meter, and stopwatch. All testing equipment introduced into the wells was properly decontaminated before continuing to the next location.

The static water level was recorded as the reference point prior to displacement. Water was removed from the well using the Waterra® system until all water was purged from the well or a steady-state condition was reached. At this point, pumping ceased and water level changes were recorded to document the rate of recovery. Continuous measurements were recorded until the water level had

recovered to within 90 percent of the reference level. Appendix D includes the hydraulic conductivity test data, hydraulic conductivity curves, and hydraulic conductivity calculations.

The slug test data were analyzed using the Bouwer & Rice (1976) and Bouwer (1989) method for determining horizontal hydraulic conductivity (K_H) using the following equation:

$$K = \frac{r^2}{2L(t_2-t_1)} \ln(L/R) \ln(h_1/h_2)$$

where:

K_H= horizontal hydraulic conductivity

r = well riser radius

L =well intake screen length

R = borehole radius

h_1,h_2 = head ratio (H/Ho) at selected elapsed time intervals, after initial depressed head Ho

t_1,t_2 = elapsed time at h_1 and h_2

The term "ln (L/R)" in this equation assumes that the entire length of screen is affected by the hydraulic conductivity of the formation. At some of the test locations, however, the initial static water level was below the top of the well screen. The Bouwer and Rice slug test method (Bouwer & Rice, 1976; Bouwer, 1989) compensates for this effect by accounting for specific aquifer dimensions. The popular software package AQTESOLV Version 1.0 developed by Geraghty & Miller, Inc. was used as a check for these determinations. Further discussion of the hydraulic conductivity results will be presented in Section 5.0.

2.15 Residential Well Survey

A survey of private and municipal water supply sources was completed within a one-half mile radius of the site boundary. Municipal records were reviewed, accompanied by a door-to-door survey of properties within the specified radius. The focus of this study was to identify residences that are currently using private water supplies. Residences and businesses were surveyed to confirm the

source of their water supply (public system or private well). Section 6.4 presents the results of this activity. Figure 6-1 identifies the area included in the survey, while Appendix F includes the tax maps with the parcels identified which were included as part of this survey.

2.16 Fish and Wildlife Impact Analysis

A habitat-based assessment of the Erwin Town Landfill and its immediate surroundings was performed by EcoLogic, LLC on May 22, 2001. Steps I and II (parts A and B) of the New York State Department of Environmental Conservation (NYSDEC) October 1994 Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (FWIA) were completed as part of this assessment. The results of this study are summarized in Section 8.0 of this report, and the complete report prepared by EcoLogic, LLC is presented as Appendix E.

3.0 PHYSICAL SETTING

3.1 Physiography and Geomorphology

The site is located within the northern region of the Allegheny Plateau in the physiographic province of the Appalachian Uplands (USGS Survey Report 82-553, 1982). The preglacial bedrock surface was modified by erosion and deeply incised by ancient rivers. During glacial advance, ice scoured the preglacial topography and widened and deepened the valleys, oversteepened hillside slopes, and rounded hilltops (USGS Survey Report 82-553, 1982). During periods of glacial recession, meltwaters deposited glacial drift in the valley areas, resulting in the present surface topography of the region.

The Erwin Town Landfill is situated at the confluence of the Cohocton River to the northeast and the Tioga River to the south, where they merge approximately 1,000 feet east of the site, forming the Chemung River (NYSDEC, 1992). The natural topography of the site is a flat river valley with an average elevation of 935 feet above sea level. The landfill forms a gently sloping, rectangular mound, extending approximately 35 feet above the surrounding topography (NYSDEC 1995).

3.2 Climate

The climate in Steuben County is cool, humid, and representative of the continental Northeastern United States (Pack, 1972). Summers are warm with occasional short periods of high temperature. Winters are typically long and cold.

Lengthy periods of either abnormally cold or warm weather result from the movement of great high-pressure (anticyclone) systems into and through the Eastern United States. Cold winter temperatures prevail over New York whenever Arctic air masses, under high barometric pressure, flow southward from central Canada or from Hudson Bay. High-pressure systems often move just off the Atlantic coast, become more or less stagnant for several days, and then a persistent airflow from the southwest

or south affects the State. This circulation brings very warm, often humid weather of the summer season and the mild, more pleasant temperatures during the fall, winter, and spring seasons (Pack, 1972).

The prevailing wind direction for February through July is west-northwest; west-southwest for August and October through January; and southerly for September. The primary prevailing wind direction is west-northwest (NOAA, 1982).

The mean annual temperature from 1978-1999 for Corning was 47.5°F with a mean maximum temperature of 70.5°F during the months of July and August and mean minimum of 22.3°F during the months of January and February (NOAA). For the Corning Region, the highest recorded temperature was 102°F and the lowest was -25°F.

The average annual precipitation from 1978 to 1999 for Corning was 35.02 inches (NOAA). The mean average precipitation is highest during the months of June and July with 6.18 inches and lowest during the months of November and December with 0.84 inches. In comparison, Syracuse has a slightly higher annual average with 39.11 inches and Ithaca with 35.27 inches (NOAA).

3.3 Land Uses

Steuben County covers an area of 1,397 square miles (Steuben County Historian Department, 1996). Land use in Steuben County is predominantly rural, with the exception of the higher population areas of Bath and Corning and the smaller villages. Such rural land uses include a mixture of agricultural, State Land/reforestation areas, residential and undeveloped land areas.

The Erwin Town Landfill site is located at the confluence of the Tioga and Cohocton Rivers. Land use in the immediate vicinity of the site include the Town of Erwin Sewage Treatment Plant, US Route 15, a train yard, and some undeveloped land areas and a few residences. The Village of Painted Post, located across the Cohocton River from the landfill, is predominantly residential and moderately industrialized.

3.4 Seismicity

The 1990 United States Geologic Survey (USGS) Map (Algermissen, et al., 1990) shows that the Erwin Town Landfill site is located in an area exhibiting a maximum horizontal bedrock acceleration of approximately 0.06 g in 250 years. This is less than the 0.10 g threshold established in 6 NYCRR Part 360 Section 2.7 (b)(I) that determines when seismic analyses are required for new landfills. Accordingly, this indicates that the site is located in a relatively stable region that is not susceptible to major ground accelerations.

4.0 GEOLOGIC SETTING

4.1 Regional Bedrock Geology

The bedrock units within the Appalachian Uplands area of New York were deposited as shallow seas that covered portions of the State during the Paleozoic Era, approximately 300 to 600 million years ago. The total thickness of the Paleozoic age strata in New York is approximately 9,000 feet (Broughton, 1981). The Paleozoic strata is underlain by the Pre-Cambrian basement rock complex, which occurs approximately 7,000 to 9,000 feet below sea level (Broughton, 1981). These formations consist of primarily sedimentary units (shale, siltstone, and sandstone) with a shallow regional dip to the south.

4.2 Site Bedrock Geology

The uppermost bedrock units in the Painted Post/Corning region are the Upper Devonian age shale, siltstone, and sandstone of the West Falls, Java, and Wiscoy Groups. Sediments for these rock units were deposited approximately 350 million years ago. The majority of the Tioga and Cohocton River Valleys and the Erwin Town Landfill are underlain by rock units from the West Falls Group, principally the Gardeau Formation, which is composed of dark gray shales and thin gray siltstones. There are no bedrock outcrops (surface exposures) within the immediate vicinity of the landfill site. The depth to bedrock within the vicinity of the landfill appears to be approximately 100 feet (Waller et al., 1982).

4.3 Regional Glacial Geology

During Pleistocene time, continental ice sheets covered the region. Movement of tongues of ice down the valleys preceded the ice sheets. As the lobes of ice moved, they deepened and broadened the valleys. Eventually the ice sheet associated with the lobes of ice completely covered the uplands as well as the valleys. The greater thickness and speed of the ice moving through the valleys caused

greater erosion of the bedrock valleys to occur. The materials eroded by the moving ice were transported and redeposit as an unsorted mixture of clay, silt, sand and gravel. This mixture is termed glacial till.

Upon the retreat of the glaciers, the uplands were mantled with 5 to 25 feet of till. The material in the valleys, however, was often reworked by the flowing melt water, resulting in sorting, washing and redeposition of stratified unconsolidated materials (drift). In the Coming-Painted Post-Gang Mills area, borings and well logs through the glacial drift indicate predominantly sand and gravel (70-90 feet thick), but includes areas of silty sand and gravel and others containing till (MacNish, Randal, and Ku, 1969).

4.4 Site Surficial Geology

The unconsolidated materials that mantle the area occupied by the Erwin Town Landfill consists of reworked glacial drift deposited during the Wisconsinan ice age approximately 10,000 to 12,000 years ago. The results of the current subsurface investigation, combined with the information from past investigations reveal a 9 to 10 foot layer of sandy-silt, with some clay, which grades into a coarse-medium sand and fine gravel with variable amounts of silt. The extent of the sand and gravel layer on site was unable to be determined since borings were terminated at depths of 18 to 22 feet. The sand and gravel material was well rounded and saturated at fairly shallow depths.

Plate 3 presents stratigraphic cross-sections A-A' and B-B' through the study area. Both cross-sections are oriented generally northwest to southeast, but are off-set from each other to illustrate the subsurface stratigraphy within different areas at the study area. Stratigraphic cross-section A-A' identifies the landfill waste limits, the perimeter soil berms, and the approximate position of the underlying foundry sand layer. Also, indicated, is the limited layer of waste observed within the vicinity of MW-A3 and MW-A6, located north of the main waste disposal area.

5.0 HYDROGEOLOGIC SETTING

5.1 Regional Conditions

5.1.1 Surface Water Drainage

The Erwin Town Landfill lies within the Susquehanna River drainage basin. The Chemung River is the primary surface water drainage feature in the Corning-Painted Post-Gang Mills region. The Chemung River is formed from the assemblage of 3 major tributaries: Canisteo, Tioga, and Cohocton Rivers. The Canisteo and Tioga Rivers flow east and converge with the Cohocton River, which flows from the north forming the headwaters of Chemung River in the Town of Painted Post. The Chemung River flows in a southeasterly direction through Elmira and into Pennsylvania where it converges with the Susquehanna River South of Athens.

5.1.2 Regional Water Resources

The Corning area segment of the Corning-Elmira-Horseheads-Big Flats Aquifier System (USGS, 1982) provides municipal groundwater resources to the communities of Corning, Painted Post, and Gangs Mills. For many smaller communities and outlying rural areas, water is generally supplied from private groundwater sources as drilled or dug wells.

Groundwater resources of the Susquehanna River drainage basin are most prolific in the unconsolidated glacial drift deposits that fill the valleys. The glacial tills, which mantle most of the upland areas, are, in general, not used for domestic water supply wells. Instead, the upland wells typically penetrate through the overburden and into the unconsolidated glacial drift deposits to meet domestic needs.

The Corning-Elmira-Horseheads-Big Flats aquifer is primarily composed of permeable sands and gravels. Yields of 500 to 1000 gallons/minute are common within this region where the sand and gravel exceeds 40 feet in depth and near streams where pumping can induce streams to recharge the aquifer. In Corning, the saturated, permeable sand and gravel deposits exceed depths of 60 feet, producing high yield wells (USGS, 1982).

5.2 Site Conditions

5.2.1 Surface Water Drainage

The Erwin Town Landfill is located to the north and west of the Tioga and Cohocton Rivers respectively, where they merge approximately 1000 feet east of the site forming the Chemung River. All surface water drainage from the landfill property flows south or east into the tributaries of the Chemung River. A seasonal stream located to the west of the landfill is generally stagnant except during the spring or periods of high precipitation. This unnamed stream flows directly into the Tioga River approximately 1000 feet west of the confluence of the Tioga and the Cohocton Rivers, and collects drainage from the west side of the landfill. This stream was not flowing at the time of the site investigation.

5.2.2 Overburden Groundwater

The overburden piezometric surface for May 23, 2001 groundwater elevations are presented in Plate 4. These data represent water levels and staff gauge measurements recorded during the collection of groundwater samples from the new wells installed during the Remedial Investigation, and the existing wells installed during the NYSDEC Preliminary Site Assessment in 1995 and the NYSDOT Detailed Site Investigation in 2000. The contoured water table surface incorporates the stream elevation data also recorded for May 23, 2001, as it appears that the Tioga and Cohocton rivers represent surface exposures of the local groundwater system. Two previous rounds of water level measurements were recorded immediately following the installation of the new wells and during hydraulic conductivity testing. There was no significant difference in water levels observed for the three data sets. Water level elevation data is presented on Table 5-1.

The horizontal component of groundwater flow within the overburden appears to be generally radial beneath the landfill, and then towards the Tioga and Cohocton Rivers, south and east of the site, respectively. Overall, the regional groundwater flow pattern appears to be southeast,

TABLE 5-1
ERWIN TOWN LANDFILL REMEDIAL INVESTIGATION
WATER LEVEL MEASUREMENTS
MAY 2001 DATA

			Water Level*					
	Total	Reference	5/17/01		5/21/01		5/23/01	
Well Location	Well Depth	Elevation (fmsl)	Depth (ft)	Elevation (fmsl)	Depth (ft)	Elevation (fmsl)	Depth (ft)	Elevation (fmsl)
MW-1	22.82	940.51	14.95	925.56	15.11	925.40	15.04	925.47
MW-2	19.10	937.44	8.42	929.02	8.20	929.24	8.30	929.14
MW-3	21.66	939.24	14.80	924.44	14.88	924.36	14.88	924.36
MW-4	22.80	936.56	12.54	924.02	12.61	923.95	12.45	924.11
MW-5	20.20	934.33	9.75	924.58	9.85	924.48	9.80	924.53
MW-6	18.80	933.88	7.80	926.08	8.11	925.77	8.15	925.73
MW-7 **	46.00	NA	12.30	NA	12.30	NA	NR	NA
MW-8	21.40	935.09	10.40	924.69	10.66	924.43	10.74	924.35
MW-9	20.60	934.09	8.28	925.81	8.36	925.73	8.34	925.75
MW-A1	19.25	939.55	14.24	925.31	14.36	925.19	14.30	925.25
MW-A2	21.10	939.34	14.70	924.64	14.80	924.54	14.69	924.65
MW-A3	20.80	944.25	18.60	925.65	18.73	925.52	18.70	925.55
MW-A4	19.25	938.40	13.50	924.90	13.61	924.79	13.53	924.87
MW-A5	20.96	937.77	12.78	924.99	12.80	924.97	12.76	925.01
MW-A6	20.80	944.58	19.58	925.00	19.69	924.89	19.65	924.93
MW-A7	21.25	941.29	16.68	924.61	16.79	924.50	16.68	924.61
Staff Gauge 1	--	927.81	4.86	922.95	--	NR	5.00	922.81
Staff Gauge 2	--	928.00	4.69	923.31	--	NR	4.55	923.45

NOTES: * - measured from top of PVC casing for wells; top of wooden stake for staff gauges.
** - MW-7 also serves as the WWTP well.
-- not applicable
NA - not available
NR - no reading
fmsl - feet above mean sea level

coincident with the orientation of the valley aquifer system. According to the groundwater contour information, the valley aquifer system, as well as the Tioga, Cohocton and Chemung Rivers, represents a groundwater discharge condition for the adjacent land areas, including the area occupied by the landfill, and therefore, serve as groundwater divides.

A minor low spot in the groundwater surface is present within the vicinity of wells MW-A4 and MW-A7. This feature is consistent with water level measurements recorded for the May 2000 readings collected during the NYSDOT Detailed Site Investigation. Upon closer inspection of the stratigraphy observed at these locations, it appears as though the sand and gravel water-bearing formation (within which the well screens are set) is lower in elevation at MW-A4 and MW-A7, than that observed at nearby monitoring wells MW-A5 and MW-A6. This condition, therefore, is the likely cause for groundwater elevations to be slightly lower than the surrounding area. This condition also appears to be localized, and does not appear to impact the overall groundwater flow direction.

5.2.3 Hydraulic Conductivity Test Results

Table 5-2 presents the summary of the variable head (slug test) horizontal hydraulic conductivity testing for the newly installed and existing monitoring wells. As previously stated in Section 2.11, the Bouwer and Rice calculation method was used to calculate the horizontal hydraulic conductivities.

The hydraulic conductivity values ranged 1.32×10^{-3} cm/sec at MW-A3 to 1.38×10^{-5} cm/sec at MW-4, with a geometric mean of 2.28×10^{-4} cm/sec. These values appear to be considerably slower than the values expected for the granular materials making up the Corning-Elmira-Horseheads-Big Flats aquifer system. This is due to the greater percentages of silt within the upper portion of this aquifer. In addition, the 1982 USGS Water Resources Investigations Open-File Report No. 82-553 indicates that the portion of the aquifer within which the Erwin Town Landfill lies, exhibits less infiltration and yield potential than other higher-yielding areas within this aquifer system. This may be due to the merger of the Tioga and Cohocton Rivers at this point, which,

Table 5-2
Erwin Town Landfill Remedial Investigation
Hydraulic Conductivity Test Results Summary

WELL NUMBER	SCREEN INTERVAL (FT)	HYDRAULIC CONDUCTIVITY (CM/SEC)
MW-1	11.0'-21.0'	9.44E-05
MW-2	7.0'-17.0'	1.01E-04
MW-4	11.0'-21.0'	1.38E-05
MW-5	8.0'-18.0'	2.58E-04
MW-6	8.0'-18.0'	7.74E-05
MW-8	9.0'-19.0'	6.54E-04
MW-9	8.0'-18.0'	9.74E-05
MW-A1	7.0'-17.0'	5.54E-04
MW-A2	9.0'-19.0'	2.61E-04
MW-A3	9.0'-19.0'	1.32E-03
MW-A4	7.0'-17.0'	6.20E-04
MW-A5	9.0'-19.0'	2.54E-04
MW-A6	9.0'-19.0'	3.61E-04
MW-A7	9.5'-19.5'	5.53E-04
GEOMETRIC MEAN		**2.28E-04**

during earlier episodes of sediment deposition, created an environment more conducive for finer-grained particles to settle out, instead of being carried downstream.

The presentation of the groundwater elevation data in Plate 4, combined with a review of the boring logs associated with the site monitoring wells and the range of hydraulic conductivities measured at the site, does not indicate that there are any preferential pathways present within the site's surface which would promote groundwater flow and/or contaminant migration in an unprecedented direction. Flow appears to be generally uniform and consistent.

6.0 RESULTS OF FIELD INVESTIGATIONS

6.1 Limits of Waste Investigation Results

Test pits were excavated around the perimeter of the Erwin Town Landfill to define the limits of waste. Previous site information suggested that a soil berm had been constructed at the perimeter of the landfill area prior to waste disposal. This berm was confirmed to be present along the northern, eastern and southern perimeters during the test pit phase of the field investigation. Along the western landfill perimeter (i.e., within the vicinity of test pits TP-5 through TP-8, and TP-11), evidence of the soil berm was masked by the presence of waste at the toe of slope. Although it is believed that the soil berm exists in these areas, it was not encountered due to the extent of waste beyond the berm. Test pits/trenches were excavated starting on the slope of the landfill and continuing down-slope until contact with the soil berm was reached or waste became absent. Where confirmed to be present, the berm was generally located at the toe of the slope, with the limits of waste beginning a short distance upslope. Test pits/trenches were excavated every 100-200 feet where possible. The limit of waste was logged and staked for subsequent surveying. Table 6-1 provides a summary of the test pit investigation findings.

6.2 Combustible Gas Survey

The results of the three rounds of combustible gas readings collected at the site during this task are presented in Table 6-2. As shown, only minor percentages of combustible gases, registering less than 1 percent of the lower explosive limit (LEL), were recorded at the gas survey locations. These results are indicative of the types of wastes encountered during the test pit excavations, observed to exhibit only minimal potential for combustible gas generation.

TABLE 6-1
ERWIN TOWN LANDFILL REMEDIAL INVESTIGATION
SUMMARY OF TEST PIT INVESTIGATION RESULTS - MAY 21-22, 2001

TEST PIT NO.	COVER THICKNESS (IN FEET)	REMARKS
1	1	Located at edge of woods. Waste encountered - white crumbly material, ceramic pieces, wood, glass and 6' diameter honeycombed light material.
2	2	Location is ~25 ft. from toe of slope. It appears as though there was a berm of soil prior to the landfilling. Waste encountered - white crumbly material, ceramic pieces, wood, glass and 6" diameter honeycombed light material.
3	2	Location of waste is upslope ~ 30 ft. from toe of slope. Waste encountered - white crumbly material, ceramic pieces, wood, glass and 6" diameter honey combed light material.
4	2	Location is ~135 ft. to the west of TP-3. Waste encountered - steel pipe, ceramic material, honeycombed material, glass and white crumbly waste.
5	2	Location is NW of TP-4, at toe of slope. Waste encountered - wood, ceramic, honeycombed material, glass, white crumbly material and steel pipe.
6	2	Located ~105 ft. from TP-5(to the north) at toe of slope. Waste encountered - household trash (plastic bags, cans, bottles), honeycombed material, and construction debris.
7	2	Location is ~105 ft. north of TP-6 at toe of slope. Waste included - household trash (plastic bags, cans, bottles), honeycombed material, and construction debris.
8	2	Location is ~156 ft. north of TP-7 at toe of slope. Waste included - household garbage/construction debris.
9		Location is ~60 ft. north of TP-8. Test Pit clean, no waste found.
10	3	Located ~75 ft. SE of MW-7A. Waste encountered - white crumbly material, honeycombed material, plastic, and steel pipe.
11	3	Location ~90 ft. east of MW-3A at TOS. Waste extends noth across access road. Waste found included construction debris (wood), ceramic material, honeycombed material, and white crumbly material
12	5	Located on east slope between MW-2 and MW-3. Waste encountered - metal, plastic, white and blue crumbly material, and some asphalt.
13	6	Located is 10 ft. NW of MW-3 (on east side of LF). Waste encountered - black crumbly material with glass, some ceramic pieces and metals.
14	6	Located is on SE corner of L.F., ~50 ft. from east access road. Waste encountered - honeycombed material.
15	6	Location is ~210 ft. west of TP-14. Waste encountered - construction debris (shingles, twine, metal, insulation) and honeycombed material.
16	6	Located ~96 ft. NW of MW-2. Waste encountered - black in color, gragments of glass, some metal and honeycombed material.

Notes:
All test pits were screened for volatile organic vapors, total radiation, combustible gases (i.e.. methane), and hydrogen sulfide (H_2S)
No detections were observed during this screening process; radiation levels were within background ranges.

Table 6-2
Erwin Town Landfill Remedial Investigation
Summary of Combustible Gas Survey Results

Location	5/16/01		5/17/01		5/23/01	
	%LEL	%Gas	%LEL	%Gas	%LEL	%Gas
GP-1	0.05	---	NIR	---	0.04	---
GP-2	0.03	---	NIR	---	0.02	---
GP-3	0.03	---	NIR	---	0.03	---
GP-4	0.04	---	NIR	---	0.06	---
GP-5	0.04	---	0.04	---	0.06	---
GP-6	0.03	---	NIR	---	0.02	---
GP-7	0.05	---	0.03	---	0.04	---
GP-8	0.35	---	0.47	---	0.08	---
GP-9	0.06	---	0.07	---	0.05	---
GP-10	0.01	---	NIR	---	0.02	---
GP-11	0.10	---	0.11	---	0.11	---
GP-12	0.10	---	0.10	---	0.10	---
GP-13	0.06	---	0.07	---	0.08	---
GP-14	0.13	---	0.11	---	0.11	---
GP-15	0.79	---	0.91	---	0.27	---
GP-16	0.31	---	0.25	---	NIR	---
GP-17	0.04	---	NIR	---	NIR	---
MW-A3	0.02	---	NIR	---	NIR	---
MW-A5	0.03	---	NIR	---	NIR	---
MW-A6	NIR	---	NIR	---	NIR	---
MW-A7	0.03	---	NIR	---	NIR	---
MW-5	NR	---	NR	---	NR	---

Notes: LEL - lower explosive limit
NIR - no instrument response
NR - no reading

Barton & Loguidice, P.C.
Consulting Engineers

6.3 Radioactivity Survey

As previously stated in Section 2.8, the landfill surface exhibited radioactivity levels similar to that of measurements recorded in background areas (i.e., natural radiation sources), except for four isolated areas. In these locations, labeled as RAD-1 through RAD-4 on Plate 2, radioactivity levels were measured to be greater than twice that of background (or the range of background readings). Shallow soil samples were subsequently collected from these locations for laboratory analysis of gross alpha/beta and for gamma spectroscopy. A background soil sample (RAD-B) was also collected for reference as noted on Plate 2.

Table 6-3 presents the summary of the radioactivity survey results and the four sample locations designated for subsequent soil radiochemistry analysis. Tables 6-4 and 6-5 present the results of the radiochemistry analysis and the comparative evaluation of the associated risks of these levels. As shown in Table 6-4, the spectroscopy analysis revealed that the radioactive emissions from the four samples collected within the landfill limits were similar to, and in many instances, below the levels detected in the background sample. This suggests that the anomalous elevated gamma readings observed during the walk-over survey only represent variations within normal background conditions. Table 6-5 further compares the highest radioactivity result for each isotope with published risk factors (external exposure) from the Health Effect Assessment Summary Tables "HEAST" (USEPA, 1997) to determine the comparative risk associated with that isotope. The "external exposure" risk coefficient provided for each isotope was multiplied by the isotope activity concentration value to calculate the comparative risk potential. The resulting value represents the potential for individuals to develop cancer if exposed over a lifetime to that particular activity concentration. For all isotope activity concentrations (shown on Table 6-5 as the greatest radioactivity result taken from the five sampling locations), the comparative risks are within or below the acceptable range of carcinogenic risk of 10^{-6} to 10^{-4} (USEPA, 1989).

Table 6-3

Erwin Town Landfill Remedial Investigation

Summary of Radioactivity Survey Results - May 21-23, 2001

			Radioactivity Readings		
Date	**Location***	**Time**	**Multiprobe (mR/hr)**	**Gamma (mR/hr)**	**Comments**
5/14/01	RAD-1	12:00 PM	< background	15	Near bottom of landfill access road
	RAD-1	1:00 PM	< background	20	
5/15/01	RAD-1	11:30 AM	< background	18	
	RAD-2	11:30 AM	< background	15.5	20 Feet up access rd. from RAD-1
	RAD-3	6:00 PM	< background	17	Top and center of landfill
5/16/01	RAD-1	6:00 PM	< background	23	
	RAD-2	6:00 PM	< background	13.8	
	RAD-3	5:30 PM	< background	17.7	
	RAD-4	5:00 PM	< background	12.1	Adjacent to RAD-3

Background readings:

			Radioactivity Readings	
Date	**Location**	**Time**	**Multiprobe (mR/hr)**	**Gamma (mR/hr)**
5/14/01	White Maint. Garage	10:00 AM	0-20	0-4.5
	Outside tunnel	10:00 AM	0-20	0-5
5/15/01	White Maint. Garage	10:00 AM	0-20	0-5
	Outside tunnel	10:00 AM	0-20	0-5
5/16/01	Downtown Painted Post		0-40	---

Notes: * Locations indicate areas flagged in field with Gamma readings in excess of 2x background.
These locations were later sampled for soil radiochemistry analysis.

TABLE 6-4
ERWIN TOWN LANDFILL REMEDIAL INVESTIGATION
SOIL RADIOCHEMISTRY RESULTS - JUNE 2001 SAMPLING

	SAMPLE LOCATION (pCi/g)											
	RAD-1		RAD-2		RAD-3		RAD-4		Duplicate (RAD-4)		RAD-B (Background)	
ISOTOPE *	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Gross Alpha	7.3E+00 ± 2.6E+00		1.1E+01 ± 3.3E+00		8.5E+00 ± 2.9E+00		1.1E+01 ± 3.2E+00		9.8E+00 ± 3.1E+00		1.2E+01 ± 3.4E+00	
Gross Beta	8.8E+00 ± 1.7E+00		1.1E+01 ± 2.3E+00		1.3E+01 ± 2.3E+00		1.5E+01 ± 2.4E+00		1.7E+01 ± 2.8E+00		2.2E+01 ± 3.3E+00	
Potassium-40	7.8E+00 ± 1.6E+00		1.0E+01 ± 2.0E+00		1.4E+01 ± 2.7E+00		1.5E+01 ± 3.0E+00		1.3E+01 ± 2.6E+00		1.7E+01 ± 3.2E+00	
Cesium-137	1.9E-02 ± 1.8E-02	J	1.2E-02 ± 1.6E-02	U	1.2E-01 ± 3.7E-02		1.3E-01 ± 4.2E-02		1.3E-01 ± 5.1E-02		1.2E-01 ± 3.9E-02	U
Thallium-208	1.7E-01 ± 4.7E-02		2.1E-01 ± 4.3E-02		3.1E-01 ± 6.4E+-02		3.5E-01 ± 6.9E-02		3.0E-01 ± 6.8E-02		5.7E-01 ± 1.1E-01	
Lead-210	-3.6E+00 ± 1.5E+01	U	1.7E+00 ± 6.9E+00	U	5.0E-01 ± 2.6E+00	U	6.8E-01 ± 3.2E+00	U	2.4E+00 ± 1.1E+01	U	1.5E+00 ± 6.2E+00	
Lead-211	-5.6E-02 ± 3.2E-01	U	-2.0E-02 ± 3.1E-01	U	-1.8E-01 ± 3.3E-01	U	-2.4E-01 ± 3.9E-01	U	-8.2E-02 ± 4.1E-01	U	1.4E-01 ± 5.7E-01	U
Bismuth-211	2.1E+00 ± 5.8E+00		3.1E+00 ± 8.7E+00		1.9E+00 ± 5.3E+00		2.2E+00 ± 6.0E+00		1.8E+00 ± 5.0E+00		2.8E+00 ± 7.8E+00	
Lead-212	5.4E-01 ± 1.2E-01		5.6E-01 ± 1.3E-01		7.0E-01 ± 1.4E-01		1.0E+00 ± 1.8E-01		9.2E-01 ± 1.7E-01		1.1E+00 ± 2.0E-01	
Bismuth-212	6.4E-01 ± 4.6E-01		8.2E-01 ± 3.8E-01		1.2E-00 ± 4.6E-01		1.0E+00 ± 5.2E-01		1.4E+00 ± 5.7E-01		1.4E+00 ± 7.0E-01	
Lead-214	7.8E-01 ± 1.8E-01		9.7E-01 ± 3.5E-01		6.0E-01 ± 2.3E-01		7.7E-01 ± 2.8E-01		7.0E-01 ± 1.7E-01		1.0E+00 ± 2.1E-01	
Bismuth-214	8.5E-01 ± 1.2E-01		1.1E+00 ± 1.2E-01		7.0E-01 ± 1.1E-01		7.3E-01 ± 1.1E-01		6.3E-01 ± 1.4E-01	U	7.2E-01 ± 1.6E-01	U
Francium-223	-8.8E-02 ± 2.7E-01	U	-1.4E-02 ± 1.1E-01	U	-6.4E-03 ± 1.4E-01	U	-7.4E-02 ± 1.4E-01	U	-2.4E-01 ± 3.6E-01	U	4.3E-02 ± 8.0E-02	U
Radium-223	-1.3E-01 ± 1.0E-01	U	8.0E-02 ± 6.2E-02	U	1.4E-01 ± 7.3E-02	U	3.7E-01 ± 3.9E-01		-4.0E-01 ± 1.7E-01	U	1.0E-01 ± 1.7E-01	U
Radium-224	3.3E-01 ± 6.2E-01	J	4.4E-01 ± 8.4E-01		4.9E-01 ± 6.3E-01	J	2.4E-01 ± 7.1E-01	J	1.2E+00 ± 7.3E-01		6.6E+00 ± 1.7E+00	
Radium-226	1.8E+00 ± 7.2E-01		2.3E+00 ± 6.7E-01		2.5E+00 ± 7.9E-01		1.9E+00 ± 6.5E-01	U	2.0E+00 ± 7.4E-01		4.0E+00 ± 1.2E+00	
Thorium-227	1.5E+00 ± 7.3E-01	U	1.4E-01 ± 1.2E-01	U	1.2E-01 ± 1.3E-01	U	1.7E-01 ± 1.5E-01	U	2.8E+00 ± 1.3E+00	U	4.7E+00 ± 2.2E+00	U
Actinium-228	6.9E-01 ± 1.2E-01		6.9E-01 ± 9.5E-02		9.9E-01 ± 1.2E-01		1.1E+00 ± 1.5E-01		1.2E+00 ± 1.5E-01		1.6E+00 ± 2.4E-01	
Thorium-231	-3.0E-01 ± 4.1E-01	U	3.0E-01 ± 2.4E-01	U	5.1E-01 ± 2.8E-01		7.5E-01 ± 3.9E-01		-1.0E+00 ± 6.8E-01	U	5.6E-01 ± 6.6E-01	U
Protactinium-231	2.0E+00 ± 1.1E+00	U	8.4E-01 ± 6.5E-01	U	5.0E-01 ± 8.7E-01	J	4.2E-01 ± 8.7E-01	J	7.0E-01 ± 1.2E+00	J	1.3E+00 ± 1.7E+00	
Thorium-234	9.8E-01 ± 9.0E-01	U	1.4E+00 ± 1.1E+00		3.0E+00 ± 2.0E+00		1.5E+00 ± 1.0E+00		9.4E-01 ± 1.1E+00	U	4.3E+00 ± 2.1E+00	
Protactinium-234	4.9E-02 ± 6.7E-02	U	4.9E-02 ± 4.6E-02	U	-8.2E-03 ± 5.2E-02	U	2.9E-02 ± 5.6E-02	U	1.9E-02 ± 8.0E-02	U	3.8E-01 ± 1.5E-01	U
Uranium-235	8.4E-02 ± 1.0E-01	U	1.1E-01 ± 9.1E-02	U	1.1E-02 ± 9.5E-02	U	1.2E-01 ± 3.9E-02	J	9.6E-02 ± 1.3E-01	U	2.9E-01 ± 1.6E-01	U

Note: * Results are reported in pCi/g.

Results indicate a range of radioactivity representing an assigned factor of uncertainty.

Radioactive isotope detected in exceedance of background radioactivity level.

U - Isotope was undetected

J - Isotope was detected but activitty is below MDC

TABLE 6-5
ERWIN TOWN LANDFILL REMEDIAL INVESTIGATION
COMPARATIVE HEALTH RISKS - SOIL RADIOCHEMISTRY RESULTS

ISOTOPE	SAMPLE LOCATION [1]	RADIOACTIVITY (pCi/g) [2]	EXTERNAL EXPOSURE (Risk/yr per pCi/g) [3]	COMPARATIVE HEATH RISK (Risk/yr) [4]
Gross Alpha	RAD-B	15.400	NA	NA
Gross Beta	RAD-B	25.300	NA	NA
Potassium-40	RAD-B	20.200	7.97E-07	1.61E-05
Cesium-137	RAD-4	0.181	5.32E-10	9.63E-11
Thallium-208	RAD-B	0.680	1.76E-05	1.20E-05
Lead-210	RAD-4	13.400	1.41E-09	1.89E-08
Lead-211	RAD-B	0.710	2.29E-07	1.63E-07
Bismuth-211	RAD-2	11.800	1.88E-07	2.22E-06
Lead-212	RAD-B	11.200	5.09E-07	5.70E-06
Bismuth-212	RAD-B	2.100	8.87E-07	1.86E-06
Lead-214	RAD-2	1.320	9.82E-07	1.30E-06
Bismuth-214	RAD-2	1.220	7.48E-06	9.13E-06
Francium-223	RAD-1	0.182	1.40E-07	2.55E-08
Radium-223	RAD-4	0.760	4.34E-07	3.30E-07
Radium-224	RAD-B	8.300	3.72E-08	3.09E-07
Radium-226	RAD-B	5.200	2.29E-08	1.19E-07
Thorium-227	RAD-B	6.900	3.78E-07	2.61E-06
Actinium-228	RAD-B	1.840	4.53E-06	8.34E-06
Thorium-231	RAD-4	1.140	2.45E-08	2.79E-08
Protactinium-231	RAD-1	3.100	1.39E-07	4.31E-07
Thorium-234	RAD-B	6.400	1.63E-08	1.04E-07
Protactinium-234	RAD-B	0.530	8.71E-06	4.62E-06
Uranium-235	RAD-2	11.090	5.18E-07	5.74E-06

Notes: 1- Represents the location which exhibited the greatest radioactivity for the radioactive isotope listed.

2 - Number indicates the upper range of radioactivity identified on Table 6-4.

3 - Source: Health Effect Assessment Summary Tables - USEPA, 1997.

4 - Comparative risks determined by multiplying the detected radioactivity (upper range) with the external exposure coefficient. Comparative risk values are evaluated against the acceptable human health risk range of 10^{-6} to 10^{-4} (USEPA, 1989). This evaluation assigns a relative risk for an individual to develop cancer if exposed over a lifetime to a constant radioactivity concentration.

NA - not applicable

6.4 Residential Well Survey

A survey of private and municipal water supply sources was completed within a one-half mile radius of the site boundary. The focus of this study was to identify residences that are currently using private water supplies. Figure 6-1 identifies the area included as part of this survey. Municipal water is provided by the Village of Painted Post to residences and businesses to the east of the Cohocton River. The Town of Erwin provides municipal water to residences and businesses in areas to the north and west of the landfill (west of the Cohocton River). Appendix F includes sketches illustrating the extent of municipal water service, and Township-based tax maps identifying each of the parcels included in this survey.

The Town of Erwin water distribution system includes three supply wells, identified as Well #2, #3 and #4 in Appendix F. Of these, Well #4 (installed in 1998 to supplement the existing well field) is located within the one-half mile survey radius, approximately 2,400 feet northwest of the landfill. Well #4 is approximately 80 feet deep (see Appendix F) and currently provides water to the Town at a rate of approximately 800 gallons per minute (pers. comm., 2001). The overburden piezometric surface within the study area shown of Plate 4 suggests that Well #4 is located in an area which is upgradient from the landfill. Section 5.2.2 previously recognized the regional groundwater flow direction of the valley aquifer system in a southeast direction, opposite from the location of Well #4. Following installation, Well #4 was pump tested for a 72-hour period at a rate of approximately 1,200 gpm (pers. comm., 2001). At this rate, the resulting cone of influence created during the test was less than the distance to the landfill. Therefore, the upgradient position of Well #4 with respect to the landfill, and the lower current groundwater withdrawal rate, indicates that there are no direct flowpaths from the landfill to Well #4, and hence no potential for any impacts to occur at this well as a result of the landfill.

In addition to the water supply wells serving the Town of Erwin and the Village of Painted Post, the Corning area portion of the Corning-Elmira-Horseheads-Big Flats aquifer provides water to six additional municipal/community water supply wells systems at distances greater than one-half mile from the landfill. These include systems installed for the Village of Addison, the City of Corning, Corning Manor Water District, Gibson Water District, Village of South Corning (Pinewood Acres) and

TABLE 6-6 cont.
Erwin Town Landfill Remedial Investigation
Summary of Residential Well Survey Results - December 2001

Tax Map #	Contact	Well/Public	Comments
298-1-43.2	Phone	Public	-
298-1-47	Vacant Lot - No Buildings	-	-
299.13-1-2	Vacant Lot - No Buildings	-	-
299.13-1-3	Personal Communication	Public	-
299.13-1-4	Personal Communication	Public	Village of Painted Post water.
299.13-1-7	Vacant Lot - No Buildings Park Area	-	-
299.13-1-13	Phone	Public	-
299.13-1-14	Phone	Public	-
299.13-1-15	Unable to Contact	-	-
299.13-1-16	Unable to Contact	-	-
299.13-1-17	Phone	Public	-
299.13-1-18	Personal Communication	Public	-
299.13-1-19	Personal Communication	Public	-
299.13-1-20	Phone	Public	-
299.13-1-21	Personal Communication	Public	-

TABLE 6-6 cont.
Erwin Town Landfill Remedial Investigation
Summary of Residential Well Survey Results - December 2001

Tax Map #	Contact	Well/Public		Comments
299.13-1-21	Unable to Contact	-	-	
299.13-1-23	Phone	Public	-	
299.13-1-24	Tried to Contact No Response	-		
299.13-1-25	Tried to Contact No Response	-	-	
299.13-1-35	Unable to Contact	-	-	
299.13-1-36	Phone	Public	-	
299.13-1-37	Unable to Contact	-	-	
299.13-1-38	Phone	Public	-	
299.13-1-39	Tried to Contact No Response	-	-	
299.13-1-40	Phone	Public	-	
299.13-1-41	Phone	Public	-	
299.13-1-42	Tried to Contact No Response	-		
299.13-1-43	Unable to Contact	-	-	
299.13-1-44	Phone	Public	-	
299.13-1-45	Personal Communication	Public	-	
299.13-1-46	Personal Communication	Public	-	

the Morningside Heights Water District (USGS, 1982). Of these, the well serving the Village of Addison is located approximately 8 miles southwest of the landfill, in an apparent upgradient direction, while the remaining five water districts have wells positioned apparently down-gradient from the landfill. The nearest well field (serving the Corning Manor Water District) is located approximately four miles southeast of the landfill. At this distance, and in consideration of the volume of water which passes through this valley aquifer system, there is no chance for any landfill contaminants to impact these wells.

Table 6-6 presents the summary of the residential well survey. A total of 173 individual parcels were identified as part of this activity. Of these, 3 comprised the landfill and the Town of Erwin Waste Water Treatment Plant property, 17 were vacant lots with no structures, and another 45 could not be reached by telephone or through personal contact. Six houses located on the opposite side of the Tioga River from the landfill, currently receive water from drilled wells. One of these homes is located within one-half mile radius of the landfill. However, since the Tioga River acts as a hydraulic divide with respect to groundwater movement, (the river serves as groundwater discharge feature) there is no possible contaminant migration pathway, from the landfill to these residences. Five parcels located on Canada Road (north and upgradient from the landfill) indicated a private well on their property. Of these, one residence and one business indicated the use of both the private well and the public water system. Another business indicated that the public water system was not available to them. The Dresser-Rand facility, located in the Village of Painted Post, also indicated the use of a private well for industrial process water only.

In summary, one municipal supply well and seven private supply wells are located within the one-half mile radius of this survey. However, the location of these wells, with respect to the landfill, suggests that there are no concerns with their use relative to the landfill and any contaminants in the site's groundwater.

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TABLE 6-6
Erwin Town Landfill Remedial Investigation
Summary of Residential Well Survey Results - December 2001

Tax Map #	Contact	Well/Public	Comments
298-1-21.113	Phone	Well & Public	Both systems are in use.
298-1-21.21	Vacant Lot - No Buildings	-	-
298-1-34.11	Vacant Lot - No Buildings	-	-
298-1-34.12	Personal Communication	Public	Was stated that all local businesses use public water.
298-1-34.2	Personal Communication	Well	Was stated that the business was connected to the town sewer but not to public water. Well water used for everything.
298-1-35	Personal Communication	Well & Public	Well water used for all non-drinking uses (air conditioning, toilets…). 2 years ago they started using city water.
298-1-36	Personal Communication	Well & Public	Have a well but never use it because it always goes dry. They were switched to public water last summer.
298-1-37	Personal Communication	Well & Public	Have a well but never use it because it always goes dry. They were switched to public water last summer.
298-1-38	Personal Communication	Well & Public	Have a well but never use it. Strictly Public water.
298-1-39	Phone	Public	-
298-1-40	Vacant Lot - No Buildings	-	-
298-1-41	Vacant Lot - No Buildings	-	-
298-1-42	Vacant Lot - No Buildings	-	-
298-1-43.1	Phone	Well & Public	Both systems are in use.

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TABLE 6-6 cont.
Erwin Town Landfill Remedial Investigation
Summary of Residential Well Survey Results - December 2001

Tax Map #	Contact	Well/Public	Comments
299.13-1-47	Personal Communication	Public	Water tastes bad.
299.13-1-48	Phone	Public	-
299.13-1-49	Personal Communication	Public	-
299.13-1-50	Personal Communication	Public	-
299.13-1-51	Phone	Public	-
299.13-1-52	Personal Communication	Public	Always have had public water.
299.13-1-53	Personal Communication	Public	30 years of public water.
299.13-1-54	Personal Communication	Public	-
299.13-1-55	Personal Communication	Public	-
299.13-1-56	Personal Communication	Public	-
299.13-1-57	Personal Communication	Public	-
299.13-1-58	Unable to Contact	-	-
299.13-1-59	Personal Communication	Public	-
299.13-1-60	Unable to Contact	-	-
299.13-1-61	Phone	Public	-
299.13-1-62	Phone	Public	-

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TABLE 6-6 cont.
Erwin Town Landfill Remedial Investigation
Summary of Residential Well Survey Results - December 2001

Tax Map #	Contact	Well/Public	Comments
299.13-1-63	Phone	Public	-
299.13-1-64	Phone	Public	-
299.13-1-74	Vacant Lot - No Buildings Hodgeman Park Area	-	-
299.13-1-75	Same Owner as Parcel # 299.13-3-1	-	-
299.13-2-3	The Entire Block of the Village Square Mall Complex.	-	-
299.13-2-4	Personal Communication	Public	Public water from the town of Painted Post.
299.13-2-4	Personal Communication	Public	Stated that water was colored and tasted poor.
299.13-2-5	Personal Communication	Public	-
299.13-2-6	Personal Communication	Public	-
299.13-2-7	Personal Communication	Public	-
299.13-2-8	Personal Communication	Public	-
299.13-2-9.1	Personal Communication	Public	-
299.13-2-9.2	Personal Communication	Public	-
299.13-2-9.2	Tried to Contact No Response.	-	-
299.13-2-10	Phone	Public	-
299.13-2-13	Phone	Public	-

TABLE 6-6 cont.
Erwin Town Landfill Remedial Investigation
Summary of Residential Well Survey Results - December 2001

Tax Map #	Contact	Well/Public	Comments
299.13-2-14	Tried to Contact No Response.	-	
299.13-2-16	Personal Communication	Public	
299.13-2-17	Personal Communication	Public	Everyone in the village square uses public water.
299.13-2-18	Tried to Contact No Response.	-	-
299.13-2-19	Tried to Contact No Response.	-	-
299.13-2-21	Personal Communication	Public	-
299.13-2-24	Personal Communication	Public	-
299.13-2-25	Personal Communication	Public	The entire square has public water.
299.13-2-26	Personal Communication	Public	The entire square has public water.
299.13-2-27	Personal Communication	Public	-
299.13-2-28	Tried to Contact No Response.	-	-
299.13-2-29	Tried to Contact No Response.	-	-
299.13-2-30	Tried to Contact No Response.	-	
299.13-2-31	Tried to Contact No Response.	-	-
299.13-2-32	Vacant Lot - No Buildings	-	-
299.13-2-34	Tried to Contact No Response.	-	-

TABLE 6-6 cont.
Erwin Town Landfill Remedial Investigation
Summary of Residential Well Survey Results - December 2001

Tax Map #	Contact	Well/Public	Comments
299.13-2-55	Personal Communication	Public	-
299.13-3-1	Phone	Public & Well	Well water is used for process water and public is used for sanitary purposes.
299.13-3-2	Vacant Lot - No Buildings	-	-
299.13-3-3	Same Owner as Parcel # 299.13-3-1	-	-
299.13-3-4	Unable to Contact	-	-
299.13-3-7	Same Owner as Parcel # 299.13-3-1	-	-
299.13-3-8	Same Owner as Parcel # 299.13-3-1	-	
299.13-3-10	Personal Communication	Public	-
299.13-3-11.1	Tried to Contact No Response	-	-
299.13-3-11.2	Same Owner as Parcel # 299.13-3-1	-	-
299.13-3-14	Phone	Public	-
299.13-3-16	Unable to Contact	-	-
299.13-3-17	Tried to Contact No Response	-	
299.13-3-19	Unable to Contact	-	-
299.13-3-21	Unable to Contact	-	-
299.13-3-57	Phone	Public	-

TABLE 6-6 cont.
Erwin Town Landfill Remedial Investigation
Summary of Residential Well Survey Results - December 2001

Tax Map #	Contact	Well/Public		Comments
299.13-3-76	Vacant Lot - No Buildings	-	-	
299.13-5-29	Personal Communication	Public	-	
299.13-5-30	Personal Communication	Public	-	
299.13-5-31	Personal Communication	Public	-	
299.13-5-32	Personal Communication	Public	-	
299.13-5-33	Phone	Public	-	
299.13-5-34	Tried to Contact No Response.	-	-	
299.13-5-36	Tried to Contact No Response.	-	-	
299.13-5-37	Tried to Contact No Response.	-		
299.13-5-38	Same Owner as Parcel # 299.13-3-1	-	-	
299.13-5-39	Same Owner as Parcel # 299.13-3-1	-	-	
299.13-5-41	Same Owner as Parcel # 299.13-3-1	-	-	
299.13-5-47	Tried to Contact No Response.	-	-	
299.13-5-48	Tried to Contact No Response.	-	-	
299.13-5-49	Tried to Contact No Response.	-		
299.13-5-50	Tried to Contact No Response.	-	-	

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TABLE 6-6 cont.
Erwin Town Landfill Remedial Investigation
Summary of Residential Well Survey Results - December 2001

Tax Map #	Contact	Well/Public	Comments
299.13-5-51	Personal Communication	Public	-
299.13-5-52	Personal Communication	Public	-
299.13-5-53	Personal Communication	Public	-
299.13-5-54	Personal Communication	Public	-
299.13-5-55	Personal Communication	Public	Thinks that residents down Hamilton road may use well water.
299.13-5-56	Tried to Contact No Response.	-	-
299.17-1-1	Vacant Lot - No Buildings	-	-
299.17-1-2.1	Erwin Landfill No Survey Done	-	-
299.17-1-2.2	Erwin Landfill No Survey Done	-	-
299.17-1-2.3	Erwin Landfill No Survey Done	-	-
299.17-1-3	Railroad	-	-
299.17-1-6	Same Owner as Parcel # 299.13-3-1	-	-
299.17-1-9	Tried to Contact No response.	-	-
299.17-1-11	Personal Communication	Public	-
299.17-1-12	Tried to Contact No response.	-	-
299.17-1-13	Tried to Contact No response.	-	-

TABLE 6-6 cont.
Erwin Town Landfill Remedial Investigation
Summary of Residential Well Survey Results - December 2001

Tax Map #	Contact	Well/Public	Comments
299.17-1-14	Tried to Contact No response.	-	-
299.17-1-17	Tried to Contact No response.	-	-
299.17-1-17	Tried to Contact No Response.	-	
299.17-1-18	Tried to Contact No response.	-	-
299.17-1-20	Personal Communication	Public	-
299.17-1-21	Tried to Contact No response.	-	-
299.17-1-22	Tried to Contact No response.	-	-
299.17-1-23	Tried to Contact No response.	-	-
299.17-1-24	Vacant Lot - No Buildings	-	-
299.17-1-25	Vacant Lot - No Buildings	-	-
299.17-1-26	Utility Structures	-	-
299.17-1-27	Same Owner as Parcel # 299.13-3-1	-	-
316-1-9	Personal Communication	Public	-
316-1-10.2	Personal Communication	Public	Since 1974 - Have always had public water.
316-1-12	Personal Communication	Well	All uses are well water.
316-1-13.1	Personal Communication	Public	-

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TABLE 6-6 cont.
Erwin Town Landfill Remedial Investigation
Summary of Residential Well Survey Results - December 2001

Tax Map #	Contact	Well/Public	Comments
316-1-13.2	Personal Communication	Public	-
299.17-1-17	Was Unable To Contact	-	-
316-1-21	Railroad	-	-
316-1-24	Phone	Well	-
316-1-75	Suspected Vacant Lot - No Buildings	-	-
316.08-1-23	Personal Communication	Public	-
316.08-1-30	Personal Communication	Public	-
316.08-2-1	Vacant Lot - No Buildings	-	-
316.08-2-2	Railroad	-	-
316.08-??	Personal Communication	Public	-
316.08-??	Personal Communication	Public	-
317-1-3.1	Personal Communication	Well	Has always had a well. Building behind house also uses well water.
317-1-3.2	Utility Structures	-	-
317-1-4	Personal Communication	Well	Always has had well water and uses it for everything.
317-1-5	Personal Communication	Well	Has always had a well. Building behind house also uses well water.
317-1-6	Personal Communication	Well	-

6.5 Surface Soil Analytical Results

A limited number of surface soil samples were collected during this investigation to analyze for potential leachate impacts along the western perimeter of the landfill and to confirm the presence of PCB's identified in surface soil samples during previous site investigations. Plate 1 presents the locations of surface soil samples. SS-1 and SS-2 represent background surface soil samples collected to the north of State Route 15. Table 6-7 presents a summary of the surface soil analytical results for those samples analyzed for potential leachate impacts.

6.5.1 Volatile Organic Compounds

Low levels of two volatile organic compounds (methylene chloride and tetrachloroethene) were identified both in the on-site and background samples, at concentrations well below the clean-up objective as stated in NYSDEC TAGM #4046. The distribution of these compounds suggests that their presence is not related to an impact from landfill leachate.

6.5.2 Semi-Volatile Organic Compounds

Several semi-volatile organic compounds were also identified in both the on-site and the background samples, with most well below their respective clean-up objectives. Benzo(a)pyrene was detected above the sediment clean-up objective of 61 ppb at SS-1 (94 ppb), SS-2 (81 ppb) and SS-4 (260 ppb). The similar spectrum of contaminants identified at these locations suggests an influence other than the landfill; possibly a residual effect of flooding events which occurred in this area.

6.5.3 Inorganics

Total metals results for the surface soil samples indicated levels of most constituents at or less than concentrations exhibited by the background samples. The exceptions to this were antimony, calcium, lead and sodium. Of these, all were observed to be within the range of background soil concentrations recorded for the Eastern United States as stated in NYSDEC TAGM #4046.

TABLE 6-7
ERWIN TOWN LANDFILL REMEDIAL INVESTIGATION
SURFACE SOIL ANALYTICAL RESULTS - MAY 2001 SAMPLING
VOLATILE ORGANIC COMPOUNDS

	TAGM #4046	SAMPLE LOCATION (ppb)										
PARAMETER *	Clean-up Objective (ppb)	SS-1	SS-1RE	SS-2	SS-2RE	SS-3	SS-3RE	SS-4	SS-4RE	Duplicate (SS-2)	Duplicate RE (SS-2)	Field Blank (Scoop)
Chloromethane	--	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
Vinyl Chloride	200	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
Bromomethane	--	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
Chloroethane	1900	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
1 1-Dichloroethene	400	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
Acetone	200	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
Carbon Disulfide	2700	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
Methylene Chloride	100	13	<6.2	16	<6.3	3.5 J	9.5	13	6.7	16	8.2	<5
trans-1 2-Dichloroethene	--	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
1,1-Dichloroethane	200	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
2-Butanone	300	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
cis-1,2-Dichloroethene	--	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
Chloroform	300	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
1 1 1-Trichloroethane	800	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
Carbon Tetrachloride	600	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
Benzene	60	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
1 2-Dichloroethane	100	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
Trichloroethene	700	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
1 2-Dichloropropane	--	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
Bromodichloromethane	--	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
4-Methyl-2-Pentanone	--	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
Toluene	1500	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
t-1 3-Dichloropropene	--	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
cis-1 3-Dichloropropene	--	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
1 1 2-Trichloroethane	--	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
2-Hexanone	--	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
Dibromochloromethane	--	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
Tetrachloroethene	700	<6.2	<6.2	4.5 J	<6.3	3.2 J	4.3 J	<5.9	<5.9	6.6	1.3 J	<5
Chlorobenzene	1700	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
Ethyl Benzene	5500	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
m/p-Xylenes	--	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
o-Xylene	--	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
Styrene	--	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
Bromoform	--	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
1 1,2 2-Tetrachloroethane	800	<6.2	<6.2	<6.3	<6.3	<5.8	<5.8	<5.9	<5.9	<6.2	<6.2	<5
Total VOCs **	10 000	13	ND	20.5	ND	6.7	13.8	13	6.7	22.2	9.5	ND

Notes: * Results are reported in µg/L.
** Total Volatile Organic Compounds
-- Indicates that a clean-up value has not been assigned.
< Indicates that the analyte was not detected above the instrument detection limit.
RE - result of re-analysis following sample dilution.
ND - not detected
B - indicates that the analyte was also detected in the blank.
J - indicates an estimate value.

TABLE 6-7 cont.
ERWIN TOWN LANDFILL REMEDIAL INVESTIGATION
SURFACE SOIL ANALYTICAL RESULTS - MAY 2001 SAMPLING
SEMI-VOLATILE ORGANIC COMPOUNDS

	TAGM #4046	SAMPLE LOCATION (ppb)							
PARAMETER *	**Clean-up Objective (ppb)**	**SS-1**	**SS-2**	**SS-3**	**SS-3 RE**	**SS-4**	**SS-4 RE**	**Duplicate (SS-2)**	**Field Blank (Scoop)**
Phenol	30	<410	<420	<390	<390	<390	<390	<420	<10
bis(2-Chloroethyl)ether	--	<410	<420	<390	<390	<390	<390	<420	<10
2-Chlorophenol	800	<410	<420	<390	<390	<390	<390	<420	<10
1,2-Dichlorobenzene	7,900	<410	<420	<390	<390	<390	<390	<420	<10
1,3-Dichlorobenzene	1,600	<410	<420	<390	<390	<390	<390	<420	<10
1 4-Dichlorobenzene	8,500	<410	<420	<390	<390	<390	<390	<420	<10
2-Methylphenol	100	<410	<420	<390	<390	<390	<390	<420	<10
2,2'-oxybis(1-Chloropropane)	--	<410	<420	<390	<390	<390	<390	<420	<10
3+4-Methylphenols	--	<820	<830	<780	<780	<780	<780	<830	<20
n-Nitroso-di-n-propylamine	--	<410	<420	<390	<390	<390	<390	<420	<10
Hexachloroethane	--	<410	<420	<390	<390	<390	<390	<420	<10
Nitrobenzene	200	<410	<420	<390	<390	<390	<390	<420	<10
Isophorone	4,400	<410	<420	<390	<390	<390	<390	<420	<10
2-Nitrophenol	330	<410	<420	<390	<390	<390	<390	<420	<10
2,4-Dimethylphenol	--	<410	<420	<390	<390	<390	<390	<420	<10
bis(2-Chloroethoxy)methane	--	<410	<420	<390	<390	<390	<390	<420	<10
2,4-Dichlorophenol	400	<410	<420	<390	<390	<390	<390	<420	<10
1,2,4-Trichlorobenzene	3,400	<410	<420	<390	<390	<390	<390	<420	<10
Naphthalene	13,000	<410	<420	<390	<390	<390	<390	<420	<10
4-Chloroaniline	220	<410	<420	<390	<390	<390	<390	<420	<10
Hexachlorobutadiene	--	<410	<420	<390	<390	<390	<390	<420	<10
4-Chloro-3-methylphenol	240	<410	<420	<390	<390	<390	<390	<420	<10
2-Methylnaphthalene	36,400	<410	<420	<390	<390	<390	<390	<420	<10
Hexachlorocyclopentadiene	--	<410	<420	<390	<390	<390	<390	<420	<10
2,4 6-Trichlorophenol	--	<410	<420	<390	<390	<390	<390	<420	<10
2,4,5-Trichlorophenol	100	<410	<420	<390	<390	<390	<390	<420	<10
2-Chloronaphthalene	--	<410	<420	<390	<390	<390	<390	<420	<10
2-Nitroaniline	430	<410	<420	<390	<390	<390	<390	<420	<10
Dimethylphthalate	2,000	<410	<420	<390	<390	<390	<390	<420	<10
Acenaphthylene	41,000	<410	<420	<390	<390	<390	<390	<420	<10
2,6-Dinitrotoluene	1,000	<410	<420	<390	<390	<390	<390	<420	<10
3-Nitroaniline	500	<410	<420	<390	<390	<390	<390	<420	<10

Notes: * Results are reported in µg/kg.
Indicates that a clean-up value has not been assigned.
< Indicates that the analyte was not detected above the instrument detection limit.
RE - result of re-analysis following sample dilution.
ND - not detected
B - indicates that the analyte was also detected in the blank.
J - indicates an estimate value.

TABLE 6-7 cont.
ERWIN TOWN LANDFILL REMEDIAL INVESTIGATION
SURFACE SOIL ANALYTICAL RESULTS - MAY 2001 SAMPLING
SEMI-VOLATILE ORGANIC COMPOUNDS cont.

PARAMETER *	TAGM #4046 Clean-up Objective (ppb)	SAMPLE LOCATION (ppb) SS-1	SS-2	SS-3	SS-3 RE	SS-4	SS-4 RE	Duplicate (SS-2)	Field Blank (Scoop)
Acenaphthene	50,000	<410	<420	<390	<390	84 J	83 J	<420	<10
2,4-Dinitrophenol	200	<410	<420	<390	<390	<390	<390	<420	<10
4-Nitrophenol	100	<410	<420	<390	<390	<390	<390	<420	<10
Dibenzofuran	6,200	<410	<420	<390	<390	45 J	45 J	<420	<10
2,4-Dinitrotoluene	--	<410	<420	<390	<390	<390	<390	<420	<10
Diethylphthalate	7,100	52 J	<420	<390	<390	<390	<390	<420	<10
4-Chlorophenyl-phenylether	--	<410	<420	<390	<390	<390	<390	<420	<10
Fluorene	50,000	<410	<420	<390	<390	55 J	55 J	<420	<10
4-Nitroaniline	--	<410	<420	<390	<390	<390	<390	<420	<10
4,6-Dinitro-2-methylphenol	--	<410	<420	<390	<390	<390	<390	<420	<10
n-Nitrosodiphenylamine	--	<410	<420	<390	<390	<390	<390	<420	<10
4-Bromophenyl-phenylether	--	<410	<420	<390	<390	<390	<390	<420	<10
Hexachlorobenzene	410	<410	<420	<390	<390	<390	<390	<420	<10
Pentachlorophenol	1,000	<410	<420	<390	<390	<390	<390	<420	<10
Phenanthrene	50,000	130 J	100 J	62 J	63 J	290 J	300 J	88 J	<10
Anthracene	50,000	<410	<420	<390	<390	63 J	62 J	<420	<10
Carbazole	--	<410	<420	<390	<390	<390	40 J	<420	<10
Di-n-butylphthalate	8,100	110 J	<420	42 J	44 J	65 J	70 J	<420	1.4
Fluoranthene	50,000	220 J	190 J	72 J	72 J	480	490	180 J	<10
Pyrene	50,000	140 J	130 J	57 J	58 J	650	670	130 J	<10
Butylbenzylphthalate	50,000	<410	<420	<390	<390	<390	<390	<420	<10
3,3'-Dichlorobenzidine	--	<410	<420	<390	<390	<390	<390	<420	<10
Benzo(a)anthracene	224	78 J	67 J	<390	<390	220 J	220 J	72 J	<10
Chrysene	400	98 J	87 J	41 J	42 J	270 J	260 J	90 J	<10
Bis(2-Ethylhexyl)phthalate	50,000	67 J	<420	<390	<390	54 J	54 J	<420	<10
Di-n-octyl phthalate	50,000	<410	<420	<390	<390	<390	<390	<420	<10
Benzo(b)fluoranthene	1,100	77 J	69 J	43 J	<390	270 J	270 J	73 J	<10
Benzo(k)fluoranthene	1,100	130 J	120 J	40 J	48 J	390 J	350 J	120 J	<10
Benzo(a)pyrene	61	94 J	81 J	40 J	41 J	260 J	250 J	89 J	<10
Indeno(1,2,3-cd)pyrene	--	<410	<420	<390	<390	<390	40 J	<420	<10
Dibenzo(a,h)anthracene	14	<410	<420	<390	<390	<390	<390	<420	<10
Benzo(g,h,i)perylene	50,000	<410	<420	<390	<390	120 J	130 J	<420	<10
Total Semi-VOCs **	500,000	1,196	844	397	368	3,316	3,389	842	1.4

Notes: * Results are reported in µg/kg.
** Total Semi-Volatile Organic Compounds
-- Indicates that a clean-up value has not been assigned.
< Indicates that the analyte was not detected above the instrument detection limit.
RE - result of re-analysis following sample dilution.
ND - not detected
B - indicates that the analyte was also detected in the blank.
J - indicates an estimate value.

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TABLE 6-7 cont.
ERWIN TOWN LANDFILL REMEDIAL INVESTIGATION
SURFACE SOIL ANALYTICAL RESULTS - MAY 2001 SAMPLING
TOTAL METALS

	TAGM #4046	Sample Location (ppm)											
PARAMETER *	**Clean-up Objective (ppm)**	**SS-1**		**SS-2**		**SS-3**		**SS-4**		**Duplicate (SS-2)**		**Field Blank (Scoop)**	
Aluminum	SB	12600		12500		2500		7270		12800		<7.9	E
Antimony	SB	0.41	B	1.1	B	3	B	1.2	B	0.88	B	<3.1	
Arsenic	7.5 or SB	19.6		10.3		12.4		9.1		10.4		<2.5	
Barium	300 or SB	251		196		60.2		104		194		<.3	N
Beryllium	0.16 or SB	0.74	E	0.62	BE	0.1	BE	0.37	BE	0.63	E	<.01	
Cadmium	1 or SB	0.37	B	0.36	B	1.1		0.41	B	0.37	B	<.04	
Calcium	SB	2910		2430		4270		12100		2400		<3.1	
Chromium	10 or SB	18.4		15.9		10.4		11.1		16.1		<.8	
Cobalt	30 or SB	10.5		10.5		3.2	B	8		10.7		<1	
Copper	25 or SB	23.8		20.3		11.4		20.3		20.1		<.8	
Iron	2,000 or SB	23400		22900		9100		15100		22800		15.1	B
Lead	SB	39.4		62.2		236		121		61.4		<2.5	
Magnesium	SB	3730		3510		2160		3540		3530		<7.9	
Manganese	SB	709		789		158		475		801		0.32	B
Mercury	0.1	<.01	N	0.02	N	<.01		<.01		0.03	N	<.02	
Nickel	13 or SB	23.5		20		22.1		15.4		20.2		<1.7	
Potassium	SB	1580	E	1600	E	326	BE	986	E	1740	E	<31	E
Selenium	2 or SB	<.4		0.57	B	0.54	B	<.37		<.4		<3.2	
Silver	SB	1	BN	1.1	BN	0.62	BN	0.69	BN	1.2	BN	<1.3	
Sodium	SB	<33.2		69.4	B	150	B	82.6	B	94.1	B	<267	E
Thallium	SB	<.48		<.49		<.45		<.46		<.49		<3.9	
Vanadium	150 or SB	17.9		16.9		4.5	B	13.4		17.4		<34.9	
Zinc	20or SB	113		99.3		65.2		84.4		99.8		<.5	
Cyanide	--	0.74		<0.63		<0.58		0.7		<0.62		<0.01	

Notes: * Results are reprted in mg/kg.
-- Indicates that a clean-up value has not been assigned.
< Indicates that the analyte was not detected above the instrument detection limit.
B - indicates that the reported value is less than the Contract Required Detection Limit (CRDL), greater than the instrument detection limit.
E - The reported value is estimated because of the presence of interference.
N - Spiked sample recovery not within control limits.

TABLE 6-7 cont.
ERWIN TOWN LANDFILL REMEDIAL INVESTIGATION
SURFACE SOIL ANALYTICAL RESULTS - MAY 2001 SAMPLING
PCBs

	TAGM #4046	SAMPLE LOCATION (ppb)					
PARAMETER *	**Clean-up Objective (ppb)**	**SS-1**	**SS-2**	**SS-3**	**SS-4**	**Duplicate (SS-2)**	**Field Blank (Scoop)**
Aroclor 1016	1000	<21	<21	<19	<20	<21	<0.5
Aroclor 1221	1000	<21	<21	<19	<20	<21	<0.5
Aroclor 1232	1000	<21	<21	<19	<20	<21	<0.5
Aroclor 1242	1000	<21	<21	<19	<20	<21	<0.5
Aroclor 1248	1000	<21	<21	<19	<20	<21	<0.5
Aroclor 1254	1000	<21	<21	<19	<20	<21	<0.5
Aroclor 1260	1000	<21	<21	<19	92	<21	<0.5

Note: * Results are reported in µg/kg.

6.5.4 PCBs

PCB results for the surface soil samples identified one Aroclor (1260) at a concentration of 92 ppb (parts per billion), below the NYSDEC clean-up objective of 1000 ppb (TAGM #4046).

The limited surface soil sampling program was performed in areas of the site where impacts from the landfill were expected. Since these areas of the site did not reveal any contaminants of concern above background levels, it can be concluded that surface soil impacts from the landfill are not expected, and therefore, do not warrant additional investigation or remediation.

6.6 Groundwater Analytical Results

Several groundwater analytical programs have been conducted at the site since the Erwin Town Landfill ceased to accept waste. A Preliminary Site Assessment was conducted in 1987 by NUS Corporation for the United States Environmental Protection Agency (USEPA). In 1989, Recra Environmental, Inc. and Lawler, Matusky, and Skelly Engineers were contracted by the NYSDEC to conduct a Phase I Investigation at the site. This study used a Hazard Ranking System to quantify the potential for migration of contaminants from the site. A score of 50.47 was given based on levels of contamination found around the site at that time. It was concluded that the existing site data was insufficient to perform a proper site assessment, and additional sampling was recommended.

NUS Corporation was later contracted by the USEPA to complete a Site Investigation in 1990. Ground water samples collected during this investigation indicated elevated levels of metals including arsenic, manganese, lead, silver, zinc, barium, iron, and sodium. As a result of the Site Investigation, it was recommended that additional monitoring wells be installed to define the extent of contamination beyond the limits of the landfill.

In 1992, Ecology and Environment Engineering, P.C. was retained by the NYSDEC to perform a Preliminary Site Assessment (Task 1). This Preliminary Site Assessment focused on the hazardous waste disposal by the Corning Glass Works. It was concluded that further investigation was required to determine if the site posed a danger to human health and the environment.

JCL, a subcontractor to E&E, continued the Preliminary Site Assessment in 1993. The fieldwork included the collection of surface water and sediment samples, seven surface soil samples, seven subsurface soil samples, one waste sample, and installation and sampling of six groundwater monitoring wells. This study, completed in 1995, recommended that the Erwin Town Landfill be reclassified from a Class 3 to a Class 2 Inactive Hazardous Waste Disposal Site (NYSDEC, 1995). This recommendation was based on the detection of hazardous constituents in the site media associated with documented hazardous waste disposal, the location of the site in relation to drinking water supplies, the proximity of NYSDEC classified surface waters, and the detection of other contaminants in groundwater such as VOCs. The classification "upgrade" recognizes the site as exhibiting a significant threat to public health and the environment, requiring additional studies.

In November of 1999, The Sear-Brown Group, Inc. completed a hazardous waste assessment for the New York State Department of transportation (NYSDOT) associated with the proposed Interstate 86/Route 15 Interchange and Route 15/Gang Mills Interchange project. The resulting "Detailed Site Investigation Report" (NYSDOT, 2000) presented data collected from a portion of this study involving the Erwin Town Landfill site. The results of the various sampling programs confirmed the presence of contaminants in site media detected in earlier studies.

The results of the detailed environmental sampling programs as presented in the 1995 NYSDEC Preliminary Site Assessment and the 2000 NYSDOT Detailed Site Investigation indicated a similar distribution of contaminants in the various media studied. Both studies identified low levels of volatile organic compounds in the site groundwater in exceedance of standards along the eastern landfill perimeter in MW-4. VOCs detected along the northeastern landfill perimeter, in Wells MW-2 and MW-3, during the 1995 NYSDEC PSA were no longer present during the 2000 NYSDOT study. In addition, semi-volatile organic compounds and PCBs were detected in the surface soil at the site. The following discussion presents the site data generated as a result of the current Remedial Investigation.

Table 6-8 presents the summary of groundwater analytical results for samples collected during May 2001 for this Remedial Investigation. This sampling round included all of the existing wells installed during previous site investigations as well as the two new wells installed in order to fill in data gaps along the southern and western landfill perimeters. In general, the results from this round of analysis are similar to that recorded in 2000 during the NYSDOT Detailed Site Investigation Report.

6.6.1 Volatile Organic Compounds

Low concentrations of a few volatile organic compounds were identified at site wells MW-A3, MW-1 and MW-4. Of these, only MW-4 (located directly downgradient from the landfill) exhibited specific contaminants in excess of groundwater standards. Overall, the groundwater quality appears to have improved since first analyzed during the March 1995 Preliminary Site Assessment. Specifically, the conditions previously identified at MW-2 in the 1995 PSA have decreased from a total VOC concentration of 21 µg/L and Aroclor-1242 at 0.62 µg/L, to no VOCs or PBCs detected during the current investigation. Also, MW-A3 detected a total VOC concentration of 35 µg/L during the 2000 NYSDOT Detailed Site Investigation Report. This decreased to a total of 5 µg/L during the current investigation. Total VOCs detected at MW-4 increased slightly from 42 µg/L in 2000, to 75.6 µg/L during the Remedial Investigation.

6.6.2 Semi-Volatile Organic Compounds

Very low levels of four semi-volatile organic compounds were detected in nearly every location sampled. Three of these four are common laboratory contaminants. Since none of these constituents were detected in exceedance of applicable groundwater standards, there is no environmental threat associated with their presence.

6.6.3 Inorganics

In general, the site's groundwater is highly mineralized in nature, with excessive concentrations of aluminum, calcium, iron, magnesium, manganese, potassium and sodium and several

TABLE 6-8
ERWIN TOWN LANDFILL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS - MAY 2001 SAMPLING
VOLATILE ORGANIC COMPOUNDS

PARAMETER *	6NYCRR Part 703 Groundwater Standard or [Guidance Value]	SAMPLE LOCATION (ppb) MW-A1***	MW-A2***	MW-A3	MW-A4	MW-A5	MW-A6	MW-A7	MW-1	MW-2
Chloromethane	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Bromomethane	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroethane	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,1-Dichloroethene	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Acetone	[50]	<5	<5	<5	<5	<5	<5	<5	<5	<5
Carbon Disulfide		<5	<5	<5	<5	<5	<5	<5	<5	<5
Methylene Chloride	5	<5	<5	<5	<5	<5	<5	<5	2	<5
trans-1,2-Dichloroethene	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1 1-Dichloroethane	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
2-Butanone	[50]	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1 2-Dichloroethene	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	7	<5	<5	<5	<5	<5	<5	<5	<5	<5
1 1,1-Trichloroethane	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Carbon Tetrachloride	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Benzene	0.7	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,2-Dichloroethane	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Trichloroethene	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,2-Dichloropropane	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Bromodichloromethane	[50]	<5	<5	<5	<5	<5	<5	<5	<5	<5
4-Methyl-2-Pentanone	-	<5	<5	<5	<5	<5	<5	<5	<5	<5
Toluene	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
trans-1,3-Dichloropropene	-	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,3-Dichloropropene	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,1,2-Trichloroethane	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
2-Hexanone	[50]	<5	<5	<5	<5	<5	<5	<5	<5	<5
Dibromochloromethane	[50]	<5	<5	<5	<5	<5	<5	<5	<5	<5
Tetrachloroethene	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chlorobenzene	5	<5	<5	5	<5	<5	<5	<5	<5	<5
Ethyl Benzene	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
m/p-Xylenes	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
o-Xylene	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Styrene	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Bromoform	[50]	<5	<5	<5	<5	<5	<5	<5	<5	<5
1 1,2,2-Tetrachloroethane	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Total VOCs **	5	<5	<5	5	<5	<5	<5	<5	2	<5

Notes: * Results are reported in µg/L.
** Total Volatile Organic Compounds.
*** MW-A1 and MW-A2 are considered to be background water quality locations.
- Indicates that a standard or guidance value has not been assigned.
< Indicates that the analyte was not detected above the instrument detection limit.
ND - not detected

TABLE 6-8 cont.
ERWIN TOWN LANDFILL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS - MAY 2001 SAMPLING
VOLATILE ORGANIC COMPOUNDS cont.

PARAMETER *	6NYCRR Part 703 Groundwater Standard or [Guidance Value]	SAMPLE LOCATION (ppb) MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	Duplicate (MW-A2)	Trip Blank
Chloromethane	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Bromomethane	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroethane	5	<5	66	<5	<5	<5	<5	<5	<5	<5
1,1-Dichloroethene	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Acetone	[50]	<5	<5	<5	<5	<5	<5	<5	<5	<5
Carbon Disulfide	-	<5	<5	<5	<5	<5	<5	<5	<5	<5
Methylene Chloride	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
trans-1,2-Dichloroethene	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,1-Dichloroethane	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
2-Butanone	[50]	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1 2-Dichloroethene	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	7	<5	<5	<5	<5	<5	<5	<5	<5	<5
1 1,1-Trichloroethane	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Carbon Tetrachloride	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Benzene	0.7	<5	<5	<5	<5	<5	<5	<5	<5	<5
1 2-Dichloroethane	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Trichloroethene	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,2-Dichloropropane	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Bromodichloromethane	[50]	<5	<5	<5	<5	<5	<5	<5	<5	<5
4-Methyl-2-Pentanone	-	<5	<5	<5	<5	<5	<5	<5	<5	<5
Toluene	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
trans-1,3-Dichloropropene	-	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,3-Dichloropropene	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,1,2-Trichloroethane	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
2-Hexanone	[50]	<5	<5	<5	<5	<5	<5	<5	<5	<5
Dibromochloromethane	[50]	<5	<5	<5	<5	<5	<5	<5	<5	<5
Tetrachloroethene	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chlorobenzene	5	<5	9.6	<5	<5	<5	<5	<5	<5	<5
Ethyl Benzene	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
m/p-Xylenes	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
o-Xylene	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Styrene	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Bromoform	[50]	<5	<5	<5	<5	<5	<5	<5	<5	<5
1 1 2,2-Tetrachloroethane	5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Total VOCs **	5	<5	75.6	<5	<5	<5	<5	<5	<5	<5

Notes: * Results are reported in µg/L.
** Total Volatile Organic Compounds.
*** MW-A1 and MW-A2 are considered to be background water quality locations.
- Indicates that a standard or guidance value has not been assigned.
< Indicates that the analyte was not detected above the instrument detection limit.
ND - not detected

TABLE 6-8 cont.
ERWIN TOWN LANDFILL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS - MAY 2001 SAMPLING
SEMI-VOLATILE ORGANIC COMPOUNDS

PARAMETER *	6NYCRR Part 703 Groundwater Standard or [Guidance Value]	SAMPLE LOCATION (ppb)								
		MW-A1 **	MW-A2 **	MW-A3	MW-A4	MW-A5	MW-A6	MW-A7	MW-1	MW-2
Phenol	1	<10	<10	<10	<10	<10	<10	<10	<10	<10
bis(2-Chloroethyl)ether	1	<10	<10	<10	<10	<10	<10	<10	<10	<10
2-Chlorophenol	1	<10	<10	<10	<10	<10	<10	<10	<10	<10
1,2-Dichlorobenzene	3	<10	<10	<10	<10	<10	<10	<10	<10	<10
1,3-Dichlorobenzene	3	<10	<10	<10	<10	<10	<10	<10	<10	<10
1,4-Dichlorobenzene	3	<10	<10	<10	<10	<10	<10	<10	<10	<10
2-Methylphenol	-	<10	<10	<10	<10	<10	<10	<10	<10	<10
2,2'-oxybis(1-Chloropropane)	-	<10	<10	<10	<10	<10	<10	<10	<10	<10
3+4-Methylphenols	-	<20	<20	<20	<20	<20	<20	<20	<20	<20
n-Nitroso-di-n-propylamine	-	<10	<10	<10	<10	<10	<10	<10	<10	<10
Hexachloroethane	5	<10	<10	<10	<10	<10	<10	<10	<10	<10
Nitrobenzene	0.4	<10	<10	<10	<10	<10	<10	<10	<10	<10
Isophorone	[50]	<10	<10	<10	<10	<10	<10	<10	<10	<10
2-Nitrophenol	-	<10	<10	<10	<10	<10	<10	<10	<10	<10
2,4-Dimethylphenol	-	<10	<10	<10	<10	<10	<10	<10	<10	<10
bis(2-Chloroethoxy)methane	5	<10	<10	<10	<10	<10	<10	<10	<10	<10
2,4-Dichlorophenol	1	<10	<10	<10	<10	<10	<10	<10	<10	<10
1,2,4-Trichlorobenzene	5	<10	<10	<10	<10	<10	<10	<10	<10	<10
Naphthalene	[10]	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-Chloroaniline	5	<10	<10	<10	<10	<10	<10	<10	<10	<10
Hexachlorobutadiene	0.5	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-Chloro-3-methylphenol	1	<10	<10	<10	<10	<10	<10	<10	<10	<10
2-Methylnaphthalene	-	<10	<10	<10	<10	<10	<10	<10	<10	<10
Hexachlorocyclopentadiene	5	<10	<10	<10	<10	<10	<10	<10	<10	<10
2,4,6-Trichlorophenol	1	<10	<10	<10	<10	<10	<10	<10	<10	<10
2,4,5-Trichlorophenol	1	<10	<10	<10	<10	<10	<10	<10	<10	<10
2-Chloronaphthalene	[10]	<10	<10	<10	<10	<10	<10	<10	<10	<10
2-Nitroaniline	5	<10	<10	<10	<10	<10	<10	<10	<10	<10
Dimethylphthalate	[50]	<10	<10	<10	<10	<10	<10	<10	<10	<10
Acenaphthylene	-	<10	<10	<10	<10	<10	<10	<10	<10	<10
2,6-Dinitrotoluene	5	<10	<10	<10	<10	<10	<10	<10	<10	<10
3-Nitroaniline	5	<10	<10	<10	<10	<10	<10	<10	<10	<10

Notes: * Results are reported in µg/L.

** MW-A1 and MW-A2 are considered to be background water quality locations.

- Indicates that a standard or guidance value has not been assigned.

< Indicates that the analyte was not detected above the instrument detection limit.

J - Indicates an estimated value.

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TABLE 6-8 cont.
ERWIN TOWN LANDFILL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS - MAY 2001 SAMPLING
SEMI-VOLATILE ORGANIC COMPOUNDS cont.

PARAMETER *	6NYCRR Part 703 Groundwater Standard or [Guidance Value]	SAMPLE LOCATION (ppb)								
		MW-A1 **	MW-A2 **	MW-A3	MW-A4	MW-A5	MW-A6	MW-A7	MW-1	MW-2
Acenaphthene	[20]	<10	<10	<10	<10	<10	<10	<10	<10	<10
2,4-Dinitrophenol	10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-Nitrophenol	-	<10	<10	<10	<10	<10	<10	<10	<10	<10
Dibenzofuran	-	<10	<10	<10	<10	<10	<10	<10	<10	<10
2,4-Dinitrotoluene	5	<10	<10	<10	<10	<10	<10	<10	<10	<10
Diethylphthalate	[50]	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-Chlorophenyl-phenylether	-	<10	<10	<10	<10	<10	<10	<10	<10	<10
Fluorene	[50]	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-Nitroaniline	5	<10	<10	<10	<10	<10	<10	<10	<10	<10
4,6-Dinitro-2-methylphenol	-	<10	<10	<10	<10	<10	<10	<10	<10	<10
n-Nitrosodiphenylamine	[50]	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-Bromophenyl-phenylether	-	<10	<10	<10	<10	<10	<10	<10	<10	<10
Hexachlorobenzene	0.04	<10	<10	<10	<10	<10	<10	<10	<10	<10
Pentachlorophenol	1	<10	<10	<10	<10	<10	<10	<10	<10	<10
Phenanthrene	[50]	<10	<10	<10	<10	<10	<10	<10	<10	<10
Anthracene	[50]	<10	<10	<10	<10	<10	<10	<10	<10	<10
Carbazole		<10	<10	<10	<10	<10	<10	<10	<10	<10
Di-n-butylphthalate	50	<10	<10	<10	<10	<10	<10	1.1 J	<10	<10
Fluoranthene	[50]	<10	<10	<10	<10	<10	<10	<10	<10	<10
Pyrene	[50]	<10	<10	<10	<10	<10	<10	<10	<10	<10
Butylbenzylphthalate	[50]	<10	<10	<10	<10	<10	<10	<10	<10	<10
3,3'-Dichlorobenzidine	5	<10	<10	<10	<10	<10	<10	<10	<10	<10
Benzo(a)anthracene	[.002]	<10	<10	<10	<10	<10	<10	<10	<10	<10
Chrysene	[0.002]	<10	<10	<10	<10	<10	<10	<10	<10	<10
Bis(2-Ethylhexyl)phthalate	5	1 J	1.5 J	2.2 J	1.7	2.9 J	3 J	3.4 J	1.2 J	3.7 J
Di-n-octyl phthalate	[50]	<10	<10	<10	<10	<10	<10	<10	<10	<10
Benzo(b)fluoranthene	[.002]	<10	<10	<10	<10	<10	<10	<10	<10	<10
Benzo(k)fluoranthene	[.002]	<10	<10	<10	<10	<10	<10	<10	<10	<10
Benzo(a)pyrene	-	<10	<10	<10	<10	<10	<10	<10	<10	<10
Indeno(1,2,3-cd)pyrene	[.002]	<10	<10	<10	<10	<10	<10	<10	<10	<10
Dibenzo(a,h)anthracene	-	<10	<10	<10	<10	<10	<10	<10	<10	<10
Benzo(g,h,i)perylene	-	<10	<10	<10	<10	<10	<10	<10	<10	<10

Notes: * Results are reported in µg/L.
** MW-A1 and MW-A2 are considered to be background water quality locations.
- Indicates that a standard or guidance value has not been assigned.
< Indicates that the analyte was not detected above the instrument detection limit.
J - Indicates an estimated value.

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TABLE 6-8 cont.
ERWIN TOWN LANDFILL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS - MAY 2001 SAMPLING
SEMI-VOLATILE ORGANIC COMPOUNDS cont.

PARAMETER *	6NYCRR Part 703 Groundwater Standard or [Guidance Value]	SAMPLE LOCATION (ppb MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	FIELDBLANK
Phenol	1	<10	<10	<10	<10	<10	<10	<10	<10
bis(2-Chloroethyl)ether	1	<10	<10	<10	<10	<10	<10	<10	<10
2-Chlorophenol	1	<10	<10	<10	<10	<10	<10	<10	<10
1,2-Dichlorobenzene	3	<10	<10	<10	<10	<10	<10	<10	<10
1,3-Dichlorobenzene	3	<10	<10	<10	<10	<10	<10	<10	<10
1,4-Dichlorobenzene	3	<10	1.1 J	<10	<10	<10	<10	<10	<10
2-Methylphenol		<10	<10	<10	<10	<10	<10	<10	<10
2,2'-oxybis(1-Chloropropane)		<10	<10	<10	<10	<10	<10	<10	<10
3+4-Methylphenols		<20	<20	<20	<20	<20	<20	<20	<20
n-Nitroso-di-n-propylamine		<10	<10	<10	<10	<10	<10	<10	<10
Hexachloroethane	5	<10	<10	<10	<10	<10	<10	<10	<10
Nitrobenzene	0.4	<10	<10	<10	<10	<10	<10	<10	<10
Isophorone	[50]	<10	<10	<10	<10	<10	<10	<10	<10
2-Nitrophenol		<10	<10	<10	<10	<10	<10	<10	<10
2.4-Dimethylphenol		<10	<10	<10	<10	<10	<10	<10	<10
bis(2-Chloroethoxy)methane	5	<10	<10	<10	<10	<10	<10	<10	<10
2,4-Dichlorophenol	1	<10	<10	<10	<10	<10	<10	<10	<10
1,2,4-Trichlorobenzene	5	<10	<10	<10	<10	<10	<10	<10	<10
Naphthalene	[10]	<10	<10	<10	<10	<10	<10	<10	<10
4-Chloroaniline	5	<10	<10	<10	<10	<10	<10	<10	<10
Hexachlorobutadiene	0.5	<10	<10	<10	<10	<10	<10	<10	<10
4-Chloro-3-methylphenol	1	<10	<10	<10	<10	<10	<10	<10	<10
2-Methylnaphthalene		<10	<10	<10	<10	<10	<10	<10	<10
Hexachlorocyclopentadiene	5	<10	<10	<10	<10	<10	<10	<10	<10
2,4,6-Trichlorophenol	1	<10	<10	<10	<10	<10	<10	<10	<10
2,4,5-Trichlorophenol	1	<10	<10	<10	<10	<10	<10	<10	<10
2-Chloronaphthalene	[10]	<10	<10	<10	<10	<10	<10	<10	<10
2-Nitroaniline	5	<10	<10	<10	<10	<10	<10	<10	<10
Dimethylphthalate	[50]	<10	<10	<10	<10	<10	<10	<10	<10
Acenaphthylene		<10	<10	<10	<10	<10	<10	<10	<10
2,6-Dinitrotoluene	5	<10	<10	<10	<10	<10	<10	<10	<10
3-Nitroaniline	5	<10	<10	<10	<10	<10	<10	<10	<10

Notes: * Results are reported in µg/L.

** MW-A1 and MW-A2 are considered to be background water quality locations.

- Indicates that a standard or guidance value has not been assigned.

< Indicates that the analyte was not detected above the instrument detection limit.

J - Indicates an estimated value.

TABLE 6-8 cont.
ERWIN TOWN LANDFILL REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS - MAY 2001 SAMPLING
SEMI-VOLATILE ORGANIC COMPOUNDS cont.

PARAMETER *	6NYCRR Part 703 Groundwater Standard or [Guidance Value]	SAMPLE LOCATION (ppb MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	FIELDBLANK
Acenaphthene	[20]	<10	<10	<10	<10	<10	<10	<10	<10
2,4-Dinitrophenol	10	<10	<10	<10	<10	<10	<10	<10	<10
4-Nitrophenol		<10	<10	<10	<10	<10	<10	<10	<10
Dibenzofuran		<10	<10	<10	<10	<10	<10	<10	<10
2,4-Dinitrotoluene	5	<10	<10	<10	<10	<10	<10	<10	<10
Diethylphthalate	[50]	<10	<10	<10	<10	1.2 J	<10	<10	<10
4-Chlorophenyl-phenylether		<10	<10	<10	<10	<10	<10	<10	<10
Fluorene	[50]	<10	<10	<10	<10	<10	<10	<10	<10
4-Nitroaniline	5	<10	<10	<10	<10	<10	<10	<10	<10
4,6-Dinitro-2-methylphenol		<10	<10	<10	<10	<10	<10	<10	<10
n-Nitrosodiphenylamine	[50]	<10	<10	<10	<10	<10	<10	<10	<10
4-Bromophenyl-phenylether		<10	<10	<10	<10	<10	<10	<10	<10
Hexachlorobenzene	0.04	<10	<10	<10	<10	<10	<10	<10	<10
Pentachlorophenol	1	<10	<10	<10	<10	<10	<10	<10	<10
Phenanthrene	[50]	<10	<10	<10	<10	<10	<10	<10	<10
Anthracene	[50]	<10	<10	<10	<10	<10	<10	<10	<10
Carbazole		<10	<10	<10	<10	<10	<10	<10	<10
Di-n-butylphthalate	50	<10	1.2 J	6.2 J	5 J	8.7 J	3.4 J	3.7 J	<10
Fluoranthene	[50]	<10	<10	<10	<10	<10	<10	<10	<10
Pyrene	[50]	<10	<10	<10	<10	<10	<10	<10	<10
Butylbenzylphthalate	[50]	<10	<10	<10	<10	<10	<10	<10	<10
3,3'-Dichlorobenzidine	5	<10	<10	<10	<10	<10	<10	<10	<10
Benzo(a)anthracene	[.002]	<10	<10	<10	<10	<10	<10	<10	<10
Chrysene	[0.002]	<10	<10	<10	<10	<10	<10	<10	<10
Bis(2-Ethylhexyl)phthalate	5	4.3 J	<10	1.7 J	1.8 J	2.9 J	1.6 J	1.9 J	<10
Di-n-octyl phthalate	[50]	<10	<10	<10	<10	<10	<10	<10	<10
Benzo(b)fluoranthene	[.002]	<10	<10	<10	<10	<10	<10	<10	<10
Benzo(k)fluoranthene	[.002]	<10	<10	<10	<10	<10	<10	<10	<10
Benzo(a)pyrene		<10	<10	<10	<10	<10	<10	<10	<10
Indeno(1,2,3-cd)pyrene	[.002]	<10	<10	<10	<10	<10	<10	<10	<10
Dibenzo(a,h)anthracene		<10	<10	<10	<10	<10	<10	<10	<10
Benzo(g,h,i)perylene		<10	<10	<10	<10	<10	<10	<10	<10

Notes: * Results are reported in µg/L.

** MW-A1 and MW-A2 are considered to be background water quality locations.

- Indicates that a standard or guidance value has not been assigned.

< Indicates that the analyte was not detected above the instrument detection limit.

J - Indicates an estimated value.

TABLE 6-8 cont.
ERWIN TOWN LANDFILL REMEDIAL INVESITGATION
GROUNDWATER ANALYTICAL RESULTS - MAY 2001 SAMPLING
TOTAL METALS

PARARMETER *	6NYCRR Part 703 Groundwater Standard or [Guidance Value]	SAMPLE LOCATION (ppb) MW-A1 **		MW-A2 **		MW-A3		MW-A4		MW-A5		MW-A6		MW-A7		MW-1		MW-2	
Aluminum		5 300		11,500		1 040		9 030		57,300		2 110		64,100		75,900		366	
Antimony	3	<3.1		<3.1		14.4	B	<3.1		7.2	B	<3.1		4.5	B	4.7	B	13.6	B
Arsenic	25	10.8		29		23.7		22.9		60.3		10.4		59.6		125		63.4	
Barium	1,000	257		480		792		633		1,530		414		2 460		4,920		454	
Beryllium	[3]	0.46	B	0.67	B	0.12	B	0.56	B	3.3	B	0.24	B	3	B	4.1	B	0.16	B
Cadmium	5	<.4		<.4		<.4		<.4		<.4		0.46	B	1.5	B	1	B	<.4	
Calcium		125,000		107 000		145 000		155,000		144 000		98 500		211 000		337 000		124 000	
Chromium	50	6.9	B	13.4		2	B	9.9	B	70		<.8		72.1		126		1.5	B
Cobalt		6.4	B	9	B	9.5	B	12.1	B	34.4	B	8.6	B	42.6	B	97.8		4.3	B
Copper	200	18.7	B	41.5		18.6	B	45.6		204		20.7	B	205		391		9.5	B
Iron	300	11 400		30 100		17 500		30,200		119,000		14 000		96 900		172 000		24,900	
Lead	25	12.2		19.5		45.5		21.6		87.3		10.9		98.8		193		40.9	
Magnesium	[35000]	19,200		23 100		57,200		37,800		69,200		14,200		79 400		143 000		80 500	
Manganese	300	1,030		3 300		3 850		14 100		5 700		16,200		13,300		29 900		814	
Mercury	0.7	<.2		<.2		<.2		<.2		0.25		<.2		0.21		0.22		<.2	
Nickel	100	11	B	20.2	B	7.3	B	19.2	B	95.8		7.9	B	103		187		4.2	B
Potassium		4 250	BE	5,000	BE	151,000	E	17,000	E	25 200	E	5 100	E	13 800	E	15,800	E	210,000	E
Selenium	10	<3.2		<3.2		<3.2		<3.2		<3.2		<3.2		<3.2		<3.2		<3.2	
Silver	50	<1.3		<1.3		<1.3		<1.3		<1.3	B	<1.3		<1.3		<1.3		<1.3	
Sodium	20 000	132 000	E	73,600	E	523,000	E	123 000	E	101 000	E	91,700	E	492 000	E	80,500	E	502,000	E
Thallium	[0.5]	<3.9		<3.9		<3.9		<3.9		<3.9		<3.9		<3.9		9	B	<3.9	
Vanadium		<34.9		<34.9		<34.9		<34.9		76.3		<34.9		78.8		122		<34.9	
Zinc	[2000]	64.7		119		59.8		116		618		34.8		559		986		45.4	
Cyanide	200	<0.01		<0.01		<0.01		<0.01		<0.01		<0.01		<0.01		<0.01		<0.01	
Iron & Manganese	500	12,430		33,400		21 350		44,300		124,700		30 200		110,200		201 900		25,714	

Notes: * Results are reported in µg/L.

** MW-A1 and MW-A2 are considered to be background water quality locations.

- Indicates that a standard or guidance value has not been assigned.

< Indicates that the analyte was not detected above the instrument detection limit.

B - indicates that the reported value is less than the Contract Required Detection Limit (CRDL), greater than the instrument detection limit.

E - The reported value is estimated because of the presence of interference.

TABLE 6-8 cont.
ERWIN TOWN LANDFILL REMEDIAL INVESITGATION
GROUNDWATER ANALYTICAL RESULTS - MAY 2001 SAMPLING
TOTAL METALS cont.

PARARMETER *	6NYCRR Part 703 Groundwater Standard or [Guidance Value]	SAMPLE LOCATION (ppb) MW-3		MW-4		MW-5		MW-6		MW-7		MW-8		MW-9		Duplicate (MW-A2)		Field Blank	
Aluminum		6 600		34 700	E	473	E	44 500	E	<7.9	E	97 400	E	81 800	E	11,500		<7.9	E
Antimony	3	1 720		16.2	B	6.7	B	12.4	B	3.5	B	6.1	B	7.3	B	<3.1		<3.1	
Arsenic	25	40.6		72.3		<2.5		272		23.1		79.8		58.2		26.8		<2.5	
Barium	1 000	940		2 370	N	668	N	2 820	N	1 730	N	2,170	N	1 700	N	512		<.3	N
Beryllium	[3]	0.78	B	1.2	B	<.01		2	B	<.01		3.7	B	3.1	B	0.72	B	<.01	
Cadmium	5	1.8	B	1.5	B	<.04		7.9		<.04		5.4		3.7	B	<.4		<.04	
Calcium		144 000		164 000		159 000		162 000		176 000		234 000		132 000		114 000		<3.1	
Chromium	50	29.2		58.5		1.4	B	63.2		<.8		134		102		12.5		<.8	
Cobalt		10.1	B	31	B	5.5	B	31.2	B	1.1	B	67.9		59.6		8.5	B	<1	
Copper	200	34.7		135		15.7	B	104		14.2	B	254		178		42.2		<.8	
Iron	300	42 400		71 700		4 400		324 000		5 550		175 000		140 000		29 400		15.1	B
Lead	25	52.1		122		19.5		445		6.8		130		127		17.7		<2.5	
Magnesium	[35000]	43 700		79 500		47 300		44 900		47 500		105 000		56 000		24 200		<7.9	
Manganese	300	3 760		5 370		3 010		6 760		3,840		14,500		6 400		3 510		0.32	B
Mercury	0.7	<.2		<.02		<.02		0.24		<.02		<.02		<.02		<.2		<.02	
Nickel	100	23.8	B	71.8		17.2	B	38.4	B	2.5	B	160		132		19	B	<1.7	
Potassium		14 200	E	76,500	E	34 400	E	11,900	E	3 120	BE	50 700	E	40 000	E	5 880	E	<31	E
Selenium	10	<3.2		<3.2		<3.2		<3.2		<3.2		<3.2		<3.2		<3.2		<3.2	
Silver	50	<1.3		<1.3		<1.3		10.4		<1.3		2.6	B	1.8	B	1.5	B	<1.3	
Sodium	20,000	259 000	E	726 000	E	532 000	E	148 000	E	245 000	E	251 000	E	186,000	E	80 100	E	<267	E
Thallium	[0.5]	<3.9		<3.9		<3.9		<3.9		<3.9		<3.9		<3.9		<3.9		<3.9	
Vanadium	-	<34.9		46.2	B	<34.9		80		<34.9		126		104		<34.9		<34.9	
Zinc	[2000]	103		458		31.3		365		66.9		720		589		110		<.5	
Cyanide	200	<0.01		<0.01		<0.01		<0.01		<0.01		<0.01		<0.01		<0.01		<0.01	
Iron & Manganese	500	46,160		77,070		7,410		330,760		9,390		189,500		146 400		32,910		15.42	

Notes: * Results are reported in µg/L.

** MW-A1 and MW-A2 are considered to be background water quality locations.

Indicates that a standard or guidance value has not been assigned.

< Indicates that the analyte was not detected above the instrument detection limit.

B - indicates that the reported value is less than the Contract Required Detection Limit (CRDL), greater than the instrument detection limit.

E - The reported value is estimated because of the presence of interference.

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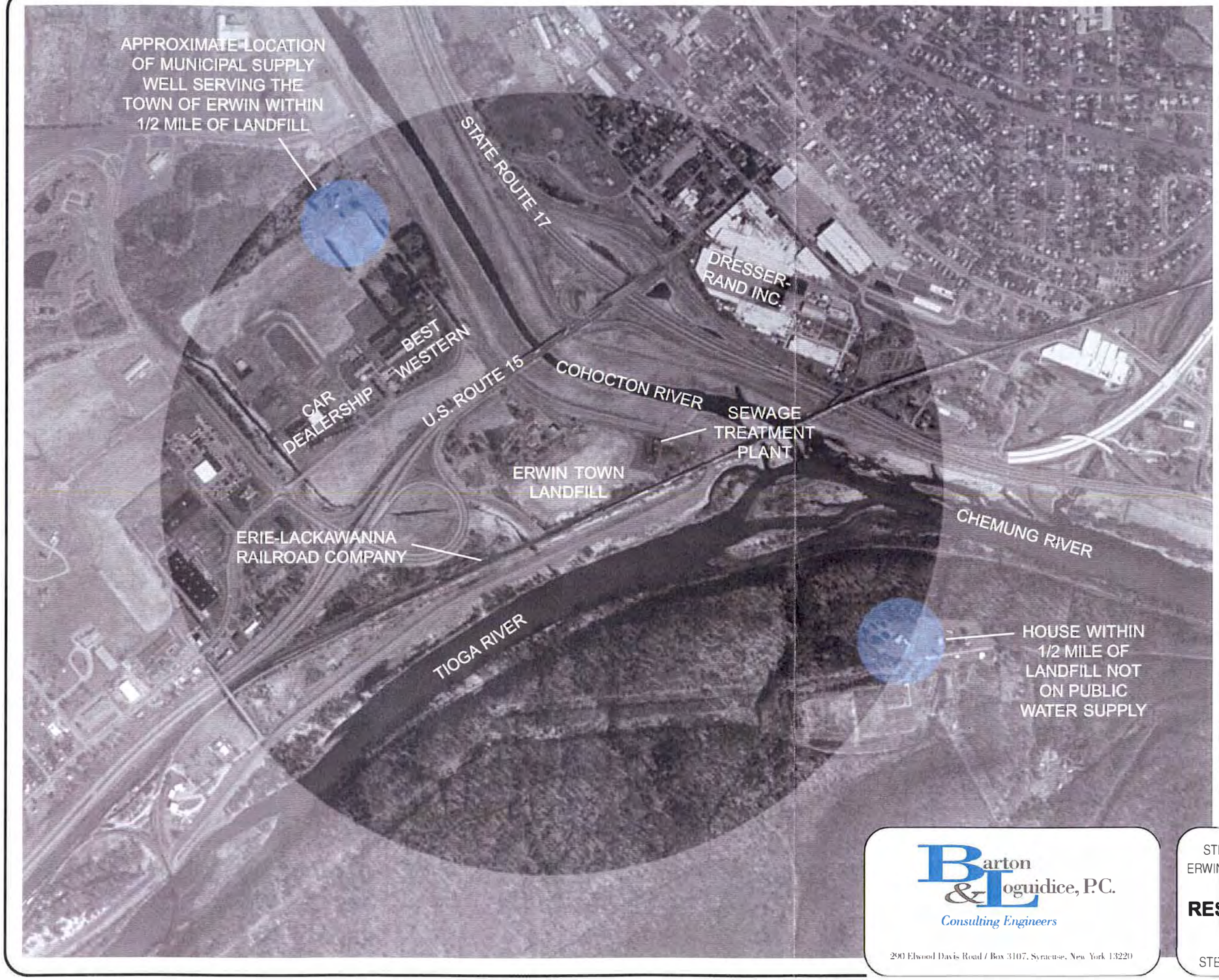
TABLE 6-8 cont.
ERWIN TOWN LANDFILL REMEDIAL IVESTIGATION
GROUNDWATER ANALYTICAL RESULTS - MAY 2001 SAMPLING
PCBs

PARAMETER *	6NYCRR Part 703 Groundwater Standard or [Guidance Value]	SAMPLE LOCATION (ppb) MW-A1**	MW-A2**	MW-A3	MW-A4	MW-A5	MW-A6	MW-A7	MW-1	MW-2
Aroclor 1016	50	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5
Aroclor 1221	50	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5
Aroclor 1232	50	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5
Aroclor 1242	50	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5
Aroclor 1248	50	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5
Aroclor 1254	50	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5
Aroclor 1260	50	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5

Note: * Results are reported in µg/L.
** MW-A1 and MW-A2 are considered to be background water quality locations.



RESIDENTIAL WELL SURVEY

LEGEND

LARGE CIRCLE REPRESENTS 1/2 MILE RADIUS FROM ERWIN TOWN LANDFILL

SMALL CIRCLES REPRESENT SUPPLY WELLS WITHIN 1/2 MILE OF LANDFILL

SCALE: 1"=800'

SOURCE: AERIAL PHOTOGRAPH DATED APRIL 16, 1995 (PROVIDED COURTESY OF USGS)

Barton & Loguidice, P.C.
Consulting Engineers
290 Elwood Davis Road / Box 3107, Syracuse, New York 13220

STEUBEN COUNTY DEPT. OF PUBLIC WORKS
ERWIN TOWN LANDFILL REMEDIAL INVESTIGATION

RESIDENTIAL WELL SURVEY

STEUBEN COUNTY NEW YORK

Figure

6-1

Project No.

268.012

TABLE 6-8 cont.
ERWIN TOWN LANDFILL REMEDIAL IVESTIGATION
GROUNDWATER ANALYTICAL RESULTS - MAY 2001 SAMPLING
PCBs cont.

PARAMETER *	6NYCRR Part 703 Groundwater Standard or [Guidance Value]	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	Duplicate (MW-A2)
Aroclor 1016	50	<.5	<.05	<.05	<.05	<.05	<.05	<.05	<.5
Aroclor 1221	50	<.5	<.05	<.05	<.05	<.05	<.05	<.05	<.5
Aroclor 1232	50	<.5	<.05	<.05	<.05	<.05	<.05	<.05	<.5
Aroclor 1242	50	<.5	<.05	<.05	<.05	<.05	<.05	<.05	<.5
Aroclor 1248	50	<.5	<.05	<.05	<.05	<.05	<.05	<.05	<.5
Aroclor 1254	50	<.5	<.05	<.05	<.05	<.05	<.05	<.05	<.5
Aroclor 1260	50	<.5	<.05	<.05	<.05	<.05	<.05	<.05	<.5

Note: * Results are reported in µg/L.
** MW-A1 and MW-A2 are considered to be background water quality locations.

exceedances of standards and guidance values (see Table 6-8). This was also observed as a result of the sampling program completed during the 2000 NYSDOT Detailed Site Investigation. However, comparing the two sets of data, the results of this current investigation exhibit higher concentrations of inorganics. Since there was not a corresponding increase in organic parameters, it would not appear likely that the increase in inorganic concentrations is due to greater landfill leachate impacts. The greater concentrations of inorganics, observed during this current investigation, is more likely attributable to higher turbidity values at the time of sampling. Most locations sampled in 2000 exhibited turbidity values well below 100 NTUs, whereas during the Remedial investigation, most locations exhibited turbidities of the time of sampling in excess of 200 NTUs. A comparison of the unfiltered metals results for samples collected during both events revealed a direct correlation between observed turbidities and analytical results. For example, MW-2 exhibited turbidity values below 100 NTUs during both sampling events, with similar analytical results for unfiltered metals. However, MW-A7, which exhibited a turbidity of less than 50 NTUs during the 2000 NYSDOT Detailed Site Investigation, and greater than 1,000 NTUs during the Remedial Investigation, exhibited significantly higher concentrations of unfiltered metals during this current study.

The distribution of inorganic constituents is widespread, irrespective of the sampling location in context with the position of the landfill. Therefore, while it is likely that fractions of these concentrations are attributable to the landfill at certain locations, it does not appear to represent a significant environmental threat.

6.6.4 PCBs

There were no PCBs detected in the groundwater at any of the sampling locations, therefore, PCBs are not a concern.

The groundwater sampling program confirmed the presence of a few volatile organic compounds in excess of standards at MW-4. This is consistent with earlier studies performed at the site, and confirms areas of expected groundwater impacts. Impacts to groundwater from inorganic contaminants are believed to be minimal with respect to comparisons to background conditions.

6.7 Perimeter/Personal Monitoring Results

Tables 6-9 and 6-10 summarize the results from the perimeter and personal monitoring program performed in accordance with the RI/FS Work Plan's Health and Safety Plan and the Community Air Monitoring Program. As shown, air-monitoring levels recorded during the various field activities were well below the safe work limits presented in the above referenced documents. Appendix G contains the continuous data-logger records for the monitoring instruments used during the perimeter monitoring program.

6.8 Data Validation Results

The Data Validation report (included as Appendix C) rejected several analytical results due to either low matrix recoveries or internal standard deviations. The overall assessment of the laboratory data and associated quality control information, however, was that the data was useable for qualitative and quantitative purposes. Refer to the complete Data Validation report for a description of rejected analyses.

Table 6-9
Erwin Town Landfill Remedial Investigation
Summary of Perimeter Monitoring Results
Photoionization Detector Results May 14-16, 2001

5/14/01			5/15/01			5/16/01		
Time	Max (ppm)	15 min. Avg (ppm	Time	Max (ppm)	15 min. Avg (ppm)	Time	Max (ppm)	15 min. Avg (ppm)
11:25	0.0	0.0	9:37	4.5	0.0	8:30	3.3	0.0
11:40	0.7	0.0	9:52	6.8	0.0	8:45	5.5	0.0
11:55	0.7	0.0	10:07	2.0	0.0	9:00	8.8	0.1
12:10	0.3	0.0	10:22	2.1	0.0	9:15	2.0	0.0
12:25	0.3	0.0	10:37	1.7	0.0	9:30	1.9	0.0
12:40	0.0	0.0	10:52	1.5	0.0	9:45	2.0	0.0
12:55	0.0	0.0	11:07	0.8	0.0	10:00	1.7	0.0
13:10	0.0	0.0	11:22	1.0	0.0	10:15	4.2	0.0
13:25	0.0	0.0	11:37	0.2	0.0	10:30	4.0	0.1
13:40	1.5	0.0	11:52	0.8	0.0	10:45	5.5	0.2
13:55	4.5	0.0	12:07	0.0	0.0	11:00	5.6	0.3
14:10	3.7	0.1	12:22	0.5	0.0	11:15	5.8	0.3
14:25	3.9	0.1	12:37	1.9	0.0	11:30	10.0	0.5
14:40	5.3	0.2	12:52	3.3	0.0	11:45	11.3	0.9
14:55	5.5	0.2	13:07	5.0	0.1	12:00	10.7	0.5
15:10	3.3	0.0	13:22	4.8	0.0	12:15	9.6	0.5
15:25	2.7	0.0	13:37	2.7	0.0	12:30	5.6	0.4
15:40	2.0	0.0	13:52	2.3	0.0	12:45	7.4	0.6
15:55	3.4	0.0	14:07	2.3	0.0	13:00	11.3	0.7
16:10	5.2	0.2	14:22	0.5	0.0	13:15	10.6	0.8
16:25	5.3	0.3	14:32	1.6	0.0	13:30	11.8	1.3
16:40	3.6	0.0	14:52	1.0	0.0	13:45	11.4	1.0
16:55	2.4	0.0	15:07	1.2	0.0	14:00	5.8	0.5
17:10	1.8	0.0	15:22	1.1	0.0	--	--	--
--	--	--	15:37	1.6	0.0	--	--	--
--	--	--	15:52	1.1	0.0	--	--	--
--	--	--	16:07	2.1	0.0	--	--	--
--	--	--	16:22	4.0	0.0	--	--	--
--	--	--	16:37	1.5	0.0	--	--	--

Note: The VOC monitoring criteria presented in the Community Air Monitoring Plan (of the Health & Safety Plan) for temporary work suspension is 5 ppm (at the downwind monitoring point), for vapor abatement activities is >5 ppm and <25 ppm, and for mandatory work stoppage is >25 ppm. These values represent the criteria established for the 15-minute average of the monitoring data.

Table 6-10
Erwin Town Landfill Remedial Investigation
Summary of Particulate Monitoring Results -- May 14-16, 2001

	Dusttrak 1 (NW Corner of Landfill)		Dusttrak 2 (SE Corner of Landfill)			Dusttrak 1		Dusttrak 2			Dusttrak 1		Dusttrak 2	
Date	Time	(mg/m^3)	Time	(mg/m^3)	Date	Time	(mg/m^3)	Time	(mg/m^3)	Date	Time	(mg/m^3)	Time	(mg/m^3)
5/14/01	10:54 AM	0.018	11:05 AM	0.012	5/15/01	9:20 AM	0.034	9:41 AM	0.031	5/16/01	8:33 AM	0.033	8:29 AM	0.021
5/14/01	11:09 AM	0.018	11:20 AM	0.010	5/15/01	9:35 AM	0.036	9:56 AM	0.027	5/16/01	8:48 AM	0.033	8:44 AM	0.021
5/14/01	11:24 AM	0.016	11:35 AM	0.010	5/15/01	9:50 AM	0.033	10:11 AM	0.023	5/16/01	9:03 AM	0.028	8:59 AM	0.025
5/14/01	11:39 AM	0.014	11:50 AM	0.010	5/15/01	10:05 AM	0.031	10:26 AM	0.017	5/16/01	9:18 AM	0.025	9:14 AM	0.020
5/14/01	11:54 AM	0.013	12:05 PM	0.010	5/15/01	10:20 AM	0.025	10:41 AM	0.016	5/16/01	9:33 AM	0.022	9:29 AM	0.015
5/14/01	12:09 PM	0.013	12:20 PM	0.010	5/15/01	10:35 AM	0.025	10:56 AM	0.010	5/16/01	9:48 AM	0.021	9:44 AM	0.016
5/14/01	12:24 PM	0.013	12:35 PM	0.010	5/15/01	10:50 AM	0.013	11:11 AM	0.009	5/16/01	10:03 AM	0.017	9:59 AM	0.015
5/14/01	12:39 PM	0.012	12:50 PM	0.009	5/15/01	11:05 AM	0.012	11:26 AM	0.010	5/16/01	10:18 AM	0.014	10:14 AM	0.013
5/14/01	12:54 PM	0.012	1:05 PM	0.009	5/15/01	11:20 AM	0.013	11:41 AM	0.010	5/16/01	10:33 AM	0.011	10:29 AM	0.013
5/14/01	1:09 PM	0.012	1:20 PM	0.009	5/15/01	11:35 AM	0.013	11:56 AM	0.009	5/16/01	10:48 AM	0.010	10:44 AM	0.011
5/14/01	1:24 PM	0.012	1:35 PM	0.010	5/15/01	11:50 AM	0.013	12:11 PM	0.010	5/16/01	11:03 AM	0.010	10:59 AM	0.010
5/14/01	1:39 PM	0.014	1:50 PM	0.014	5/15/01	12:05 PM	0.013	12:26 PM	0.010	5/16/01	11:18 AM	0.009	11:14 AM	0.009
5/14/01	1:54 PM	0.022	2:05 PM	0.015	5/15/01	12:20 PM	0.013	12:41 PM	0.010	5/16/01	11:33 AM	0.007	11:29 AM	0.008
5/14/01	2:09 PM	0.023	2:20 PM	0.015	5/15/01	12:35 PM	0.013	12:56 PM	0.010	5/16/01	11:48 AM	0.006	11:44 AM	0.008
5/14/01	2:24 PM	0.023	2:35 PM	0.014	5/15/01	12:50 PM	0.012	1:11 PM	0.010	5/16/01	12:03 PM	0.006	11:59 AM	0.007
5/14/01	2:39 PM	0.022	2:50 PM	0.014	5/15/01	1:05 PM	0.012	1:26 PM	0.010	5/16/01	12:18 PM	0.006	12:14 PM	0.007
5/14/01	2:54 PM	0.021	3:05 PM	0.014	5/15/01	1:20 PM	0.012	1:41 PM	0.010	5/16/01	12:33 PM	0.005	12:29 PM	0.008
5/14/01	3:09 PM	0.021	3:20 PM	0.014	5/15/01	1:35 PM	0.012	1:56 PM	0.011	5/16/01	12:48 PM	0.004	12:44 PM	0.008
5/14/01	3:24 PM	0.020	3:35 PM	0.015	5/15/01	1:50 PM	0.012	2:11 PM	0.011	5/16/01	1:03 PM	0.003	12:59 PM	0.008
5/14/01	3:39 PM	0.021	3:50 PM	0.013	5/15/01	2:05 PM	0.012	2:26 PM	0.010	5/16/01	1:18 PM	0.003	1:14 PM	0.008
5/14/01	3:54 PM	0.022	--	--	5/15/01	2:20 PM	0.011	2:41 PM	0.011	5/16/01	1:33 PM	0.002	1:29 PM	0.008
5/14/01	4:09 PM	0.023	--	--	5/15/01	2:35 PM	0.011	2:56 PM	0.011	5/16/01	1:48 PM	0.001	1:44 PM	0.007
5/14/01	4:24 PM	0.029	--	--	5/15/01	2:50 PM	0.010	3:11 PM	0.011	5/16/01	2:03 PM	0.000	1:59 PM	0.007
5/14/01	4:39 PM	0.022	--	--	5/15/01	3:05 PM	0.009	3:26 PM	0.012	5/16/01	2:18 PM	0.000	2:14 PM	0.007
5/14/01	4:54 PM	0.016	--	--	5/15/01	3:20 PM	0.008	3:41 PM	0.011	--	--	--	--	--
5/14/01	5:09 PM	0.015	--	--	5/15/01	3:35 PM	0.008	3:56 PM	0.011	--	--	--	--	--
--	--	--	--	--	5/15/01	3:50 PM	0.005	4:11 PM	0.011	--	--	--	--	--
--	--	--	--	--	5/15/01	4:05 PM	0.002	4:26 PM	0.011	--	--	--	--	--
--	--	--	--	--	5/15/01	4:20 PM	0.000	4:41 PM	0.011	--	--	--	--	--
--	--	--	--	--	5/15/01	4:35 PM	-0.002	4:56 PM	0.011	--	--	--	--	--
--	--	--	--	--	5/15/01	4:50 PM	-0.004	--	--	--	--	--	--	--
--	--	--	--	--	5/15/01	5:05 PM	-0.004	--	--	--	--	--	--	--

Note: The maximum particulate level presented in the Community Air Monitoring Plan (of the Health & Safety Plan) for mandatory dust suppression is 100 mg/g^3, and for mandatory work stoppage is 150 mg/g^3.

7.0 CONTAMINANT FATE AND TRANSPORT

In Section 5, the hydrogeologic conditions within the study area were illustrated through the distribution of groundwater shown in Plate 4, and the position of various geologic horizons presented in subsurface cross-sections A-A' and B-B' (Plate 3). Groundwater appears to be slightly mounded immediately beneath the landfill, with radial distribution toward the landfill perimeter. A short distance from the landfill, however, the groundwater flow patterns resemble the regional flow which follows the valley within which the Coming-Elmira-Horseheads-Big Flats aquifer occupies. Section 6 summarized the results of the groundwater and surface soil analytical program, and described the relative distribution of identified site contaminants within the study area. These data indicated very minor impacts to groundwater within the vicinity of monitoring well MW-4. This section discusses the physical and chemical controls which determine the fate of these contaminants with respect to their migration within the various geologic media at the site.

The fate of a contaminant refers to the time and distance required for certain geochemical and physical mechanisms to render that particular element or compound harmless. These mechanisms account for the attenuation of contaminant concentrations and limit the distance that any particular contaminant can ultimately travel. Attenuation is defined as any physical, chemical or biological reaction or transformation in saturated or unsaturated zones that brings about a temporary or permanent decrease in the concentration or in the total quantity of an applied chemical or biological constituent in a fixed time or distance traveled (Metry, 1981). The persistence of the individual contaminant relates to its ability to withstand the attenuating effects of these mechanisms.

Physical processes which enhance attenuation include molecular diffusion, hydrodynamic dispersion and dilution. Chemical processes include adsorption-desorption (ion exchange), precipitation, transformation and oxidation/reduction. Biological attenuation of the contaminant occurs through the interaction of microorganisms.

Oxidation of elements within groundwater that becomes exposed to the surface, will be enhanced as a result of the increase in available oxygen. The likely discharge of groundwater from the overburden to the surface water conditions associated with the Tioga and Cohocton Rivers, therefore, will likely promote greater attenuation simply from the increase in oxygen levels at the point of discharge.

7.1 Organic Compounds

7.1.1 Groundwater

Groundwater contamination in the form of volatile and semi-volatile organic compounds was detected only marginally at the site both in extent and concentration. Overall, only MW-4, situated downgradient from the landfill, exhibited a limited set of parameters at concentrations in exceedance of groundwater standards. Chloroethane and chlorobenzene were detected at 66 µg/L and 9.6 µg/L, respectively. The groundwater standard for both of these compounds is 5 µg/L. Both of these compounds degrade biologically under aerobic conditions. In the absence of these conditions, these compounds have a tendency to linger in the environment. Elevated ammonia and Total Kjeldahl Nitrogen (TKN) concentrations detected during the 2000 NYSDOT Detailed Site Investigation along the immediate northern, eastern and southern landfill perimeters, suggests the presence of anaerobic/reducing groundwater conditions, therefore minimizing the degradation potential of these contaminants. Farther downgradient, however, ammonia and TKN concentrations are significantly reduced or non-detected (NYSDOT 2000), as evidenced by the conditions observed at MW-6 and MW-7, respectively, indicating that aerobic conditions return to the subsurface a short distance from the landfill perimeter.

The former water supply well serving the Town of Erwin Sewage Treatment Plant (MW-7) does not exhibit groundwater contamination in the form of volatile or semi-volatile organic compounds. Monitoring well MW-4, however, located within the direct flow path between the landfill and MW-7, exhibited low concentrations of two volatile organic compounds (chloroethane and chlorobenzene). Since the potential for biodegradation of the two compounds to occur under current conditions is low, it would appear that supplemental attenuation mechanisms (previously mentioned above) are

taking place rendering non-detectable concentrations at MW-7. This is apparently true for other areas downgradient from the landfill, in light of the non-detectable concentrations of VOCs at MW-6 as well, located only about 150 feet from the southwestern corner of the limits of waste.

7.1.2 Soil

Soil contamination in the form of volatile and semi-volatile organic compounds was detected at the two on-site surface soil sampling locations as well as the two background samples collected off-site. The similar suite of contaminants identified in the background samples suggests possible interference due to laboratory contamination. In all cases, the concentration of the detected parameter was below the associated clean-up objective stated in NYSDEC TAGM #4046. Additionally, those parameters detected in the surface soil samples were not found at any significant concentration in the groundwater at the site, suggesting that the surface soil contaminants are bound to the soil particles, and do not migrate downward to the water table.

7.2 Inorganic Compounds

7.2.1 Groundwater

As previously stated, the local groundwater within the vicinity of the Erwin Town Landfill exhibits a highly mineralized condition, with elevated concentrations of several metals widespread across the study area. Inorganic parameters analyzed for the surface soil samples were detected either at or below background soil sample concentrations, and/or within background concentration ranges for soils reported for the Eastern United States. Therefore, it did not appear necessary to discuss the soil attenuation mechanisms inhibiting the potential migration of these constituents to the groundwater table.

The previous discussion presented in Section 6.6.3 indicated a correlation between excessive turbidities during sampling and associated elevated concentrations of inorganic (metals) parameters detected during the current Remedial Investigation. Despite this, there is evidence at

the site that the highly mineralized nature of the site's groundwater, a portion of which is likely attributable to a landfill leachate impact, is experiencing attenuation due to natural mechanisms. For example, there are two areas of the site which demonstrate natural attenuation of inorganic constituents. The groundwater distribution configuration depicted on Plate 4 shows that MW-7 is located downgradient from MW-4, and MW-6 is downgradient from wells MW-8 and MW-9. In both areas, significant decreases in most of the constituents at MW-6 and MW-7 are observed. These conditions are likely attributable to changes in the oxidation/reduction potential in the groundwater system causing minerals to precipitate from solution or form other mineral complexes. Other factors may include mineral adsorption and dispersion/dilution effects.

7.3 Summary

The limited extent of volatile and semi-volatile organic compound contamination in the site groundwater is consistent with the results observed from past investigations at the site. This finding is not surprising given the probable composition and main contributors to the landfill during its life of operation. There is no evidence that the low levels of VOCs or SVOCs are migrating great distances beyond the limits of waste associated with the landfill. Their attenuation is likely controlled by the effects of contaminant adsorption onto soil particles, and hydrodynamic dispersion and dilution within the groundwater.

The extent that elevated inorganic contamination in the groundwater was observed also appears to be controlled by natural attenuation factors likely occurring short distances away from the landfill perimeter. Reducing conditions appear to be present immediately adjacent to the waste limits. Beyond these limits, it is anticipated that conditions would favor the oxidation of most of these minerals, further controlling their downgradient migration. A return to aerobic conditions within a relatively short distance from the landfill perimeter is also consistent with an environment more conducive to the biodegradation of persistent, yet low concentration, VOCs detected along a portion of the downgradient perimeter of the landfill.

8.0 SUMMARY OF ENVIRONMENTAL ASSESSMENT

8.1 Fish and Wildlife Impact Analysis

A Fish and Wildlife Impact Analysis (FWIA) was performed at the Erwin Town Landfill on May 22, 2001 by EcoLogic, LLC. This study was performed in accordance with the guidelines set forth in Steps I and II of the New York State Department of Environmental Conservation October 1994 FWIA for work done on Inactive Hazardous Waste Sites.

The study found no adverse effects to the productivity, biomass, diversity, or abundance of fish and wildlife resources. Additionally, the study found that vegetation communities on and within the vicinity of the landfill were healthy and robust, and showed no evidence of landfill leachate impact. The complete report prepared by EcoLogic, LLC is indicated as Appendix E.

8.2 Qualitative Human Health Risk Evaluation

The primary objective in performing a qualitative human health risk analysis is to determine whether a quantitative human health risk assessment is required. The basis of this evaluation is three-fold; 1) are there contaminants present in the site media in exceedance of appropriate State and/or Federal standards or guidance values; 2) are there surficial receptors within the immediate site vicinity or groundwater receptors downgradient from the site which complete an exposure pathway to the site contaminants; and 3) does the exposure scenario for surficial and/or groundwater contaminants create a threat to human health if left unremediated.

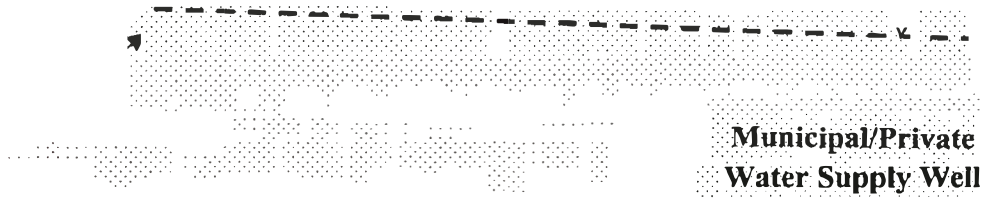
Figure 8-1 illustrates the possible exposure pathways for contaminants at the landfill site. As shown, risk-based exposure scenarios for site contaminants are manifested under three general categories: an inhalation pathway, an ingestion pathway, and a dermal exposure pathway.

Figure 8-1
Erwin Town Landfill Remedial Investigation
Risk-Based Exposure Pathways

Inhalation Pathway

Ingestion Pathway

Dermal Exposure Pathway(s)



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guidice, P.C.
Consulting Engineers

Section 6 presented the summary of analytical results obtained during the Remedial Investigation from surface and groundwater soil sampling. Surficial soils and groundwater were analyzed for volatile and semi-volatile organic compounds, total metals and PCBs. In addition, surface soils were analyzed for radiochemistry to determine the level of radioactive emissions from the landfill. The analytical data was previously presented as Tables 6-4, 6-5, 6-7, and 6-8.

For surficial soils, there were no volatile organic compounds detected in exceedance of the clean-up objectives as stated in NYSDEC TAGM #4046. Additionally, Benzo(a)pyrene was the only semi-volatile organic compound was detected in exceedance of sediment clean-up objectives. This condition occurred at both on-site and background (off-site) surface soil sampling locations. Total metals results for the surface soil samples indicated levels of most constituents at or less than concentrations exhibited by the background samples, or below their respective clean-up objective (TAGM #4046). The exceptions to this were antimony, calcium, lead and sodium, for which the clean-up objective is based on site background conditions. Of these, all were observed to be within the range of background soil concentrations recorded for the Eastern United States as stated in NYSDEC TAGM #4046. The PCB results for the surface soil samples identified one Aroclor (1260) at a concentration of 92 ppb (parts per billion), below the NYSDEC clean-up objective of 1000 ppb (TAGM #4046). Finally, radiochemistry values for surficial soil samples collected within the limits of waste indicated levels which were within acceptable ranges of health indices. These results, therefore, indicate that the surficial soil media (and the site contaminants present therein) does not meet the initial criteria to be considered as a possible risk to human health.

For groundwater, two volatile organic compounds were identified in exceedance of their respective groundwater standards. This condition was present at only one location. Only two semi-volatile organic compounds were consistently present at nearly every location sampled. However, none were detected in exceedance of applicable groundwater standards. Several metals were detected in exceedance of water quality standards or guidance values. While several appear to be elevated as a result of a mild leachate impact, others are naturally elevated as evidenced by elevated background concentrations. Since only total metals were analyzed for, there is a potential that a portion of the total

metals value represents metals which were introduced to the sample along with unfiltered sediment. There were no PCBs detected in the groundwater at any of the sampling locations.

The overall appearance of the groundwater reveals very mild impacts which are likely attributable to the landfill; thereby satisfying the first criteria in creating a potential risk pathway. However, there are no private or municipal water supply wells located downgradient from, and within close proximity to the landfill that would satisfy the receptor criteria. Although the aquifer beneath the landfill eventually becomes part of the Coming Aquifer, which provides municipal water to a number of communities in the area, the concentrations of landfill contaminants present in the groundwater at the site are not elevated enough to survive the attenuation effects received upon entering this larger groundwater regime. In addition, the absence of volatile organic compounds and significantly lower inorganic constituent concentrations at MW-7, suggests that any impacts to the site groundwater do not persist for any great distance downgradient from the site's impacted area. Therefore, from a groundwater standpoint, this media does not satisfy the receptor criteria, and as a result, does not carry an associated human health risk.

There were no significant concentrations of volatile organic vapors or landfill gases measured during the Remedial Investigation which would create an inhalation exposure hazard. Additionally, the low concentrations of VOCs and SVOCs, detected in the surface soil samples would not have the capability of creating such a hazard. As a result, there is no contaminant inhalation exposure pathway present at the landfill.

The objective of this qualitative human health risk evaluation was to identify contaminants in the site media which are present at concentrations exceeding allowable standards or guidance values, and to determine if receptors are present which could complete an exposure pathway to the identified site contaminants. The results of this evaluation determined that the site's surface soils exhibit contaminant concentrations below acceptable clean-up standards or are within the range of background soil conditions. Additionally, radiochemical data indicates that the level of radioactivity is generally within observed background conditions, and do not exceed acceptable ranges for carcinogenic risks. For surface soils, the observed contaminant concentrations do not satisfy the initial criteria and, therefore,

do not represent a human health risk. While there are a few volatile organic compounds present in the groundwater at one location in excess of standards, there are no groundwater receptors within close proximity to the landfill, and within the same flow regime, to satisfy and complete an exposure pathway for this media. Therefore, groundwater does not represent a human health risk. Finally, an exposure pathway for the inhalation of volatile organic vapors or landfill gases was deemed incomplete due to limited concentrations of these contaminants in air.

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9.0 REMEDIAL INVESTIGATION SUMMARY

The Erwin Town Landfill is listed as a Class 2 site on the New York State Department of Environmental Conservation (NYSDEC) Registry of Inactive Hazardous Waste Disposal Sites (Site Number 8-51-003). The site was added to the NYS Registry in response to knowledge that hazardous waste materials had been disposed of at the site.

A Remedial Investigation (RI) was conducted at the landfill site in accordance with the RI Work Plan (Barton & Loguidice, 2000). The following lists the site activities performed as part of this work and the findings associated with each work item:

- A limits of waste delineation was performed through a series of test pit/trenches completed around the perimeter of the waste. This investigation revealed the presence of a soil berm, extending most of the way around the perimeter of waste. The berm had apparently been constructed prior to the disposal of waste. The test pits also confirmed the presence of an initial layer of foundry sand, onto which the waste was placed.
- A combustible gas survey was completed around the entire limits of waste to investigate the potential for landfill derived gases to be migrating within the subsurface and away from the landfill. There were no significant levels of combustible gases identified within the subsurface at the site.
- A full-coverage walk-over radioactivity survey was completed utilizing a series of concentric circles over the entire landfill surface to investigate the possible presence of radioactive emissions from the landfill. Elevated radioactivity readings at four locations resulted in the sampling of surface soils for detailed radiochemistry analysis. Analytical results indicated comparative risks within acceptable ranges associated with cancer development scenarios.
- Two new groundwater monitoring wells were installed to fill in gaps in the network of environmental monitoring locations in order to evaluate water quality conditions around the entire landfill perimeter.
- In-situ rising head hydraulic conductivity tests were performed at each existing and new monitoring well location. Test results indicated a moderately transmissive media underlying the site. These results are consistent with the types of geologic materials encountered at the site.

- Surface soil samples were collected from two locations at the perimeter of the landfill; one in the drainage channel between the western perimeter and the flood levee, the other at the northeast corner of the waste limits. The latter sample was collected to verify PCB concentrations identified during previous investigations. Two additional samples were collected within background areas of the site. The results of the limited sampling program identified areas which had been impacted by landfill leachate, although not at significant enough concentrations to create a significant exposure pathway. The surface soils at the site do not represent a media of concern warranting remediation.
- Groundwater samples were collected from each existing and the two new monitoring wells on site. Minor exceedances of NYSDEC standards and guidance values indicated a slight impact from landfill leachate. However, the location of the landfill and the absence of private water supply sources imply that the impacts are not significant enough to complete an exposure pathway or warrant the implementation of a groundwater remediation program.
- The Fish and Wildlife Impact Analysis indicated no observable impacts attributable to the landfill.
- The Qualitative Human Health Risk Evaluation determined that the contaminant concentrations in the surface soils were below that which would establish an exposure risk. This assessment further concluded that the groundwater pathway could not be completed since there were no municipal or private water supply wells that would intercept groundwater migrating away from the landfill. Finally, it was determined that the low concentrations of volatile and semi-volatile organic compounds in the soil and groundwater were insufficient to generate an inhalation exposure pathway.
- It is further recommended that the Feasibility Study for this site be completed at this time based upon the limited environmental concerns identified by this Remedial Investigation.

Total Depth of Hole (feet BGS): 22.0

Ground Elevation (feet above MSL): 939.05

Inner Casing Stick-Up (feet above GS): 2.08

Groundwater Depth (feet BGS):

Date Of Water Level Meas.: 14 NOV 1993

Water Level: 15.37

ground surface (gs)

0.0–2.0' SILT: tan, little fine sand, trace coarse to medium sand, trace clay, moist. SS-1 6 6 11 14 2.0 0/0

No sample.

3

4

5

5.0–7.0' SAND: tan, medium to fine grained, some fine to coarse gravel, little coarse sand, trace silt, moist. SS-2 3 6 12 11 1.5 0/3.5

6

BENTONITE SEAL

7

No sample.

8

9

10

10.0–12.0' GRAVEL and SAND: tan to brown, gravel is fine to medium grained, sand is fine to coarse grained, little silt, wet. SS-3 6 3 5 2 0.5 0/8

11

SAND PACK

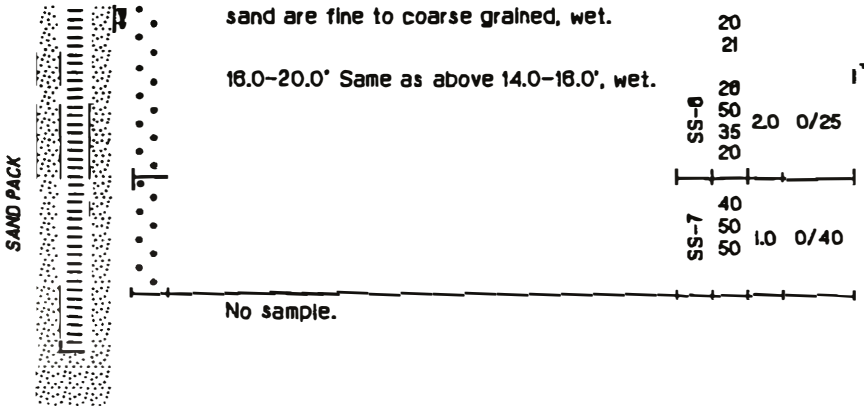
12

12.0–14.0' GRAVEL and SAND: tan to dark brown, gravel and sand are fine to coarse grained, trace silt, some cobbles coming up with augers, moist. SS-4 16 35 30 32 1.0 0/80

13

14.0–16.0' GRAVEL: tan to brown, with some sand, and little silt. Gravel and SS 8 10 1.0 0/4

14


SAND PACK
sand are fine to coarse grained, wet.
16.0–20.0' Same as above 14.0–16.0', wet.
No sample.
SS-6
20
21
20
50
35
20
2.0
0/25
SS-7
40
50
50
1.0
0/40
Collected sample from 14.0–16.0' BGS for grain-size analysis.
Collected sample from 16.0–18.0' BGS for full TCL analysis.
2-inch ID PVC screen, with 0.010-inch slot set from 11.0–21.0' BGS. Sandpack (#0) from 10.0–22.0' BGS. Bentonite seal from 8.0–10.0' BGS. Grout from 10.0' BGS to grade. Five foot length of 4-inch locked steel protective casing (Master lock #3252).

APPENDIX A

APPENDIX A

DATA VALIDATION CHECKLISTS

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Data Validation Checklist - Part A: VOA Analyses

		YES	NO	N/A
1.0	**Traffic Reports and Laboratory Narrative**			
1.1	Are the traffic Report Forms present for all samples?	X		
1.2	Do the Traffic Reports or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	
2.0	**Holding Times**			
2.1	Have any VOA technical holding times, determined from date of collection to date of analysis, been exceeded?		X	
3.0	**System Monitoring Compound (SMC) Recovery (Form II)**			
3.1	Are the VOA SMC Recovery Summaries (FORM II) present for each of the following matrices:			
	a. Low Water	X		
	b. Low Soil	X		
	c. Med Soil			X
3.2	Are all the VOA samples listed on the appropriate System Monitoring Compound Recovery Summary for each of the following matrices:			
	a. Low Water	X		
	b. Low Soil	X		
	c. Med Soil			X
3.3	Were outliers marked correctly with an asterisk?	X		
3.4	Was one or more VOA system monitoring compound recovery outside of contract specifications for any sample or method blank?	X		
	If yes, were samples re-analyzed?	X		
	Were method blanks re-analyzed?			X
3.5	Are there any transcription/calculation errors between raw data and Form II?		X	
4.0	**Matrix Spikes (Form III)**			
4.1	Is the Matrix Spike/Matrix Spike Duplicate Recovery Form (Form III) present?	X		
4.2	Were matrix spikes analyzed at the required frequency for each of the following matrices?	X		
	a. Low Water	X		
	b. Low Soil	X		

Data Validation Checklist - Part A: VOA Analyses

		YES	NO	N/A
	c. Med Soil			X
4.3	How many VOA spike recoveries are outside QC limits? Water 0 out of 20 Soils 1 out of 10			
4.4	How many RPD's for matrix spike and matrix spike duplicate recoveries are outside QC limits? Water 5 out of 10 Soils 1 out of 5			
5.0	**Blanks (Form IV)**			
5.1	Is the Method Blank Summary (Form IV) present?	X		
5.2	Frequency of Analysis: for the analysis of VOA TCL compounds, has a reagent/method blank been analyzed for each SDG or every 20 samples of similar matrix (low water, low soil, medium soil), whichever is more frequent?	X		
5.3	Has a VOA method/instrument blank been analyzed at least once every twelve hours for each concentration level and GC/MS system used?	X		
5.4	Is the chromatographic performance (baseline stability) for each instrument acceptable for VOAs?	X		
6.0	**Contamination**			
6.1	Do any method/instrument/reagent blanks have positive results (TCL and/or TIC) for VOAs?		X	
6.2	Do any field/trip/rinse blanks have positive VOA results (TCL and/or TIC)?		X	
6.3	Are there field/rinse/equipment blanks associated with every sample?	X		
7.0	**GC/MS Instrument Performance Check (Form V)**			
7.1	Are the GC/MS Instrument Performance Check Forms (Form V) present for Bromofluorobenzene (BFB)?	X		
7.2	Are the enhanced bar graph spectrum and mass/charge (m/z) listing for the BFB provided for each twelve hour shift?	X		
7.3	Has an instrument performance compound been analyzed for every twelve hours of sample analysis per instrument?	X		
7.4	Have the ion abundances been normalized to m/z 95?	X		
7.5	Have the ion abundance criteria been met for each instrument used?	X		
7.6	Are there any transcription/calculation errors between mass lists and Form V's?		X	
7.7	Have the appropriate number of significant figures (two) been reported?	X		
7.8	Are the spectra of the mass calibration compound acceptable?	X		

Data Validation Checklist - Part A: VOA Analyses

		YES	NO	N/A
8.0	**Target Compound List (TCL) Analytes**			
8.1	Are the Organic Analysis Data Sheets (Form I VOA) present with required header information on each page, for each of the following:			
	a. Sample and/or fractions as appropriate?	X		
	b. Matrix spikes and matrix spike duplicates?	X		
	c. Blanks?	X		
8.2	Are the VOA Reconstructed Ion Chromatograms, the mass spectra for the identified compounds, and the data system printouts (Quant Reports) included in the sample package for each of the following?			
	a. Samples and/or fractions as appropriate?	X		
	b. Matrix spikes and matrix spike duplicates (Mass spectra not required)?	X		
	c. Blanks?	X		
8.3	Are the response factors shown in the Quant Report?	X		
8.4	Is the chromatographic performance acceptable with respect to:			
	Baseline stability?	X		
	Resolution?	X		
	Peak shape?	X		
	Full-scale graph (attenuation)?	X		
	Other:_____			
8.5	Are the lab-generated standard mass spectra of the identified VOA compounds present for each sample?	X		
8.6	Is the RRT of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	X		
8.7	Are all ions in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	X		
8.8	Do sample and standard relative ion intensities agree within 20%?	X		
9.0	**Tentatively Identified Compounds (TIC)**			
9.1	Are all Tentatively Identified Compound Forms (Form I Part B) present; and do listed TICs include scan number or retention time, estimated concentration and "JN" qualifier?	X		
9.2	Are the mass spectra for the tentatively identified compounds and associated "best match" spectra included in the sample package for each of the following:			
	a. Samples and/or fractions as appropriate?	X		

Data Validation Checklist - Part A: VOA Analyses

		YES	NO	N/A
	b. Blanks?	X		
9.3	Are any TCL compounds (from any fraction) listed as TIC compounds?		X	
9.4	Are all ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample mass spectrum?	X		
9.5	Do TIC and "best match" standard relative ion intensities agree within 20%?	X		
10.0	**Compound Quantitation and Reported Detection Limits**			
10.1	Are there any transcription/calculation errors in Form I results?		X	
10.2	Are the CRQLs adjusted to reflect sample dilutions and, for soils, sample moisture?	X		
11.0	**Standards Data (GC/MS)**			
11.1	Are the Reconstructed Ion Chromatograms, and data system printouts present for initial and continuing calibration?	X		
12.0	**GC/MS Initial Calibration (Form VI)**			
12.1	Are the Initial Calibration Forms (Form VI) present and complete for the volatile fraction at concentrations of 10, 20, 50, 100, 200 ug/L? Are there separate calibrations for low/med soils and low soil samples?	X		
12.2	Were all low level soil standards, blanks, and samples analyzed by heated purge?	X		
12.3	Are the response factors stable for VOA's over the concentration range of the calibration (%Relative Standard Deviation (%RSD) <30%)		X	
12.4	Are the RRFs above 0.05?	X		
12.5	Are there any transcription/calculation errors in the reporting of average response factors (RRF) or %RSD?		X	
13.0	**GC/MS Continuing Calibration (Form VII)**			
13.1	Are the Continuing Calibration Forms (Form VII) present and complete for the volatile fraction?	X		
13.2	Has a continuing calibration standard been analyzed for every twelve hours of sample analysis per instrument?	X		
13.3	Do any volatile compounds have a %Difference (%D) between the initial and continuing RRF which exceeds the +/- 25% criteria?	X		
13.4	Do any volatile compounds have a RRF <0.05?		X	
13.5	Are there any transcription/calculation errors in the reporting of average response factor (RRF) or %difference (%D) between initial and continuing RRFs?		X	
14.0	**Internal Standard (Form VIII)**			
14.1	Are the internal standard areas (Form VIII) of every sample and blank within the upper and lower limits (-50% to +100%) for each continuing calibration?		X	

Data Validation Checklist - Part A: VOA Analyses

		YES	NO	N/A
14.2	Are the retention times of the internal standards within 30 seconds of the associated calibration standard?	X		
15.0	**Field Duplicates**			
15.1	Were any field duplicates submitted for VOA analysis?	X		

Data Validation Checklist - Part B: BNA Analyses

		YES	NO	N/A
1.0	**Traffic Reports and Laboratory Narrative**			
1.1	Are the traffic Report Forms present for all samples?	X		
1.2	Do the Traffic Reports or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	
2.0	**Holding Times**			
2.1	Have any BNA technical holding times, determined from date of collection to date of extraction, been exceeded?		X	
3.0	**System Monitoring Compound (SMC) Recovery (Form II)**			
3.1	Are the BNA Surrogate Recovery Summaries (FORM II) present for each of the following matrices:			
	a. Low Water	X		
	b. Low Soil	X		
	c. Med Soil			X
3.2	Are all the BNA samples listed on the appropriate System Monitoring Compound Recovery Summary for each of the following matrices:			
	a. Low Water	X		
	b. Low Soil	X		
	c. Med Soil			X
3.3	Were outliers marked correctly with an asterisk?			X
3.4	Were two or more base neutral or acid surrogate compound recoveries out of specification for any sample or method blank?		X	
	If yes, were samples re-analyzed?			X
	Were method blanks re-analyzed?			X
3.5	Are there any transcription/calculation errors between raw data and Form II?		X	
4.0	**Matrix Spikes (Form III)**			
4.1	Is the Matrix Spike/Matrix Spike Duplicate Recovery Form (Form III) present?	X		
4.2	Were matrix spikes analyzed at the required frequency for each of the following matrices?	X		
	a. Low Water	X		
	b. Low Soil	X		

Data Validation Checklist - Part B: BNA Analyses

		YES	NO	N/A
	c. Med Soil			X
4.3	How many BNA spike recoveries are outside QC limits?			
	Water ___0___ out of 22 Soils ___0___ out of 22			
4.4	How many RPD's for matrix spike and matrix spike duplicate recoveries are outside QC limits?			
	Water ___0___ out of 11 Soils ___0___ out of 11			
5.0	**Blanks (Form IV)**			
5.1	Is the Method Blank Summary (Form IV) present?	X		
5.2	Frequency of Analysis: Has a reagent/method blank analysis been reported per 20 samples of a similar matrix, or concentration level, for each extraction batch?	X		
5.3	Has a BNA method blank been analyzed for each GC/MS system used?	X		
5.4	Is the chromatographic performance (baseline stability) for each instrument acceptable for BNAs?	X		
6.0	**Contamination**			
6.1	Do any method/instrument/reagent blanks have positive results (TCL and/or TIC) for BNAs?		X	
6.2	Do any field/rinse blanks have positive BNA results (TCL and/or TIC)?	X		
6.3	Are there field/rinse/equipment blanks associated with every sample?	X		
7.0	**GC/MS Instrument Performance Check (Form V)**			
7.1	Are the GC/MS Instrument Performance Check Forms (Form V) present for Decafluorotriphenylphosphine (DFTPP)?	X		
7.2	Are the enhanced bar graph spectrum and mass/charge (m/z) listing for the DFTPP provided for each twelve hour shift?	X		
7.3	Has an instrument performance check solution been analyzed for every twelve hours of sample analysis per instrument?	X		
7.4	Have the ion abundances been normalized to m/z 198?	X		
7.5	Have the ion abundance criteria been met for each instrument used?	X		
7.6	Are there any transcription/calculation errors between mass lists and Form V's?		X	
7.7	Have the appropriate number of significant figures (two) been reported?	X		
7.8	Are the spectra of the mass calibration compound acceptable?	X		

Data Validation Checklist - Part B: BNA Analyses

		YES	NO	N/A
8.0	**Target Compound List (TCL) Analytes**			
8.1	Are the Organic Analysis Data Sheets (Form I BNA) present with required header information on each page, for each of the following:			
	a. Sample and/or fractions as appropriate?	X		
	b. Matrix spikes and matrix spike duplicates?	X		
	c. Blanks?	X		
8.2	Has GPC cleanup been performed on all soil/sediment sample extracts?			X
8.3	Are the BNA Reconstructed Ion Chromatograms, the mass spectra for the identified compounds, and the data system printouts (Quant Reports) included in the sample package for each of the following?			
	a. Samples and/or fractions as appropriate?	X		
	b. Matrix spikes and matrix spike duplicates (Mass spectra not required)?	X		
	c. Blanks?	X		
8.4	Are the response factors shown in the Quant Report?	X		
8.5	Is the chromatographic performance acceptable with respect to:			
	Baseline stability?	X		
	Resolution?	X		
	Peak shape?	X		
	Full-scale graph (attenuation)?	X		
	Other:_____			
8.6	Are the lab-generated standard mass spectra of identified BNA compounds present for each sample?	X		
8.7	Is the RRT of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	X		
8.8	Are all ions in the standard mass spectrum at a relative intensity greater than 10% also present in the sample mass spectrum?	X		
8.9	Do sample and standard relative ion intensities agree within 20%?	X		
9.0	**Tentatively Identified Compounds (TIC)**			
9.1	Are all Tentatively Identified Compound Forms (Form I, Part B) present; and do listed TICs include scan number or retention time, estimated concentration and "JN" qualifier?	X		

Data Validation Checklist - Part B: BNA Analyses

		YES	NO	N/A
9.2	Are the mass spectra for the tentatively identified compounds and associated "best match" spectra included in the sample package for each of the following:			
	a. Samples and/or fractions as appropriate?	X		
	b. Blanks?	X		
9.3	Are any TCL compounds (from any fraction) listed as TIC compounds?		X	
9.4	Are all ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample mass spectrum?	X		
9.5	Do TIC and "best match" standard relative ion intensities agree within 20%?	X		
10.0	**Compound Quantitation and Reported Detection Limits**			
10.1	Are there any transcription/calculation errors in Form I results?		X	
10.2	Are the CRQLs adjusted to reflect sample dilutions and, for soils, sample moisture?	X		
11.0	**Standards Data (GC/MS)**			
11.1	Are the Reconstructed Ion Chromatograms, and data system printouts present for initial and continuing calibration?	X		
12.0	**GC/MS Initial Calibration (Form VI)**			
12.1	Are the Initial Calibration Forms (Form VI) present and complete for the BNA fraction ?	X		
12.2	Are response factors stable for BNA's over the concentration range of the calibration (%Relative Standard Deviation (%RSD) <30%)		X	
12.3	Are all BNA compound RRFs > 0.05?	X		
12.4	Are there any transcription/calculation errors in the reporting of average response factors (RRF) or %RSD?		X	
13.0	**GC/MS Continuing Calibration (Form VII)**			
13.1	Are the Continuing Calibration Forms (Form VII) present and complete for the BNA fraction?	X		
13.2	Has a continuing calibration standard been analyzed for every twelve hours of sample analysis per instrument?	X		
13.3	Do any semivolatile compounds have a %Difference (%D) between the initial and continuing RRF which exceeds the +/- 25% criteria?	X		
13.4	Do any semivolatile compounds have a RRF <0.05?		X	
13.5	Are there any transcription/calculation errors in the reporting of average response factor (RRF) or %difference (%D) between initial and continuing RRFs?		X	
14.0	**Internal Standard (Form VIII)**			

Data Validation Checklist - Part B: BNA Analyses

		YES	NO	N/A
14.1	Are the internal standard areas (Form VIII) of every sample and blank within the upper and lower limits (-50% to +100%) for each continuing calibration?		X	
14.2	Are the retention times of the internal standards within 30 seconds of the associated calibration standard?	X		
15.0	**Field Duplicates**			
15.1	Were any field duplicates submitted for BNA analysis?	X		

Data Validation Checklist - Part C: Herbicide and Pesticide/PCB Analysis

		YES	NO	N/A
1.0	**Traffic Reports and Laboratory Narrative**			
1.1	Are the traffic Report Forms present for all samples?	X		
1.2	Do the Traffic Reports or SDG Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	
2.0	**Holding Times**			
2.1	Have any PEST/PCB technical holding times, determined from date of collection to date of extraction, been exceeded?		X	
3.0	**System Monitoring Compound (SMC) Recovery (Form II)**			
3.1	Are the PEST/PCB Surrogate Recovery Summaries (FORM II) present for each of the following matrices:			
	a. Low Water	X		
	b. Soil	X		
3.2	Are all the PEST/PCB samples listed on the appropriate Surrogate Recovery Summary for each of the following matrices:			
	a. Low Water	X		
	b. Soil	X		
3.3	Were outliers marked correctly with an asterisk?			X
3.4	Were surrogate recoveries of TCX or DCB outside of the contract specification for any sample or method blank? (30-150%)		X	
3.5	Were surrogate retention times (RT) within the windows established during the initial 3-point analysis of Individual Standard Mixture A?	X		
3.6	Are there any transcription/calculation errors between raw data and Form II?		X	
4.0	**Matrix Spikes (Form III)**			
4.1	Is the Matrix Spike/Matrix Spike Duplicate Recovery Form (Form III) present?	X		
4.2	Were matrix spikes analyzed at the required frequency for each of the following matrices?	X		
	a. Low Water	X		
	b. Soil	X		

4.3 How many PEST/PCB spike recoveries are outside QC limits?

Water __0__ out of 12 Soils __0__ out of 12

Data Validation Checklist - Part C: Herbicide and Pesticide/PCB Analysis

		YES	NO	N/A
4.4	How many RPD's for matrix spike and matrix spike duplicate recoveries are outside QC limits? Water ___0___ out of 6 Soils ___0___ out of 6			
5.0	**Blanks (Form IV)**			
5.1	Is the Method Blank Summary (Form IV) present?	X		
5.2	Frequency of Analysis: For the analysis of Pesticide/PCB TCL compounds, has a reagent/method blank been analyzed for each SDG or every 20 samples of similar matrix or concentration or each extraction batch, whichever is more frequent?	X		
5.3	Has a PEST/PCB instrument blank been analyzed at the beginning of every 12 hr. period following the initial calibration sequence?	X		
5.4	Is the chromatographic performance (baseline stability) for each instrument acceptable for PEST/PCBs?	X		
6.0	**Contamination**			
6.1	Do any method/instrument/reagent blanks have positive results PEST/PCBs?		X	
6.2	Do any field/rinse blanks have positive PEST/PCB results?		X	
6.3	Are there field/rinse/equipment blanks associated with every sample?	X		
7.0	**Calibration and GC Performance**			
7.1	Are the following Gas Chromatograms and Data Systems Printouts for both columns present for all samples, blanks, MS/MSD?			
	a. Peak resolution check			X
	b. Performance evaluation mixtures			X
	c. Aroclor 1016/1260	X		
	d. Aroclors 1221, 1232, 1242, 1248, 1254	X		
	e. Toxaphene			X
	f. Low points individual mixtures A & B			X
	g. Med points individual mixtures A & B			X
	h. High points individual mixtures A & B			X
	I. Instrument blanks	X		
7.2	Are Forms VI - PEST 1-4 present and complete for each column and each analytical sequence?	X		
7.3	Are there any transcription/calculation errors between raw data and Forms VI?		X	

Data Validation Checklist - Part C: Herbicide and Pesticide/PCB Analysis

		YES	NO	N/A
7.4	Do all standard retention times, including each pesticide in each level of Individual Mixtures A & B, fall within the windows established during the initial calibration analytical sequence?	X		
7.5	Are the linearity criteria for the initial analyses of Individual Standards A & B within limits for both columns?	X		
7.6	Is the resolution between any two adjacent peaks in the Resolution Check Mixture > 60.0% for both columns?			X
7.7	Is Form VII - Pest-1 present and complete for each Performance Evaluation Mixture analyzed during the analytical sequence for both columns?			X
7.8	Has the individual %breakdown exceeded 20.0% on either column.			X
	- for 4,4' - DDT?			X
	- for endrin?			X
	Has the combined %breakdown for 4,4' - DDT/Endrin exceeded 30.0% on either column?			X
7.9	Are the relative percent difference (RPD) values for all PEM analytes <25.0%?			X
7.10	Have all samples been injected within a 12 hr. Period beginning with the injection of an Instrument Blank?	X		
7.11	Is Form VII - Pest-2 present and complete for each INDA and INDB Verification Calibration analyzed?	X		
7.12	Are there any transcription/calculation errors between raw data and Form VII - Pest-2?		X	
7.13	Do all standard retention times for each INDA and INDB Verification Calibration fall within the windows established by the initial calibration sequence?	X		
7.14	Are the RPD values for all verification calibration standard compounds <25.0%?	X		
8.0	**Analytical Sequence Check (Form VIII-PEST)**			
8.1	Is Form VIII present and complete for each column and each period of analyses?	X		
8.2	Was the proper analytical sequence followed for each initial calibration and subsequent analyses?	X		
9.0	**Cleanup Efficiency Verification (Form IX)**			
9.1	Is Form IX - Pest-1 present and complete for each lot of Florisil Cartridges used?			X
9.2	Are all samples listed on the Pesticide Florisil Cartridge Check Form?			X
9.3	If GPC Cleanup was performed, is Form IX - Pest-2 present?			X
9.4	Are percent recoveries (%R) of the pesticide and surrogate compounds used to check the efficiency of the cleanup procedures within QC limits:			
	80-120% for florisil cartridge check?			X

Data Validation Checklist - Part C: Herbicide and Pesticide/PCB Analysis

		YES	NO	N/A
	80-110% for GPC calibration?			X
10.0	**Pesticide/PCB Identification**			
10.1	Is Form X complete for every sample in which a pesticide or PCB was detected?	X		
10.2	Are there any transcription/calculation errors between raw data and Forms 6E, 6G, 7E, 7D, 8D, 9A, 9B, 10A?		X	
10.3	Are retention times (RT) of the sample compounds within the established windows for both analyses?	X		
10.4	Is the percent difference (%D) calculated for the positive sample results on the two GC columns < 25.0%?	X		
10.5	Check chromatograms for false negatives, especially the multiple peak compounds toxaphene and PCBs. Were there any false negatives?		X	
11.0	**Compound Quantitation and Reported Detection Limits**			
11.1	Are there any transcription/calculation errors in Form I results?		X	
11.2	Are the CRQLs adjusted to reflect sample dilutions and, for soils, %moisture?	X		
12.0	**Chromatogram Quality**			
12.1	Were baselines stable?	X		
12.2	Were any electropositive displacement (negative peaks) or unusual peaks seen?		X	
13.0	**Field Duplicates**			
13.1	Were any field duplicates submitted for PEST/PCB analysis?	X		

Data Validation Checklist - Part D: Metals Analyses

		YES	NO	N/A
1.0	**Form I to IX**			
1.1	Are all the Form I through Form IX labeled with:			
	Laboratory Name?	X		
	Case/SAS No.?			X
	EPA sample No.?			X
	SDG No.?	X		
	Contract No.?	X		
	Correct units?	X		
	Matrix?	X		
1.2	Do any computer/transcription errors exceed 10% of reported values on Forms I-IX for:		X	
	A. All analytes analyzed by ICP?		X	
	B. All analytes analyzed by GFAA?			X
	C. All analytes analyzed by AA Flame?			X
	D. Mercury?		X	
	E. Cyanide?		X	
2.0	**Raw Data**			
2.1	Digestion Log for flame AA/ICP (Form XIII) present?	X		
2.2	Digestion Log for furnace AA (Form XIII) present?			X
2.3	Distillation Log for mercury (Form XIII) present?	X		
2.4	Distillation Log for cyanides (Form XIII) present?	X		
2.5	Are pH values (pH<2 for all metals, pH>12 for cyanide) present?	X		
2.6	Percent solids calculation dates present on sample preparation logs/bench sheets?	X		
2.7	Are preparation dates present on sample preparation logs/bench sheets?	X		
2.8	Measurement read out record present?			
	A. ICP	X		
	B. Flame AA			X
	C. Furnace AA			X
	D. Mercury	X		
	E. Cyanides	X		

Data Validation Checklist - Part D: Metals Analyses

		YES	NO	N/A
2.9	Are all raw data to support all sample analyses and QC operations present?	X		
3.0	**Holding Times**			
3.1	A. Mercury analysis (28 days) .....exceeded?		X	
	B. Cyanide distillation (14 days) .....exceeded?		X	
	C. Other Metals analysis (6 months) .....exceeded?		X	
3.2	Is pH of aqueous samples for:			
	A. Metals Analysis >2?		X	
	B. Cyanides Analysis <12?		X	
4.0	**Form I (Final Data)**			
4.1	Are all Forms I's present and complete?	X		
4.2	Are correct units (ug/l for waters and mg/kg for soils) indicated on Form I's?	X		
4.3	Are soil sample results for each parameter corrected for percent solids?	X		
4.4	Are all "less than IDL" values properly coded with "U"?	X		
4.5	Are the correct concentration qualifiers used with final data?	X		
4.6	Are EPA sample #s and corresponding laboratory sample ID #s the same as on the Cover Page, Form I's and in the raw data?	X		
4.7	Was a brief physical description of samples given on Form I's?	X		
4.8	Was the dilution of any sample diluted beyond the requirements of the contract noted on Form I or Form XIV?		X	
5.0	**Calibration**			
5.1	Is record of at least 2 point calibration present for ICP analysis?	X		
5.2	Is record of 5 point calibration present for Hg analysis?	X		
5.3	Is record of 4 point calibration present for:			
	Flame AA?			X
	Furnace AA?			X
	Cyanides?	X		
5.4	Is one calibration standard at the CRDL level for all AA (except Hg) and cyanides analyses?	X		

Data Validation Checklist - Part D: Metals Analyses

		YES	NO	N/A
5.5	Is correlation coefficient less than 0.995 for:			
	Mercury Analysis?	X		
	Cyanide Analysis?	X		
	Atomic Absorption Analysis?			X
5.6	In the instance where less than 4 standards are measured in absorbance (or peak area, peak height, etc.) Mode, are remaining standards analyzed in concentration mode immediately after calibration within +/- 10% of the true values?			X
6.0	**Form II A (Initial and Continuing Calibration Verification)**			
6.1	Present and complete for every metal and cyanide?	X		
6.2	Present and complete for AA and ICP when both are used for the same analyte?			X
6.3	Are all calibration standards (initial and continuing) within control limits:			
	Metals - 90 - 110 %R	X		
	Hg - 80 - 120 %R	X		
	Cyanides - 85 - 115 %R	X		
6.4	Was continuing calibration performed every 10 samples or every 2 hours?	X		
6.5	Was ICV for cyanides distilled?	X		
7.0	**Form II B (CRDL Standards for AA and ICP)**			
7.1	Was a CRDL standard (CRA) analyzed after initial calibration for all AA metals (except Hg)?	X		
7.2	Was a mid range calibration verification standard distilled and analyzed foe cyanide analysis?	X		
7.3	Was a 2xCRDL (or 2xIDL when IDL>CRDL) analyzed (CRI) for each ICP run?	X		
7.4	Was CRI analyzed after ICV/ICB and before the final CCV/CCB, and twice every eight hours of ICP run?	X		
7.5	Are CRA and CRI standards within control limits: Metals 80 - 120 %R?	X		
7.6	Is mid-range standard within control limits: Cyanide 80 - 120 %R?	X		
8.0	**Form III (Initial and Continuing Calibration Blanks)**			
8.1	Present and complete?	X		
8.2	For both AA and ICP when both are used for the same analyte?			X
8.3	Was an initial calibration blank analyzed?	X		

Data Validation Checklist - Part D: Metals Analyses

		YES	NO	N/A
8.4	Was a continuing calibration blank analyzed after every 10 samples or every 2 hours (which ever is more frequent)?	X		
8.5	Are all calibration blanks (when IDL<CRDL) less than or equal to the Contract Required Detection Limits (CRDLs)?	X		
8.6	Are all calibration blanks less than two times Instrument Detection Limit (when IDL>CRDL)?			X
9.0	**Form III (Preparation Blank)**			
9.1	Was one preparation blank analyzed for:			
	each Sample Delivery Group?	X		
	each batch of digested samples?	X		
	each matrix type?	X		
	both AA and ICP when both are used for the same analyte?			X
9.2	Is concentration of preparation blank value greater than the CRDL when IDL is less than or equal to CRDL?		X	
9.3	If yes, is the concentration of the sample with the least concentrated analyte less than 10 times the preparation blank?			X
9.4	Is concentration of preparation blank value (Form III) less than two times IDL, when IDL is greater than CRDL?			X
9.5	Is concentration of preparation blank below the negative CRDL?		X	
10.0	**Form IV (Interference Check Sample)**			
10.1	Present and Complete?	X		
10.2	Are all Interference Check Sample results inside the control limits (+/- 20%)?	X		
10.3	If no, is concentration of Al, Ca, Fe, or Mg lower than the respective concentration in ICS?			X
11.0	**Form V A (Spiked Sample recovery - Pre-Digestion/Pre-Distillation**			
11.1	Present and complete for:			
	each SDG?	X		
	each matrix type?	X		
	each concentration range (i.e., low, medium, high)?	X		
	For both AA and ICP when both are used for the same analyte?			X
11.2	Was field blank used for spiked sample?		X	
11.3	Are all recoveries within control limits?		X	

Data Validation Checklist - Part D: Metals Analyses

		YES	NO	N/A
11.4	If no, is sample concentration greater than or equal to four times spike concentration?		X	
12.0	**Form VI (Lab Duplicates)**			
12.1	Present and complete for :			
	each SDG?	X		
	each matrix type?	X		
	each concentration range (i.e., low, medium, high)?	X		
	both AA and ICP when both are used for the same analyte?			X
12.2	Was field blank used for duplicate analysis?		X	
12.3	Are all values within control limits (RPD 20% or difference </= +/-CRDL)?	X		
12.4	If no, are all results outside the control limits flagged with an * on Form I's and VI?			X
13.0	**Field Duplicates**			
13.1	Were field duplicates analyzed?	X		
13.2	**Aqueous**			
	Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times CRDL?		X	
	Is any difference between sample and duplicate greater than CRDL where sample and/or duplicate is less than 5 times CRDL?		X	
13.3	**Soil/Sediment**			
	Is any RPD (where sample and duplicate are both greater than 5 times CRDL): >100%?		X	
	Is any difference between sample and duplicate (where sample and/or duplicate is less than 5x CRDL): >2x CRDL?		X	
14.0	**Form VII (Laboratory Control Sample)**			
14.1	Was one LCS prepared and analyzed for:			
	each SDG?	X		
	each batch samples digested/distilled?	X		
	both AA and ICP when both are used for the same analyte?			X
14.2	**Aqueous LCS**			
	Is any LCS recovery:			
	less than 50%?		X	
	between 50% and 79%?		X	

Data Validation Checklist - Part D: Metals Analyses

		YES	NO	N/A
	between 121% and 150%?		X	
	greater than 150%?		X	
14.3	**Solid LCS**			
	Is LCS "Found" value higher than the control limits on Form VII?		X	
	Is LCS "Found" value lower than the control limits on Form VII?		X	
15.0	**Form IX (ICP Serial Dilution)**			
15.1	Was serial dilution analysis performed for:			
	each SDG?	X		
	each matrix type?	X		
	each concentration range (i.e., low, medium, high)?	X		
15.2	Was field blank(s) used for Serial Dilution Analysis?		X	
15.3	Are results outside control limit flagged with an "E" on Form I's and Form IX when initial concentration on Form IX is equal to 10 times IDL or greater?	X		
15.4	Are any %difference values:			
	>10%	X		
	>/=100%		X	
16.0	**Furnace Atomic Absorbtion (AA) QC Analysis**			
16.1	Are duplicate injections present in furnace raw data for each sample analyzed by GFAA?			X
16.2	Do the duplicate injection readings agree within 20% Relative Standard Deviation (RSD) or Coefficient of Variation (CV) for concentration greater than CRDL?			X
16.3	Was a dilution analyzed for sample with analytical spike recovery less than 40%?			X
16.4	Is analytical spike recovery outside the control limits (85 - 115%) for any sample?			X
17.0	**Form VIII (Method of Standard Addition Results)**			
17.1	Present?			X
17.2	If no, is any Form I result coded with "S" or a "+"?			X
17.3	Is coefficient of correlation for MSA less than 0.990 for any sample?			X
17.4	Was MSA required for any sample but not performed?			X
17.5	Is coefficient of correlation for MSA less than 0.995?			X
17.6	Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?			X

Data Validation Checklist - Part D: Metals Analyses

		YES	NO	N/A
17.7	Was proper Quantitation procedure followed correctly as outlined in the SOW on page E-23?			X
18.0	**Dissolved/Total or Inorganic/Total Analytes**			
18.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s)?		X	
18.2	Were any analyses performed for inorganic as well as total (organic and inorganic) analytes on the same sample(s)?	X		
18.3	Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 10%?			X
18.4	Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 50%?			X
19.0	**Form I (Field Blank)**			
19.1	Is field blank concentration less than CRDL (or 2 x IDL when IDL>CRDL) for all parameters of associated aqueous and soil samples?	X		
19.2	If no, was field blank value already rejected due to other QC criteria?			X
20.0	**Form X, XI, XII (Verification of Instrumental Parameters)**			
20.1	Is verification report present for:			
	Instrument Detection Limits (quarterly)?	X		
	ICP Interelement Correction Factors (annually)?	X		
	ICP Linear Ranges (quarterly)?	X		
21.0	**Form X (Instrument Detection Limits)**			
21.1	Are IDLs present for:			
	all the analytes?	X		
	all the instruments used?	X		
	For both AA and ICP when both are used for the same analyte?			X
21.2	Is IDL greater than CRDL for any analytes?		X	
21.3	If yes, is the concentration on Form I of the sample analyzed on the instrument whose IDL exceeds CRDL, greater than 5 x IDL?			X
22.0	**Form XI (Linear Ranges)**			
22.1	Was any sample result higher than the high linear range of ICP?		X	
22.2	Was any sample result higher than the highest calibration standard for non-ICP parameters?		X	

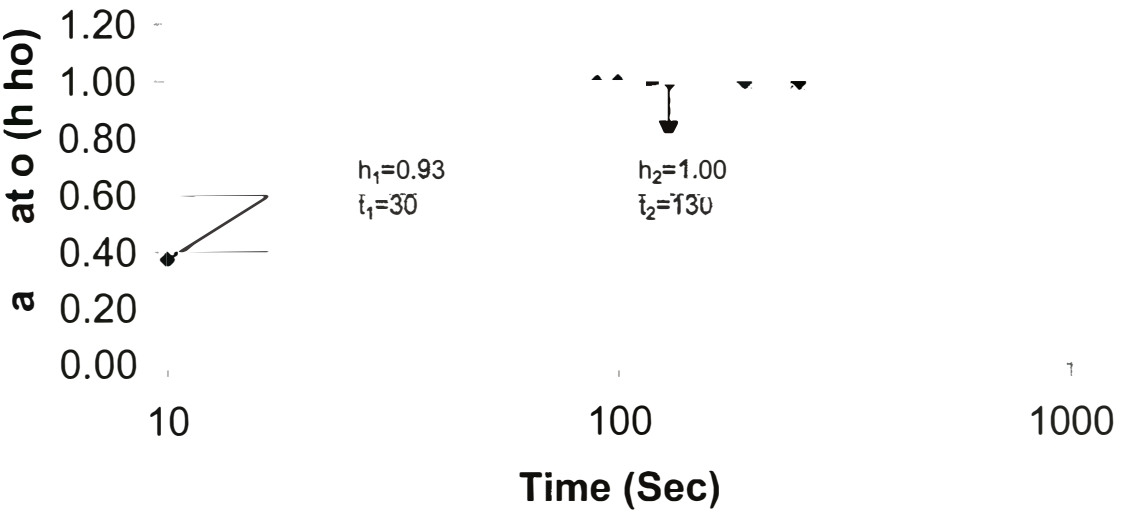
Data Validation Checklist - Part D: Metals Analyses

		YES	NO	N/A
22.3	If yes for any of the above, was the sample diluted to obtain the result on Form I?			X
23.0	**Percent Solids of Sediments**			
23.1	Are percent solids in sediment(s):			
	<50%?		X	
	<10%?		X	

APPENDIX D

HYDRAULIC CONDUCTIVITY TEST RESULTS

Erwin Town Landfill Remedial Investigation
Hydraulic Conductivity Test Results MW-1



Hydraulic Conductivity Calculation

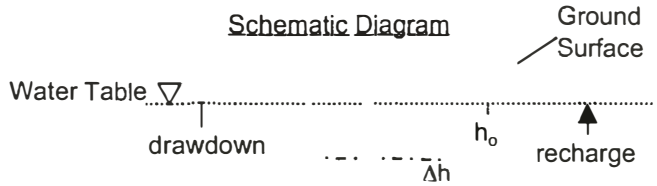
$$-K = \frac{r^2}{2L(t_2-t_1)} \ln(L/R) \times (h_1/h_2)$$

Where:

r = screen radius (cm) = 5.08
R = sand pack radius (cm)= 11.43
L = intake length (cm) = 335.3
t_1 = time interval corresponding to h_1 (sec) = 30
t_2 = time interval corresponding to h_2 (sec) = 130
h_1 = head ratio at t_1 ($\Delta h_{[t1]}/h_o$) = 0.93
h_2 = head ratio at t_2 ($\Delta h_{[t2]}/h_o$) = 1.00
K = hydraulic conductivity (cm/sec)

Note: Hydraulic conductivity calculation and schematic diagram from Cedergren, 1977.

Schematic Diagram



Calculation:

$$-K = \frac{25.81\text{cm}^2}{2(335.3\text{cm})(130\text{sec} - 30\text{sec})} \ln(335.3\text{cm}/\ 11.43\text{cm}) \times \ln(0.93/1.00)$$

K = 9.44E-05 cm/sec

MW- 1 Hydraulic Conductivity Summary

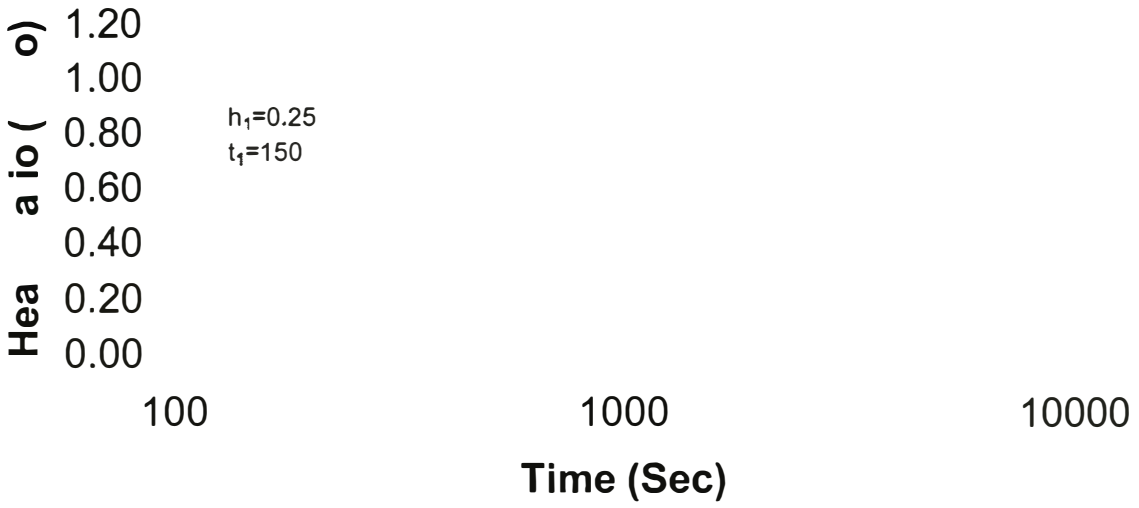
Static Water Level: 15.04' (Top of PVC Casing)

Test Start: 2:30 PM

Elapsed Time (Sec)	Water Level (Test #1)	Water Level (Test #2)
0	21.20	19.20
10	18.90	17.50
20	17.00	15.50
30	15.50	15.26
40	15.30	15.20
50	15.20	15.16
60	15.15	15.12
70	15.13	15.10
80	15.10	15.08
90	15.09	15.08
100	15.08	15.08
(1) 130	15.07	15.07
160	15.06	15.06
190	15.06	15.06
(2) 250	15.06	15.06

Notes: A change in elapsed time is indicated by a numerical value in (parentheses).

Erwin Town Landfill Remedial Investigation
Hydraulic Conductivity Test Results MW-2



Hydraulic Conductivity Calculation

$$-K = \frac{r^2}{2L(t_2-t_1)} \ln(L/R) \times (h_1/h_2)$$

Where:

r = screen radius (cm) = 5.08

R = sand pack radius (cm)= 11.43

L = intake length (cm) = 335.3

t_1 = time interval corresponding to h_1 (sec) = 150

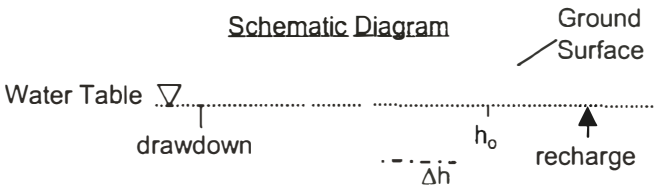
t_2 = time interval corresponding to h_2 (sec) = 1890

h_1 = head ratio at t_1 ($\Delta h_{[t1]}/h_o$) = 0.25

h_2 = head ratio at t_2 ($\Delta h_{[t2]}/h_o$) = 0.97

K = hydraulic conductivity (cm/sec)

Schematic Diagram



Note: Hydraulic conductivity calculation and schematic diagram from Cedergren, 1977.

Calculation:

$$-K = \frac{25.81\text{cm}^2}{2(335.3\text{cm})(1890\text{sec} - 150\text{sec})} \ln(335.3\text{cm}/\ 11.43\text{cm}) \times \ln(0.25/0.97)$$

K = 1.01E-04 cm/sec

MW- 2 Hydraulic Conductivity Summary

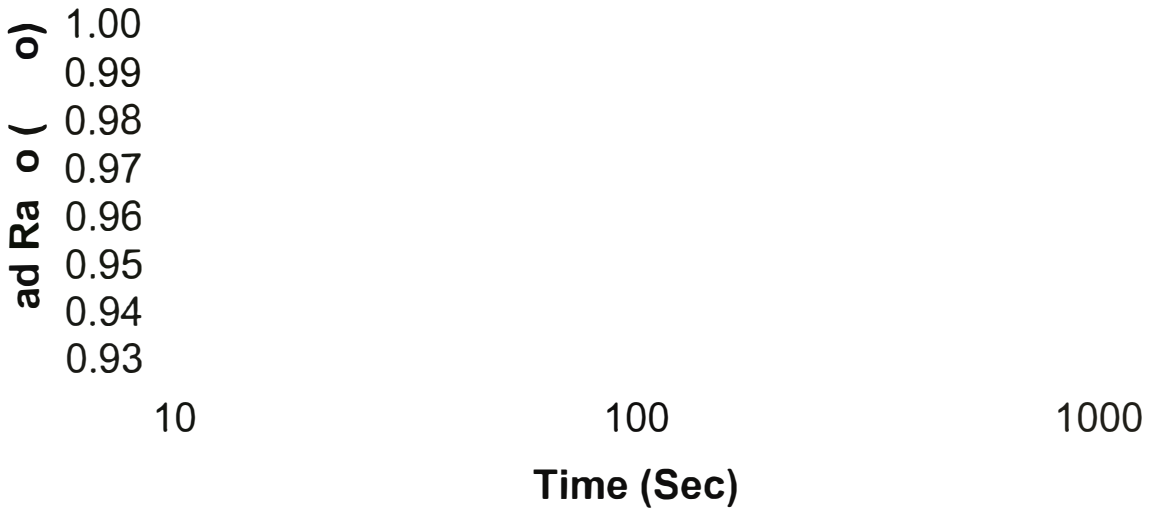
Static Water Level: 8.30' (Top of PVC Casing)

Test Start: 3:00 PM

Elapsed Time (Sec)	Water Level (Test #1)	Water Level (Test #2)
0	21.20	19.20
10	18.90	17.50
20	17.00	15.50
30	15.50	15.26
40	15.30	15.20
50	15.20	15.16
60	15.15	15.12
70	15.13	15.10
80	15.10	15.08
90	15.09	15.08
100	15.08	15.08
(1) 130	15.07	15.07
160	15.06	15.06
190	15.06	15.06
(2) 250	15.06	15.06

Notes: A change in elapsed time is indicated by a numerical value in (parentheses).

Erwin Town Landfill Remedial Investigation
Hydraulic Conductivity Test Results MW-4



Hydraulic Conductivity Calculation

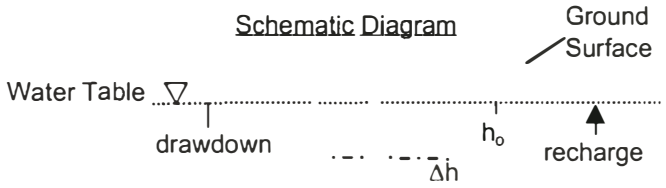
$$-K = \frac{r^2}{2L(t_2-t_1)} \ln(L/R) \times (h_1/h_2)$$

Where:

r = screen radius (cm) = 5.08
R = sand pack radius (cm) = 11.43
L = intake length (cm) = 335.3
t_1 = time interval corresponding to h_1 (sec) = 50
t_2 = time interval corresponding to h_2 (sec) = 340
h_1 = head ratio at t_1 ($\Delta h_{[t1]}/h_o$) = 0.96
h_2 = head ratio at t_2 ($\Delta h_{[t2]}/h_o$) = 0.99
K = hydraulic conductivity (cm/sec)

Note: Hydraulic conductivity calculation and schematic diagram from Cedergren, 1977.

Schematic Diagram



Calculation:

$$-K = \frac{25.81\,cm^2}{2(335.3cm)(340sec - 50sec)} \ln(335.3cm/\ 11.43cm) \times \ln(0.96/0.99)$$

K = 1.38E-05 cm/sec

MW- 4 Hydraulic Conductivity Summary

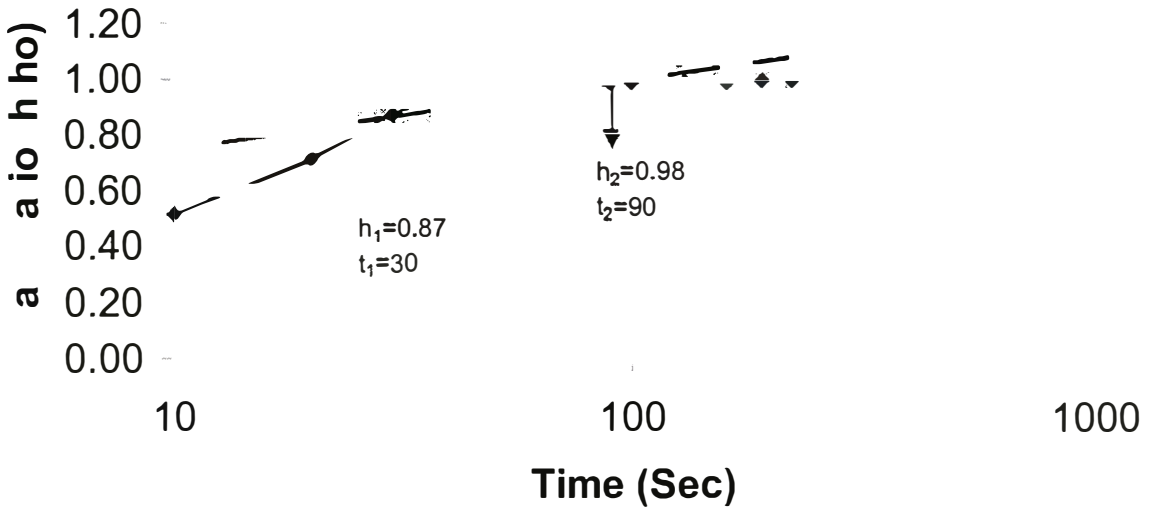
Static Water Level: 12.45' (Top of PVC Casing)

Test Start: 3:00 PM

Elapsed Time (Sec)	Water Level (Test #1)	Water Level (Test #2)
0	14.70	14.30
10	12.58	12.62
20	12.55	12.55
30	12.54	12.53
40	12.53	12.53
50	12.53	12.52
60	12.52	12.51
70	12.52	12.51
80	12.51	12.51
90	12.51	12.51
100	12.50	12.51
(1)130	12.50	12.50
160	12.49	12.50
190	12.49	12.50
220	12.48	12.50
(2)280	12.48	12.49
340	12.47	12.48
400	12.47	12.48
460	12.47	12.47

Notes: A change in elapsed time is indicated by a numerical value in (parentheses).

Erwin Town Landfill Remedial Investigation
Hydraulic Conductivity Test Results MW-5



Hydraulic Conductivity Calculation

$$-K = \frac{r^2}{2L(t_2-t_1)} \ln(L/R) \times (h_1/h_2)$$

Where:

r = screen radius (cm) = 5.08

R = sand pack radius (cm)= 11.43

L = intake length (cm) = 335.3

t_1 = time interval corresponding to h_1 (sec) = 30

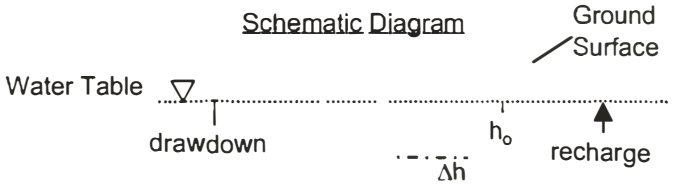
t_2 = time interval corresponding to h_2 (sec) = 90

h_1 = head ratio at t_1 ($\Delta h_{[t1]}/h_o$) = 0.87

h_2 = head ratio at t_2 ($\Delta h_{[t2]}/h_o$) = 0.98

K = hydraulic conductivity (cm/sec)

Schematic Diagram



Note: Hydraulic conductivity calculation and schematic diagram from Cedergren, 1977.

Calculation:

$$-K = \frac{25.81\,cm^2}{2(335.3cm)(90sec - 30sec)} \ln(335.3cm/\ 11.43cm) \times \ln(0.87/0.98)$$

K = 2.58E-04 cm/sec

MW- 5 Hydraulic Conductivity Summary

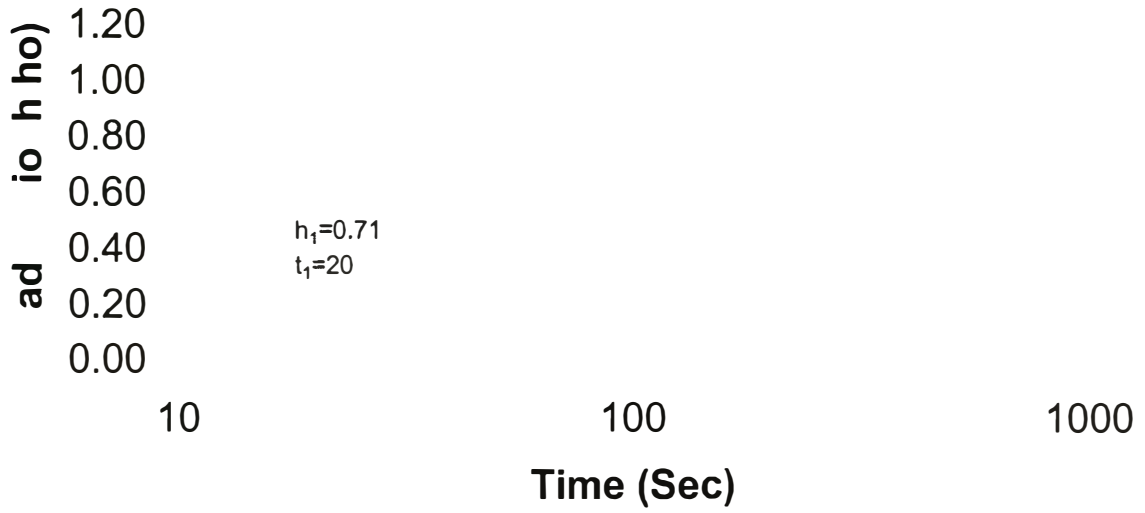
Static Water Level: 9.80' (Top of PVC Casing)

Test Start: 3:00 PM

Elapsed Time (Sec)	Water Level (Test #1)	Water Level (Test #2)
0	13.30	13.50
10	11.50	11.64
20	10.80	11.00
30	10.25	10.80
40	10.04	10.36
50	9.92	10.11
60	9.91	10.03
70	9.90	9.98
80	9.87	9.95
90	9.86	9.94
100	9.85	9.93
(1)130	9.84	9.90
160	9.84	9.86
190	9.82	9.85
220	9.81	9.84
(2)280	--	9.83
340	--	9.82
400	--	9.81
460	--	

Notes: A change in elapsed time is indicated by a numerical value in (parentheses).

Erwin Town Landfill Remedial Investigation
Hydraulic Conductivity Test Results MW-8



Hydraulic Conductivity Calculation

$$-K = \frac{r^2}{2L(t_2-t_1)} \ln(L/R) \times (h_1/h_2)$$

Where:

r = screen radius (cm) = 5.08

R = sand pack radius (cm)= 11.43

L = intake length (cm) = 335.3

t_1 = time interval corresponding to h_1 (sec) = 20

t_2 = time interval corresponding to h_2 (sec) = 80

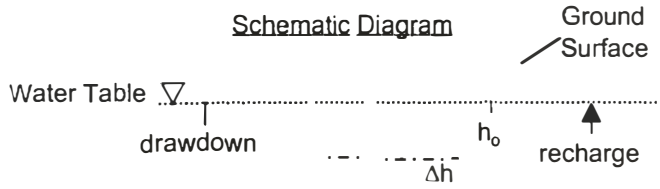
h_1 = head ratio at t_1 ($\Delta h_{[t1]}/h_o$) = 0.71

h_2 = head ratio at t_2 ($\Delta h_{[t2]}/h_o$) = 0.96

K = hydraulic conductivity (cm/sec)

Note: Hydraulic conductivity calculation and schematic diagram from Cedergren, 1977.

Schematic Diagram



Calculation:

$$-K = \frac{25.81 cm^2}{2(335.3cm)(80sec - 20sec)} \ln(335.3cm/11.43cm) \times \ln(0.71/0.96)$$

K = 6.54E-04 cm/sec

MW- 8 Hydraulic Conductivity Summary

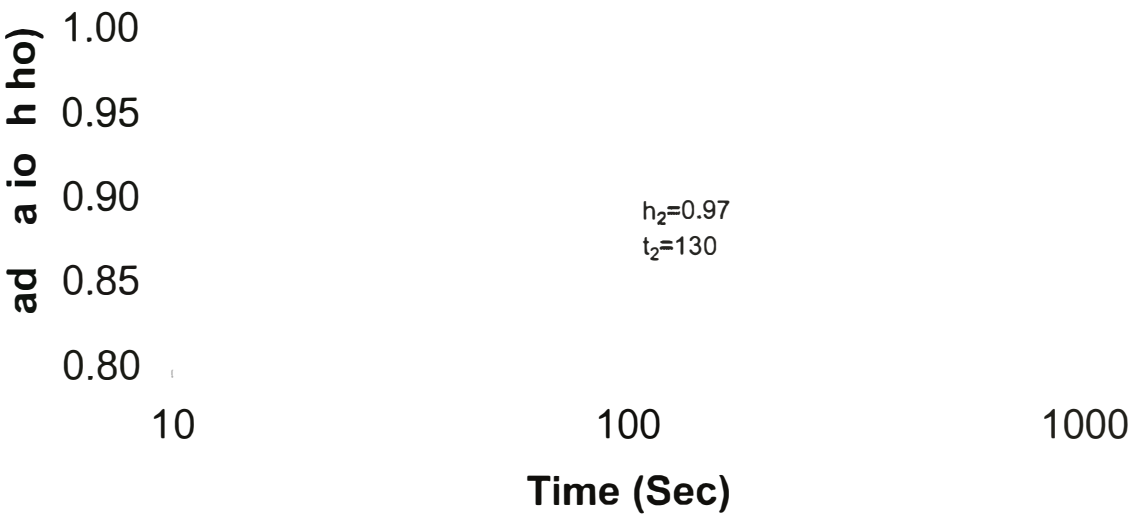
Static Water Level: 10.74' (Top of PVC Casing)

Test Start: 6:07 PM

Elapsed Time (Sec)	Water Level (Test #1)	Water Level (Test #2)
0	17.80	16.08
10	13.40	13.40
20	12.80	12.02
30	12.06	11.52
40	11.62	11.22
50	11.35	11.09
60	11.22	11.00
70	11.11	10.96
80	11.04	10.92
90	11.01	10.89
100	10.96	10.86
(1)130	10.92	10.84
160	10.86	10.83
190	10.83	10.80
220	10.83	10.80
(2)280	10.82	10.77
340	10.81	10.77
400	10.79	
460	10.78	

Notes: A change in elapsed time is indicated by a numerical value in (parentheses).

Erwin Town Landfill Remedial Investigation
Hydraulic Conductivity Test Results MW-9



Hydraulic Conductivity Calculation

$$-K = \frac{r^2}{2L(t_2-t_1)} \ln(L/R) \times (h_1/h_2)$$

Where:

r = screen radius (cm) = 5.08

R = sand pack radius (cm)= 11.43

L = intake length (cm) = 335.3

t_1 = time interval corresponding to h_1 (sec) = 30

t_2 = time interval corresponding to h_2 (sec) = 130

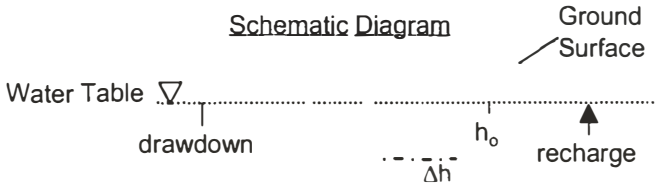
h_1 = head ratio at t_1 ($\Delta h_{[t1]}/h_o$) = 0.90

h_2 = head ratio at t_2 ($\Delta h_{[t2]}/h_o$) = 0.97

K = hydraulic conductivity (cm/sec)

Note: Hydraulic conductivity calculation and schematic diagram from Cedergren, 1977.

Schematic Diagram



Calculation:

$$-K = \frac{25.81\text{cm}^2}{2(335.3\text{cm})(130\text{sec} - 30\text{sec})} \ln(335.3\text{cm}/\ 11.43\text{cm}) \times \ln(0.90/0.97)$$

K = 9.74E-05 cm/sec

MW- 9 Hydraulic Conductivity Summary

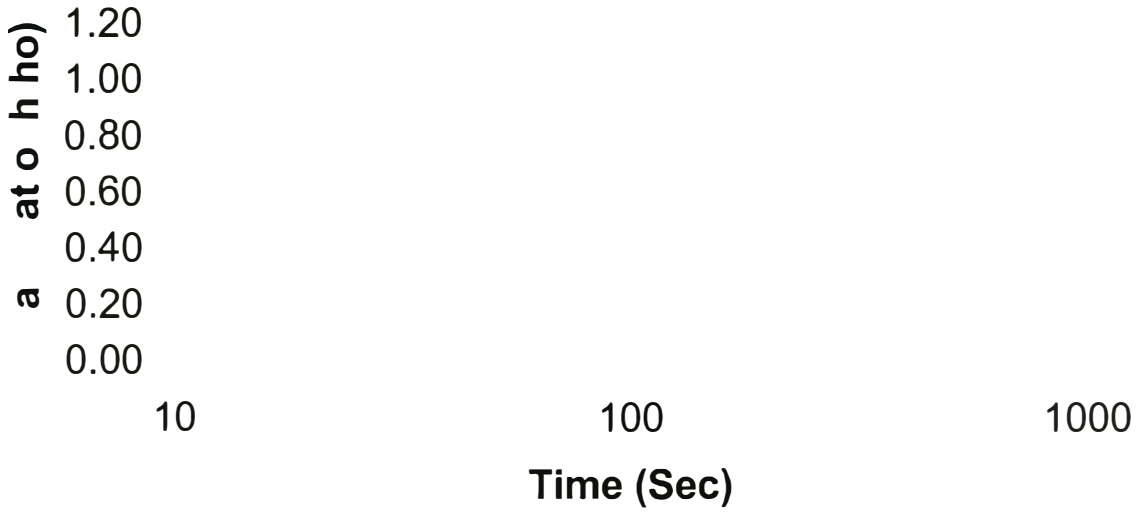
Static Water Level: 8.34' (Top of PVC Casing)

Test Start: 4:03 PM

Elapsed Time (Sec)	Water Level (Test #1)	Water Level (Test #2)
0	10.35	10.20
10	8.70	8.65
20	8.56	8.54
30	8.54	8.50
40	8.50	8.47
50	8.48	8.45
60	8.46	8.44
70	8.45	8.44
80	8.45	8.44
90	8.44	8.43
100	8.43	8.42
(1)130	8.41	8.41
160	8.41	8.40
190	8.41	8.40
(2)250	8.39	8.39
310	8.37	8.37

Notes: A change in elapsed time is indicated by a numerical value in (parentheses).

Erwin Town Landfill Remedial Investigation
Hydraulic Conductivity Test Results MW-A1



Hydraulic Conductivity Calculation

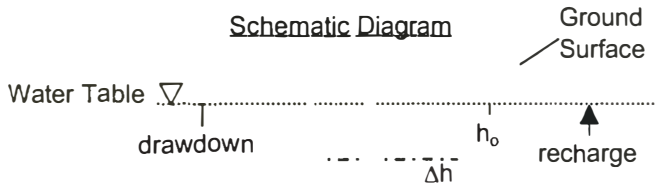
$$-K = \frac{r^2}{2L(t_2-t_1)} \ln(L/R) \times (h_1/h_2)$$

Where:

r = screen radius (cm) = 5.08
R = sand pack radius (cm)= 11.43
L = intake length (cm) = 335.3
t_1 = time interval corresponding to h_1 (sec) = 60
t_2 = time interval corresponding to h_2 (sec) = 150
h_1 = head ratio at t_1 ($\Delta h_{[t1]}/h_o$) = 0.62
h_2 = head ratio at t_2 ($\Delta h_{[t2]}/h_o$) = 0.91
K = hydraulic conductivity (cm/sec)

Note: Hydraulic conductivity calculation and schematic diagram from Cedergren, 1977.

Schematic Diagram



Calculation:

$$-K = \frac{25.81\text{cm}^2}{2(335.3\text{cm})(150\text{sec} - 60\text{sec})} \ln(335.3\text{cm}/\ 11.43\text{cm}) \times \ln(0.62/0.91)$$

K = 5.54E-04 cm/sec

MW- A1 Hydraulic Conductivity Summary

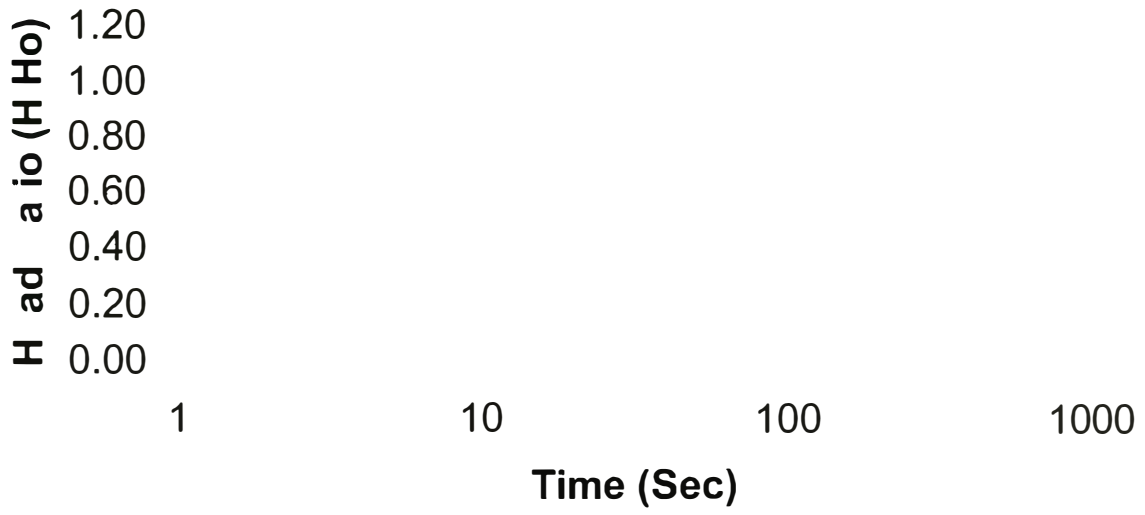
Static Water Level: 14.3' (Top of PVC Casing)

Test Start: 10:15 AM

Elapsed Time (Sec)	Water Level (Test #1)	Water Level (Test #2)
0	19.60	19.60
15	17.70	17.60
30	17.30	17.00
45	16.70	16.40
60	16.30	16.05
75	15.85	15.65
90	15.55	15.35
105	15.30	15.15
120	15.10	14.95
135	14.95	14.80
150	14.80	14.71
165	14.70	14.62
180	14.61	14.52
195	14.55	14.50
210	14.51	14.48
225	14.50	14.47
240	14.47	14.46
255	14.46	14.45
270	14.45	14.42
(1) 300	14.43	14.42
330	14.40	14.40
360	14.39	14.38
390	14.37	14.36
420	14.36	14.35
450	14.34	14.34
480	14.33	14.33
510	14.32	14.33
540	14.32	14.33
600	14.31	14.32
(2) 660	----	14.30

Notes: A change in elapsed time is indicated by a numerical value in (parentheses).

Erwin Town Landfill Remedial Investigation
Hydraulic Conductivity Test Results MW-A2



Hydraulic Conductivity Calculation

$$-K = \frac{r^2}{2L(t_2-t_1)} \ln(L/R) \times (h_1/h_2)$$

Where:

r = screen radius (cm) = 5.08

R = sand pack radius (cm)= 11.43

L = intake length (cm) = 335.3

t_1 = time interval corresponding to h_1 (sec) = 30

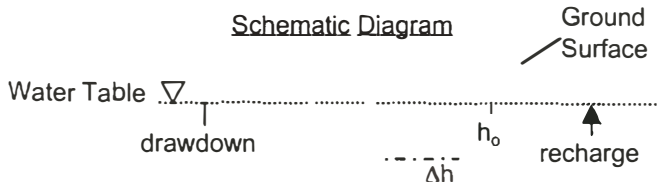
t_2 = time interval corresponding to h_2 (sec) = 100

h_1 = head ratio at t_1 ($\Delta h_{[t1]}/h_o$) = 0.86

h_2 = head ratio at t_2 ($\Delta h_{[t2]}/h_o$) = 0.99

K = hydraulic conductivity (cm/sec)

Schematic Diagram



Note: Hydraulic conductivity calculation and schematic diagram from Cedergren, 1977.

Calculation:

$$-K = \frac{25.81\text{cm}^2}{2(335.3\text{cm})(100\text{sec} - 30\text{sec})} \ln(335.3\text{cm}/ 11.43\text{cm}) \times \ln(0.86/0.99)$$

K = 2.61E-04 cm/sec

MW- A2 Hydraulic Conductivity Summary

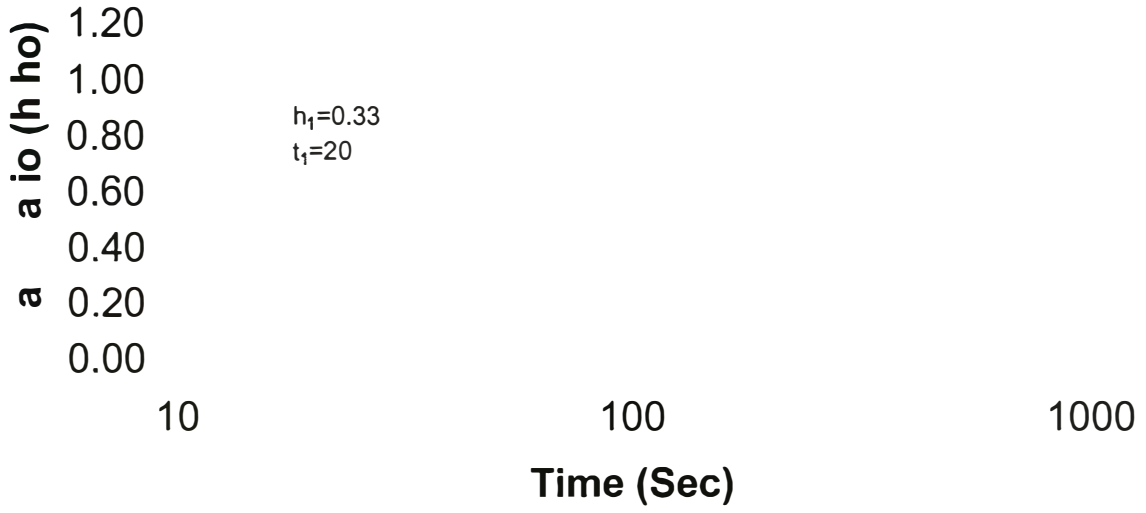
Static Water Level: 14.69' (Top of PVC Casing)

Test Start: 10:50 AM

Elapsed Time (Sec)	Water Level (Test #1)	Elapsed Time (Sec)	Water Level (Test #2)
0	19.70	0	19.90
10	17.90	15	17.10
20	16.20	30	15.50
30	15.40	45	14.95
40	15.05	60	14.80
50	14.90	75	14.76
60	14.80	90	14.74
70	14.79	105	14.73
80	14.76	120	14.73
90	14.75	135	14.72
100	14.74	150	14.71
110	14.74	165	14.71
120	14.74	(1) 180	14.70
(1) 150	14.71	210	14.70
180	14.70	----	----

Notes: A change in elapsed time is indicated by a numerical value in (parentheses).

Erwin Town Landfill Remedial Investigation
Hydraulic Conductivity Test Results MW-A3



Hydraulic Conductivity Calculation

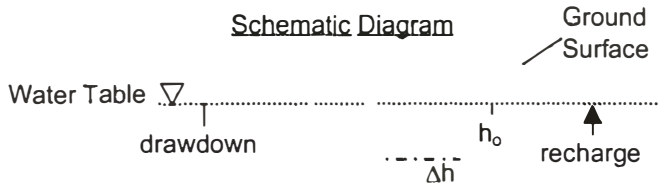
$$-K = \frac{r^2}{2L(t_2-t_1)} \ln(L/R) \times (h_1/h_2)$$

Where:

r = screen radius (cm) = 5.08
R = sand pack radius (cm)= 11.43
L = intake length (cm) = 335.3
t_1 = time interval corresponding to h_1 (sec) = 20
t_2 = time interval corresponding to h_2 (sec) = 120
h_1 = head ratio at t_1 ($\Delta h_{[t1]}/h_o$) = 0.33
h_2 = head ratio at t_2 ($\Delta h_{[t2]}/h_o$) = 0.91
K = hydraulic conductivity (cm/sec)

Note: Hydraulic conductivity calculation and schematic diagram from Cedergren, 1977.

Schematic Diagram



Calculation:

$$-K = \frac{25.81\text{cm}^2}{2(335.3\text{cm})(120\text{sec} - 20\text{sec})} \ln(335.3\text{cm}/\ 11.43\text{cm}) \times \ln(0.33/0.91)$$

K = 1.32E-03 cm/sec

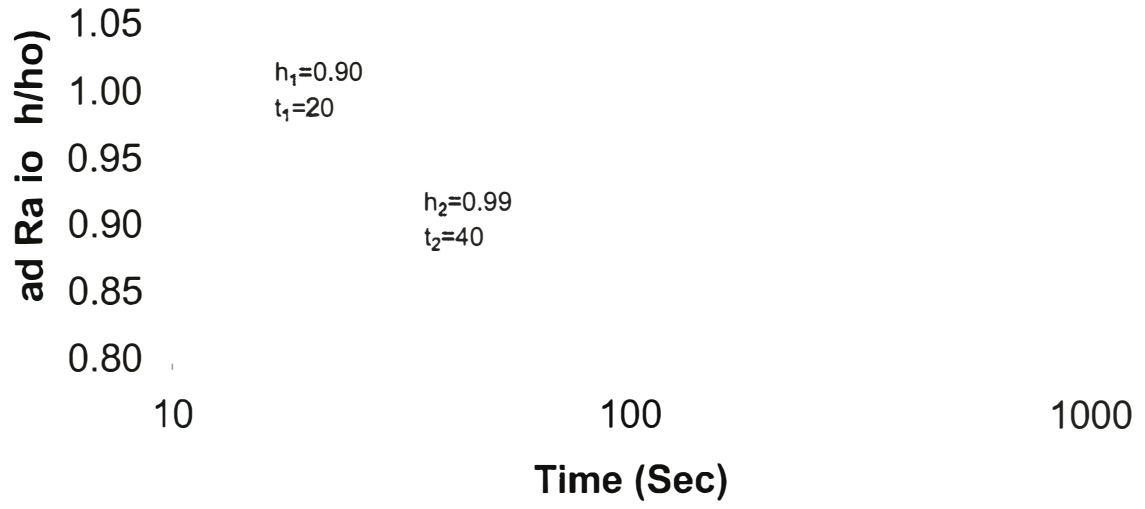
MW- A3 Hydraulic Conductivity Summary

Static Water Level: 18.70' (Top of PVC Casing)
Test Start: 11:20 AM

Elapsed Time (Sec)	Water Level (Test #1)	Water Level (Test #2)
0	20.20	19.60
10	19.90	19.35
20	19.70	19.25
30	19.50	19.16
40	19.35	19.06
50	19.24	19.00
60	19.10	18.94
70	19.00	18.90
80	18.95	18.88
90	18.90	18.86
100	18.88	18.84
110	18.86	18.82
120	18.83	18.81
(1) 150	18.78	18.79
180	18.76	18.77
210	18.74	18.76
240	18.74	18.75
270	18.73	18.74
(2) 330	18.72	18.74
390	18.72	18.72

Notes: A change in elapsed time is indicated by a numerical value in (parentheses).

Erwin Town Landfill Remedial Investigation
Hydraulic Conductivity Test Results MW-A4



Hydraulic Conductivity Calculation

$$-K = \frac{r^2}{2L(t_2-t_1)} \ln(L/R) \times (h_1/h_2)$$

Where:

r = screen radius (cm) = 5.08

R = sand pack radius (cm)= 11.43

L = intake length (cm) = 335.3

t_1 = time interval corresponding to h_1 (sec) = 20

t_2 = time interval corresponding to h_2 (sec) = 40

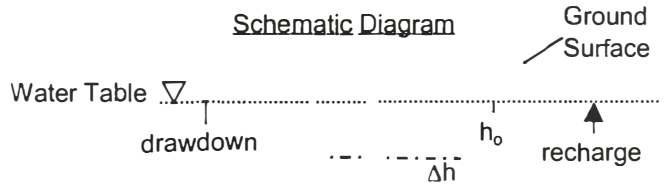
h_1 = head ratio at t_1 ($\Delta h_{[t1]}/h_o$) = 0.90

h_2 = head ratio at t_2 ($\Delta h_{[t2]}/h_o$) = 0.99

K = hydraulic conductivity (cm/sec)

Note: Hydraulic conductivity calculation and schematic diagram from Cedergren, 1977.

Schematic Diagram



Calculation:

$$-K = \frac{25.81\text{cm}^2}{2(335.3\text{cm})(40\text{sec} - 20\text{sec})} \ln(335.3\text{cm}/\ 11.43\text{cm}) \times \ln(0.90/0.99)$$

K = 6.20E-04 cm/sec

MW- A4 Hydraulic Conductivity Summary

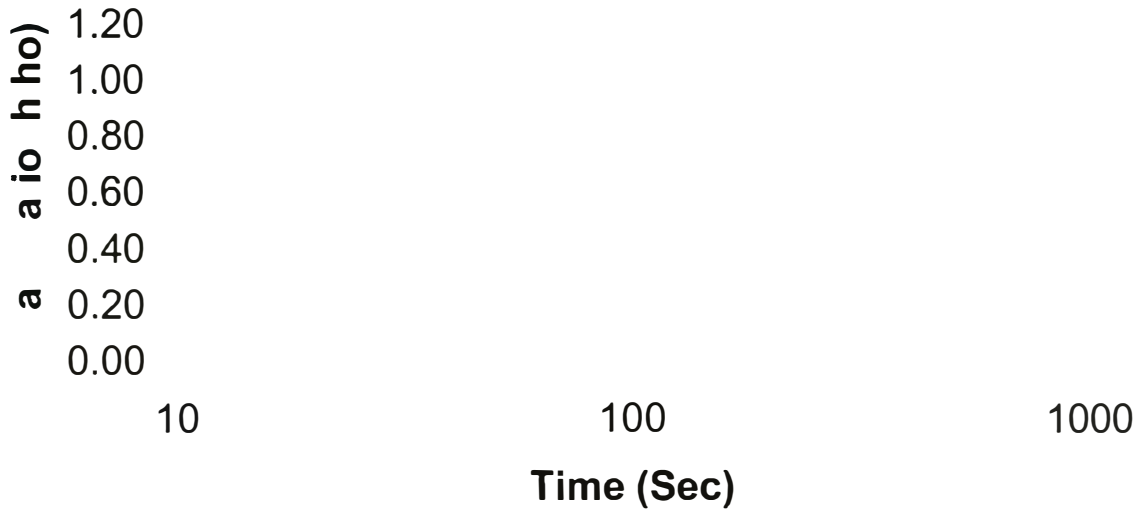
Static Water Level: 13.53' (Top of PVC Casing)

Test Start: 11:55 AM

Elapsed Time (Sec)	Water Level (Test #1)	Water Level (Test #2)
0	15.30	15.70
10	13.80	13.90
20	13.70	13.85
30	13.60	13.63
40	13.55	13.56
50	13.54	13.55
60	13.54	13.54
70	13.54	13.54

Notes:

Erwin Town Landfill Remedial Investigation
Hydraulic Conductivity Test Results MW-A5



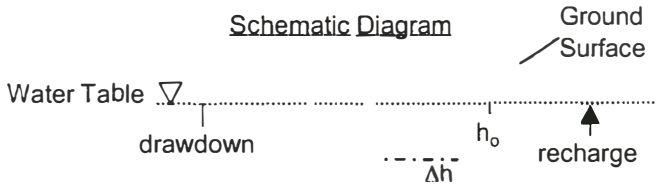
Hydraulic Conductivity Calculation

$$-K = \frac{r^2}{2L(t_2-t_1)} \ln(L/R) \times (h_1/h_2)$$

Where:

r = screen radius (cm) = 5.08
R = sand pack radius (cm)= 11.43
L = intake length (cm) = 335.3
t_1 = time interval corresponding to h_1 (sec) = 30
t_2 = time interval corresponding to h_2 (sec) = 270
h_1 = head ratio at t_1 ($\Delta h_{[t1]}/h_o$) = 0.62
h_2 = head ratio at t_2 ($\Delta h_{[t2]}/h_o$) = 0.99
K = hydraulic conductivity (cm/sec)

Schematic Diagram



Note: Hydraulic conductivity calculation and schematic diagram from Cedergren, 1977.

Calculation:

$$-K = \frac{25.81\text{cm}^2}{2(335.3\text{cm})(270\text{sec} - 30\text{sec})} \ln(335.3\text{cm}/ 11.43\text{cm}) \times \ln(0.62/0.99)$$

K = 2.54E-04 cm/sec

MW- A5 Hydraulic Conductivity Summary

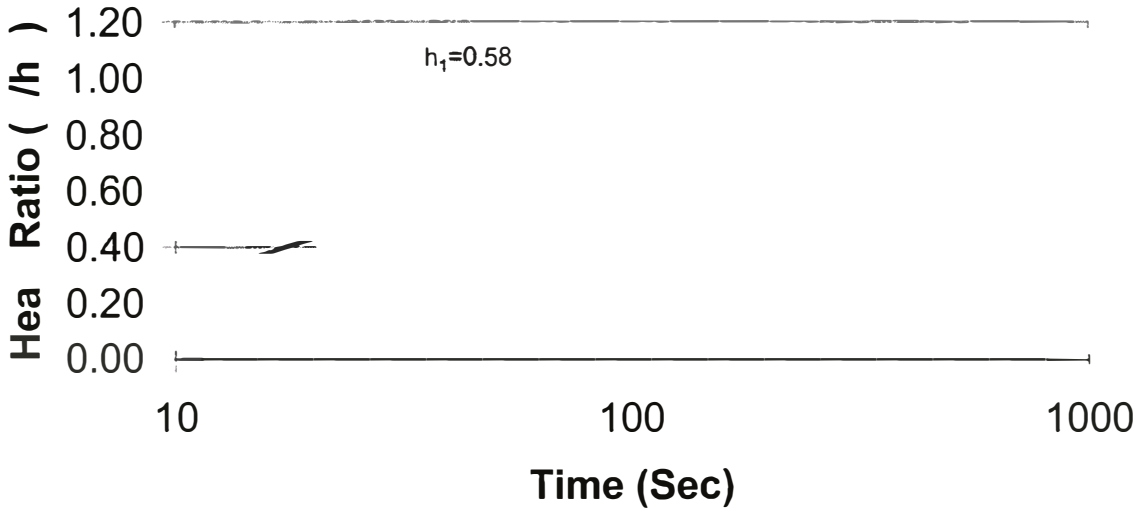
Static Water Level: 12.76' (Top of PVC Casing)

Test Start: 12:20 PM

Elapsed Time (Sec)	Water Level (Test #1)	Water Level (Test #2)
0	18.10	20.00
10	16.60	18.10
20	15.80	16.80
30	14.80	15.80
40	14.45	15.10
50	14.15	14.50
60	13.90	14.15
70	13.72	13.90
80	13.60	13.74
90	13.52	13.62
100	13.44	13.54
110	13.36	13.46
(1) 130	13.26	13.32
150	13.15	13.22
(2) 180	13.05	13.09
210	13.00	13.02
(3) 270	12.79	12.97
330	12.94	12.95
390	12.93	12.94
450	12.92	12.93

Notes: A change in elapsed time is indicated by a numerical value in (parentheses).

Erwin Town Landfill Remedial Investigation
Hydraulic Conductivity MW-A6



Hydraulic Conductivity Calculation

$$-K = \frac{r^2}{2L(t_2-t_1)} \ln(L/R) \times (h_1/h_2)$$

Where:

r = screen radius (cm) = 5.08

R = sand pack radius (cm)= 11.43

L = intake length (cm) = 335.3

t_1 = time interval corresponding to h_1 (sec) = 40

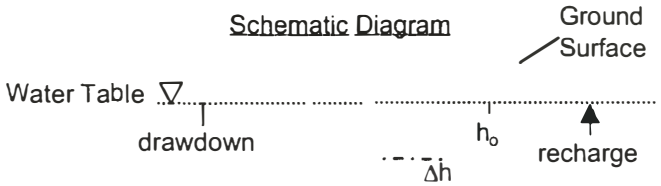
t_2 = time interval corresponding to h_2 (sec) = 210

h_1 = head ratio at t_1 ($\Delta h_{[t1]}/h_o$) = 0.58

h_2 = head ratio at t_2 ($\Delta h_{[t2]}/h_o$) = 0.93

K = hydraulic conductivity (cm/sec)

Schematic Diagram



Note: Hydraulic conductivity calculation and schematic diagram from Cedergren, 1977.

Calculation:

$$-K = \frac{25.81\text{cm}^2}{2(335.3\text{cm})(210\text{sec} - 40\text{sec})} \ln(335.3\text{cm}/\ 11.43\text{cm}) \times \ln(0.58/0.93)$$

K = 3.61E-04 cm/sec

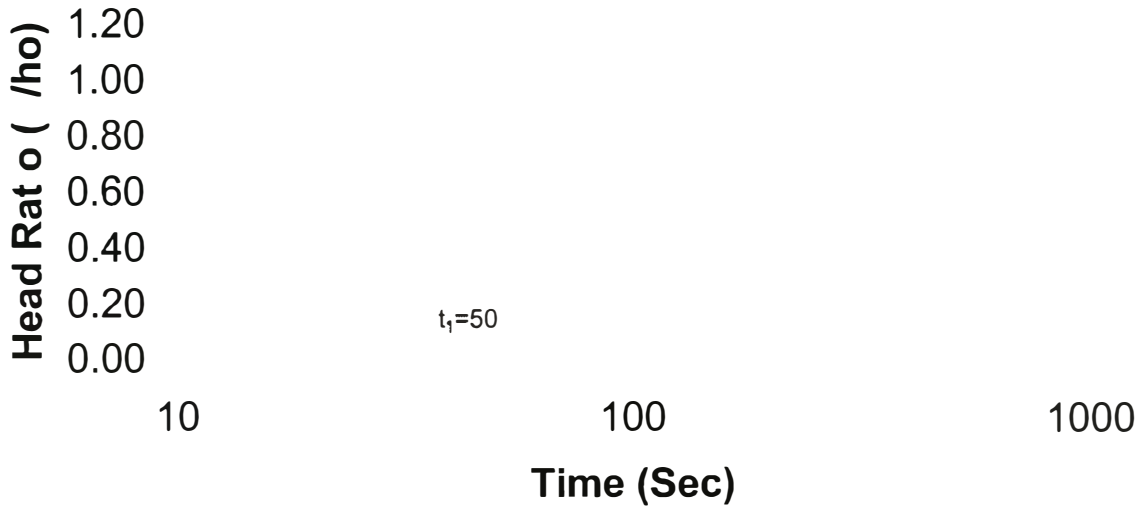
MW- A6 Hydraulic Conductivity Summary

Static Water Level: 19.65' (Top of PVC Casing)
Test Start: 12:50 PM

Elapsed Time (Sec)	Water Level (Test #1)	Water Level (Test #2)
0	20.85	20.38
10	20.69	20.26
20	20.47	20.17
30	20.28	20.09
40	20.15	20.04
50	20.06	19.98
60	20.01	19.94
70	19.96	19.91
80	19.92	19.89
90	19.90	19.86
100	19.87	19.84
110	19.85	19.83
120	19.84	19.82
(1) 150	19.80	19.79
180	19.76	19.77
210	19.73	19.75
(2) 270	19.72	19.72
330	19.70	19.70

Notes: A change in elapsed time is indicated by a numerical value in (parentheses).

Erwin Town Landfill Remedial Investigation
Hydraulic Conductivity Test Results MW-A7



Hydraulic Conductivity Calculation

$$-K = \frac{r^2}{2L(t_2-t_1)} \ln(L/R) \times (h_1/h_2)$$

Where:

r = screen radius (cm) = 5.08

R = sand pack radius (cm)= 11.43

L = intake length (cm) = 335.3

t_1 = time interval corresponding to h_1 (sec) = 50

t_2 = time interval corresponding to h_2 (sec) = 100

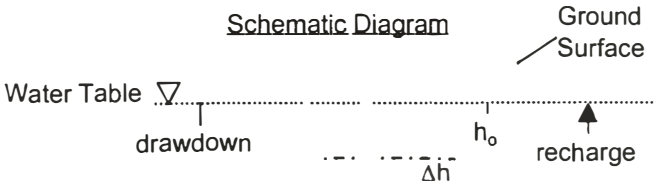
h_1 = head ratio at t_1 ($\Delta h_{[t1]}/h_o$) = 0.76

h_2 = head ratio at t_2 ($\Delta h_{[t2]}/h_o$) = 0.94

K = hydraulic conductivity (cm/sec)

Note: Hydraulic conductivity calculation and schematic diagram from Cedergren, 1977.

Schematic Diagram



Calculation:

$$-K = \frac{25.81\text{cm}^2}{2(335.3\text{cm})(100\text{sec} - 50\text{sec})} \ln(335.3\text{cm}/ 11.43\text{cm}) \times \ln(0.76/0.94)$$

K = 5.53E-04 cm/sec

MW- A7 Hydraulic Conductivity Summary

Static Water Level: 16.68' (Top of PVC Casing)

Test Start: 2:10 PM

Elapsed Time (Sec)	Water Level (Test #1)	Water Level (Test #2)
0	20.10	20.00
10	19.00	19.30
20	18.60	18.70
30	18.20	18.10
40	17.80	17.70
50	17.50	17.45
60	17.30	17.25
70	17.15	17.12
80	17.05	17.00
90	16.96	16.94
100	16.90	16.88
110	16.86	16.85
120	16.81	16.82
130	16.79	16.79
(1) 150	16.76	16.76
180	16.74	16.74
210	16.72	16.73
240	16.72	16.73
(2) 300	16.72	16.71

Notes: A change in elapsed time is indicated by a numerical value in (parentheses).

APPENDIX E

FISH AND WILDLIFE IMPACT ANALYSIS
(Subcontractor Report Prepared By EcoLogic, LLC)

Erwin Town Landfill
Remedial Investigation
Fish & Wildlife Impact Analysis

EcoLogic, LLC
Atwell Mill Annex, Suite S-2
132½ Albany Street
Cazenovia NY 13035

September 10, 2001

ERWIN TOWN LANDFILL
Remedial Investigation
Fish & Wildlife Impact Analysis

Prepared by
EcoLogic, LLC

This report provides an overall habitat-based assessment of the Erwin Town Landfill site. The field survey for the site assessment was conducted by Ecologic, LLC on May 22, 2001. This assessment conforms to the guidelines contained in Step I and Step II (parts A and B) of the New York State Department of Environmental Conservation (NYSDEC) October 1994 document "Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites" (FWIA). The results of the Fish & Wildlife assessment are presented below.

1. Site Description

The site covers approximately 13 acres of an abandoned landfill owned by the Town of Erwin. It is located south of the Finger Lakes within the corporate limits of the Village of Painted Post in Steuben County, New York. The site is bordered on the North by the Cohocton River, on the Northwest by Route 15 and an intersection, on the south by the Erie–Lackawanna Railroad and the Tioga River, and on the east by the Town of Erwin sewage treatment plant. Man-made flood levees (constructed in 1938 by the US Army Corps of Engineers) circle most of the site on the north, east and south. Runoff from the landfill flows into a small stream located along the landfill's southwest edge, which eventually flows into the Tioga River.

2. Ecological Communities

Most of the site has been previously disturbed and is regularly maintained by the Town of Erwin. There are a number of ecological communities and habitat types covering the site. These have been classified according to the New York Heritage Program's Ecological Communities of New York State (Reschke, 1990). The habitat types observed fall under the broad category of Terrestrial Cultural or Palustrine Cultural. These categories include communities that are either created or maintained by human activities, or are modified by human influence to such a degree that the physical characteristics of the substrate and or the biological composition of the resident community is substantially different from the character

of the substrate or community as it existed prior to human influence. Habitat types found on the site are indicated on Figure E-1 and include:

Mowed Lawn
Mowed Lawn with Trees
Successional Old Field
Open Uplands
Forested Uplands
Terrestrial/cultural

3. Description of Habitats

For this report, the site has been divided between the immediate site, about 8 hectares (20 acres) that cover the now closed Erwin Town Landfill, and a larger site, about 45 hectares (110 acres), that covers the area shown on Figure E-1. Reported percentages for each habitat area are calculated based on the 8-hectare (20 acre) immediate site. Habitat types are labeled on Figure E-1. The number in brackets refers to the habitat identification numbers indicated on the map (Figure E-1).

3.1 Upland Habitats

3.1.1 Mowed Lawn [Habitat type 1]

This habitat type, found on top of the landfill, covers 25% of the site, or approximately 2 hectares (5 acres). This habitat type is made up of a groundcover that is mowed perhaps once or twice a year. The vegetation is dominated by red fescue (*Festuca rubra*) and reed canary grass (*Phalaris arundinacea*). There is less than 30 percent cover of trees.

3.1.2 Mowed Lawn with trees [Habitat type 2]

This vegetative assemblage covers 3.4 hectares (8.4 acres, 42% of the site area) on the side slopes portion of the landfill, adjacent to the top. Some of the areas in this habitat are mowed periodically by the Town and have the same characteristics of [1], in that they are dominated by reed canary grass and red fescue. It includes other grasses and forbs, for example, Dame's violet (*Hesperis matronalis*) and Japanese Knotweed (*Polygonum*

cuspidatum). About 30-40% of the community is shaded by trees. The dominant trees on the south side are Box elder (*Acer negundo*) and Eastern cottonwood (*Populus deltoides*) along with scattered shrubs of Tartarian honeysuckle (*Lonicera tartarica*).

3.2 Wetland Habitats

The wetlands associated with the site include a few ditches and swales and a few depressional wetlands north of the landfill. Among these areas are the following communities:

3.2.1 Cattail Emergent Marsh [Habitat type 3]

This habitat makes up only about 100 m^2 (1076 square feet) at the base of the southeast corner slope of the landfill (0.1% of the site) and is dominated by a monoculture of narrow-leaved cattail (*Typha angustifolia*) with some reed canary grass. This area is fed by a swale that is located at the base of the landfill side slopes. Leachate seeps are often found in these areas of landfills. None were observed at the time of the field visit.

3.2.2 Ditch/artificial intermittent stream [Habitat type 4]

This community surrounds the small stream described under Aquatic Habitat. This intermittent stream has formed in an artificial waterway constructed for drainage of adjacent areas. Water levels fluctuate as a result of precipitation and groundwater levels. The sides of the ditches are vegetated with grasses (mostly reed canary grass) and sedges. A number of forbs such as horse-radish (*Armoracia rusticana*), upright burhead (*Echniodurus rostratus*) are found in this area.

3.3 Areas Adjacent to the Site

3.3.1 Forested Uplands [Habitat type 5]

There is a small upland community about 2,500 square meters (0.6 acres) in size that appears to be a remnant wood with more than 60% canopy cover of trees. The dominant trees include sugar maple (*Acer saccharum*), green ash (*Fraxinus pennsylvanica*), black walnut (*Juglans nigra*), American elm (*Ulmus americana*) and quacking aspen (*Populus*

tremuloides). Understory plants include red fescue, reed canary grass, and red milkwort (*Polygala sanguinea*).

3.3.2 Ash Swamp [Habitat type 6]

This type of cover is found adjacent to the northwest corner of the site and consists of a young, nearly even-age swamp heavily dominated by green ash (*Fraxinus pennsylvanica*). The green ashes are interspersed with some small open marshy areas containing rushes (*Juncus spp.*), sedges (*Carex spp.*), and cattails (*Typha spp.*).

3.3.3 Terrestrial/Cultural [Habitat type 7]

These areas encompass the Town of Erwin sewage treatment plant and areas north of the closed landfill used as composting and gravel storage areas.

3.3.4 Access road [Habitat type 8]

Approximately 1% of the site (0.15 hectares, 0.37 acres) is comprised of the gravel access road. Smaller access trails located on top of the landfill have been considered as part of the mowed lawn habitat area.

4. Wildlife

The Erwin Town landfill site supports a wildlife population indicative of an urban and cultural setting. During the site characterization, signs of wildlife were observed in several of the areas. Wildlife species are those associated with cultural environments and disturbed habitats, such as white tailed deer (*Odocoileus virginicus*), woodchuck (*Marmota monax*), and American robin (*Turdus migratorius*).

5. Terrestrial and Wetland Habitats, Endangered Species Assessment

There have been no reports of endangered, threatened, or special concern species on the Erwin Town Landfill or on adjacent land. Based on information from the NYSDEC Wildlife Resources Center – New York Natural Heritage Program, the Erwin Town Landfill is located approximately ½ mile from Painted Post, which has reported two records of the presence of *Hydrangea arborescens* (wild hydrangea) considered "endangered" in New York State. The recorded last-seen dates were 1884 and 1908.

New York is the northern limit of this shrub's *(Hydrangea arborescens)* range, which is usually found in dry or moist, often rocky woods and hillsides. It occasionally is found along streambanks, which also provides habitat for this rare species. This species was not observed on the site and based on its habitat requirements, is not expected to be found on the site.

6. Biological Associations Found in the Project Vicinity

The area within a two-mile radius of the Town of Erwin Landfill site consists of urban areas (e.g., Painted Post, Riverside and Corning), old-field successional communities, and forests. Just north of the site is the Cohocton River and just south of the site is the Tioga River.

6.1 Observations of Stress Potentially Related to Site Contaminants

6.1.1 Terrestrial and Wetland Habitats

Leachate seeps or areas of stained soils were not observed near the bottom of the landfill's side slopes during the field visit of May 22 2001. Evidence of leachate seeps, if present, would be expected along these side slopes.

The field team looked for signs of atypical biotic conditions. No unusual wildlife mortality was observed.

A few dead trees are present adjacent to the landfill. Directly north of the Erwin Town Landfill (between MW-A7 and MW-A2) there were a number of dead trees between 16" and 18" in diameter. It appears that the change in hydrology from the landfill has raised the water table and caused this dieback. Water tends to pond in this area, which has lengthened the period of inundation. To the west of the ponded area is a young growth

green ash wetland. The age and composition of this wetland community is consistent with a recent change in hydrology. Wetland sedges and grasses under the green ash canopy provide further evidence of a change in wetland hydrology. This could explain why the present community is a healthy green ash swamp with remnant dead trees. If contamination were an issue it would be evident in the young vegetation. Throughout the Erwin Town Landfill and adjacent areas, vegetation is healthy and robust showing no evidence of contamination from the landfill.

6.1.2 Aquatic Habitats

6.1.2.1 *Small Stream Along West Side of Landfill*

This tributary to the Tioga River is intermittent; much of the stream was dry at the time of sampling. A pool underneath a railroad bridge near the downstream end of the site contained some standing water. The stream width at the railroad bridge was about 8 meters but the area of exposed rock in the main streambed was only about half a meter across. The stream runs through an earth dyke downstream of the railroad bridge. The dyke is equipped with a large flood control gate that would appear to prevent all but the highest flows of the stream from entering the nearby Tioga River (Photos 13 &14).

The pool at the railroad overpass contained moderate amount of vegetation and algae. No fish were observed in the water. No noticeable signs of impairment were observed in the pool or along the dry streambed. The water in the pool was clear and the vegetation submerged in water and along the banks of both the pool and dry streambed did not show signs of stress.

6.1.2.2 *Cohocton River*

The Cohocton River is located about 200 m from the north-northeast side of the landfill (Photos 9 & 10). An earthen dyke between the landfill and river prevents floodwater from reaching the landfill and nearby sewage treatment plant. Macroinvertebrate samples were collected at four locations: 1) approximately 200 m from the upstream end of the landfill; 2) 25 m upstream of the sewage treatment

plant's outfall, at about the mid point of the landfill; 3) 25 m downstream of the sewage outfall and; 4) about 100 m downstream of the landfill. The field team used an aquatic D-frame net to collect kick samples of the macroinvertebrate community in the Cohocton River adjacent to the landfill site (Photo 10). From these data a Family Level Biotic Index (FBI) was calculated. The FBI is a rapid field assessment of stream macroinvertebrates used to determine relative degrees of impact from organic pollution (see Table 1). FBIs are based on the well-known Hilsenhoff Biotic Index (HBI) but only identify organisms to the family level instead of to genus or species as the HBI does. Use of the FBI is advantageous for quickly evaluating the general status of organic pollution in streams. However, FBIs are less accurate and can more frequently lead to erroneous conclusions about water quality than a standard HBI. Compared to HBIs, FBIs tend to indicate greater pollution in unpolluted or slightly polluted streams and less pollution in polluted streams.

Table 1. Evaluation of water quality using the family-level biotic index.

FBI	Water Quality	Degree of Organic Pollution
0.00-3.75	Excellent	Organic pollution unlikely
3.76-4.25	Very Good	Possible slight organic pollution
4.26-5.00	Good	Some organic pollution probable
5.01-5.75	Fair	Fairly substantial pollution likely
5.76-6.50	Fairly Poor	Substantial pollution likely
6.51-7.25	Poor	Very substantial pollution likely
7.26-10.00	Very Poor	Severe organic pollution likely

No indication of impacts from the landfill was observed at any of the four Cohocton River sites. Algae were prominent on stream rocks at all sites. The FBI, as determined from the macroinvertebrate community composition, indicates that "excellent" conditions exist in this area of the Cohocton River with the exception of the site directly downstream of the sewage discharge where localized " very good" conditions were present (Table 2). Pollution intolerant mayflies and stoneflies were present at all sites. Macroinvertebrates appeared normal with no obvious signs of external abnormalities.

Table 2. Results of macroinvertebrate sampling in the Cohocton River.

Common Name	Family	Percent at Site 1	Percent at Site 2	Percent at Site 3	Percent at Site 4
Mayfly	Baetidae	3%	4%	6%	8%
Mayfly	Ephemerellidae	15%	2%	9%	12%
Mayfly	Ephemeridae	-	16%	-	-
Mayfly	Heptageniidae	6%	28%	21%	15%
Mayfly	Oligoneuriidae	-	-	7%	5%
Mayfly	Potomanthidae	-	11%	1%	3%
Dragon Fly	Corduliidae	2%	-	-	-
Dragon Fly	Gomphidae	-	4%	-	-
Stonefly	Perlidae	6%	3%	3%	15%
Beetle	Psephenidae	6%	10%	9%	9%
Beetle	Elmidae	-		3%	-
Caddisfly	Hydropsychidae	43%	22%	30%	30%
Blackfly	Simuliidae	11%	-	-	-
Midge-blood worm	Chironomidae (red)	-	-	6%	-
Midge	Chironomidae (other)	8%	-	3%	3%
Leech	Class Hirudinea	-	-	2%	-
FBI Score		3.75	3.70	3.93	3.17
FBI Water Quality Designation		Excellent	Excellent	Very Good	Excellent

6.1.2.3 *Tioga River*

The Tioga River is located about 300 m from the south side of the landfill. The river was examined where the small landfill stream enters. There was no flow from the stream during the May 22 field visit; flow from the Tioga River had backed into the mouth of the stream. No macroinvertebrate samples were collected due to lack of flow in both the small stream and the Tioga River. Algae and stream vegetation were evident and appeared healthy. No fish or invertebrates were observed. No visible impacts from the landfill were observed either at the mouth of the small stream or in the Tioga River.

7. Habitat Values of Terrestrial and Aquatic Zones Within the Project Site

As part of the Fish and Wildlife Impact Analysis, the field team used their best professional judgment to identify the functions and values of existing habitats at the Erwin Town Landfill site. The assessment of functions and values of vegetative zones examined primary support functions critical to wildlife. These support functions include food-chain production,

specialized habitats, hydrologic interactions (groundwater recharge areas and flood storage), and the potential for reduction in concentration of nutrients, sediment, and pathogens.

Values reflect a human-centered perspective. This assessment focused on attributes such as visual quality and aesthetics, educational or scientific value, and potential for recreation.

There is no unique habitat associated with the Erwin Town Landfill. The site was highly disturbed to support the landfill operation and the successional communities presently on site are typical of reverting forest or wetlands. Much of the site is presently maintained by mowing once or twice a year. Two rivers and a railroad bound the area and reduce the site's use by migratory mammals.

The New York Natural Heritage Program rates habitat types by global and statewide rarity in order to come up with a general "element rank" for that cover type. The rankings go from G1 (globally critically imperiled) to G5 (demonstrably secure) and S1 (5 or fewer occurrences in the state) to S5 (demonstrably secure). The habitats listed above were primarily rated as G5, and S5, "demonstrably secure" both globally and statewide.

Of the habitat systems examined, the aquatic and wetland habitats appear to provide the highest support functions for wildlife and fish. Wetlands are particularly important to the site because of their productivity, ability to assimilate sediment and nutrients, and capacity to modify hydrology.

The site is isolated from adjacent area so it provides very little opportunities for passive recreation, such as hiking, hunting, and bird watching. Open space is abundant in this rural area of Stueben County

8. Contaminant-Specific Impact Assessment

As described in the preceding sections of this report, site conditions do not appear to have adversely affected the productivity, diversity, biomass, or abundance of fish and wildlife resources. This finding is evaluated in context of the nature and extent of contamination as documented through the B&L field investigations in support of the Remedial Investigation/Feasibility Study.

8.1 Sources and Pathways of Contamination

- Soils: Analytical results for site soils indicate that semivolatile compounds associated with combustion of petroleum are present in site soils. One cogener of PCB (arochlor 1260) was detected in SET-4. There was no visual evidence of stress on the vegetative community at locations with elevated levels of semivolatile organic compounds. Detectable concentrations were also reported in off-site soils used to indicate background conditions.

- Groundwater: The shallow groundwater system that may discharge to seeps, adjacent wetlands, or the rivers bordering the site potentially affects both vegetation and surface water resources. Sampling results indicate exceedances of Class GA groundwater standards for two volatile organic compounds (chloroethane and chlorobenzene) at MW-4. There is no evidence of impacts on the adjacent terrestrial or aquatic ecosystems. These compounds would tend to be lost to the atmosphere or undergo biological degradation once the groundwater system flows to surface water or wetlands. Trace concentrations of semivolatile phthalate compounds were detected in groundwater samples; however, these common laboratory contaminants were also detected in field blanks. Inorganic compounds likely reflect regional water quality and the vegetative community is adapted to these water quality conditions.

Site-related chemicals could enter surface water through groundwater discharge or runoff from the landfill surface. Soil particles eroded from the face of the landfill also become deposited within the surface water network. Many synthetic organic compounds and metals tend to sorb to particulates that eventually end up as bottom sediment deposits. Once there, the chemicals may become unavailable, transform into other chemical forms, or be incorporated into the food web.

The composition and abundance of the macroinvertebrate community assayed in the adjacent surface water system provides strong evidence that the Erwin Town Landfill has not adversely affected surface water and sediment resources.

APPENDIX A

SUBSURFACE BORING LOGS/MONITORING WELL INSTALLATION DETAILS

WELL DEVELOPMENT RECORD
The Sear-Brown Group

Job Name Hamilton Street
Well ID: MW-1
Personnel D. Gnage

Job No: 14705a
Date/Time: 7/31/2000 @ 1415

Well Depth (ft):	22.35		Well Volume (Gal):	1.12
Water Level (ft): (-)	15.38		(See Calculations)	
Water Col.(ft):	6.97	1.12	Total Volume Removed:	11.0
			Development Method:	foot valve

Development Monitoring

Volume number/Time	1/1420	2/1423	3/1427	4/1432	5/1435
Volume Purged	1.2	2.4	3.3	4.4	5.6
Temp(C)	14.3	13.5	13.3	13.5	12.8
pH	7.24	7.20	7.18	7.14	7.15
Spec. Cond(umhos)	1111	1120	1119	1132	1121
Turbidity (NTU)	>200	>200	>200	>200	>200
ORP (eV)	212.0	217.0	218.0	219.0	219.0
Color/odor	sandy, brown	sandy, brown	sandy, brown	sandy, brown	sandy, brown

Volume number/Time	6/1440	7/1445	8/1449	9/1453	10/1500
Volume Purged	6.75	7.9	8.8	9.9	11.0
Temp(C)	13.6	13.4	13.6	13.3	13.6
pH	7.15	7.18	7.19	7.27	7.19
Spec. Cond(umhos)	1143	1131	1126	1123	1127
Turbidity (NTU)	176.8	>200	>200	>200	>200
ORP (eV)	220.0	224.0	225.0	224.0	224.0
Color/odor	sandy, brown	sandy, brown	sandy, brown	sandy, brown	sandy, brown

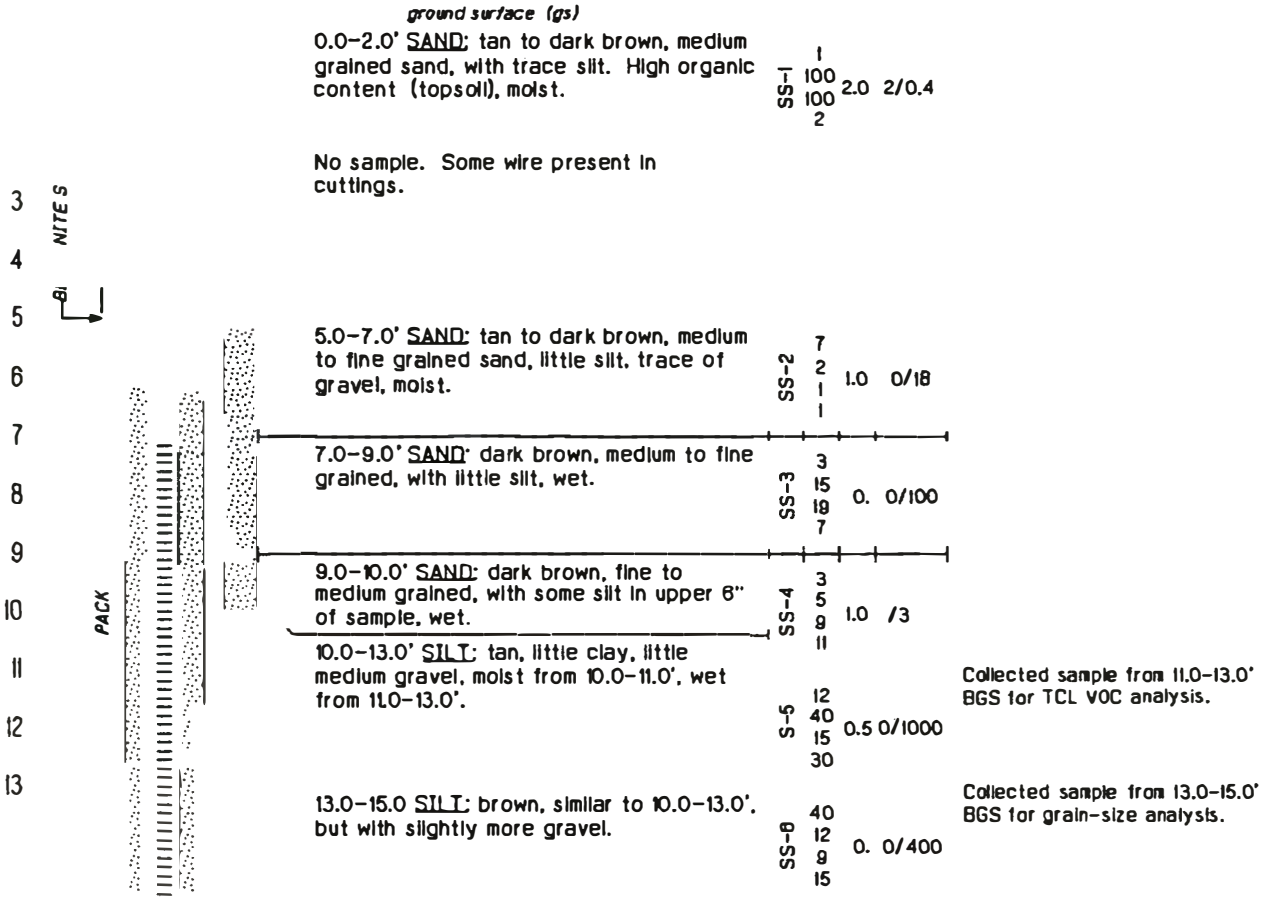
Meter ID Myron 6P Ultrameter
LaMotte turbidity meter

Well Vol. Calcs.

Note: 2" dia. well 1'=16 gal; 4" dia. well 1'=0.65'

Weather
Comment dedicated PVC bailer in well

Checked By Date


ground surface (gs)
0.0–2.0' SAND: tan to dark brown, medium grained sand, with trace silt. High organic content (topsoil), moist.
SS-1 1 100 100 2 2.0 2/0.4
No sample. Some wire present in cuttings.
5.0–7.0' SAND: tan to dark brown, medium to fine grained sand, little silt, trace of gravel, moist.
SS-2 7 2 1 1 1.0 0/18
7.0–9.0' SAND: dark brown, medium to fine grained, with little silt, wet.
SS-3 3 15 19 7 0. 0/100
9.0–10.0' SAND: dark brown, fine to medium grained, with some silt in upper 6" of sample, wet.
SS-4 3 5 8 11 1.0 /3
10.0–13.0' SILT: tan, little clay, little medium gravel, moist from 10.0–11.0', wet from 11.0–13.0'.
S-5 12 40 15 30 0.5 0/1000
Collected sample from 11.0–13.0' BGS for TCL VOC analysis.
13.0–15.0 SILT: brown, similar to 10.0–13.0', but with slightly more gravel.
SS-6 40 12 8 15 0. 0/400
Collected sample from 13.0–15.0' BGS for grain-size analysis.
3
4
5
6
7
8
9
10
11
12
13
NITE S
PACK

ERWIN-WL

16	15.0–18.0 SAND; brown, fine to coarse grained, some gravel, some silt.	SS-7	30 27 19 23	0.5	0/100	c e samp rom 15.0–15.0' BGS for full TCL analysis except VOCs.
17						
18						2-inch ID PVC screen with 0.010-inch slots set from 7.0–17.0' BGS. Sandpack (#0) from 6.0–18.0' BGS. Bentonite seal from 4.0–6.0' BGS. Grout from 4.0' BGS to grade. Five foot length of 4-inch locked steel protective casing, (Master lock #3252)
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						

WELL DEVELOPMENT RECORD
The Sear-Brown Group

Job Name: Hamilton Street
Well ID: MW-2
Personnel: D. Gnage

Job No: 14705a
Date/Time: 8/1/2000 @ 1305

Well Depth (ft): 19.20
Water Level (ft): (-) 7.54
Water Col.(ft): 11.66

Well Volume (Gal): 0.00
(See Calculations)
Total Volume Removed: 3.6
Development Method: foot valve

Development Monitoring

Volume number/Time	1/1315	2/1325	3/	4/	5/
Volume Purged	2.0	3.6	dry at 3.6		
Temp(C)	16.9	17.2			
pH	6.95	7.21			
Spec. Cond(umhos)	2927	3253			
Turbidity (NTU)	95.8	74.3			
ORP (eV)	-117.0	-134.0			
Color/odor	green/black cloudy	green/black foamy			

Volume number/Time	6/	7/	8/	9/	10/
Volume Purged					
Temp(C)					
pH					
Spec. Cond(umhos)					
Turbidity (NTU)					
ORP (eV)					
Color/odor					

Meter ID Myron 6P Ultrameter
Lamotte turbidity meter

Well Vol. Calcs.

Note: 2" dia. well 1'=16 gal; 4" dia. well 1'=0.65'

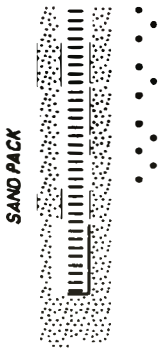
Weather
Comments dedicated PVC bailer in well

Checked By Date

DRILLING LOG OF WELL NO. MW-3

Project: ERWIN TOWN LANDFILL - SITE ID 851003

		ground surface (gs)						
		0.0–2.0' SAND: brown to black, fine to coarse, with little gravel and trace silt, moist.	SS-1	4 6 11	2.0	0/0	
2		No sample.						
3								
4								
5		5.0–7.0' FILL: brown, tan and black, fine to coarse gravel and sand, little silt, with wood and glass fragments, moist.	SS-2	4 7 12 12	2.0	0/ 10,000	Collected sample from 5.0–7.0' BGS for TCL VOC analysis.
		No sample.						
9								
10		10.0–12.0' FILL: brown, similar to 5.0–7.0', with larger glass fragments and with cobble fragments, moist to wet.	S-3	17 5 7 12	0.	0/0		
12		12.0–14.0' SAND: fine to coarse, wet.						
13			SS-4	2 1 2 2	0.0	0/0		



some fine to coarse sand, little to some silt, wet.

18
18

16

1 60–20.0 ' GRAVEL and SAND: brown and tan, fine to coarse-grained, with some silt, wet.

8
25
17 SS-6 37 1.0 0/200
20

18

37
19 SS-7 35 2.0 0/200
28
20 32

21

22

23

24

25

26

27

28

29

30

31

32

33

34

35

Collected sample from 14.0–17.0'BGS for full TCL analysis except VOCs.

Collected sample from 18.0–20.0'BGS for grain-size analysis.

2-inch ID PVC screen with 0.010-inch slots set from 10.0–20.0' BGS. Sandpack (#0) from 8.0–21.0' BGS. Bentonite seal from 7.0–8.0' BGS. Grout from 7.0' BGS to grade. Five foot length of 4-inch locked steel protective casing (Master lock #3252).

WELL DEVELOPMENT RECORD
The Sear-Brown Group

Job Name: Hamilton Street
Well ID: MW-3
Personnel: D. Gnage

Job No: 14705a
Date/Time: 8/1/2000 @1340

Well Depth (ft):	21.90	Well Volume (Gal):	0.00
Water Level (ft): (-)	14.24	(See Calculations)	
Water Col.(ft):	7.66	Total Volume Removed:	4.0
		Development Method:	peristaltic

Development Monitoring

Volume number/Time	1/1410	2/1420	3/1430	4/	5/
Volume Purged	1.3	2.5	4.0		
Temp(C)	14.5	14.9	14.5		
pH	6.87	6.80	6.74		
Spec. Cond(umhos)	2504	2508	2624		
Turbidity (NTU)	15.18	9.16	8.43		
ORP (eV)	-51.0	-54.0	-53.0		
Color/odor	clear, no odor	clear, no odor	clear, no odor		

Volume number/Time	6/	7/	8/	9/	10/
Volume Purged					
Temp(C)					
pH					
Spec. Cond(umhos)					
Turbidity (NTU)					
ORP (eV)					
Color/odor					

Meter ID Myron 6P Ultrameter
Lamotte turbidity meter

Well Vol. Calcs.

Note: 2" dia. well 1'=16 gal; 4" dia. well 1'=0.65'

Weather
Comments dedicated PVC bailer; riser pinched at 5.0ft , unable to pass footvalve or bailer post

Checked By Date

	0.0–1.5' LOAM; dark brown, high in organic material, moist.	SS-1	8 5 7 8	0.4	0/0	
2	1.5–2.0' SAND; brown, with little gravel and cobbles, moist.					
3	No sample.					
4						
5						
6	5.0–7.0' GRAVEL and SAND; brown, fine to coarse-grained with trace of silt, moist.	SS-2	45 17 10 10	0	0/1000	
	7.0–9.0' SAND and SILT; brown, little fine to medium gravel, moist.	SS-3	15 11 11 15	0.4	5/100	
	No sample.					
10	10.0–16.0' SAND and SILT; brown, fine to coarse sand, little fine to medium gravel, wet.	SS-4	11 10 14 23	2.0	14/50	Collected sample from 10.0–12.0' BGS for TCL VOC analysis. HNu reading probably due to interference from moisture.
12						
13		SS-5	18 15 10 15	0.4	0/20	
14			10 28	1.0	9/300	Collected sample from 14.[illegible] BGS for grain-size analysis.

ELEVATION

DEPTH

16.0–21.0' GRAVEL and SAND: brown, fine to coarse, some silt, wet.

SS-8 | 49 50/5" | 2.0 | 0/80

2-inch ID PVC screen, with 0.010-inch slot set from 11.0–21.0' BGS. Sandpack (#0) from 10.0–22.0' BGS. Bentonite seal from 8.0–10.0' BGS. Grout from 8.0' BGS to grade. Five foot length of 4-inch locked steel protective casing (Master lock #3252).

WELL DEVELOPMENT RECORD
The Sear-Brown Group

Job Name: Hamilton Street
Well ID: MW-4
Personnel: D. Gnage

Job No: 14705a
Date/Time: 8/1/2000 @1446

Well Depth (ft):	21.15	Well Volume (Gal):	0.00
Water Level (ft): (-)	12.28	(See Calculations)	
Water Col.(ft):	8.87	Total Volume Removed:	12.0
		Development Method:	foot valve

Development Monitoring

Volume number/Time	1/1445	2/1450	3/	4/1455	5/
Volume Purged	1.5	3.0		6.0	
Temp(C)	16.0	16.2		16.0	
pH	6.84	6.85		6.90	
Spec. Cond(umhos)	3429	1031		3451	
Turbidity (NTU)	>200	>200		>200	
ORP (eV)	-111.0	-140.0		-106.0	
Color/odor	gray, heavy, sand	gray, heavy, sand		gray, heavy, sand	

Volume number/Time	6/1500	7/	8/1505	9/	10/
Volume Purged	9.0		12.0		
Temp(C)	15.6		16.0		
pH	6.84		6.82		
Spec. Cond(umhos)	3473		3512		
Turbidity (NTU)	>200		>200		
ORP (eV)	-112.0		-110.0		
Color/odor	gray, heavy, sand		gray, heavy, sand		

Meter ID Myron 6P Ultrameter
Lamotte turbidity meter

Well Vol. Calcs.

Note: 2" dia. well 1'=16 gal; 4" dia. well 1'=0.65'

Weather
Comments dedicated PVC bailer

Checked By Date

DRILLING LOG OF WELL NO. MW-5

Project: ERWIN TOWN LANDFILL - SITE ID 851003
Location: TOWN OF ERWIN, STEUBEN COUNTY, N.Y.
Well Coordinates/Reference System: N 4678.9094 E 4818.5292
Date Started/Finished: 10-6-93 / 10-7-93
Drilling Company: AMERICAN AUGER AND DITCHING
Driller/Geologist: LEE PENROD / GREG ANDRUS

Total Depth of Hole (feet BGS): 19.0
Ground Elevation (feet above MSL): 933.00
Inner Casing Stick-Up (feet above GS): 1.88
Groundwater Depth (feet BGS):
Date Of Water Level Meas.: 14 NOV 1993
Water Level: 10.29

ELEVATION / DEPTH	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SPLIT SPOON NO.	BLOW COUNT	SS RECOVERY (FT)	HNu/OVA (ppm)	COMMENTS
gs elevation 933.00 ft.			*ground surface (gs)*					
1	GROUT		0.0–2.0' LOAM: fine to coarse sand and silt, trace gravel, moist.	SS-1	8 4 1 1	0.5	0/0	
2			No sample.					Miscellaneous trash coming up with augers between 2.0–5.0' BGS.
3								
4								
5	BENTONITE SEAL		5.0–7.0' SAND: brown to black, fine to medium grained, with trace coarse sand, and trace silt. moist.	SS-2	15 10 12 20	1.5	0/0.18	
6								
7			No sample.					
8			8.0–10.0' SAND and CLAY: brown to black, fine to medium grained, some silt. Wood/root fragments, apparently native, wet.	SS-3	3 3 8 20	2.0	0/100	Collected sample from 8.0–10.0' BGS for TCL VOC analysis.
9								
10	SAND PACK		10.0–19.0' GRAVEL and SAND: tan to brown, fine to coarse grained, some silt, wet.	SS-4	3 8 8 7	2.0	0/10	
11								
12				SS-5	7 3 1 1	<0.2	0/0.02	
13								
14				SS-6	1 1	2.0	0/3	
15								

TOWN OF ERWIN, STEUBEN COUNTY, N.Y.

Ecology and Environment Engineering, P.C.

ERWIN-dL

DRILLING LOG OF WELL NO. MW-5

Project: ERWIN TOWN LANDFILL - SITE ID 851003

Total Depth of Hole (feet BGS): 19.0

ELEVATION / DEPTH	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SPLIT SPOON NO.	BLOW COUNT	SS RECOVERY (FT)	Any/OVA (ppm)	COMMENTS
16	SAND PACK				1 3			Collected sample from 14.0-16.0' BGS for full TCL analysis except VOCs.
17				SS-7	34 50/3"	2.0	0/30	Collected sample from 18.0-18.0' BGS for grain-size analysis.
18								
19								2-inch ID PVC screen with 0.010-inch slots set from 8.0-18.0' BGS. Sandpack (#0) from 7.0-18.0' BGS. Bentonite seal from 5.0-7.0' BGS. Grout from 5.0' BGS to grade. Five foot length of 4-inch locked steel protective casing (Master lock #3252).
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21								
22								
23								
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34								
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36								

TOWN OF ERWIN, STEUBEN COUNTY, N.Y.

WELL DEVELOPMENT RECORD
The Sear-Brown Group

Job Name: Hamilton Street
Well ID: MW-5
Personnel: D. Gnage

Job No: 14705a
Date/Time: 8/1/2000 @ 1530

Well Depth (ft):	20.15	Well Volume (Gal):	0.00
Water Level (ft): (-)	9.92	(See Calculations)	
Water Col.(ft):	10.23	Total Volume Removed:	12.0
		Development Method:	foot valve

Development Monitoring

Volume number/Time	1/1535	2/1555	3/	4/1600	5/
Volume Purged	1.5	3.0		6.0	
Temp(C)	14.2	14.3		14.2	
pH	6.83	6.79		6.82	
Spec. Cond(umhos)	2047	2082		2062	
Turbidity (NTU)	>200	129.1		188.2	
ORP (eV)	-83.0	-63.0		-53.0	
Color/odor	gray, black, sandy	gray, black, sandy		gray, black, sandy	

Volume number/Time	6/1608	7/	8/1615	9/	10/
Volume Purged	9.0		12.0		
Temp(C)	13.4		13.7		
pH	6.89		6.79		
Spec. Cond(umhos)	2082		2096		
Turbidity (NTU)	>200		>200		
Dissolved Oxygen mg/l	nm		nm		
ORP (eV)	-56.0		-52.0		
Color/odor	gray, black, sandy		gray, black, sandy		

Meter ID Myron 6P Ultrameter
Lamotte turbidity meter

Well Vol. Calcs.

Note: 2" dia. well 1'=16 gal; 4" dia. well 1'=0.65'

Weather
Comments dedicated PVC bailer

Checked By _____ Date _____

DRILLING LOG OF WELL NO. MW-6

Project: ERWIN TOWN LANDFILL - SITE ID 851003
Location: TOWN OF ERWIN, STEUBEN COUNTY, N.Y.
Well Coordinates/Reference System: N 4187.3247 E 4244.6805
Date Started/Finished: 10-8-93 / 10-8-93
Drilling Company: AMERICAN AUGER AND DITCHING
Driller/Geologist: LEE PENROD / GREG ANDRUS

Total Depth of Hole (feet BGS): 19.0
Ground Elevation (feet above MSL): 93.72
Inner Casing Stick-Up (feet above GS): 2.20
Groundwater Depth (feet BGS):
Date Of Water Level Meas.: 14 NOV 1993
Water Level: 7.65

ELEVATION / DEPTH	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SPLIT SPOON NO.	BLOW COUNT	SS RECOVERY (FT)	HNU/OVA (ppm)	COMMENTS
gs elevation 93.72 ft.			*ground surface (gs)*					
1–2	GROUT		0.0–2.0' SILT and SAND: brown, sand is fine grained, with trace of clay, coarse sand, and fine gravel, moist.	SS-1	3 6 14 12	2.0	0/0	
2–3			No sample.					
4–5	BENTONITE SEAL		4.0–6.0' SILT: brown to gray, some clay, and trace fine sand, moist.	SS-2	8 4 4 5	2.0	0/0	
6–7			No sample.					
9–10	SAND PACK		9.0–10.0' SILT: Same as 4.0–6.0', moist.	SS-3	4 13 2 4	2.0	0/2.5	Collected sample from 9.0–11.0' BGS for grain-size analysis.
10–11			10.0–19.0' GRAVEL and SAND: brown, fine to coarse, with some silt, wet, with silt lenses at 14.0' and 17.5–18.5'.					
11–12				SS-4	2 2 4 4	2.0	0/0	Collected sample from 11.0–13.0' BGS for full TCL analysis.
13–14				SS-5	4 4 2 5	2.0	0/0	
14–15								

TOWN OF ERWIN, STEUBEN CO[illegible], N.Y.

Ecology and Environment Engineering, P.C.

ERWIN-WL

DRILLING LOG OF WELL NO. MW-6

Project: ERWIN TOWN LANDFILL - SITE ID 851003

Total Depth of Hole (feet BGS): 19.0

ELEVATION / DEPTH	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SPLIT SPOON NO.	BLOW COUNT	SS RECOVERY (FT)	HNu/OVA (ppm)	COMMENTS
16	SAND PACK			SS-6	6 8 13 3	2.0	0/2	
17								
18				SS-7	10 36 50/ 5"	2.0	0.5/0	
19								2-inch ID PVC screen with 0.010-inch slots set from 8.0-18.0' BGS. Sandpack (#0) from 7.0-18.0' BGS. Bentonite seal from 4.0-7.0' BGS. Grout from 4.0' BGS to grade. Five foot length of 4-inch locked steel protective casing (Master lock #3252)
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
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33								
34								
35								
36								

TOWN OF ERWIN, STEUBEN COUNTY, N.Y.

WELL DEVELOPMENT RECORD
The Sear-Brown Group

Job Name: Hamilton Street
Well ID: MW-6
Personnel: D. Gnage

Job No: 14705a
Date/Time: 8/1/2000 @ 1005

Well Depth (ft):	17.30	Well Volume (Gal):	0.00
Water Level (ft): (-)	8.44	(See Calculations)	
Water Col.(ft):	8.86	Total Volume Removed:	12.0
		Development Method:	foot valve

Development Monitoring

Volume number/Time	1/1010	2/1015	3/1020	4/1025	5/1030
Volume Purged	1.5	3.0	4.5	6.0	7.5
Temp(C)	14.5	14.8	14.2	14.8	14.1
pH	6.67	6.66	6.66	6.64	6.62
Spec. Cond(umhos)	1169	1230	1241	1261	1265
Turbidity (NTU)	>200	>200	>200	>200	>200
ORP (eV)	-103.0	-79.0	-43.0	-24.0	-16.0
Color/odor	brown silty/sandy	brown silty/sandy	brown silty/sandy	brown silty/sandy	brown silty/sandy

Volume number/Time	6/1035	7/1040	8/1045	9/	10/
Volume Purged	9.0	10.5	12.0		
Temp(C)	13.8	13.4	13.6		
pH	6.66	6.62	6.61		
Spec. Cond(umhos)	1267	1277	1274		
Turbidity (NTU)	>200	>200	>200		
ORP (eV)	-17.0	-5.0	-15.0		
Color/odor	brown silty/sandy	brown silty/sandy	brown silty/sandy		

Meter ID Myron 6P Ultrameter
Lamotte turbidity meter

Well Vol. Calcs.

Note: 2" dia. well 1'=16 gal; 4" dia. well 1'=0.65'

Weather
Comments Possible 3' section of old dedicated PVC bailer in well. The top was suspended in the riser.

Checked By Date

Barton & Loguidice, P.C.
Consulting Engineers

SUBSURFACE INVESTIGATION LOG

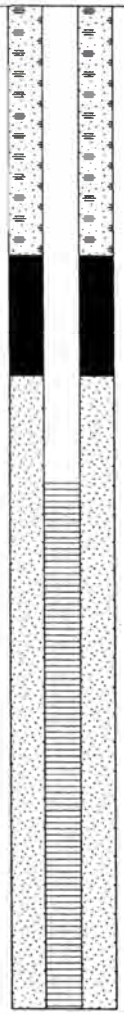
BORING NO. **MW-8**
B&L Project No. 268.012

Project: Erwin Landfill
Client: Steuben County
Project Location:Town of Erwin/Painted Post

Drill Rig: CME ATV	Elevation: 935.15 Feet Datum: NGVD
Casing: 4-1/4" HSA	Northing: 784292.2924 Easting: 680995.8735
Soil Sampler:2" Split-Spoon Sampler	Start Date: 5/15/01 Finish Date: 5/15/01
Sample Hammer Wt: 140 Fall: 30 inches	Contractor: Geologic
Rock Sampler:	Driller: Scott Breeds
Other:	Geologist: Bryce Dingman

Depth	Sample Type	Blows per 6"	N or RQD %	Recovery (ft)	PID (ppm)	Lithology	Material Description
		1,1,2,3	3	1'3"	0.0		Topsoil, dark brown silty loam, damp, some small pebbles, some fine sand.
		2,4,3,3	7	1'6"	0.0		Dark brown silty loam, some clay, some fine sand, damp.
5		3,3,5,5	8	1'9"	0.0		Dark brown silty loam, some clay, some fine sand, damp.
		6,6,5,7	11	1'9"	0.5		Brown silty loam, some clay, some fine sand, small fragments of black shale, wet.
		2,4,4,6	8	1'5"	0.0		Brown silty loam,some clay and fine sand. At 9' change to coarse sand and gravel, saturated. Water table at approximately 9'.
10		5,7,9,10	16	6"	0.0		Coarse sand and gravel, well rounded, saturated.
		4,7,8,6	15	1'	0.0		Coarse sand, some coarse gravel, sand and gravel rounded, saturated.
15		4,10,20, 12	30	1'6"	0.0		6" Clay lense at approximately 15', reddish brown color. 1' of coarse sand and gravel at bottom of spoon, saturated.
		6,12,20, 18	32	1'9"	0.3		Coarse sand and gravel, well rounded, saturated.
							End of Boring

Well Completion Details



Notes:

C:\Program Files\Well Logger\Erwin Landfill.wl2

Barton & Loguidice, P.C.
Consulting Engineers

SUBSURFACE INVESTIGATION LOG

BORING NO. **MW-8**
B&L Project No. 268.012

Project: **Erwin Landfill**
Client: **Steuben County**
Project Location: **Town of Erwin/Painted Post**

Depth	Sample Type	Blows per 6"	N or RQD %	Recovery (ft)	PID (ppm)	Lithology	Material Description	Well Completion Details
							Well Development: The well was developed using Waterra 1"OD tubing and a High Flow 1" footvalve. MW-8 was developed for 3 hours removing approximately 85 gallons. Well Development Parameters: Turbidity >1000 NTU's Specific Conductivity >1000 Eh = 20-30 mV pH = 7.0 su Temperature = 56 degrees Fahrenheit	

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Notes:

Barton & Loguidice, P.C.
Consulting Engineers

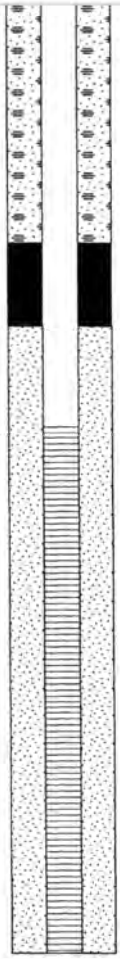
SUBSURFACE INVESTIGATION LOG

BORING NO. **MW-9**
B&L Project No. 268.012

Project: Erwin Landfill		
Client: Steuben County		
Project Location:Town of Erwin/Painted Post		
Drill Rig: CME ATV	Elevation: 932.07 Feet	Datum: NGVD
Casing: 4-1/4" HSA	Northing: 784274.9470	Easting: 680491.3426
Soil Sampler:2" Split Spoon Sampler	Start Date: 5/16/01	Finish Date: 5/16/01
Sample Hammer Wt: 140 Fall: 30 inches	Contractor:	
Rock Sampler:	Driller:	
Other:	Geologist: Bryce Dingman	

Depth	Sample Type	Blows per 6"	N or RQD %	Recovery (ft)	PID (ppm)	Lithology	Material Description
		1,1,1,2	2	4"	0.0		Black silt and sand mixed with broken fragments of ceramic and glass debris, wet.
		1,1,1,2	2	1'6"	0.0		Gray-green silty-clay, saturated. Water table located at approximately 3'.
5		2,1,5,6	6	1'6"	0.0		Gray-green silty-clay grades into coarse sand and gravel around 5'. some patches of fine sand, saturated.
		5,6,7,7	13	1'6"	0.0		Gray, dirty sand and coarse gravel. Gravel well rounded, saturated
		4,8,8,10	16	1'4"	0.0		Gray, dirty sand and gravel, saturated
10		2,8,6,3	14	1'0"	0.0		Gray, dirty medium sand, coarse gravel, gravel well rounded, saturated. One small clay lense at 11'.
		6,25,32, 40	57	1'6"	0.0		Brown coarse sand and gravel, some silt. Sand and gravel well rounded, saturated.
15		22,18,18 ,14	36	1'6"	0.0		Brown coarse sand and gravel, silt, saturated.
		12,15,13 ,15	28	1'6"	0.0		Gray, dirty, coarse sand and gravel, grades to a silty clay with numerous rounded clasts, saturated.
							End of Boring

Well Completion Details



Notes:

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Barton & Loguidice, P.C.
Consulting Engineers

SUBSURFACE INVESTIGATION LOG

BORING NO. **MW-9**
B&L Project No. 268.012

Project: **Erwin Landfill**
Client: **Steuben County**
Project Location: **Town of Erwin/Painted Post**

Depth	Sample Type	Blows per 6"	N or RQD %	Recovery (ft)	PID (ppm)	Lithology	Material Description	Well Completion Details
							Well Development: The well was developed using Waterra 1"OD tubing and a High Flow 1" footvalve. MW-9 was developed for 3 hours removing approximately 85 gallons. Well Development Parameters: Turbidity >500 NTU's Specific Conductivity >1000umhos/cm Eh = 60-70 mV pH = 7.1 su Temperature = 55 degrees Fahrenheit	

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Notes:

C:\Program Files\Well Logger\Erwin Landfill.wl2

SEAR·BROWN

85 Metro Park
Rochester, NY 14623
(716) 475-1440

Test Boring No.: MW-A1

Project: Hamilton Street
Project#: 14705A
Client: NYSDOT
Location: 60'E of asphalt turnaround
7' N of access road from Rt.15

Drilling Contractor: Natures Way
Driller: S. Gingrich
Elevation:
Weather: overcast +/- 70F

Start Date: 6/12/00
Completion Date: 6/12/00
Drilling Method: 4 1/4 HSA
Supervisor: D. Gnage

	C	Blows on Sampler 0-6"	6-12"	12-18"	18-24"	SAMPLE N	Rec.	No.	Depth	Soil and Rock Information Remarks
0									0-0.6m	
		2				5	0.95	1	0-2'	organic material (topsoil), lt.brown to tan silt,
			2							trace sand & gravel (0.12m; 0.4ft)
				3						dk.brown/black, SP sand, fine to medium grain,
					6				0.6-1.2m	trace silt & gravel, moist (0.15m; 0.5ft)
0.8m		3				7	1	2	2-4'	lt.brown to orange silt, trace sand, soft to medium, moist
2.5ft			3							(0.23m; 0.75ft)
				4						SP sand, fine to medium grain, trace silt & gravel, moist,
					3				1.2-1.8m	dk.brown to black
		2				4	1.1	3	4-6'	(1.37m; 4.5ft)
1.5m			2							tan silt, trace sand & clay, hard, dry
5.0ft				2						
					9				1.8-2.4m	(1.8m; 6.0ft)
		5				16	1.3	4	6-8'	same as above, moist, gray (native)
			7							
2.3m				9						
7.5ft					10				2.4-3.0m	(2.5m; 8.2ft)
		10				32	0.7	5	8-10'	SP sand, some silt & gravel, few pebbles, wet, lt.brown
			16							to red
				16						
3.0m					17				3.0-3.7m	
10.0ft		6				30	0.6	6	10-12'	
			12							
				18						
					18				3.7-4.3m	
3.8m		8				16	0.1	7	12-14'	
12.5ft			10							(3.9m; 12.8ft)
				6						same as above, saturated
					6				4.3-4.9m	
		5				15	1.1	8	14-16'	
4.6m			6							
15.0ft				9						
					4				4.9-5.5m	
		15				54	1	9	16-18'	
			22							
5.3m				32						
17.5ft					20				5.5-6.1m	
										(5.5m; 18.0ft)
										End of hole @ 18.0ft

N = No. of Blows to Drive _____ Spoon _____ with _____ lb. Wt. _____ Ea. Blow
C = No. of Blows to Drive _____ Casing _____ with _____ lb. Wt. _____ Ea. Blow

SEAR-BROWN

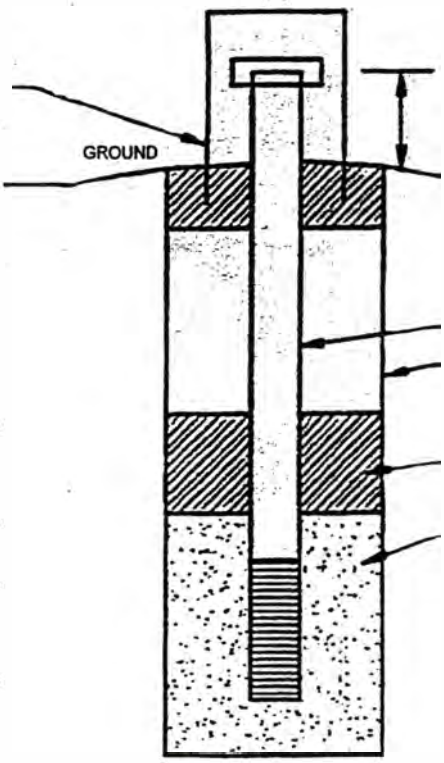
OVERBURDEN MONITORING WELL CONSTRUCTION LOG

PROJECT NAME: Hamilton St.
PROJECT NUMBER: 1470Sa
CLIENT: NYSDOT
LOCATION: 60' E of asphalt turn around, 7' N of access road

HOLE DESIGNATION: MW-A1
DATE COMPLETED: 6/12/00
DRILLING METHOD: 4 ¼ HSA
SUPERVISOR: D. Gnage

CAP TYPE: Kobe

PROTECTIVE CASING: 4" dia. Steel



STICK-UP: 1.8/.548 ft/m

SURFACE SEAL TYPE: N/A

TOP OF SEAL* AT	4	ft/m	1.22
BOTTOM OF SEAL AT	6	ft/m	1.83
TOP OF SCREEN* AT	7	ft/m	2.13
BOTTOM OF SCREEN* AT	17	ft/m	5.18
BOTTOM OF HOLE* AT	18	ft/m	5.48

WELL CASING
ANNULUS BACKFILL
TYPE: grout

SEAL TYPE: bentonite

PACK TYPE: - SAND, SIZE #2 sand
- GRAVE
- NATURAL

*NOTE:
ALL DIMENSIONS ARE
BELOW GROUND SURFACE (BGS)

SCREEN TYPE: CONTINUOUS SLOT ___ PERFORATED X LOUVRE ___ OTHER ___

SCREEN MATERIAL: STAINLESS STEEL ___ PLASTIC ___ OTHER PVC

SCREEN LENGTH: 10.0/3.0 ft/ m SCREEN DIAMETER 2.0/5.0 in/cm SCREEN SLOT SIZE: 10

WELL CASING MATERIAL: Sch 40 PVC WELL CASING DIAMETER: 2.0/5.0 in/ cm

BOREHOLE DIAMETER: 8.0/20.0 in/cm

DEVELOPMENT: METHOD: Foot valve DURATION:

SEAR·BROWN
85 Metro Park
Rochester, NY 14623
(716) 475-1440

Test Boring No.: MW-A2

Project: Hamilton Street
Project#: 14705A
Client: NYSDOT
Location: 40'W &80'S of NYSEG Pole 260

Drilling Contractor: Natures Way
Driller: S. Gingrich
Elevation:
Weather: overcast

Start Date: 6/12/00
Completion Date: 6/12/00
Drilling Method: 4 1/4 HSA
Supervisor: D. Gnage

	C	Blows on Sampler 0-6"	6-12"	12-18"	18-24"	SAMPLE N	Rec.	No.	Depth	Soil and Rock Information / Remarks
0									0-0.6m	
		2				24	1	1	0-2'	topsoil (0.06m; 0.2ft)
			9							gray/brown silt, soft, trace sand, mois (0.12m; 0.4ft)
				15						red/brown silt, trace clay, some sand & gravel,
					10				0.6-1.2m	few pebbles, hard, dry (0.6m; 2.0ft)
0.8m		10				22	0.9	2	2-4'	dk.brown silt, some sand & gravel, pebbles, soft, moist
2.5ft			12							
				10						
					6				1.2-1.8m	(1.25m; 4.1ft)
		2				7	1.0	3	4-6'	dk. gray silt, trace clay & sand, medium to soft, moist
1.5m			2							
5.0ft				5						
					5				1.8-2.4m	
		2				5	1.0	4	6-8'	(1.98m; 6.5ft)
			2							green/gray clay, some silt & sand, soft, moist (native)
2.3m				3						
7.5ft					3				2.4-3.0m	(2.4m; 8.0ft)
		2				7	1.2	5	8-10'	same as above with rust mottling/streaking, blue/gray
			2							
				5						
3.0m					5				3.0-3.7m	
10.0ft		7				24	1.0	6	10-12'	(3.2m; 10.5ft)
			12							blue/gray silt, some sand & gravel, trace clay, few
				12						pebbles, moist, spots of brick red silt
					14				3.7-4.3m	(3.7m; 12.0ft)
3.8m		9				23	0.4	7	12-14'	GP gravel, fine to medium grain, some sand & silt,
12.5ft			12							blue/gray, wet
				11						
					8				4.3-4.9m	(4.3m; 14.0ft)
		2				6	0.0	8	14-16'	same as above, lt.brown, saturated
4.6m			3							
15.0ft				3						
					4				4.9-5.5m	
		8				40	0.4	9	16-18'	
			22							
5.3m				18						
17.5ft					13				5.5-6.1m	
		12				20	NR	10	18-20'	
			12							
				8						(6.1m; 20.0ft)
					11					End of hole at 20.0ft

N = No. of Blows to Drive _____ Spoon _____ with _____ lb. Wt. _____ Ea. Blow
C = No. of Blows to Drive _____ Casing _____ with _____ lb. Wt. _____ Ea. Blow

SEAR-BROWN

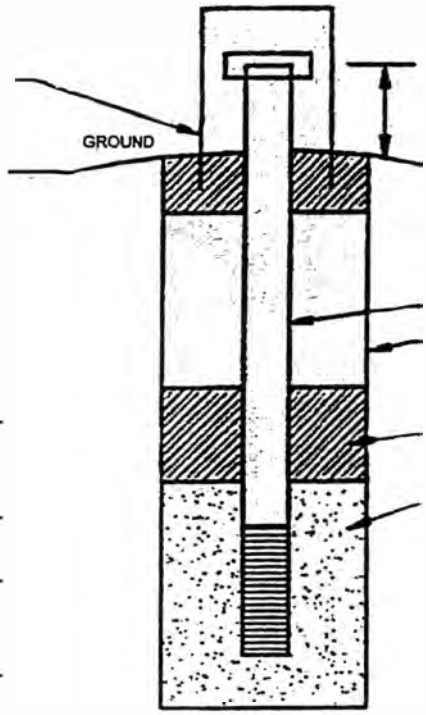
OVERBURDEN MONITORING WELL CONSTRUCTION LOG

PROJECT NAME: Hamilton St.
PROJECT NUMBER: 14705a
CLIENT: NYSDOT
LOCATION: 10'W & 80' S of NYSEG Pole#260

HOLE DESIGNATION: MW A2
DATE COMPLETED: 6/12/00
DRILLING METHOD: 4 ¼ HSA
SUPERVISOR: D. Gnage

CAP TYPE: Kobe

PROTECTIVE CASING
4" dia. Steel



STICK-UP: 2.15/0.655 ft/m

SURFACE SEAL TYPE: N/A

TOP OF SEAL* AT: 6 ft/m 1.83

BOTTOM OF SEAL* AT: 8 ft/m 2.43

TOP OF SCREEN* AT: 9 ft/m 2.74

BOTTOM OF SCREEN* AT: 19 ft/m 5.79

BOTTOM OF HOLE* AT: 20 ft/m 6.09

WELL CASING

ANNULUS BACKFILL
TYPE: grout

SEAL TYPE: bentonite

PACK TYPE: - SAND, SIZE #2 sand
- GRAVE
- NATURAL

*NOTE:
ALL DIMENSIONS ARE
BELOW GROUND SURFACE (BGS)

SCREEN TYPE: CONTINUOUS SLOT ___ PERFORATED X LOUVRE ___ OTHER ___

SCREEN MATERIAL: STAINLESS STEEL ___ PLASTIC ___ OTHER PVC

SCREEN LENGTH: 10.0/3.0 ft/ m SCREEN DIAMETER 2.0/5.0 in/cm SCREEN SLOT SIZE: 10

WELL CASING MATERIAL: Sch 40 PVC WELL CASING DIAMETER: 2.0/5.0 in/ cm

HOLE DIAMETER: 8.0/20.0 in/cm

DEVELOPMENT: METHOD: Foot valve DURATION:

SEAR·BROWN

85 Metro Park
Rochester, NY 14623
(716) 475-1440

Test Boring No.: MW-A3

Project: Hamilton Street
Project#: 14705A
Client: NYSDOT
Location: 110'S of southern A-frame
5' E of road

Drilling Contractor: Natures Way
Driller: S. Gingrich
Elevation:
Weather:NR

Start Date: 6/13/00
Completion Date: 6/13/00
Drilling Method: 4 1/4 HSA
Supervisor: D. Gnage

	C	Blows on Sampler 0-6"	6-12"	12-18"	18-24"	SAMPLE N	Rec.	No.	Depth	Soil and Rock Information Remarks
0									0-0.6m	
		3				20	0.5	1	0-2'	SP sand, fine grained, trace silt, moist, black (0.03m; 0.1ft)
			8							SP sand, fine to medium grained, some gravel, trace silt,
				12						few pebbles, moist,brown, few small pieces of slag
					8				0.6-1.2m	(0.6m; 2.0ft)
0.8m		8				26	0.3	2	2-4'	SP sand, fine to medium grained, trace silt & gravel,
2.5ft			15							moist, pieces of wood, rust & black staining,
				11						orange/brown
					8				1.2-1.8m	(1.2m; 4.0ft)
		11				25	0.4	3	4-6'	gray/brown silt, some sand, trace gravel, few pebbles,
1.5m			14							moist, soft
5.0ft				11						
					10				1.8-2.4m	(1.86m; 6.1ft)
		11				21	0.7	4	6-8'	tan silt, trace sand, some pebbles, moist, soft
			10							(1.95m; 6.4ft)
2.3m				11						wood (1.98m; 6.5ft)
7.5ft					14				2.4-3.0m	blue/gray silt, trace sand, some gravel& pebbles, iron
		5				15	0.6	5	8-10'	mottling/staining, moist, soft (2.47m; 8.1ft)
			7							SP sand, some silt, little to trace gravel, moist, brown
				8						at (2.5m; 8.2ft) pieces of iron.
3.0m					11				3.0-3.7m	(3.0m; 10.0ft)
10.0ft		4				43	0.4	6	10-12'	brown silt, trace sand, some gravel & pebbles, soft, moist
			27							
				16						
					16				3.7-4.3m	(3.68m; 12.1ft)
3.8m		11				25	0.9	7	12-14'	green/gray silt, some sand & gravel, few pebbles,
12.5ft			12							soft, wet (native) (3.75m; 12.3ft)
				13						same as above lt.brown/gray
					11				4.3-4.9m	(4.3m; 14.0ft)
		5				17	0.6	8	14-16'	sand & gravel, fine to medium grain, some silt & cobbles,
4.6m			6							gray/brown, saturated
15.0ft				11						
					15				4.9-5.5m	
		38				33	0.9	9	16-18'	
			16							
5.3m				17						
17.5ft					17				5.5-6.1m	
		21				57	1.1	10	18-20'	
			31							(5.8m; 19.1ft)
				26						
					34					End of hole at 20.0ft

N = No. of Blows to Drive _____ Spoon _____ with _____ lb. Wt. _____ Ea. Blow
C = No. of Blows to Drive _____ Casing _____ with _____ lb. Wt. _____ Ea. Blow

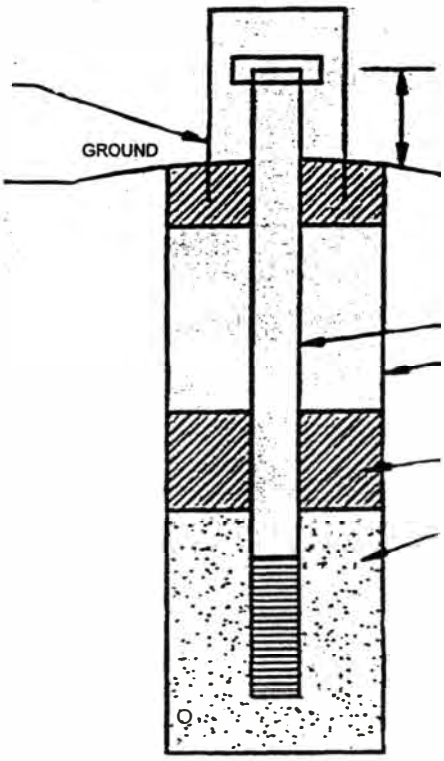
SEAR-BROWN

OVERBURDEN MONITORING WELL CONSTRUCTION LOG

PROJECT NAME	Hamilton St.	HOLE DESIGNATION	MW-A3
PROJECT NUMBER	14705a	DATE COMPLETED	6/13/00
CLIENT	NYSDOT	DRILLING METHOD	4 ¼ HSA
LOCATION	110' S of Southern A-frame 5' E of Road	SUPERVISOR	D. Gnage

CAP TYPE: Kobe

PROTECTIVE CASING: 4" dia. Steel



STICK-UP 2.0/0.61 ft/m

SURFACE SEAL TYPE N/A

TOP OF SEAL* AT	6	ft/m	1.83
BOTTOM OF SEAL* AT	8	ft/m	2.43
TOP OF SCREEN* AT	9	ft/m	2.74
BOTTOM OF SCREEN* AT	19	ft/m	5.79
BOTTOM OF HOLE* AT	20	ft/m	6.09

WELL CASING

ANNULUS BACKFILL

TYPE: grout

SEAL TYPE: bentonite chips

PACK TYPE: - SAND, SIZE #2 sand
- GRAVE
- NATURAL

*NOTE:
ALL DIMENSIONS ARE BELOW GROUND SURFACE (BGS)

SCREEN TYPE: CONTINUOUS SLOT ___ PERFORATED X LOUVRE ___ OTHER ___

SCREEN MATERIAL: STAINLESS STEEL ___ PLASTIC ___ OTHER PVC

SCREEN LENGTH: 10.0/3.0 ft/ m SCREEN DIAMETER 2.0/5.0 in/cm SCREEN SLOT SIZE: 10

WELL CASING MATERIAL: Sch 40 PVC WELL CASING DIAMETER: 2.0/5.0 in/ cm

HOLE DIAMETER: 8.0/20.0 in/cm

DEVELOPMENT: METHOD: Foot valve DURATION:

SEAR·BROWN

85 Metro Park
Rochester, NY 14623
(716) 475-1440

Test Boring No.: MW-A4

Project: Hamilton Street
Project#: 14705A
Client: NYSDOT
Location: 50'S & 64' of concrete bridge

Drilling Contractor: Natures Way
Driller: S. Gingrich
Elevation:
Weather: overcast +/-65°F

Start Date: 6/13/00
Completion Date: 6/13/00
Drilling Method: 4 1/4 HSA
Supervisor: D. Gnage

	C	Blows on Sampler 0-6"	6-12"	12-18"	18-24"	SAMPLE N	Rec.	No.	Depth	Soil and Rock Information Remarks
0									0-0.6m	
		10				38	1	1	0-2'	brown silt, some sand & gravel, roots & organic material,
			24							soft, wet (0.06m; 0.2ft)
				14						gray/brown silt, some sand, little gravel, few pebbles,
					24				0.6-1.2m	hard, dry (0.6m; 2.0ft)
0.8m		9				16	0.4	2	2-4'	same as above, moist
2.5ft			10							
				6						
					6				1.2-1.8m	
		5				10	0.4	3	4-6'	at (1.3m; 4.35ft) wood pieces
1.5m			7							
5.0ft				3						
					5				1.8-2.4m	
		3				7	0.4	4	6-8'	
			4							
2.3m				3						
7.5ft					5				2.4-3.0m	(2.5m; 8.3ft)
		8				14	1.3	5	8-10'	gray to gray/green silty clay, hard, moist, iron mottling/
			8							streaking (native)
				6						
3.0m					8				3.0-3.7m	(3.0m; 10.0ft)
10.0ft		3				11	0.8	6	10-12'	SP sand, some gravel, fine to medium grain, some
			4							pebbles, trace silt, wet to saturated, yellow/brown, iron
				7						staining
					9				3.7-4.3m	(3.7m; 12.0ft)
3.8m		9				36	0.6	7	12-14'	same as above, saturated, increase in
12.5ft			15							gravel & pebbles/cobbles content
				21						
					17				4.3-4.9m	(4.9m; 16.0ft)
		28				32	0.3	8	14-16'	SP and, fine to medium grain, some gravel, few to trace
4.6m			17							pebbles, trace silt, wet, lt.brown
15.0ft				15						
					7				4.9-5.5m	
		7				13	0.75	9	16-18'	
			3							
5.3m				10						
17.5ft					10				5.5-6.1m	*(5.5m; 18.0ft)
								10	18-20'	End of hole at 18.0ft (5.5m)
										* based on limited recovery

N = No. of Blows to Drive _____ Spoon _____ with _____ lb. Wt. _____ Ea. Blow
C = No. of Blows to Drive _____ Casing _____ with _____ lb. Wt. _____ Ea. Blow

SEAR-BROWN

OVERBURDEN MONITORING WELL CONSTRUCTION LOG

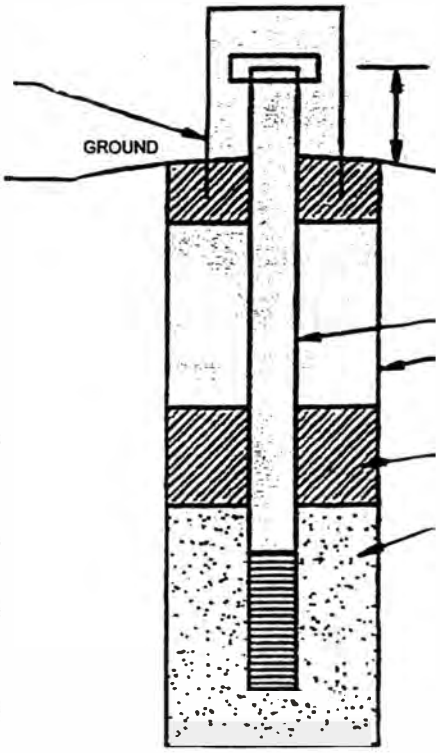
PROJECT NAME Hamilton St.
PROJECT NUMBER 14705a
CLIENT NYSDOT
LOCATION 50'S & 64' W of concrete bridge

HOLE DESIGNATION MW-A4
DATE COMPLETED 6/13/00
DRILLING METHOD 4 ¼ HSA
SUPERVISOR D. Gnage

CAP TYPE Kobe

PROTECTIVE CASING

" dia. Steel



STICK-UP 2.1/0.64 ft/m

SURFACE SEAL TYPE N/A

WELL CASING

ANNULUS BACKFILL
TYPE: grout

SEAL TYPE: bentonite pellets

PACK TYPE: - SAND, SIZE #2 sand
- GRAVE
- NATURAL

TOP OF SEAL* AT 4 ft/m 1.22

BOTTOM OF SEAL* AT 6 ft/m 1.83

TOP OF SCREEN* AT 7 ft/m 2.13

BOTTOM OF SCREEN* AT 17 ft/m 5.18

BOTTOM OF HOLE* AT 18 ft/m 5.49

*NOTE:
ALL DIMENSIONS ARE
BELOW GROUND SURFACE (BGS)

SCREEN TYPE: CONTINUOUS SLOT ___ PERFORATED X LOUVRE ___ OTHER ___

SCREEN MATERIAL: STAINLESS STEEL ___ PLASTIC ___ OTHER PVC

SCREEN LENGTH: 10.0/3.0 ft/m SCREEN DIAMETER 2.0/5.0 in/cm SCREEN SLOT SIZE: 10

WELL CASING MATERIAL: Sch 40 PVC WELL CASING DIAMETER: 2.0/5.0 in/cm

HOLE DIAMETER: 8.0/2.0 in/cm

DEVELOPMENT: METHOD: Foot valve DURATION: ___

SEAR·BROWN

85 Metro Park
Rochester, NY 14623
(716) 475-1440

Test Boring No.: MW-A5

Project: Hamilton Street
Project#: 14705A
Client: NYSDOT
Location: NE corner of garage

Drilling Contractor: Natures Way
Driller: S. Gingrich
Elevation:
Weather: overcast +/-60°F

Start Date: 6/12/00
Completion Date: 6/12/00
Drilling Method: 4 1/4 HSA
Supervisor: D. Gnage

	C	Blows on Sampler 0-6"	6-12"	12-18"	18-24"	SAMPLE N	Rec.	No.	Depth	Soil and Rock Information Remarks
0									0-0.6m	
		1				7	1.25	1	0-2'	brown silt, trace sand & gravel, moist, soft (topsoil) (0.21m; 0.7ft)
			2							brown silt, trace sand, dry, hard (0.27m; 0.9ft)
				5						SW sand, fine grained, trace silt, moist, tan/orange
					5				0.6-1.2m	(0.64m; 2.1ft)
0.8m		3				12	1.1	2	2-4'	brown silt, trace clay, medium to hard, moist
2.5ft			5							
				7						
					7				1.2-1.8m	(1.28m; 4.2ft)
		2				16	1.4	3	4-6'	gray silt, trace clay, hard, moist, red/brown to rust
1.5m			6							mottling/streaking (native)
5.0ft				10						
					11				1.8-2.4m	(1.8m; 6.0ft)
		3				17	1.7	4	6-8'	red/brown silt, trace clay, hard, moist,
			8							gray/mottling/streaking
2.3m				9						
7.5ft					11				2.4-3.0m	
		3				12	1.2	5	8-10'	(2.65m; 8.7ft)
			5							rust colored silt, some sand & gravel, trace clay, soft
				7						(2.68m; 8.8ft)
3.0m					8				3.0-3.7m	SP sand, fine to medium grain, some silt&gravel,
10.0ft		1				4	0.8	6	10-12'	moist to wet, gray (3.0m; 10.0ft)
			1							red/brown silt, some clay, trace to no sand, moist
				3						(3.4m; 11.2ft)
					5				3.7-4.3m	SP sand, some silt, little gravel, moist to wet,
3.8m		1				3	0.5	7	12-14'	pieces of wood, few pebbles, gray (3.7m; 12.0ft)
12.5ft			1							
				2						red/brown silt, some clay, soft, pebbles, wet
					5				4.3-4.9m	(4.3m; 14.0ft)
		1				13	1.0	8	14-16'	SP sand, fine to medium, some silt & gravel, few
4.6m			5							cobbles, brown, saturated
15.0ft				8						
					9				4.9-5.5m	
		5				20	0	9	16-18'	
			8							
5.3m				12						
17.5ft					4				5.5-6.1m	
		8				20	0.5	10	18-20'	
			9							
				11						
					14					End of hole (6.1m; 20.0ft)

N = No. of Blows to Drive _____ Spoon _____ with _____ lb. Wt. _____ Ea. Blow
C = No. of Blows to Drive _____ Casing _____ with _____ lb. Wt. _____ Ea. Blow

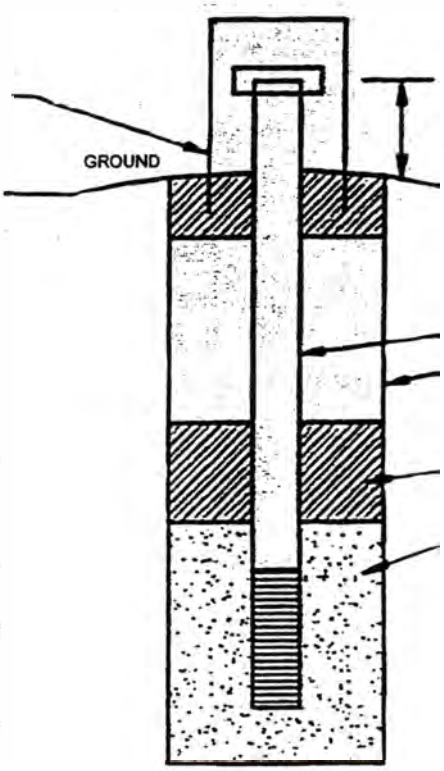
SEAR-BROWN

OVERBURDEN MONITORING WELL CONSTRUCTION LOG

PROJECT NAME	Hamilton St.	HOLE DESIGNATION	MW-A5
PROJECT NUMBER	14705a	DATE COMPLETED	6/12/00
CLIENT	NYSDOT	DRILLING METHOD	4 ¼ HSA
LOCATION	NE corner of garage	SUPERVISOR	D. Gnage

CAP TYPE: Kobe

PROTECTIVE CASING: 4" dia. Steel



STICK-UP: 2.0/0.61 ft/m

SURFACE SEAL TYPE: N/A

WELL CASING

ANNULUS BACKFILL TYPE: grout

SEAL TYPE: bentonite

PACK TYPE: - SAND, SIZE #2 sand
- GRAVE
- NATURAL

TOP OF SEAL* AT	6	ft/m	1.83
BOTTOM OF SEAL* AT	8	ft/m	2.43
TOP OF SCREEN* AT	9	ft/m	2.74
BOTTOM OF SCREEN* AT	19	ft/m	5.79
BOTTOM OF HOLE* AT	20	ft/m	6.09

*NOTE: ALL DIMENSIONS ARE BELOW GROUND SURFACE (BGS)

SCREEN TYPE: CONTINUOUS SLOT ___ PERFORATED X LOUVRE ___ OTHER ___

SCREEN MATERIAL: STAINLESS STEEL ___ PLASTIC ___ OTHER PVC

SCREEN LENGTH: 10.0/3.0 ft/ m SCREEN DIAMETER 2.0/5.0 in/cm SCREEN SLOT SIZE: 10

WELL CASING MATERIAL: Sch 40 PVC WELL CASING DIAMETER: 2.0/5.0 in/ cm

HOLE DIAMETER: 8.0/2.0 in/cm

DEVELOPMENT: METHOD: Foot valve DURATION:

N:Jobs/14705a/Data/PhaseII/Borings-wellinstall/ob instr log SiteA.xls/MW-A5

SEAR·BROWN

85 Metro Park
Rochester, NY 14623
(716) 475-1440

Test Boring No.: MW-A6

Project: Hamilton Street
Project#: 14705A
Client: NYSDOT
Location: 104' S of bridge
5' W of road

Drilling Contractor: Natures Way
Driller: S. Gingrich
Elevation:
Weather: overcast +/-70°F

Start Date: 6/14/00
Completion Date: 6/14/00
Drilling Method: 4 1/4 HSA
Supervisor: D. Gnage

	C	Blows on Sampler 0-6"	6-12"	12-18"	18-24"	SAMPLE N	Rec.	No.	Depth	Soil and Rock Information Remarks
0									0-0.6m	
		2				8	1.0	1	0-2'	brown silt, trace sand, roots & organics, soft, moist to wet,
			4							flecks of rust/orange (0.11m; 0.35ft)
				4						white silty clay, moist, hard, mixed with white/yellow honey-
					3				0.6-1.2m	combed plastic pieces (0.6m; 2.0ft)
0.8m		22				40	1.0	2	2-4'	dk.red/brown silt, trace sand, soft, moist
2.5ft			24							(0.67m; 2.2ft)
				16						SP sand, fine to medium grain, some silt, trace gravel,
					17				1.2-1.8m	moist, black to dk.brown,
		12				25	1.0	3	4-6'	at (0.73m; 2.4ft) rock (1.28m; 4.2ft)
1.5m			14							gray/green silt, some sand & gravel, few pebbles,
5.0ft				11						medium to soft, moist
					33				1.8-2.4m	(1.86m; 6.1ft)
		12				21	0.4	4	6-8'	SP sand, fine to medium grain, some gravel, few
			6							pebbles & cobbles, dry, tan
2.3m				15						
7.5ft					7				2.4-3.0m	(2.4m; 8.0ft)
		10				16	0.6	5	8-10'	SP sand, some gravel & pebbles, moist, pieces of slag,
			5							black
				11						
3.0m					9				3.0-3.7m	(3.01m; 10.12ft)
10.0ft		4				13	0.7	6	10-12'	GP gravel, medium to large grain, some sand & silt,
			8							pebbles, moist to wet (3.7m; 12.0ft)
				5						
					6				3.7-4.3m	same as above, wet (3.7m; 12.15ft)
3.8m		8				21	1.2	7	12-14'	gray/brown silty clay, trace sand & gravel,
12.5ft			9							wet to saturated (native) (3.9m; 12.8ft)
				12						same as above, increase in gravel
					14				4.3-4.9m	
		5				28	0.5	8	14-16'	
4.6m			11							
15.0ft				17						
					23				4.9-5.5m	(4.9m; 16.0ft)
		23				29	0.8	9	16-18'	GP gravel, medium to large grain, some sand & silt,
			16							saturated, gray/brown
5.3m				13						
17.5ft					12				5.5-6.1m	
		5				25	0.7	10	18-20'	
			10							
				15						
					16					End of hole (6.1m; 20.0ft)

N = No. of Blows to Drive _____ Spoon _____ with _____ lb. Wt. _____ Ea. Blow
C = No. of Blows to Drive _____ Casing _____ with _____ lb. Wt. _____ Ea. Blow

SEAR-BROWN

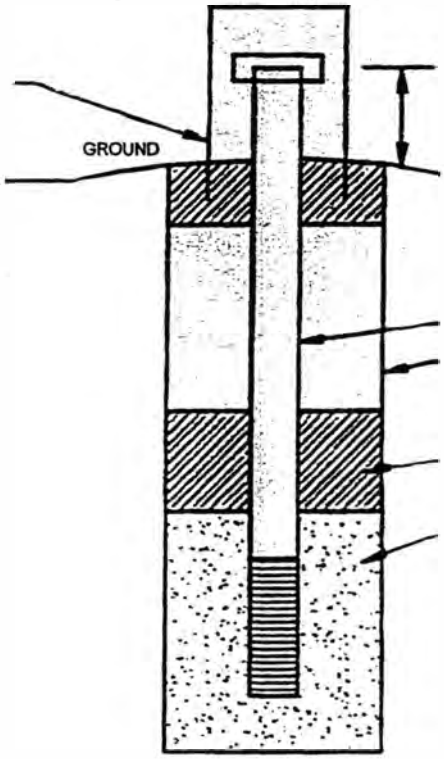
OVERBURDEN MONITORING WELL CONSTRUCTION LOG

PROJECT NAME	Hamilton St.	HOLE DESIGNATION	MW-A6
PROJECT NUMBER	14705a	DATE COMPLETED	6/14/00
CLIENT	NYSDOT	DRILLING METHOD	4 ¼ HSA
LOCATION	104'S of bridge 5' W of road	SUPERVISOR	D. Gnage

AP TYPE Kobe

PROTECTIVE CASING

4" dia. Steel



STICK-UP 2.15/0.65 ft/m

SURFACE SEAL TYPE N/A

WELL CASING

ANNULUS BACKFILL

TYPE: grout

SEAL TYPE: bentonite chips

PACK TYPE: - SAND, SIZE #2 sand
- GRAVE
- NATURAL

OP OF EAL* AT	4	ft/m	1.22
OM OF EAL* AT	8	ft/m	2.44
OP OF CREEN* AT	9	ft/m	2.74
OTTOM OF CREEN* AT	19	ft/m	5.79
OTTOM OF OLE* AT	20	ft/m	6.09

*NOTE:
ALL DIMENSIONS ARE
BELOW GROUND SURFACE (BGS)

CREEN TYPE: CONTINUOUS SLOT ___ PERFORATED X LOUVRE ___ OTHER ___

CREEN MATERIAL: STAINLESS STEEL ___ PLASTIC ___ OTHER PVC

CREEN LENGTH: 10.0/3.0 ft/ m SCREEN DIAMETER 2.0/5.0 in/cm SCREEN SLOT SIZE: 10

ELL CASING MATERIAL: Sch 40 PVC WELL CASING DIAMETER: 2.0/5.0 in/ cm

DIAMETER: 8.0/2.0 in/cm

EVELOPMENT: METHOD: Foot valve DURATION: ___

N:Jobs/14705a/Data/Phase II/Borings-wellinstall/ob instr log SiteA.xls/MW-A6

SEAR·BROWN

85 Metro Park
Rochester, NY 14623
(716) 475-1440

Test Boring No.: MW-A7

Project: Hamilton Street
Project#: 14705A
Client: NYSDOT
Location: 18' N & 8' W of Eastern side of bridge

Drilling Contractor: Natures Way
Driller: S. Gingrich
Elevation:
Weather: overcast +/-75°F

Start Date: 6/14/00
Completion Date: 6/14/00
Drilling Method: 4 1/4 HSA
Supervisor: D. Gnage

	C	Blows on Sampler 0-6"	6-12"	12-18"	18-24"	SAMPLE N	Rec.	No.	Depth	Soil and Rock Information Remarks
0									0-0.6m	
		4				18	1.2	1	0-2'	topsoil (0.03m; 0.1ft)
			8							SP sand, fine to medium grained, some silt&gravel,
				10						moist, lt.brown to red (0.09m; 0.3ft)
					11				0.6-1.2m	SP sand, fine to medium grained, some silt&gravel,
0.8m		7				38	0.7	2	2-4'	few pebbles& cobbles, moist, black, some iron staining
2.5ft			20							(0.7m; 2.3ft)
				18						rock (0.73m; 2.4ft)
					16				1.2-1.8m	SP sand, fine to medium grained, some silt&gravel,
		3				12	1.0	3	4-6'	few pebbles, moist, lt.brown to orange
1.5m			6							(1.4m; 4.6ft)
5.0ft				6						gray/green silty clay, trace sand, hard, moist, rust/iron
					6				1.8-2.4m	mottling, some brown coloring
		4				13	1.1	4	6-8'	
			5							
2.3m				8						
7.5ft					7				2.4-3.0m	(2.47m; 8.1ft)
		3				14	1.2	5	8-10'	lt.brown silty clay, trace sand, hard, moist, gray/green
			6							mottling
				8						
3.0m					8				3.0-3.7m	
10.0ft		7				8	1.4	6	10-12'	(3.2m;10.6ft)
			3							gray/green silty clay, trace sand, hard, moist,
				5						rust to lt.brown, mottling (native)
					6				3.7-4.3m	
3.8m		2				12	1.0	7	12-14'	(3.81m; 12.5ft)
12.5ft			3							same as above, increase in sand content, medium to
				9						soft, moist to wet (3.86m; 12.65ft)
					15				4.3-4.9m	SP sand, some silt & gravel, few pebbles, wet, gray/green
		3				35	0.9	8	14-16'	(4.3m; 14.15ft)
4.6m			19							GP gravel, fine to medium gravel, some sand & silt,
15.0ft				16						pebbles & cobbles, gray green to brown, saturated
					12				4.9-5.5m	
		7				28	0.8	9	16-18'	
			11							
5.3m				17						
17.5ft					21				5.5-6.1m	
		7				75	0.6	10	18-20'	
			22							
				50/4						(5.9m; 19.5ft)
										End of hole at 6.1m; 20.0ft

N = No. of Blows to Drive _____ Spoon _____ with _____ lb. Wt. _____ Ea. Blow
C = No. of Blows to Drive _____ Casing _____ with _____ lb. Wt. _____ Ea. Blow

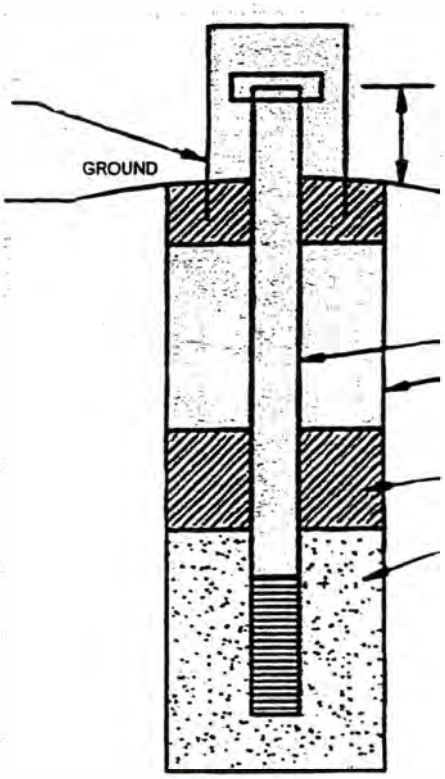
SEAR-BROWN

OVERBURDEN MONITORING WELL CONSTRUCTION LOG

PROJECT NAME	Hamilton St.	HOLE DESIGNATION	MW-A7
PROJECT NUMBER	14705a	DATE COMPLETED	6/14/00
CLIENT	NYSDOT	DRILLING METHOD	4 ¼ HSA
LOCATION	18' N & 8' W of eastern side of bridge	SUPERVISOR	D. Gnage

CAP TYPE: Kobe

PROTECTIVE CASING: 4" dia. Steel



STICK-UP: 2.1/0.64 ft/m

SURFACE SEAL TYPE: N/A

WELL CASING

ANNULUS BACKFILL

TYPE: grout

SEAL TYPE: bentonite chips

PACK TYPE: - SAND, SIZE #2 sand
- GRAVE
- NATURAL

TOP OF SEAL* AT	6.5	ft/m	1.98
BOTTOM OF SEAL* AT	8.5	ft/m	2.59
TOP OF SCREEN* AT	9.5	ft/m	2.89
BOTTOM OF SCREEN* AT	19.5	ft/m	5.94
BOTTOM OF HOLE* AT	20	ft/m	6.09

*NOTE:
ALL DIMENSIONS ARE
BELOW GROUND SURFACE (BGS)

SCREEN TYPE: CONTINUOUS SLOT ___ PERFORATED X LOUVRE ___ OTHER ___

SCREEN MATERIAL: STAINLESS STEEL ___ PLASTIC ___ OTHER PVC

SCREEN LENGTH: 10.0/3.0 ft/ m SCREEN DIAMETER 2.0/5.0 in/cm SCREEN SLOT SIZE: 10

WELL CASING MATERIAL: Sch 40 PVC WELL CASING DIAMETER: 2.0/5.0 in/ cm

HOLE DIAMETER: 8.0/2.0 in/cm

DEVELOPMENT: METHOD: Foot valve DURATION:

APPENDIX B

SAMPLING DATA SHEETS

FIELD PARAMETERS

CLIENT: Steuben County Department of Public Works **PROJECT NO.** 268.012

PROJECT: Erwin Town Landfill Remedial Investigation **TECHNICIAN** DRH/BDD

DATE	TIME	LOCATION	pH	TEMP(°F)	SP. COND. (µmhos/cm)	Eh (mV)	TURBIDITY (NTUs)	DISS. 02
5/21/01	1416 hrs	MW-1	7.0	53	700	90	170.60	NA
5/21/01	1445 hrs	MW-2	6.7	54	1,900	<-80	42.77	NA
5/21/01	1530 hrs	MW-3	6.3	55	1,100	-60	503.70	NA
5/22/01	0820 hrs	MW-4	6.6	58	2,100	<-80	593.50	NA
5/22/01	0845 hrs	MW-5	6.7	55	1,700	-15	20.46	NA
5/22/01	0945 hrs	MW-6	6.7	56	900	-30	1,021	NA
5/22/01	1120 hrs	MW-7	7.2	64	1,500	-80	24.19	NA
5/22/01	1035 hrs	MW-8	7.0	56	1,100	25	1,111	NA
5/22/01	0935 hrs	MW-9	7.1	55	1,000	-65	615.60	NA
5/21/01	0915 hrs	MW-A1	7.8	51	900	25	348.40	NA
5/21/01	0950 hrs	MW-A2	7.0	51	700	-80	787.10	NA
5/21/01	1030 hrs	MW-A3	6.8	57	2,000	<-80	148.20	NA
5/21/01	1115 hrs	MW-A4	6.4	52	1,100	-30	63.52	NA
5/21/01	1140 hrs	MW-A5	6.4	53	700	-10	694.90	NA
5/21/01	1315 hrs	MW-A6	6.5	53	800	-60	84.37	NA
5/21/01	1340 hrs	MW-A7	6.5	52	1,700	-15	1,010	NA

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FIELD SAMPLING DATA SHEET

SITE: Town of Erwin Landfill **SAMPLE LOCATION:** **MW-1**

CLIENT: Steuben County **JOB #:** **268.012**

Weather Conditions: Cloudy Temp: 60°F

SAMPLE TYPE: Groundwater [X] Surface Water [ ] Other (specify):_____
Sediment [ ] Leachate [ ]

WATER LEVEL DATA

Static Water Level (feet)*:	15.11
Measured Well Depth (feet)*:	22.82
Well Casing Diameter (inches):	2
Volume in Well Casing (gallons):	1.26

*depth from measuring point

Measuring Point: Top of Riser [ ]
Other (specify): _____
Measured by:BDD/DRH/JAB
Time:14:16 Date 5/21/01

PURGING METHOD

Equipment:
Bailer [X] Submersible Pump [ ] Air Lift System [ ]
Bladder Pump [ ] Foot Valve [ ] Peristaltic Pump [ ]
Dedicated [ ] *Non-dedicated* [X]

Volume of Water Purged (gallons):

Did well purge dry? No [ ] Yes [ ]
Did well recover? No [ ] Minimal Recovery Recovery time:

SAMPLING METHOD

Equipment:
Bailer [X] Submersible Pump [ ] Air Lift System [ ]
Bladder Pump [ ] Foot Valve [ ] Peristaltic Pump [ ]
Dedicated [ ] *Non-dedicated* [X]

Sampled by: BDD Time: 14:25 Date: 05/21/01

SAMPLING DATA

Sample Appearance
Color: Brown Sediment: Fines
Odor: None

Field Measured Parameters

pH (Standard Units)	7.0	Sp. Conductivity (umhos/cm)	700
Temperature (F)	53	Eh-Redox Potential (mV)	90
Turbidity (NTUs)	170.6	Dissolved Oxygen (mg/L)	--

Samples Collected (Number/Type) EPA Methods 8260, 8270, 8081, 8082 and NYSDEC Part 360 Baseline Metals

Samples Delivered to:Chem Tech Time: Date:

COMMENTS:

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FIELD SAMPLING DATA SHEET

SITE: Town of Erwin Landfill **SAMPLE LOCATION: MW-2**

CLIENT: Steuben County **JOB #: 268.012**

Weather Conditions: Cloudy Temp: 60°F

SAMPLE TYPE: Groundwater [X] Surface Water [ ] Other (specify):_____

Sediment [ ] Leachate [ ]

WATER LEVEL DATA

Static Water Level (feet)*:	8.2
Measured Well Depth (feet)*:	19.1
Well Casing Diameter (inches):	2
Volume in Well Casing (gallons):	1.78

*depth from measuring point

Measuring Point: Top of Riser [ ]
Other (specify): _____
Measured by:BDD/DRH/JAB
Time:14:45 Date 5/21/01

PURGING METHOD

Equipment:

Bailer	[X]	Submersible Pump	[ ]	Air Lift System	[ ]
Bladder Pump	[ ]	Foot Valve	[ ]	Peristaltic Pump	[ ]
Dedicated	[ ]	*Non-dedicated*	[X]		

Volume of Water Purged (gallons):

Did well purge dry? No [ ] Yes [X]

Did well recover? No [ ] Minimal Recovery Recovery time: 2 min

SAMPLING METHOD

Equipment:

Bailer	[X]	Submersible Pump	[ ]	Air Lift System	[ ]
Bladder Pump	[ ]	Foot Valve	[ ]	Peristaltic Pump	[ ]
Dedicated	[ ]	*Non-dedicated*	[X]		

Sampled by: BDD Time: 14:50 Date: 05/21/01

SAMPLING DATA

Sample Appearance

Color: Clear Sediment: None

Odor: None

Field Measured Parameters

pH (Standard Units)	6.7	Sp. Conductivity (umhos/cm)	1900
Temperature (F)	54	Eh-Redox Potential (mV)	<-80
Turbidity (NTUs)	42.77	Dissolved Oxygen (mg/L)	--

Samples Collected (Number/Type) EPA Methods 8260, 8270, 8081, 8082 and NYSDEC Part 360 Baseline Metals

Samples Delivered to:Chem Tech Time: _____ Date: _____

COMMENTS:

Barton & Loguidice, P.C.
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FIELD SAMPLING DATA SHEET

SITE: Town of Erwin Landfill **SAMPLE LOCATION:** **MW-3**

CLIENT: Steuben County **JOB #:** **268.012**

Weather Conditions: Cloudy/Rain Temp: 60°F

SAMPLE TYPE: Groundwater [X] Surface Water [ ] Other (specify):_____
Sediment [ ] Leachate [ ]

WATER LEVEL DATA

Static Water Level (feet)*:	14.88
Measured Well Depth (feet)*:	21.66
Well Casing Diameter (inches):	2
Volume in Well Casing (gallons):	1.11

*depth from measuring point

Measuring Point: Top of Riser [ ]
Other (specify): _____
Measured by:BDD/DRH/JAB
Time:15:30 Date 5/21/01

PURGING METHOD

Equipment:
Bailer [X] Submersible Pump [ ] Air Lift System [ ]
Bladder Pump [ ] Foot Valve [ ] Peristaltic Pump [ ]
Dedicated [ ] *Non-dedicated* [X]

Volume of Water Purged (gallons):

Did well purge dry? No [ ] Yes [ ]
Did well recover? No [ ] Minimal Recovery Recovery time:

SAMPLING METHOD

Equipment:
Bailer [X] Submersible Pump [ ] Air Lift System [ ]
Bladder Pump [ ] Foot Valve [ ] Peristaltic Pump [ ]
Dedicated [ ] *Non-dedicated* [X]

Sampled by: BDD Time: 15:45 Date: 05/21/01

SAMPLING DATA

Sample Appearance
Color: Brown Sediment: Fines
Odor: Slight

Field Measured Parameters

pH (Standard Units)	6.3	Sp. Conductivity (umhos/cm)	1100
Temperature (F)	55	Eh-Redox Potential (mV)	-60
Turbidity (NTUs)	503.7	Dissolved Oxygen (mg/L)	--

Samples Collected (Number/Type) EPA Methods 8260, 8270, 8081, 8082 and NYSDEC Part 360 Baseline Metals

Samples Delivered to: Chem Tech Time: Date:

COMMENTS:

Barton & Loguidice, P.C.
Consulting Engineers

FIELD SAMPLING DATA SHEET

SITE: Town of Erwin Landfill **SAMPLE LOCATION:** **MW-4**

CLIENT: Steuben County **JOB #:** **268.012**

Weather Conditions: Cloudy/Rain Temp: 60°F

SAMPLE TYPE: Groundwater [X] Surface Water [ ] Other (specify):_____
Sediment [ ] Leachate [ ]

WATER LEVEL DATA

Static Water Level (feet)*:	12.61
Measured Well Depth (feet)*:	22.8
Well Casing Diameter (inches):	2
Volume in Well Casing (gallons):	1.66

*depth from measuring point

Measuring Point: Top of Riser [ ]
Other (specify): _____
Measured by:BDD/DRH
Time:08:20 Date 5/22/01

PURGING METHOD

Equipment: Bailer [X] Submersible Pump [ ] Air Lift System [ ]
Bladder Pump [ ] Foot Valve [ ] Peristaltic Pump [ ]
Dedicated [ ] *Non-dedicated* [X]

Volume of Water Purged (gallons):

Did well purge dry? No [ ] Yes [ ]
Did well recover? No [ ] Minimal Recovery Recovery time:

SAMPLING METHOD

Equipment: Bailer [X] Submersible Pump [ ] Air Lift System [ ]
Bladder Pump [ ] Foot Valve [ ] Peristaltic Pump [ ]
Dedicated [ ] *Non-dedicated* [X]

Sampled by: BDD Time: 08:35 Date: 05/22/01

SAMPLING DATA

Sample Appearance
Color: Brown/Gray Sediment: Fines
Odor: None

Field Measured Parameters

pH (Standard Units)	6.6	Sp. Conductivity (umhos/cm)	2100
Temperature (F)	58	Eh-Redox Potential (mV)	<-80
Turbidity (NTUs)	593.5	Dissolved Oxygen (mg/L)	--

Samples Collected (Number/Type) EPA Methods 8260, 8270, 8081, 8082 and NYSDEC Part 360 Baseline Metals

Samples Delivered to:Chem Tech Time: Date:

COMMENTS: _____

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FIELD SAMPLING DATA SHEET

SITE: Town of Erwin Landfill **SAMPLE LOCATION:** **MW-5**

CLIENT: Steuben County **JOB #:** **268.012**

Weather Conditions: Cloudy/Rain Temp: 60°F

SAMPLE TYPE: Groundwater [X] Surface Water [ ] Other (specify):_____

Sediment [ ] Leachate [ ]

WATER LEVEL DATA

Static Water Level (feet)*:	9.85
Measured Well Depth (feet)*:	20.2
Well Casing Diameter (inches):	2
Volume in Well Casing (gallons):	1.69

*depth from measuring point

Measuring Point: Top of Riser [ ]
Other (specify): _____
Measured by:BDD/DRH
Time:08:45 Date 5/22/01

PURGING METHOD

Equipment: Bailer [X] Submersible Pump [ ] Air Lift System [ ]
Bladder Pump [ ] Foot Valve [ ] Peristaltic Pump [ ]
Dedicated [ ] *Non-dedicated* [X]

Volume of Water Purged (gallons):

Did well purge dry? No [ ] Yes [ ]
Did well recover? No [ ] Minimal Recovery Recovery time:

SAMPLING METHOD

Equipment: Bailer [X] Submersible Pump [ ] Air Lift System [ ]
Bladder Pump [ ] Foot Valve [ ] Peristaltic Pump [ ]
Dedicated [ ] *Non-dedicated* [X]

Sampled by: BDD Time: 09:00 Date: 05/22/01

SAMPLING DATA

Sample Appearance
Color: Clear Sediment:None
Odor: None

Field Measured Parameters

pH (Standard Units)	6.7	Sp. Conductivity (umhos/cm)	1700
Temperature (F)	55	Eh-Redox Potential (mV)	-15
Turbidity (NTUs)	20.46	Dissolved Oxygen (mg/L)	--

Samples Collected (Number/Type) EPA Methods 8260, 8270, 8081, 8082 and NYSDEC Part 360 Baseline Metals

Samples Delivered to:Chem Tech Time: Date:

COMMENTS:

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FIELD SAMPLING DATA SHEET

SITE: Town of Erwin Landfill **SAMPLE LOCATION:** **MW-6**

CLIENT: Steuben County **JOB #:** **268.012**

Weather Conditions: Cloudy/Rain Temp: 60°F

SAMPLE TYPE: Groundwater [X] Surface Water [ ] Other (specify):_____
Sediment [ ] Leachate [ ]

WATER LEVEL DATA

Static Water Level (feet)*:	8.11
Measured Well Depth (feet)*:	18.8
Well Casing Diameter (inches):	2
Volume in Well Casing (gallons):	1.74

*depth from measuring point

Measuring Point: Top of Riser [ ]
Other (specify): _____
Measured by:BDD/DRH
Time:09:45 Date 5/22/01

PURGING METHOD

Equipment: Bailer [X] Submersible Pump [ ] Air Lift System [ ]
Bladder Pump [ ] Foot Valve [ ] Peristaltic Pump [ ]
Dedicated [ ] *Non-dedicated* [X]

Volume of Water Purged (gallons):

Did well purge dry? No [ ] Yes [ ]
Did well recover? No [ ] Minimal Recovery Recovery time:

SAMPLING METHOD

Equipment: Bailer [X] Submersible Pump [ ] Air Lift System [ ]
Bladder Pump [ ] Foot Valve [ ] Peristaltic Pump [ ]
Dedicated [ ] *Non-dedicated* [X]

Sampled by: BDD/DRH Time: 10:00 Date: 05/22/01

SAMPLING DATA

Sample Appearance
Color: Brown Sediment:Some Fines
Odor: None

Field Measured Parameters

pH (Standard Units)	6.7	Sp. Conductivity (umhos/cm)	900
Temperature (F)	56	Eh-Redox Potential (mV)	-30
Turbidity (NTUs)	1021	Dissolved Oxygen (mg/L)	--

Samples Collected (Number/Type) EPA Methods 8260, 8270, 8081, 8082 and NYSDEC Part 360 Baseline Metals

Samples Delivered to:Chem Tech Time: Date:

COMMENTS: _____

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Consulting Engineers

FIELD SAMPLING DATA SHEET

SITE: Town of Erwin Landfill **SAMPLE LOCATION: MW-7**

CLIENT: Steuben County **JOB #: 268.012**

Weather Conditions: Cloudy/Rain Temp: 60°F

SAMPLE TYPE: Groundwater [X] Surface Water [ ] Other (specify):_____

Sediment [ ] Leachate [ ]

WATER LEVEL DATA

Static Water Level (feet)*:	12.3
Measured Well Depth (feet)*:	46.0
Well Casing Diameter (inches):	2
Volume in Well Casing (gallons):	

*depth from measuring point

Measuring Point: Top of Riser [ ]
Other (specify): _____
Measured by:BDD/DRH
Time:11:20 Date 5/22/01

PURGING METHOD

Equipment: Bailer [X] Submersible Pump [ ] Air Lift System [ ]
Bladder Pump [ ] Foot Valve [ ] Peristaltic Pump [ ]
Dedicated [ ] *Non-dedicated* [X]

Volume of Water Purged (gallons):

Did well purge dry? No [ ] Yes [ ]
Did well recover? No [ ] Minimal Recovery Recovery time:

SAMPLING METHOD

Equipment: Bailer [X] Submersible Pump [ ] Air Lift System [ ]
Bladder Pump [ ] Foot Valve [ ] Peristaltic Pump [ ]
Dedicated [ ] *Non-dedicated* [X]

Sampled by: BDD/DRH Time: 11:25 Date: 05/22/01

SAMPLING DATA

Sample Appearance

Color: Brown Sediment:Some Fines
Odor: None

Field Measured Parameters

pH (Standard Units)	7.2	Sp. Conductivity (umhos/cm)	1500
Temperature (F)	64	Eh-Redox Potential (mV)	-80
Turbidity (NTUs)	24.19	Dissolved Oxygen (mg/L)	--

Samples Collected (Number/Type) EPA Methods 8260, 8270, 8081, 8082 and NYSDEC Part 360 Baseline Metals

Samples Delivered to:Chem Tech Time: _____ Date: _____

COMMENTS:

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Consulting Engineers

FIELD SAMPLING DATA SHEET

SITE: Town of Erwin Landfill **SAMPLE LOCATION:** **MW-8**

CLIENT: Steuben County **JOB #:** **268.012**

Weather Conditions: Overcast Temp: 60°F

SAMPLE TYPE: Groundwater [X] Surface Water [ ] Other (specify):_____

Sediment [ ] Leachate [ ]

WATER LEVEL DATA

Static Water Level (feet)*:	10.66
Measured Well Depth (feet)*:	21.4
Well Casing Diameter (inches):	2
Volume in Well Casing (gallons):	1.75

*depth from measuring point

Measuring Point: Top of Riser [ ]
Other (specify): _____
Measured by:BDD/DRH
Time:10:35 Date 5/22/01

PURGING METHOD

Equipment: Bailer [X] Submersible Pump [ ] Air Lift System [ ]
Bladder Pump [ ] Foot Valve [ ] Peristaltic Pump [ ]
Dedicated [ ] *Non-dedicated* [X]

Volume of Water Purged (gallons):

Did well purge dry? No [ ] Yes [ ]
Did well recover? No [ ] Minimal Recovery Recovery time:

SAMPLING METHOD

Equipment: Bailer [X] Submersible Pump [ ] Air Lift System [ ]
Bladder Pump [ ] Foot Valve [ ] Peristaltic Pump [ ]
Dedicated [ ] *Non-dedicated* [X]

Sampled by: BDD/DRH Time: 10:55 Date: 05/22/01

SAMPLING DATA

Sample Appearance
Color: Brown Sediment:Fine silt
Odor: None

Field Measured Parameters

pH (Standard Units)	7.0	Sp. Conductivity (umhos/cm)	1100
Temperature (F)	56	Eh-Redox Potential (mV)	25
Turbidity (NTUs)	1111	Dissolved Oxygen (mg/L)	--

Samples Collected (Number/Type) EPA Methods 8260, 8270, 8081, 8082 and NYSDEC Part 360 Baseline Metals

Samples Delivered to:Chem Tech Time:_____ Date:_____

COMMENTS: _____

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FIELD SAMPLING DATA SHEET

SITE: Town of Erwin Landfill **SAMPLE LOCATION:** **MW-9**

CLIENT: Steuben County **JOB #:** **268.012**

Weather Conditions: Overcast Temp: 56°F

SAMPLE TYPE: Groundwater [X] Surface Water [ ] Other (specify):_____

Sediment [ ] Leachate [ ]

WATER LEVEL DATA

Static Water Level (feet)*:	8.36
Measured Well Depth (feet)*:	20.6
Well Casing Diameter (inches):	2
Volume in Well Casing (gallons):	2

*depth from measuring point

Measuring Point: Top of Riser [ ]
Other (specify): _____
Measured by:BDD/DRH
Time:9:25 Date 5/22/01

PURGING METHOD

Equipment: Bailer [X] Submersible Pump [ ] Air Lift System [ ]
Bladder Pump [ ] Foot Valve [ ] Peristaltic Pump [ ]
Dedicated [ ] *Non-dedicated* [X]

Volume of Water Purged (gallons):

Did well purge dry? No [ ] Yes [ ]
Did well recover? No [ ] Minimal Recovery Recovery time:

SAMPLING METHOD

Equipment: Bailer [X] Submersible Pump [ ] Air Lift System [ ]
Bladder Pump [ ] Foot Valve [ ] Peristaltic Pump [ ]
Dedicated [ ] *Non-dedicated* [X]

Sampled by: BDD/DRH Time: 09:25 Date: 05/22/01

SAMPLING DATA

Sample Appearance
Color:Gray Sediment:Silt and some sand
Odor: None

Field Measured Parameters

pH (Standard Units)	7.1	Sp. Conductivity (umhos/cm)	1000
Temperature (F)	55	Eh-Redox Potential (mV)	-65
Turbidity (NTUs)	615.6	Dissolved Oxygen (mg/L)	--

Samples Collected (Number/Type) EPA Methods 8260, 8270, 8081, 8082 and NYSDEC Part 360 Baseline Metals

Samples Delivered to:Chem Tech Time: Date:

COMMENTS:

Barton & Loguidice, P.C.
Consulting Engineers

FIELD SAMPLING DATA SHEET

SITE: Town of Erwin Landfill **SAMPLE LOCATION: MW-A1**

CLIENT: Steuben County **JOB #: 268.012**

Weather Conditions: Overcast Temp: 60°F

SAMPLE TYPE: Groundwater [X] Surface Water [ ] Other (specify):_____
Sediment [ ] Leachate [ ]

WATER LEVEL DATA

Static Water Level (feet)*:	14.36
Measured Well Depth (feet)*:	19.3
Well Casing Diameter (inches):	2
Volume in Well Casing (gallons):	0.79

*depth from measuring point

Measuring Point: Top of Riser [ ]
Other (specify): _____
Measured by:BDD/DRH/JAB
Time:09:15 Date 5/21/01

PURGING METHOD

Equipment:
Bailer [X] Submersible Pump [ ] Air Lift System [ ]
Bladder Pump [ ] Foot Valve [ ] Peristaltic Pump [ ]
Dedicated [ ] *Non-dedicated* [X]

Volume of Water Purged (gallons):

Did well purge dry? No [ ] Yes [ ]
Did well recover? No [ ] Minimal Recovery Recovery time:

SAMPLING METHOD

Equipment:
Bailer [X] Submersible Pump [ ] Air Lift System [ ]
Bladder Pump [ ] Foot Valve [ ] Peristaltic Pump [ ]
Dedicated [ ] *Non-dedicated* [X]

Sampled by: BDD/DRH Time: 09:35 Date: 05/21/01

SAMPLING DATA

Sample Appearance
Color:Cloudy Sediment:Sand and silt
Odor: None

Field Measured Parameters

pH (Standard Units)	7.8	Sp. Conductivity (umhos/cm)	900
Temperature (F)	51	Eh-Redox Potential (mV)	25
Turbidity (NTUs)	348.4	Dissolved Oxygen (mg/L)	--

Samples Collected (Number/Type) EPA Methods 8260, 8270, 8081, 8082 and NYSDEC Part 360 Baseline Metals

Samples Delivered to:Chem Tech Time: _____ Date: _____

COMMENTS: _____

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Consulting Engineers

FIELD SAMPLING DATA SHEET

SITE: Town of Erwin Landfill **SAMPLE LOCATION: MW-A2**

CLIENT: Steuben County **JOB #: 268.012**

Weather Conditions: Overcast Temp: 65°F

SAMPLE TYPE: Groundwater [X] Surface Water [ ] Other (specify):_____
Sediment [ ] Leachate [ ]

WATER LEVEL DATA

Static Water Level (feet)*:	14.8
Measured Well Depth (feet)*:	21.1
Well Casing Diameter (inches):	2
Volume in Well Casing (gallons):	1.03

*depth from measuring point

Measuring Point: Top of Riser [ ]
Other (specify): _____
Measured by:BDD/DRH/JAB
Time:09:50 Date 5/21/01

PURGING METHOD

Equipment: Bailer [X] Submersible Pump [ ] Air Lift System [ ]
Bladder Pump [ ] Foot Valve [ ] Peristaltic Pump [ ]
Dedicated [ ] *Non-dedicated* [X]

Volume of Water Purged (gallons):

Did well purge dry? No [ ] Yes [ ]
Did well recover? No [ ] Minimal Recovery Recovery time:

SAMPLING METHOD

Equipment: Bailer [X] Submersible Pump [ ] Air Lift System [ ]
Bladder Pump [ ] Foot Valve [ ] Peristaltic Pump [ ]
Dedicated [ ] *Non-dedicated* [X]

Sampled by: BDD/DRH Time: 10:00 Date: 05/21/01

SAMPLING DATA

Sample Appearance
Color:Brown Sediment:Fines
Odor: None

Field Measured Parameters

pH (Standard Units)	7.0	Sp. Conductivity (umhos/cm)	700
Temperature (F)	51	Eh-Redox Potential (mV)	-80
Turbidity (NTUs)	787.1	Dissolved Oxygen (mg/L)	--

Samples Collected (Number/Type) EPA Methods 8260, 8270, 8081, 8082 and NYSDEC Part 360 Baseline Metals

Samples Delivered to: Chem Tech Time: Date:

COMMENTS:

Barton & Loguidice, P.C.

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FIELD SAMPLING DATA SHEET

SITE: Town of Erwin Landfill **SAMPLE LOCATION: MW-A3**

CLIENT: Steuben County **JOB #: 268.012**

Weather Conditions: Cloudy Temp: 65°F

SAMPLE TYPE: Groundwater [X] Surface Water [ ] Other (specify):_____

Sediment [ ] Leachate [ ]

WATER LEVEL DATA

Static Water Level (feet)*:	18.73
Measured Well Depth (feet)*:	20.8
Well Casing Diameter (inches):	2
Volume in Well Casing (gallons):	0.34

*depth from measuring point

Measuring Point: Top of Riser [ ]
Other (specify): _____
Measured by:BDD/DRH/JAB
Time:10:50 Date 5/21/01

PURGING METHOD

Equipment: Bailer [X] Submersible Pump [ ] Air Lift System [ ]
Bladder Pump [ ] Foot Valve [ ] Peristaltic Pump [ ]
Dedicated [ ] *Non-dedicated* [X]

Volume of Water Purged (gallons):

Did well purge dry? No [ ] Yes [ ]
Did well recover? No [ ] Minimal Recovery Recovery time:

SAMPLING METHOD

Equipment: Bailer [X] Submersible Pump [ ] Air Lift System [ ]
Bladder Pump [ ] Foot Valve [ ] Peristaltic Pump [ ]
Dedicated [ ] *Non-dedicated* [X]

Sampled by: BDD/DRH Time: 10:30 Date: 05/21/01

SAMPLING DATA

Sample Appearance
Color:Cloudy Sediment:Sand and silt
Odor: Slight

Field Measured Parameters

pH (Standard Units)	6.8	Sp. Conductivity (umhos/cm)	2000
Temperature (F)	57	Eh-Redox Potential (mV)	<-80
Turbidity (NTUs)	148.2	Dissolved Oxygen (mg/L)	--

Samples Collected (Number/Type) EPA Methods 8260, 8270, 8081, 8082 and NYSDEC Part 360 Baseline Metals

Samples Delivered to:Chem Tech Time: Date:

COMMENTS:

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FIELD SAMPLING DATA SHEET

SITE: Town of Erwin Landfill **SAMPLE LOCATION:** **MW-A4**

CLIENT: Steuben County **JOB #:** **268.012**

Weather Conditions: Cloudy Temp: 65°F

SAMPLE TYPE: Groundwater [X] Surface Water [ ] Other (specify):_____
Sediment [ ] Leachate [ ]

WATER LEVEL DATA

Static Water Level (feet)*:	13.61
Measured Well Depth (feet)*:	19.3
Well Casing Diameter (inches):	2
Volume in Well Casing (gallons):	0.92

*depth from measuring point

Measuring Point: Top of Riser [ ]
Other (specify): _____
Measured by:BDD/DRH/JAB
Time:11:05 Date 5/21/01

PURGING METHOD

Equipment:
Bailer [X] Submersible Pump [ ] Air Lift System [ ]
Bladder Pump [ ] Foot Valve [ ] Peristaltic Pump [ ]
Dedicated [ ] *Non-dedicated* [X]

Volume of Water Purged (gallons):

Did well purge dry? No [ ] Yes [ ]
Did well recover? No [ ] Minimal Recovery Recovery time:

SAMPLING METHOD

Equipment:
Bailer [X] Submersible Pump [ ] Air Lift System [ ]
Bladder Pump [ ] Foot Valve [ ] Peristaltic Pump [ ]
Dedicated [ ] *Non-dedicated* [X]

Sampled by: BDD/DRH Time: 11:15 Date: 05/21/01

SAMPLING DATA

Sample Appearance
Color:Cloudy/Brown Sediment:Fines
Odor: None

Field Measured Parameters

pH (Standard Units)	6.4	Sp. Conductivity (umhos/cm)	1100
Temperature (F)	52	Eh-Redox Potential (mV)	-30
Turbidity (NTUs)	63.52	Dissolved Oxygen (mg/L)	--

Samples Collected (Number/Type) EPA Methods 8260, 8270, 8081, 8082 and NYSDEC Part 360 Baseline Metals

Samples Delivered to:Chem Tech Time: Date:

COMMENTS:

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Consulting Engineers

FIELD SAMPLING DATA SHEET

SITE: Town of Erwin Landfill **SAMPLE LOCATION: MW-A5**

CLIENT: Steuben County **JOB #: 268.012**

Weather Conditions: Cloudy Temp: 65°F

SAMPLE TYPE: Groundwater [X] Surface Water [ ] Other (specify):_____
Sediment [ ] Leachate [ ]

WATER LEVEL DATA

Static Water Level (feet)*:	12.8
Measured Well Depth (feet)*:	21.0
Well Casing Diameter (inches):	2
Volume in Well Casing (gallons):	1.33

*depth from measuring point

Measuring Point: Top of Riser [ ]
Other (specify): _____
Measured by:BDD/DRH/JAB
Time:11:30 Date 5/21/01

PURGING METHOD

Equipment:
Bailer [X] Submersible Pump [ ] Air Lift System [ ]
Bladder Pump [ ] Foot Valve [ ] Peristaltic Pump [ ]
Dedicated [ ] *Non-dedicated* [X]

Volume of Water Purged (gallons):

Did well purge dry? No [ ] Yes [ ]
Did well recover? No [ ] Minimal Recovery Recovery time:

SAMPLING METHOD

Equipment:
Bailer [X] Submersible Pump [ ] Air Lift System [ ]
Bladder Pump [ ] Foot Valve [ ] Peristaltic Pump [ ]
Dedicated [ ] *Non-dedicated* [X]

Sampled by: BDD/DRH Time: 11:40 Date: 05/21/01

SAMPLING DATA

Sample Appearance
Color:Clear Sediment:Fines
Odor: None

Field Measured Parameters

pH (Standard Units)	6.4	Sp. Conductivity (umhos/cm)	700
Temperature (F)	53	Eh-Redox Potential (mV)	-10
Turbidity (NTUs)	694.9	Dissolved Oxygen (mg/L)	--

Samples Collected (Number/Type) EPA Methods 8260, 8270, 8081, 8082 and NYSDEC Part 360 Baseline Metals

Samples Delivered to:Chem Tech Time: Date:

COMMENTS:

Barton & Loguidice, P.C.

Consulting Engineers

FIELD SAMPLING DATA SHEET

SITE: Town of Erwin Landfill **SAMPLE LOCATION:** MW-A6

CLIENT: Town of Erwin **JOB #:** 268.012

Weather Conditions: Cloudy Temp: 65°F

SAMPLE TYPE: Groundwater [X] Surface Water [ ] Other (specify):_____

Sediment [ ] Leachate [ ]

WATER LEVEL DATA

Static Water Level (feet)*:	19.69
Measured Well Depth (feet)*:	20.8
Well Casing Diameter (inches):	2
Volume in Well Casing (gallons):	0.18

*depth from measuring point

Measuring Point: Top of Riser [ ]
Other (specify): _____
Measured by:BDD/DRH/JAB
Time: 13:10 Date 5/21/01

PURGING METHOD

Equipment: Bailer [X] Submersible Pump [ ] Air Lift System [ ]
Bladder Pump [ ] Foot Valve [ ] Peristaltic Pump [ ]
Dedicated [ ] *Non-dedicated* [ ]

Volume of Water Purged (gallons):

Did well purge dry? No [ ] Yes [X]
Did well recover? No [ ] Minimal Recovery Recovery time: 1:00 Min

SAMPLING METHOD

Equipment: Bailer [ ] Submersible Pump [ ] Air Lift System [ ]
Bladder Pump [ ] Foot Valve [ ] Peristaltic Pump [ ]
Dedicated [ ] *Non-dedicated* [ ]

Sampled by:BDD Time:13:15 Date: 5/21/01

SAMPLING DATA

Sample Appearance

Color:Brown tint Sediment:Fines
Odor: Organic (soil like smell)

Field Measured Parameters

pH (Standard Units)	6.5	Sp. Conductivity (umhos/cm)	800
Temperature (F)	53	Eh-Redox Potential (mV)	-60
Turbidity (NTUs)	84.37	Dissolved Oxygen (mg/L)	

Samples Collected (Number/Type)

Samples Delivered to: Chem Tech Time: Date:

COMMENTS:

Well purged dry after bailing 1/3 of a gallon.

Barton & Loguidice, P.C.

Consulting Engineers

FIELD SAMPLING DATA SHEET

SITE: Town of Erwin Landfill **SAMPLE LOCATION:** **MW-A7**

CLIENT: Steuben County **JOB #:** **268.012**

Weather Conditions: Cloudy Temp: 65°F

SAMPLE TYPE: Groundwater [X] Surface Water [ ] Other (specify):_____

Sediment [ ] Leachate [ ]

WATER LEVEL DATA

Static Water Level (feet)*:	16.79
Measured Well Depth (feet)*:	21.3
Well Casing Diameter (inches):	2
Volume in Well Casing (gallons):	0.72

*depth from measuring point

Measuring Point: Top of Riser [ ]
Other (specify): _____
Measured by:BDD/DRH/JAB
Time:13:35 Date 5/21/01

PURGING METHOD

Equipment:

Bailer	[X]	Submersible Pump	[ ]	Air Lift System	[ ]
Bladder Pump	[ ]	Foot Valve	[ ]	Peristaltic Pump	[ ]
Dedicated	[ ]	*Non-dedicated*	[X]		

Volume of Water Purged (gallons):

Did well purge dry? No [ ] Yes [ ]

Did well recover? No [ ] Minimal Recovery Recovery time:

SAMPLING METHOD

Equipment:

Bailer	[X]	Submersible Pump	[ ]	Air Lift System	[ ]
Bladder Pump	[ ]	Foot Valve	[ ]	Peristaltic Pump	[ ]
Dedicated	[ ]	*Non-dedicated*	[X]		

Sampled by: BDD/DRH Time: 13:40 Date: 05/21/01

SAMPLING DATA

Sample Appearance

Color:Brown tint Sediment:Fines

Odor: Slight

Field Measured Parameters

pH (Standard Units)	6.5	Sp. Conductivity (umhos/cm)	1700
Temperature (F)	52	Eh-Redox Potential (mV)	-15
Turbidity (NTUs)	1010	Dissolved Oxygen (mg/L)	--

Samples Collected (Number/Type) EPA Methods 8260, 8270, 8081, 8082 and NYSDEC Part 360 Baseline Metals

Samples Delivered to:Chem Tech Time: Date:

COMMENTS:

CHEMTECH

CHAIN OF CUSTODY RECORD

☐ 110 Route 4
Englewood, NJ 07631
(201) 567-6868
Fax (201) 567-1333

☒ 205 Campus Plaza I
Edison, NJ 08837
(732) 225-4111
Fax (732) 225-4110

CHEMTECH JOB NO.:

CHEMTECH QUOTE NO.: #4621

CLIENT INFORMATION

REPORT TO BE SENT TO:

COMPANY: Barton & Loguidice P.C.

ADDRESS: 290 Elwood Davis Rd.

CITY: Liverpool STATE: NY ZIP: 13220

ATTENTION: Mark Chauvin

PHONE: 3154752000 FAX: 315 451-0002

PROJECT INFORMATION

PROJECT NAME: Erwin Landfill

PROJECT NO: 268.012

PROJECT MANAGER: Mark Chauvin

LOCATION:

PHONE: FAX:

BILLING INFORMATION

BILL TO: Barton & Loguidice PO #: 3107

ADDRESS: Liverpool

CITY: Syracuse STATE: NY ZIP: 13220

ATTENTION: Mark Chauvin PHONE: 315 457 5200

DATA TURNAROUND INFORMATION

FAX: _____ DAYS *

HARD COPY: _____ DAYS *

EDD: _____ DAYS *

* TO BE APPROVED BY CHEMTECH

** NORMAL TURNAROUND TIME - 14 DAYS

DATA DELIVERABLE INFORMATION

☐ RESULTS ONLY ☐ USEPA CLP

☐ RESULTS + QC ☒ NYS ASP "B"

☐ NJ REDUCED ☐ NYS ASP "A"

☐ NJ CLP ☐ EDD

☐ EDD FORMAT: _____

ANALYSIS

1 Metals 2 VOC's 3 CN 4 PCB 5 TCL VOC's 6 7 8 9

CHEMTECH SAMPLE ID	PROJECT SAMPLE IDENTIFICATION	SAMPLE MATRIX	SAMPLE TYPE COMP	SAMPLE TYPE GRAB	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	# OF BOTTLES	PRESERVATIVES 1	2	3	4	5	6	7	8	9	COMMENTS
1.	MW-A7 (MS/MSD)	Water		X	5/29/01	1400	6	X	+	+	+	+					
2.																	
3.																	
4.																	
5.																	
6.																	
7.																	
8.																	

← Specify Preservatives
A – HCl B – HNO_3
C – H_2SO_4 D – NaOH
E – ICE F – Other

SAMPLE CUSTODY MUST BE DOCUMENTED BELOW EACH TIME SAMPLES CHANGE POSSESSION INCLUDING COURIER DELIVERY

RELINQUISHED BY SAMPLER	DATE/TIME	RECEIVED BY:
1. David D. Zwan	5/29/01 1600	1. FED EX
RELINQUISHED BY: 2.	DATE/TIME:	RECEIVED BY: 2.
RELINQUISHED BY: 3.	DATE/TIME:	RECEIVED FOR LAB BY: 3.

Conditions of bottles or coolers at receipt: ☐ Compliant ☐ Non-Compliant ☐ Temp. of Cooler _____

Comments:

Page 1 of 1

Shipment Complete: Yes _____ No _____

CHEMTECH

CHAIN OF CUSTODY RECORD

☐ 110 Route 4
Englewood, NJ 07631
(201) 567-6868
Fax (201) 567-1333

☒ 205 Campus Plaza 1
Edison, NJ 08837
(732) 225-4111
Fax (732) 225-4110

CHEMTECH JOB NO.:

CHEMTECH QUOTE NO.: # 4621

CLIENT INFORMATION

REPORT TO BE SENT TO:

COMPANY: Barton & Loguidice, P.C.

ADDRESS: 290 Elwood Davis Rd.

CITY: Liverpool STATE: NY ZIP: 13220

ATTENTION: Mark Chauvin

PHONE: 315 457-5200 FAX: 315 451-0052

PROJECT INFORMATION

PROJECT NAME: Seven Springs Landfill

PROJECT NO.: 268-012

PROJECT MANAGER: Mark Chauvin

LOCATION:

PHONE: FAX:

BILLING INFORMATION

BILL TO: Barton & Loguidice PO #: 3107

ADDRESS:

CITY: Syracuse STATE: NY ZIP: 13220

ATTENTION: Mark Chauvin PHONE: 315 457-5200

DATA TURNAROUND INFORMATION

FAX: _____ DAYS *

HARD COPY: _____ DAYS *

EDD: _____ DAYS *

* TO BE APPROVED BY CHEMTECH

** NORMAL TURNAROUND TIME - 14 DAYS

DATA DELIVERABLE INFORMATION

☐ RESULTS ONLY ☐ USEPA CLP

☐ RESULTS + QC ☒ NYS ASP "B"

☐ NJ REDUCED ☐ NYS ASP "A"

☐ NJ CLP ☐ EDD

☐ EDD FORMAT: _____

ANALYSIS

1 METALS 2 VOC's 3 CN- 4 PCB 5 SEMI-VOC's 6 7 8 9

CHEMTECH SAMPLE ID	PROJECT SAMPLE IDENTIFICATION	SAMPLE MATRIX	SAMPLE TYPE COMP	SAMPLE TYPE GRAB	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	# OF BOTTLES	PRESERVATIVES 1	2	3	4	5	6	7	8	9	COMMENTS
1.	FIELD BLANK (Soil Scoop)	WATER		X	5/22/01	1200	6	X	X	X	X	X					
2.	SET-1 (MS/MSD)	SOIL		X		1215	6	X	X	X	X	X					
3.	SET-2	SOIL		X		1230	2	X	X	X	X	X					
4.	SET-3	SOIL		X		1245	2	X	X	X	X	X					
5.	SET-4	SOIL		X		1400	2	X	X	X	X	X					
6.	BLIND DUPE	SOIL		X			2	X	X	X	X	X					
7.																	
8.																	

Preservatives: A – HCl B – HNO_3 C – H_2SO_4 D – NaOH E – ICE F – Other

SAMPLE CUSTODY MUST BE DOCUMENTED BELOW EACH TIME SAMPLES CHANGE POSSESSION INCLUDING COURIER DELIVERY

RELINQUISHED BY SAMPLER:	DATE/TIME:	RECEIVED BY:
1. [signature]	1430 5/22/01	1. FED EX
RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:
2.		2.
RELINQUISHED BY:	DATE/TIME:	RECEIVED FOR LAB BY:
3.		3.

Conditions of bottles or coolers at receipt: ☐ Compliant ☐ Non-Compliant ☐ Temp. of Cooler _____

Comments:

Page 1 of 1

Shipment Complete: Yes _____ No _____

CHEMTECH

CHAIN OF CUSTODY RECORD

Englewood, NJ 07631
(201) 567-6868
Fax (201) 567-1333

Edison, NJ 08837
(732) 225-4111
Fax (732) 225-4110

CHEMTECH JOB NO.:

CHEMTECH QUOTE NO.: # 4621

CLIENT INFORMATION

REPORT TO BE SENT TO:

COMPANY: Barton & Loguidice, P.C.

ADDRESS: 290 Elwood Davis Rd

CITY: Liverpool STATE: NY ZIP: 13220

ATTENTION: Mark Chauvin

PHONE: 2154575200 FAX: 315 451 0052

PROJECT INFORMATION

PROJECT NAME: ERWIN LANDFILL

PROJECT NO.: 268.012

PROJECT MANAGER: Mark Chauvin

LOCATION:

PHONE: FAX:

BILLING INFORMATION

BILL TO: Barton & Loguidice PO #: 2107

ADDRESS:

CITY: Syracuse STATE: NY ZIP: 13220

ATTENTION: Mark Chauvin PHONE: 315 475 7200

DATA TURNAROUND INFORMATION

FAX: _____ DAYS *

HARD COPY: _____ DAYS *

EDD: _____ DAYS *

* TO BE APPROVED BY CHEMTECH

** NORMAL TURNAROUND TIME - 14 DAYS

DATA DELIVERABLE INFORMATION

☐ RESULTS ONLY ☐ USEPA CLP

☐ RESULTS + QC ☒ NYS ASP "B"

☐ NJ REDUCED ☐ NYS ASP "A"

☐ NJ CLP ☐ EDD

☐ EDD FORMAT: _____

ANALYSIS

1 Metals 2 VOC's 3 CN- 4 PCB 5 SEMI VOC's 6 7 8 9

CHEMTECH SAMPLE ID	PROJECT SAMPLE IDENTIFICATION	SAMPLE MATRIX	SAMPLE TYPE COMP	SAMPLE TYPE GRAB	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	# OF BOTTLES	PRESERVATIVES 1	2	3	4	5	6	7	8	9	COMMENTS
1.	MW-4	WATER		X	5/22/01	835	6	X	X	X	X	X					
2.	MW-5			X		0900	6	X	X	X	X	X					
3.	Matrix			X		1000	6	X	X	X	X	X					
4.	MW-7			X		1125	6	X	X	X	X	X					
5.	MW-8			X		1055	6	X	X	X	X	X					
6.	MW-9			X		0935	6	X	X	X	X	X					
7.																	
8.																	

← Specify Preservatives
A – HCl B – HNO_3
C – H_2SO_4 D – NaOH
E – ICE F – Other

SAMPLE CUSTODY MUST BE DOCUMENTED BELOW EACH TIME SAMPLES CHANGE POSSESSION INCLUDING COURIER DELIVERY

RELINQUISHED BY SAMPLER:	DATE/TIME:	RECEIVED BY:
1. Daniel R. [illegible]	5/22/01 1430	1. FED EX
RELINQUISHED BY: 2.	DATE/TIME:	RECEIVED BY: 2.
RELINQUISHED BY: 3.	DATE/TIME:	RECEIVED FOR LAB BY: 3.

Conditions of bottles or coolers at receipt: ☐ Compliant ☐ Non-Compliant ☐ Temp. of Cooler _____

Comments:

Page 2 of 2

Shipment Complete: Yes _____ No _____

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41023

CHEMTECH

CHAIN OF CUSTODY RECORD

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Englewood, NJ 07631
(201) 567-6868
Fax (201) 567-1333

☒ 205 Campus Plaza 1
Edison, NJ 08837
(732) 225-4111
Fax (732) 225-4110

CHEMTECH JOB NO.:

CHEMTECH QUOTE NO.: # 4621

CLIENT INFORMATION

REPORT TO BE SENT TO:

COMPANY: Barton Loguidice P.C.

ADDRESS: 290 Elwood Davis Rd

CITY: Liverpool STATE: NY ZIP: 13088

ATTENTION: Mark Chauvin

PHONE: 315 451 4200 FAX: 315 451 1005

PROJECT INFORMATION

PROJECT NAME: Erwin Landfill

PROJECT NO.: 268.012

PROJECT MANAGER: Mark Chauvin

LOCATION:

PHONE: FAX:

BILLING INFORMATION

BILL TO: Barton + Loguidice PO #: 3107

ADDRESS:

CITY: Syracuse STATE: NY ZIP: 13220

ATTENTION: Mark Chauvin PHONE: 315 457 5200

DATA TURNAROUND INFORMATION

FAX: _____ DAYS *
HARD COPY: _____ DAYS *
EDD: _____ DAYS *
* TO BE APPROVED BY CHEMTECH
** NORMAL TURNAROUND TIME - 14 DAYS

DATA DELIVERABLE INFORMATION

☐ RESULTS ONLY ☐ USEPA CLP
☐ RESULTS + QC ☒ NYS ASP "B"
☐ NJ REDUCED ☐ NYS ASP "A"
☐ NJ CLP ☐ EDD
☐ EDD FORMAT: _____

ANALYSIS

1 Methane 2 VOCs 3 CN- 4 PLM 5 Semi VOCs 6 7 8 9

CHEMTECH SAMPLE ID	PROJECT SAMPLE IDENTIFICATION	SAMPLE MATRIX	SAMPLE TYPE COMP	SAMPLE TYPE GRAB	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	# OF BOTTLES	PRESERVATIVES 1	2	3	4	5	6	7	8	9	COMMENTS
1.	MW-A7	Water		X	5/6/01	1340	6	X	X	X	X	X					
2.	MS/MSD			X		1340	12	X	X	X	X	X					
3.	MW-1			X		1425	6	X	X	X	X	X					
4.	MW-2			X		1450	6	X	X	X	X	X					
5.	MW-3			X		1515	6	X	X	X	X	X					
6.																	
7.																	
8.																	

← Specify Preservatives
A – HCl B – HNO_3
C – H_2SO_4 D – NaOH
E – ICE F – Other

SAMPLE CUSTODY MUST BE DOCUMENTED BELOW EACH TIME SAMPLES CHANGE POSSESSION INCLUDING COURIER DELIVERY

RELINQUISHED BY SAMPLER:	DATE/TIME:	RECEIVED BY:
1. [signature]	5/21 1420	1. FED EX
RELINQUISHED BY: 2.	DATE/TIME:	RECEIVED BY: 2.
RELINQUISHED BY: 3.	DATE/TIME:	RECEIVED FOR LAB BY: 3.

Conditions of bottles or coolers at receipt: ☐ Compliant ☐ Non-Compliant ☐ Temp. of Cooler _____
Comments:

Page 2 of 2

Shipment Complete: Yes _____ No _____

CHEMTECH

CHAIN OF CUSTODY RECORD

Englewood, NJ 07631
(201) 567-6868
Fax (201) 567-1333

Edison, NJ 08837
(732) 225-4111
Fax (732) 225-4110

CHEMTECH JOB NO.:

CHEMTECH QUOTE NO: E-1621

CLIENT INFORMATION

REPORT TO BE SENT TO:

COMPANY: Barton + Loguidice, P.C.

ADDRESS: 290 Elwood Davis Rd

CITY: Liverpool STATE: NY ZIP: 13088

ATTENTION: Mark Chauvin

PHONE: 315-457-5200 FAX: 315 457 2052

PROJECT INFORMATION

PROJECT NAME: Fenton Landfill

PROJECT NO.: 2682.012

PROJECT MANAGER: Mark Chauvin

LOCATION:

PHONE: FAX:

BILLING INFORMATION

BILL TO: Barton + Loguidice PO #: 3107

ADDRESS:

CITY: Syracuse STATE: NY ZIP: 13290

ATTENTION: Mark Chauvin PHONE: 315-454-3560

DATA TURNAROUND INFORMATION

FAX: _____ DAYS *

HARD COPY: _____ DAYS *

EDDE _____ DAYS *

* TO BE APPROVED BY CHEMTECH

** NORMAL TURNAROUND TIME - 14 DAYS

DATA DELIVERABLE INFORMATION

- ☐ RESULTS ONLY
- ☐ RESULTS + QC
- ☐ NJ REDUCED
- ☐ NJ CLP
- ☐ EDD FORMAT: _____
- ☐ USEPA CLP
- ☑ NYS ASP "B"
- ☐ NYS ASP "A"
- ☐ EDD

ANALYSIS

1 metals, 2 VOC-3, 3 CN-, 4 PCB, 5 semi. VOC's, 6, 7, 8, 9

CHEMTECH SAMPLE ID	PROJECT SAMPLE IDENTIFICATION	SAMPLE MATRIX	SAMPLE TYPE COMP	SAMPLE TYPE GRAB	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	# OF BOTTLES	PRESERVATIVES 1	2	3	4	5	6	7	8	9	COMMENTS
1.	MW-A1	water		X	5/21/01	935	6	X	X	X	X	X					
2.	MW-A2			X		1000	6	X	X	X	X	X					
3.	MW-A3			X		1030	6	X	X	X	X	X					
4.	MW-X			X		—	6	X	X	X	X	X					
5.	MW-A4			X		1115	6	X	X	X	X	X					
6.	MW-A5			X		1140	6	X	X	X	X	X					
7.	MW-A6			X		1315	6	X	X	X	X	X					
8.	Field Blank	↓		X	↓	1320	6	X	X	X	X	X					

Specify Preservatives: A – HCl, B – HNO_3, C – H_2SO_4, D – NaOH, E – ICE, F – Other

SAMPLE CUSTODY MUST BE DOCUMENTED BELOW EACH TIME SAMPLES CHANGE POSSESSION INCLUDING COURIER DELIVERY

RELINQUISHED BY SAMPLER:	DATE/TIME:	RECEIVED BY:
1.	5/21 1420	1.
RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:
2.		2.
RELINQUISHED BY:	DATE/TIME:	RECEIVED FOR LAB BY:
3.		3.

Conditions of bottles or coolers at receipt: ☐ Compliant ☐ Non-Compliant ☐ Temp. of Cooler _____

Comments:

Page 1 of 2

Shipment Complete: Yes _____ No _____

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41036

O'Brien & Gere Laboratories, Inc.

5000 Brittonfield Parkway
East Syracuse, New York 13057
(315) 437-0200

Chain of Custody

Client: Barton & Loguidice, P.C.

Project: Erwin Landfill (268.012)

Sampled by: D. Hanny, J. Reed

Client Contact: Mark Chauvin **Phone #** 457-5200

Sample Description

Analysis/Method

Sample Location	Date Collected	Time Collected	Sample Matrix	Comp. or Grab	No. of Containers	Gross Alpha / Beta	Gamma Spectroscopy						Comments
RAD-1	6/1/01		Soil	Comp	1	X	X						
RAD-2	↓		↓	↓	1	X	X						
RAD-3					1	X	X						
RAD-4					1	X	X						
RAD-X	↓		↓	↓	1	X	X						

Relinquished by:	**Date:**	**Time:**	**Received by:**	**Date:**	**Time:**
Relinquished by:	**Date:**	**Time:**	**Received by:**	**Date:**	**Time:**
Relinquished by: David R. Hanny	**Date:** 6/1/01	**Time:** 1505	**Received by Lab:** Mark F. Jackson	**Date:** 6/1/2001	**Time:** 15:05
Shipment Method:			**Airbill Number:**		

Turnaround Time Required:
Routine_____
Rush (Specify)_____

Comments:

Cooler Temperature: 18°

Original Laboratory Copy Clier

O'Brien & Gere Laboratories, Inc.

5000 Brittonfield Parkway
East Syracuse, New York 13057
(315) 437-0200

Chain of Custody

Client: Barton & Loguidice, P.C.
Project: Ewin Landfill (268.012)
Sampled by: D. Humpy, J. Reed
Client Contact: Mark Chauvin **Phone #** 457-5200

Sample Description

Sample Location	Date Collected	Time Collected	Sample Matrix	Comp. or Grab	No. of Containers	Analysis/Method: Gross Alpha/Beta	Analysis/Method: Gamma Spectroscopy	Analysis/Method	Analysis/Method	Analysis/Method	Analysis/Method	Analysis/Method	Comments
RAD - B	6/1/01	1200	soil	☒ Comp	1	X	X						

Relinquished by:		Date:	Time:	Received by:	Date:	Time:
Relinquished by:		Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Ryan Phaneuf	Date:	6/1/01 Time: 11:31	Received by Lab:	Mary F. Jackson	Date: 6/4/01 Time: 11:31
Shipment Method:				Airbill Number:		

Turnaround Time Required:
Routine_____
Rush (Specify)_____

Comments:

Cooler Temperature: Ambient

Original Laboratory Copy Client

APPENDIX C

DATA VALIDATION REPORT

DATA VALIDATION REPORT

MAY 2001 SAMPLING EVENT

TOWN OF ERWIN LANDFILL
Steuben County, New York

EnviroAnalytics
Data Validation Service

JULY 2001

EXECUTIVE SUMMARY

This report addresses data quality for the May 2001 sampling conducted at the Town of Erwin Landfill located in Steuben County, New York. Nineteen water samples and five sediment samples were analyzed for USEPA SW-846 parameters (volatiles, semivolatiles, and PCBs) and 6 NYCRR Part 360 Baseline Metals. The laboratory analyses were provided by CHEMTECH located in Edison, New Jersey.

The inorganics data have been determined to be usable for qualitative and quantitative purposes with the exception of mercury results for sixteen samples which were rejected due to low matrix spike recoveries. Additional qualification of data included the approximation of results for barium and silver for several samples due to matrix spike deviations and the approximation of aluminum, potassium, and sodium results for several samples due to ICP serial dilution deviations.

The volatile organics data have been determined to be usable for qualitative and quantitative purposes with the exception of 1,1,2,2-tetrachloroethane for three samples that were rejected due to internal standard deviations. Additional qualification of data included the approximation of several volatile compounds due to surrogate recovery, continuing calibration, and internal standard deviations.

The semivolatile organics data have been determined to be usable for qualitative and quantitative purposes with the exception of dibenzo(a,h)anthracene for SET-4 which was rejected due to internal standard recovery deviations. The detected di-n-butylphthalate results for SET-1, SET-3, and SET-4 were raised to the PQL and qualified with a "U" due to field blank contamination. Select TICs were rejected for several samples because they were also detected in the associated method and/or field blanks. Additional qualification of data included the approximation of several semivolatile compounds due to internal standard recovery, initial calibration, and continuing calibration deviations.

The PCBs data were determined to be usable for qualitative and quantitative purposes as presented by the laboratory and did not require further qualification.

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Appendices

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SECTION 1 - INTRODUCTION

1.1 Introduction

This report addresses data quality for the May 2001 sampling conducted at the Town of Erwin Landfill located in Steuben County, New York. Sample collection activities were performed from May 21 through May 22, 2001. The quantity and types of samples that were submitted for data validation are tabulated below.

Table 1: Introduction - Sample Summary Table

Date Collected	Sample Matrix	Sample Identification	
		Client ID	Laboratory ID
5/21/2001	groundwater	MW-1	L4474-12
		MW-2	L4474-13
		MW-3	L4474-14
		MW-A1	L4474-01
		MW-A2	L4474-02
		MW-X (MW-A2)	L4474-04
		MW-A3	L4474-03
		MW-A4	L4474-05
		MW-A5	L4474-06
		MW-A6	L4474-07
		MW-A7	L4474-09
		Field Blank	L4474-08
		Trip Blank	L4474-15
5/22/2001	groundwater	MW-4	L4487-09
		MW-5	L4487-10
		MW-6	L4487-11
		MW-7	L4487-12
		MW-8	L4487-13
		MW-9	L4487-14
		Trip Blank	L4487-15
5/22/2001	sediment	Field Blank (Soil Scoop)	L4487-01
		SET-1	L4487-02
		SET-2	L4487-05
		SET-3	L4487-06
		SET-4	L4487-07
		Blind Dupe (SET-2)	L4487-08

1.2 Analytical Methods

The samples were analyzed for USEPA SW-846 parameters (volatiles, semivolatiles, and PCBs) and 6 NYCRR Part 360 Baseline Metals in accordance with the protocols specified in the *New York State Department of Environmental Conservation Analytical Services Protocol (NYSDEC ASP)*, NYSDEC, September 1989, revised October 1995; the *Test Methods for Evaluating Solid Wastes*, SW-846 Third Edition, USEPA, November 1986, revised December 1987; and the *Methods for Chemical Analysis of Water and*

Wastes, USEPA-*600/4-79-020, March 1979*. Laboratory analyses were provided by CHEMTECH located in Edison, New Jersey.

1.3 Validation Protocols

Data validation is a process that involves the evaluation of analytical data against prescribed quality control criteria to determine the usefulness of the data. The analytical data addressed in this report were evaluated utilizing the quality control criteria presented in the following documents:

- *Exhibit E of New York State Department of Environmental Conservation Analytical Services Protocol (NYSDEC ASP)*, NYSDEC September 1989, 12/91 Revisions.
- *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, USEPA-540/R-94/013, February 1994.
- *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, USEPA-540/R-94/012, February 1994.
- *Evaluation of Metals Data for the Contract Laboratory Program (CLP)*, SOP NO. HW-2, Revision #11, USEPA Region II, January 1992.
- *CLP Organics Data Review and Preliminary Review*, SOP No. HW-6 Revision #10, USEPA Region II, October 1995.

1.3.1 Inorganic Parameters

The validation of inorganics parameters for this project followed the requirements presented in the analytical methodology and the data validation guidelines presented above. The following QA/QC parameters were evaluated:

1. Holding Times
2. Calibration
   a. Initial Calibration Verification
   b. Continuing Calibration Verification
3. Blank Analysis
4. ICP Interference Check Sample Analysis (ICP only)
5. Matrix Spike Analysis
6. Laboratory Duplicate Analysis
7. Laboratory Control Sample Analysis
8. ICP Serial Dilution Analysis (ICP only)
9. Field Blanks
10. Element Quantitation and Reported Detection Limits
11. Document Completeness
12. Overall Data Assessment

1.3.2 Organic Parameters

The validation of organic parameters for this project followed the requirements presented in the analytical methodology and the data validation guidelines presented above. The following QA/QC parameters were evaluated:

PCBs Analyses

1. Holding Times
2. Instrument Performance
   a. Standards Retention Time Windows
   b. DCBP Retention Time Shift
   c. Baseline Stability
   d. Chromatographic Resolution
3. Calibration
   a. Initial Calibration
   b. Analytical Sequence Verification
   c. Continuing Calibration Verification
4. Blank Analysis
5. Surrogate Recovery
6. Matrix Spike/Matrix Spike Duplicate Analysis
7. Reference Standard Analysis
8. Compound Identification and Quantitation
9. Documentation Completeness
10. Overall Data Assessment

Volatile and Semivolatile Organics Analyses

1. Holding Times
2. GC/MS Instrument Tuning Criteria
3. Calibration
   a. Initial Calibration
   b. Continuing Calibration
4. Blank Analysis
5. Surrogate Recovery
6. Matrix Spike / Matrix Spike Duplicate Analysis
7. Reference Standard Analysis
8. Internal Standards Recovery
9. Compound Identification and Quantitation
10. System Performance
11. Documentation Completeness
12. Overall Data Assessment

1.4 Data Qualifiers

The following qualifiers as specified in the guidance documents presented in Section 1.3 of this report have been used for this data validation.

U — Indicates that the analyte or compound was not detected. The sample quantitation limit is presented and adjusted for dilution. This qualifier is also used to signify that the detection limit of an analyte was raised due to blank contamination.

J — Indicates that the result should be considered approximate. This qualifier is used when the data validation procedure identifies a deficiency in the data generation process.

UJ — Indicates that the detection limit for the analyte or compound should be considered approximate. This qualifier is used when the data validation process identifies a deficiency in the data generation process.

R — Indicates that the previously reported detection limit or sample result has been rejected due to a major deficiency in the data generation procedure. The data are considered to be unusable for both qualitative and quantitative purposes.

The following sections of this document present a summary of the data validation process. Section 2 discusses data compliance with established QA/QC criteria and qualifications performed on the sample data. A discussion of the Precision, Accuracy, Representativeness, Comparability, and Completeness (PARCC) of the data and data usability are discussed in Section 3. The qualified data are presented on Table 1 for inorganic parameters and Table 2 for organics parameters. The USEPA Region II Data Validation Checklists are presented in Appendix A.

SECTION 2 - DATA VALIDATION SUMMARY

This section presents a discussion of QA/QC parameter compliance with established criteria and qualifications performed on the sample data when deviations from established criteria were observed. When several deviations from established QA/QC criteria were observed, the final qualifier assigned to the data was based on the cumulative effect of the deviations.

2.1 Inorganics Analysis

Data validation was performed for seventeen groundwater, five sediment samples, and two field blank samples that were analyzed for NYCRR Part 360 Baseline Metals. The QA/QC parameters presented in Section 1.3.1 of this report were found to be within specified limits with the exception of the following:

Matrix Spike Analysis

Matrix spike (MS) recovery criteria requiring spike recoveries to be between 75 and 125 percent were exceeded for several analytes. Qualification of sample results included the approximation of results when spike recoveries were less than the lower limit, but greater than 30 percent (10 percent for sediment samples). Sample results were rejected for analytes with recoveries that were less than 30 percent (10 percent for sediment samples). Samples qualified due to MS recovery deviations are tabulated below.

Table 2: Inorganics Analyses - Matrix Spike Deviations

Inorganic	Percent Recovery	Data Qualifier	Affected Samples
Mercury	2.8	R	MW-A1 MW-A2 MW-A3 MW-X (MW-A2) MW-A4 MW-A5 MW-A6 MW-A7 MW-1 MW-2 MW-3
Mercury Silver	0 73.7	R J	SET-1 SET-2 SET-3 SET-4 Blind Dupe (SET-2)

Inorganic	Percent Recovery	Data Qualifier	Affected Samples
Barium	149.1	J	MW-4 MW-5 MW-6 MW-7 MW-8 MW-9

ICP Serial Dilution Analysis

An ICP serial dilution is required to evaluate the linear range of the ICP system for analytes with a concentration greater than 10 times its instrument detection limit (IDL) in an undiluted aliquot. The ICP linear range is evaluated by comparing the results of an undiluted sample with those from an aliquot with a four-fold dilution. The percent difference (%D) between these results is required to be less than 10 percent. Analytes with %D values greater than 10 percent were qualified as approximated (J) for samples with concentrations greater than 10 times the IDL. Samples qualified due to ICP serial dilution deviations are tabulated below.

Table 3: Inorganics Analyses -Serial Dilution Deviations

Matrix	Parameter	Percent Difference	Data Qualifier	Affected Samples
Groundwater	Potassium Sodium	24.5 19.7	J J	MW-A1 MW-A2 MW-A3 MW-X (MW-A2) MW-A4 MW-A5 MW-A6 MW-A7 MW-1 MW-2 MW-3
Sediment	Potassium	16.4	J	SET-1 SET-2 SET-3 SET-4 Blind Dupe (SET-2)
Groundwater	Aluminum Potassium Sodium	29.6 27.4 22.1	J J J	MW-4 MW-5 MW-6 MW-7 (except Aluminum) MW-8 MW-9

Element Quantitation and Reported Detection Limits

Detected sample results that were greater than the IDL, but less than the contract required detection limit (CRDL) were reported by the laboratory with a "B" qualifier. These results were qualified as approximated (J) as a result of the data validation.

Overall Data Assessment

Overall, the laboratory performed inorganics analyses in accordance with the requirements specified in the methods listed in Section 1.2 of this report. These data have been determined to be usable for qualitative and quantitative purposes with the exception of mercury results for sixteen samples which were rejected due to low matrix spike recoveries. Additional qualification of data included the approximation of results for barium and silver results for several samples due to matrix spike deviations and the approximation of aluminum, potassium, and sodium results for several samples due to ICP serial dilution deviations.

2.2 Volatile Organics Analysis

Data validation was performed for seventeen groundwater, five sediment samples, two field blank samples, and two trip blank samples that were analyzed for USEPA SW-846 volatiles. The QA/QC parameters presented in Section 1.3.2 of this report were found to be within specified limits with the exception of the following:

Surrogate Recovery

Surrogate compounds are added to the samples prior to sample preparation to evaluate the efficiency of the sample preparation procedures. The surrogate compounds are required to percent recovery values within specific prescribed limits. When one or more of the surrogate compounds exceed the prescribed recovery limits the associated sample data require qualification. The following samples required qualification for surrogate compound deficiencies.

Table 4: Volatile Organics Analyses -Surrogate Compound Deviations

Sample ID	Surrogate Compound	Percent Recovery	Control Limits	Qualifier
SET-2	4-Bromofluorobenzene	65	74 to 121	all compounds were qualified as approximated
SET-3	1,2-Dichloroethane-d4 4-Bromofluorobenzene	124 67	70 to 121 74 to 121	all compounds were qualified as approximated

Sample ID	Surrogate Compound	Percent Recovery	Control Limits	Qualifier
Blind Dupe (SET-2)	4-Bromofluorobenzene	70	74 to 121	all compounds were qualified as approximated

Continuing Calibration

The continuing calibration percent difference (%D) limit which requires the absolute value of the %D to be less than 25 percent was exceeded for several compounds. Sample qualification included the approximation of results when %D criteria were exceeded. Samples requiring qualification due to these deviations are tabulated below.

Table 5: Volatile Organics Analyses - Continuing Calibration Deviations

Date Analyzed	Volatile Compound	%D	Qualifier	Affected Samples
5/30/01	4-Methyl-2-Pentanone	28.3	UJ	MW-3 Field Blank (Soil Scoop) MW-4 MW-5 MW-6 MW-7 Trip Blank (5/22/01)
5/31/01	2-Hexanone	31.9	UJ	MW-1 MW-8 MW-9
5/31/01	Acetone 2-Butanone	38.0 31.5	UJ UJ	MW-2
5/31/01	Acetone	31.4	UJ	SET-1
6/1/01	Acetone Chloromethane 1,2-Dichloroethane Dibromochloromethane	43.8 41.0 27.9 27.5	UJ UJ UJ UJ	SET-2 SET-3 SET-4 Blind Dupe (SET-4)

Internal Standards Recovery

The internal standard areas were below the lower recovery limits for all four internal standard compounds for the five sediment samples [SET-1, SET-2, SET-3, SET-4, and Blind Dupe (SET-2)]. The recoveries were above 25 percent for each of the internal standards with the exception of 1,4-dichlorobenzene-d4 which had recoveries of 20.9, 17.9, and 21.4 percent for samples SET-2, Blind Dupe (SET-2), and SET-3, respectively. Due to these deviations the results for all compounds for the five sediment samples were approximated with the exception of the non-detected results for 1,1,2,2-tetrachloroethane for samples SET-2, Blind Dupe (SET-2), and SET-3 which were rejected.

Overall Data Assessment

Overall, the laboratory performed volatile organics analyses in accordance with the requirements specified in the methods listed in Section 1.2. The volatile organics data have been determined to be usable for qualitative and quantitative purposes with the exception of 1,1,2,2-tetrachloroethane for three samples that were rejected due to internal standard deviations. Additional qualification of data included the approximation of several volatile compounds due to surrogate recovery, continuing calibration, and internal standard deviations.

2.3 Semivolatile Organics Analysis

Data validation was performed for seventeen groundwater, five sediment samples, and two field blank samples that were analyzed for USEPA SW-846 semivolatiles. The QA/QC parameters presented in Section 1.3.2 of this report were found to be within specified limits with the exception of the following:

Blank Analysis

The Field Blank (Soil Scoop) contained 1.4 µg/L of di-n-butylphthalate. Therefore, a blank action level was calculated at ten times the blank concentration for this compound. Detected sample results which were less than the blank action level were qualified with a "U" in the associated samples. Results that were detected below the practical quantitation limit (PQL) were raised to the PQL and qualified with a "U" qualifier. The "U" qualifier indicates that the semivolatile organic was not detected above the PQL. The detected di-n-butylphthalate results for SET-1, SET-3, and SET-4 were raised to the PQL and qualified with a "U" due to field blank contamination.

Initial Calibration

Initial calibration criteria require the average response factor to have a percent relative standard deviation (%RSD) to be less than 30 percent for each compound. Qualification of sample data included the qualification of detected results as approximated. Semivolatile compounds that exceeded initial calibration criteria and the samples qualified due to those deviations are tabulated below.

Table 6: Semivolatile Organics Analyses - Initial Calibration Deviations

Date Analyzed	Semivolatile Compound	%RSD	Qualifier	Affected Samples
5/23/01	Benzo(k)fluoranthene	42.1	J	SET-1 SET-2 SET-3 SET-4 Blind Dupe (SET-2)

Date Analyzed	Semivolatile Compound	%RSD	Qualifier	Affected Samples
5/23/01	Diethylphthalate	34.8	J	SET-1

Continuing Calibration

The continuing calibration percent difference (%D) limit which requires the absolute value of the %D to be less than 25 percent was exceeded for several compounds. Sample qualification included the approximation of results when %D criteria were exceeded. Samples requiring qualification due to these deviations are tabulated below.

Table 7: Semivolatile Organics Analyses - Continuing Calibration Deviations

Date Analyzed	Semivolatile Compound	%D	Qualifier	Affected Samples
5/28/01	2,4-Dinitrophenol Benzo(k)fluoranthene	27.3 28.5	UJ J, UJ	MW-A2 MW-A3 MW-X(MW-A2) MW-A4 MW-A6 Field Blank MW-1 MW-3 Field Blank (Soil Scoop) SET-1 SET-2 SET-3 SET-4 Blind Dupe (SET-2)
5/29/01	2,2'-Oxybis(1-Chloropropane) 2,4-Dinitrophenol	27.7 33.6	UJ UJ	MW-A1 MW-A5 MW-A7 MW-2 MW-4 MW-5 MW-6

Internal Standards Recovery

The internal standard areas were below the lower recovery limits for two internal standard compounds for SET-4 and one internal standard compound for SET-3. Qualification of data for these deviations included the approximation of detected and non-detected results for compounds quantitated using these internal standards. The affected compounds are presented below.

Table 8: Semivolatile Organics Analyses -Internal Standard Deviations

Sample ID	Surrogate Compound	Percent Recovery	Qualifier	Affected Compounds
SET-3	Perylene-d12	45.5	J	Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Dibenzo(a,h)anthracene Benzo(g,h,i)perylene
SET-4	Chrysene-d12	45.4	J, UJ	Pyrene Butylbenzylphthalate 3,3'_Dichlorobenzidine Benzo(a)anthracene Chrysene Bis(2-ethylhexyl)phthalate Di-n-octyl phthalate Indeno(1,2,3-cd)pyrene
SET-4	Perylene-d12	14.0	J, R	Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Dibenzo(a,h)anthracene Benzo(g,h,i)perylene

Tentatively Identified Compounds

Tentatively identified compounds (TICs) identified in several of the samples were rejected (R) because they were also detected in the associated method and/or field blanks.

Overall Data Assessment

Overall, the laboratory performed semivolatile organics analyses in accordance with the requirements specified in the method listed in Section 1.2. These analyses were determined to be usable for qualitative and quantitative purposes with the exception of dibenzo(a,h)anthracene for SET-4 which was rejected due to internal standard recovery deviations. The detected di-n-butylphthalate results for SET-1, SET-3, and SET-4 were raised to the PQL and qualified with a "U" due to field blank contamination. Select TICs were rejected for several samples because they were also detected in the associated method and/or field blanks. Additional qualification of data included the approximation of several semivolatile compounds due to internal standard recovery, initial calibration, and continuing calibration deviations.

2.4 PCBs Analyses

Data validation was performed for seventeen groundwater, five sediment samples, and two field blank samples that were analyzed for USEPA SW-846 PCBs. The QA/QC parameters presented in Section 1.3.2 of this report were found to be within specified limits. The PCBs analyses were determined to be usable for qualitative and quantitative purposes as presented by the laboratory and did not require further qualification based upon the data validation guidelines presented in Section 1.3.

SECTION 3 - DATA USABILITY and PARCC EVALUATION

3.1 Data Usability

This section presents a summary of the usability of the analytical data and an evaluation of the PARCC parameters. Data usability was calculated as the percentage of data that was not qualified as rejected based on a significant deviation from established QA/QC criteria. Data usability which was calculated separately for each type of analysis is tabulated below.

Table 9: Data Usability and PARCC Evaluation - Data Usability

Parameter	Usability	Deviation
Inorganic Parameters	97.2 %	Sixteen mercury results that were rejected due to matrix spike recovery deviations.
Volatile Organic Parameters	99.7 %	Three 1,1,2,2-tetrachloroethane results that were rejected due to internal standard deviations.
Semivolatile Organic Parameters	99.9 %	One dibenzo(a,h)anthracene result that was rejected due to internal standard deviations.
PCBs	100.0 %	None Rejected

3.2 PARCC Evaluation

The following sections provide an evaluation of the analytical data with respect to the precision, accuracy, representativeness, comparability, and completeness (PARCC) parameters.

3.2.1 Precision

Precision is measured through field duplicate samples, split samples, and laboratory duplicate samples. For this sampling program, none of the data were qualified for laboratory duplicate or field duplicate analysis criteria deviations.

3.2.2 Accuracy

Matrix spike samples, surrogate recoveries, ICP serial dilutions, laboratory control samples, and calibration criteria indicate the accuracy of the data. For this sampling program, 0.85 percent of the analytical data were qualified for deviations from matrix spike recovery criteria; 3.29 percent of the data were qualified for surrogate recovery deviations; 1.41 percent of the data were qualified for ICP serial dilution deviations; none were qualified for laboratory control sample deviations; and 2.41 percent were qualified for calibration criteria deviations.

3.2.3 Representativeness

Holding times, sample preservation, and blank analysis are indicators of the representativeness of the analytical data. For this investigation none of the analytical data were qualified for holding time or sample preservation deviations and 0.094 percent of the data were qualified for blank analysis deviations.

3.2.4 Comparability

Comparability is not compromised provided that the analytical methods did not change over time. A major component of comparability is the use of standard reference materials for calibration and QC. These standards are compared to other unknowns to verify their concentrations. Since standard analytical methods and reporting procedures were consistently used by the laboratory, the comparability criteria for the analytical data were met.

3.2.5 Completeness

The percent usability, or overall completeness of the data was 99.4 percent.

TABLES

Qualified Inorganics Data

-A4	MW-A5	MW-A6	MW-A7	FIELD BLANK	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	FIELD BLANK (SOIL SCOOP)	SET-1	SET-2	BLIND DUPE (SET-2)	SET-3	SET-4
1/01	05/21/01	05/21/01	05/21/01	05/21/01	05/21/01	05/21/01	05/21/01	05/22/01	05/22/01	05/22/01	05/22/01	05/22/01	05/22/01	05/22/01	05/22/01	05/22/01
	Water Matrix (ug/L)											Sediment Matrix (mg/Kg)				
0	57300	2110	64100	ND(7.9)	34700 J	473 J	44500 J	ND(7.9)	97400 J	81800 J	ND(7.9)	12600	12500	12800	2500	7270
.1)	7.2 J	ND(3.1)	4.5 J	ND(3.1)	16.2 J	6.7 J	12.4 J	3.5 J	6.1 J	7.3 J	ND(3.1)	0.41 J	1.1 J	0.88 J	3 J	1.2 J
9	60.3	10.4	59.6	ND(2.5)	72.3	ND(2.5)	272	23.1	79.8	58.2	ND(2.5)	19.6	10.3	10.4	12.4	9.1
3	1530	414	2460	ND(0.3)	2370 J	668 J	2820 J	1730 J	2170 J	1700 J	ND(0.3) J	251	196	194	60.2	104
6 J	3.3 J	0.24 J	3 J	0.16 J	1.2 J	ND(0.1)	2 J	ND(0.1)	3.7 J	3.1 J	ND(0.1)	0.74 J	0.62 J	1	0.1 J	0.37 J
.4)	ND(0.4)	0.46 J	1.5 J	ND(0.4)	1.5 J	ND(0.4)	7.9	ND(0.4)	5.4	3.7 J	ND(0.4)	0.37 J	0.36 J	0.37 J	1.1	0.41 J
00	144000	98500	211000	49.2 J	164000	159000	162000	176000	234000	132000	ND(3.1)	2910	2430	2400	4270	12100
J	70	ND(0.8)	72.1	ND(0.8)	58.5	1.4 J	63.2	ND(0.8)	134	102	ND(0.8)	18.4	15.9	16.1	10.4	11.1
1 J	34.4 J	8.6 J	42.6 J	ND(1)	31 J	5.5 J	31.2 J	1.1 J	67.9	59.6	ND(1)	10.5	10.5	10.7	3.2 J	8
.6	204	20.7 J	205	ND(0.8)	135	15.7 J	104	14.2 J	254	178	ND(0.8)	23.8	20.3	20.1	11.4	20.3
00	119000	14000	96900	26.8 J	71700	4400	324000	5550	175000	140000	15.1 J	23400	22900	22800	9100	15100
.6	87.3	10.9	98.8	ND(2.5)	122	19.5	445	6.8	130	127	ND(2.5)	39.4	62.2	61.4	236	121
00	69200	14200	79400	ND(7.9)	79500	47300	44900	47500	105000	56000	ND(7.9)	3730	3510	3530	2160	3540
00	5700	16200	13300	5 J	5370	3010	6760	3840	14500	6400	0.32 J	709	789	801	158	475
	R	R	R	ND(0.2)	ND(0.2)	ND(0.2)	0.24	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	R	R	R	R	R
2 J	95.8	7.9 J	103	ND(1.7)	71.8	17.2 J	38.4 J	2.5 J	160	132	ND(1.7)	23.5	20	20.2	22.1	15.4
00 J	25200 J	5100 J	13800 J	39.8 J	76500 J	34400 J	11900 J	3120 J	50700 J	40000 J	ND(31)	1580 J	1600 J	1740 J	326 J	986 J
3.2)	ND(3.2)	ND(3.2)	ND(3.2)	ND(3.2)	ND(3.2)	ND(3.2)	ND(3.2)	ND(3.2)	ND(3.2)	ND(3.2)	ND(3.2)	ND(0.4)	0.57 J	ND(0.4)	0.54 J	ND(0.37)
1.3)	1.3 J	ND(1.3)	ND(1.3)	ND(1.3)	ND(1.3)	ND(1.3)	10.4	ND(1.3)	2.6 J	1.8 J	ND(1.3)	1 J	1.1 J	1.2 J	0.62 J	0.69 J
00 J	101000 J	91700 J	492000 J	ND(267)	726000 J	532000 J	148000 J	245000 J	251000 J	186000 J	ND(267)	ND(33.2)	69.4 J	94.1 J	150 J	82.6 J
3.9)	ND(3.9)	ND(3.9)	ND(3.9)	ND(3.9)	ND(3.9)	ND(3.9)	ND(3.9)	ND(3.9)	ND(3.9)	ND(3.9)	ND(3.9)	ND(0.48)	ND(0.49)	ND(0.49)	ND(0.45)	ND(0.46)
4.9)	76.3	ND(34.9)	78.8	ND(34.9)	46.2 J	ND(34.9)	80	ND(34.9)	126	104	ND(34.9)	17.9	16.9	17.4	4.5 J	13.4
6	618	34.8	559	ND(0.5)	458	31.3	365	66.9	720	589	ND(0.5)	113	99.3	99.8	65.2	84.4
10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	0.74	ND(0.63)	ND(0.62)	ND(0.58)	0.7

05/22/01	05/21/01	05/21/01	05/21/01	05/21/01	05/22/01	05/22/01	05/22/01	05/22/01	05/22/01	05/22/01	05/22/01	05/22/01	05/22/01	05/22/01	05/22/01	05/22/01	05/22/01
Water Matrix (ug/L)													Sediment Matrix (ug/Kg)				
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	66	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	13 J	16 J	16 J	3.5 J	13 J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5) J	ND(5) J	ND(5) J	ND(5) J	ND(5)	ND(5)	ND(5) J	ND(5) J	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5) J	ND(5) J	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	4.5 J	6.6 J	3.2 J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	9.6	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	ND(6.3) J	ND(6.2) J	ND(5.8) J	ND(5.9) J
ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(6.2) J	R	R	R	ND(5.9) J
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	1.1 J	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10) J	ND(10)	ND(10) J	ND(10)	NA	ND(10) J	ND(10) J	ND(10) J	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(20)	ND(20)	ND(20)	ND(20)	NA	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	ND(20)	NA	ND(20)	ND(820)	ND(830)	ND(830)	ND(780)	ND(780)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)

05/22/01	05/21/01	05/21/01	05/21/01	05/21/01	05/22/01	05/22/01	05/22/01	05/22/01	05/22/01	05/22/01	05/22/01	05/22/01	05/22/01	05/22/01	05/22/01	05/22/01	05/22/01
		Water Matrix (ug/L)													Sediment Matrix (ug/Kg)		
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	84 J
ND(10) J	ND(10) J	ND(10) J	ND(10) J	NA	ND(10) J	ND(10) J	ND(10) J	ND(10)	ND(10)	ND(10)	NA	ND(10) J	ND(410) J	ND(420) J	ND(420) J	ND(390) J	ND(390) J
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	45 J
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	1.2 J	ND(10)	ND(10)	NA	ND(10)	52 J	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	55 J
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	130 J	100 J	88 J	62 J	290 J
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	63 J
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	1.1 J	ND(10)	NA	1.2 J	6.2 J	5 J	8.7 J	3.4 J	3.7 J	NA	1.4 J	ND(410)	ND(420)	ND(420)	ND(390)	ND(390)
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	220 J	190 J	180 J	72 J	480
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	140 J	130 J	130 J	57 J	650 J
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390) J
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390) J
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	78 J	67 J	72 J	ND(390)	220 J
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	98 J	87 J	90 J	41 J	270 J
2.9 J	3 J	3.4 J	ND(10)	NA	ND(10)	1.7 J	1.8 J	2.9 J	1.6 J	1.9 J	NA	ND(10)	67 J	ND(420)	ND(420)	ND(390)	54 J
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390) J
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	77 J	69 J	73 J	43 J	270 J
ND(10)	ND(10) J	ND(10)	ND(10) J	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10) J	130 J	120 J	120 J	40 J	390 J
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	94 J	81 J	89 J	40 J	260 J
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390)	ND(390) J
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390) J	R
ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	NA	ND(10)	ND(410)	ND(420)	ND(420)	ND(390) J	120 J
ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	NA	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	NA	ND(0.5)	ND(21)	ND(21)	ND(21)	ND(19)	ND(20)
ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	NA	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	NA	ND(0.5)	ND(21)	ND(21)	ND(21)	ND(19)	ND(20)
ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	NA	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	NA	ND(0.5)	ND(21)	ND(21)	ND(21)	ND(19)	ND(20)
ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	NA	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	NA	ND(0.5)	ND(21)	ND(21)	ND(21)	ND(19)	ND(20)
ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	NA	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	NA	ND(0.5)	ND(21)	ND(21)	ND(21)	ND(19)	ND(20)
ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	NA	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	NA	ND(0.5)	ND(21)	ND(21)	ND(21)	ND(19)	ND(20)
ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	NA	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	NA	ND(0.5)	ND(21)	ND(21)	ND(21)	ND(19)	92

APPENDIX G

DATA LOGGER RECORDS – PERIMETER MONITORING PROGRAM

Town of Erwin Landfill Daily PID Perimeter Monitoring Results

Site: Town of Erwin Landfill		Name: BDD	
Client: Stueben County		Date: 5/14/01	
Job #: 268.012		Weather Conditions: Clear	
Measurement Type	Min (ppm)	Max (ppm)	Avg (ppm)
High Alarm Levels	100.0	100.0	100.0
Low Alarm Levels	50.0	50.0	50.0
Date/Time	Min (ppm)	Max (ppm)	Avg (ppm)
5/14/01 - 11:25	----	0.0	0.0
5/14/01 - 11:40	----	0.7	0.0
5/14/01 - 11:55	----	0.7	0.0
5/14/01 - 12:10	----	0.3	0.0
5/14/01 - 12:25	----	0.3	0.0
5/14/01 - 12:40	----	0.0	0.0
5/14/01 - 12:55	----	0.0	0.0
5/14/01 - 13:10	----	0.0	0.0
5/14/01 - 13:25	----	0.0	0.0
5/14/01 - 13:40	----	1.5	0.0
5/14/01 - 13:55	----	4.5	0.0
5/14/01 - 14:10	----	3.7	0.1
5/14/01 - 14:25	----	3.9	0.1
5/14/01 - 14:40	----	5.3	0.2
5/14/01 - 14:55	----	5.5	0.2
5/14/01 - 15:10	----	3.3	0.0
5/14/01 - 15:25	----	2.7	0.0
5/14/01 - 15:40	----	2.0	0.0
5/14/01 - 15:55	----	3.4	0.0
5/14/01 - 16:10	----	5.2	0.2
5/14/01 - 16:25	----	5.3	0.3
5/14/01 - 16:40	----	3.6	0.0
5/14/01 - 16:55	----	2.4	0.0
5/14/01 - 17:10	----	1.8	0.0
Notes:			

Instrument: MiniRAE 2000 (PGM7600) Serial Number: 003406
User ID: 00000001 Site ID: 00000001
Data Points: 24 Gas Name: Isobutylene Sample Period: 900 sec
Last Calibration Time: 05/08/2001 04:20

Measurement Type:	Min(ppm)	Avg(ppm)	Max(ppm)
High Alarm Levels:	100.0	100.0	100.0
Low Alarm Levels:	50.0	50.0	50.0

Line#	Date Time	Min(ppm)	Avg(ppm)	Max(ppm)
1	05/14/2001 11:25	-----	0.0	0.0
2	05/14/2001 11:40	-----	0.0	0.7
3	05/14/2001 11:55	-----	0.0	0.7
4	05/14/2001 12:10	-----	0.0	0.3
5	05/14/2001 12:25	-----	0.0	0.3
6	05/14/2001 12:40	-----	0.0	0.0
7	05/14/2001 12:55	-----	0.0	0.0
8	05/14/2001 13:10	-----	0.0	0.0
9	05/14/2001 13:25	-----	0.0	0.0
10	05/14/2001 13:40	-----	0.0	1.5
11	05/14/2001 13:55	-----	0.0	4.5
12	05/14/2001 14:10	-----	0.1	3.7
13	05/14/2001 14:25	-----	0.1	3.9
14	05/14/2001 14:40	-----	0.2	5.3
15	05/14/2001 14:55	-----	0.2	5.5
16	05/14/2001 15:10	-----	0.0	3.3
17	05/14/2001 15:25	-----	0.0	2.7
18	05/14/2001 15:40	-----	0.0	2.0
19	05/14/2001 15:55	-----	0.0	3.4
20	05/14/2001 16:10	-----	0.2	5.2
21	05/14/2001 16:25	-----	0.3	5.3
22	05/14/2001 16:40	-----	0.0	3.6
23	05/14/2001 16:55	-----	0.0	2.4
24	05/14/2001 17:10	-----	0.0	1.8

Instrument: MiniRAE 2000 (PGM7600) Serial Number: 003406
User ID: 00000001 Site ID: 00000001
Data Points: 24 Gas Name: Isobutylene Sample Period: 900 sec
Last Calibration Time: 05/08/2001 04:20

Measurement Type:	Min(ppm)			Avg(ppm)			Max(ppm)		
Alarm Type:	STEL	TWA	AVG	STEL	TWA	AVG	STEL	TWA	AVG
Alarm Levels:	25.0	10.0		25.0	10.0		25.0	10.0	

			Min(ppm)			Avg(ppm)			Max(ppm)		
Line#	Date	Time	STEL	TWA	AVG	STEL	TWA	AVG	STEL	TWA	AVG
1	05/14/2001	11:25	-----	-----	-----	0.0	0.0	0.0	0.0	0.0	0.0
2	05/14/2001	11:40	-----	-----	-----	0.0	0.0	0.0	0.7	0.0	0.4
3	05/14/2001	11:55	-----	-----	-----	0.0	0.0	0.0	0.7	0.0	0.5
4	05/14/2001	12:10	-----	-----	-----	0.0	0.0	0.0	0.3	0.1	0.4
5	05/14/2001	12:25	-----	-----	-----	0.0	0.0	0.0	0.3	0.1	0.4
6	05/14/2001	12:40	-----	-----	-----	0.0	0.0	0.0	0.0	0.1	0.3
7	05/14/2001	12:55	-----	-----	-----	0.0	0.0	0.0	0.0	0.1	0.3
8	05/14/2001	13:10	-----	-----	-----	0.0	0.0	0.0	0.0	0.1	0.3
9	05/14/2001	13:25	-----	-----	-----	0.0	0.0	0.0	0.0	0.1	0.2
10	05/14/2001	13:40	-----	-----	-----	0.0	0.0	0.0	1.5	0.1	0.3
11	05/14/2001	13:55	-----	-----	-----	0.0	0.0	0.0	4.5	0.3	0.7
12	05/14/2001	14:10	-----	-----	-----	0.1	0.0	0.0	3.7	0.4	1.0
13	05/14/2001	14:25	-----	-----	-----	0.1	0.0	0.0	3.9	0.5	1.2
14	05/14/2001	14:40	-----	-----	-----	0.2	0.0	0.0	5.3	0.7	1.5
15	05/14/2001	14:55	-----	-----	-----	0.2	0.0	0.0	5.5	0.8	1.8
16	05/14/2001	15:10	-----	-----	-----	0.0	0.0	0.0	3.3	0.9	1.9
17	05/14/2001	15:25	-----	-----	-----	0.0	0.0	0.0	2.7	1.0	1.9
18	05/14/2001	15:40	-----	-----	-----	0.0	0.0	0.0	2.0	1.1	1.9
19	05/14/2001	15:55	-----	-----	-----	0.0	0.0	0.0	3.4	1.2	2.0
20	05/14/2001	16:10	-----	-----	-----	0.2	0.0	0.0	5.2	1.3	2.1
21	05/14/2001	16:25	-----	-----	-----	0.3	0.0	0.1	5.3	1.5	2.3
22	05/14/2001	16:40	-----	-----	-----	0.0	0.0	0.1	3.6	1.6	2.4
23	05/14/2001	16:55	-----	-----	-----	0.0	0.0	0.0	2.4	1.7	2.4
24	05/14/2001	17:10	-----	-----	-----	0.0	0.0	0.0	1.8	1.8	2.3

Instrument: MiniRAE 2000 (PGM7600) Serial Number: 003406
User ID: 00000001 Site ID: 00000001
Data Points: 24 Gas Name: Isobutylene Sample Period: 900 sec
Last Calibration Time: 05/08/2001 04:20
Start At: 05/14/2001 11:25 End At: 05/14/2001 17:10

Measurement Type:	Min(ppm)	Avg(ppm)	Max(ppm)
High Alarm Levels:	100.0	100.0	100.0
Low Alarm Levels:	50.0	50.0	50.0
STEL Alarm Levels:	25.0	25.0	25.0
TWA Alarm Levels:	10.0	10.0	10.0

Measurement Type:	Min(ppm)	Avg(ppm)	Max(ppm)
Peak Data Value:	-----	0.3	5.5
Min Data Value:	-----	0.0	0.0
TWA Data Value:	-----	0.0	1.8
AVG Data Value:	-----	0.0	2.3

Town of Erwin Landfill Daily PID Perimeter Monitoring Results

Site: Town of Erwin Landfill		Name: BDD	
Client: Stueben County		Date: 5/15/01	
Job #: 268.012		Weather Conditions: Clear	
Measurement Type	Min (ppm)	Max (ppm)	Avg (ppm)
High Alarm Levels	100.0	100.0	100.0
Low Alarm Levels	50.0	50.0	50.0
Date/Time	Min (ppm)	Max (ppm)	Avg (ppm)
5/15/01 - 09:37	----	4.5	0.0
5/15/01 - 09:52	----	6.8	0.0
5/15/01 - 10:07	----	2.0	0.0
5/15/01 - 10:22	----	2.1	0.0
5/15/01 - 10:37	----	1.7	0.0
5/15/01 - 10:52	----	1.5	0.0
5/15/01 - 11:07	----	0.8	0.0
5/15/01 - 11:22	----	1.0	0.0
5/15/01 - 11:37	----	0.2	0.0
5/15/01 - 11:52	----	0.8	0.0
5/15/01 - 12:07	----	0.0	0.0
5/15/01 - 12:22	----	0.5	0.0
5/15/01 - 12:37	----	1.9	0.0
5/15/01 - 12:52	----	3.3	0.0
5/15/01 - 13:07	----	5.0	0.1
5/15/01 - 13:22	----	4.8	0.0
5/15/01 - 13:37	----	2.7	0.0
5/15/01 - 13:52	----	2.3	0.0
5/15/01 - 14:07	----	2.3	0.0
5/15/01 - 14:22	----	0.5	0.0
5/15/01 - 14:32	----	1.6	0.0
5/15/01 - 14:52	----	1.0	0.0
5/15/01 - 15:07	----	1.2	0.0
5/15/01 - 15:22	----	1.1	0.0
5/15/01 - 15:37	----	1.6	0.0
5/15/01 - 15:52	----	1.1	0.0
5/15/01 - 16:07	----	2.1	0.0
5/15/01 - 16:22	----	4.0	0.0
5/15/01 - 16:37	----	1.5	0.0
Notes:			

Instrument: MiniRAE 2000 (PGM7600) Serial Number: 003406
User ID: 00000001 Site ID: 00000001
Data Points: 29 Gas Name: Isobutylene Sample Period: 900 sec
Last Calibration Time: 05/08/2001 04:20

Measurement Type:	Min(ppm)	Avg(ppm)	Max(ppm)
High Alarm Levels:	100.0	100.0	100.0
Low Alarm Levels:	50.0	50.0	50.0

Line#	Date Time	Min(ppm)	Avg(ppm)	Max(ppm)
1	05/15/2001 09:37	-----	0.0	4.5
2	05/15/2001 09:52	-----	0.0	6.8
3	05/15/2001 10:07	-----	0.0	2.0
4	05/15/2001 10:22	-----	0.0	2.1
5	05/15/2001 10:37	-----	0.0	1.7
6	05/15/2001 10:52	-----	0.0	1.5
7	05/15/2001 11:07	-----	0.0	0.8
8	05/15/2001 11:22	-----	0.0	1.0
9	05/15/2001 11:37	-----	0.0	0.2
10	05/15/2001 11:52	-----	0.0	0.8
11	05/15/2001 12:07	-----	0.0	0.0
12	05/15/2001 12:22	-----	0.0	0.5
13	05/15/2001 12:37	-----	0.0	1.9
14	05/15/2001 12:52	-----	0.0	3.3
15	05/15/2001 13:07	-----	0.1	5.0
16	05/15/2001 13:22	-----	0.0	4.8
17	05/15/2001 13:37	-----	0.0	2.7
18	05/15/2001 13:52	-----	0.0	2.3
19	05/15/2001 14:07	-----	0.0	2.3
20	05/15/2001 14:22	-----	0.0	0.5
21	05/15/2001 14:37	-----	0.0	1.6
22	05/15/2001 14:52	-----	0.0	1.0
23	05/15/2001 15:07	-----	0.0	1.2
24	05/15/2001 15:22	-----	0.0	1.1
25	05/15/2001 15:37	-----	0.0	1.6
26	05/15/2001 15:52	-----	0.0	1.1
27	05/15/2001 16:07	-----	0.0	2.1
28	05/15/2001 16:22	-----	0.0	4.0
29	05/15/2001 16:37	-----	0.0	1.5

Instrument: MiniRAE 2000 (PGM7600) Serial Number: 003406
User ID: 00000001 Site ID: 00000001
Data Points: 29 Gas Name: Isobutylene Sample Period: 900 sec
Last Calibration Time: 05/08/2001 04:20

Measurement Type:	Min(ppm)			Avg(ppm)			Max(ppm)		
Alarm Type:	STEL	TWA	AVG	STEL	TWA	AVG	STEL	TWA	AVG
Alarm Levels:	25.0	10.0		25.0	10.0		25.0	10.0	

			Min(ppm)			Avg(ppm)			Max(ppm)		
Line#	Date	Time	STEL	TWA	AVG	STEL	TWA	AVG	STEL	TWA	AVG
1	05/15/2001	09:37	-----	-----	-----	0.0	0.0	0.0	4.5	0.1	4.5
2	05/15/2001	09:52	-----	-----	-----	0.0	0.0	0.0	6.8	0.4	5.7
3	05/15/2001	10:07	-----	-----	-----	0.0	0.0	0.0	2.0	0.4	4.4
4	05/15/2001	10:22	-----	-----	-----	0.0	0.0	0.0	2.1	0.5	3.9
5	05/15/2001	10:37	-----	-----	-----	0.0	0.0	0.0	1.7	0.5	3.4
6	05/15/2001	10:52	-----	-----	-----	0.0	0.0	0.0	1.5	0.6	3.1
7	05/15/2001	11:07	-----	-----	-----	0.0	0.0	0.0	0.8	0.6	2.8
8	05/15/2001	11:22	-----	-----	-----	0.0	0.0	0.0	1.0	0.6	2.6
9	05/15/2001	11:37	-----	-----	-----	0.0	0.0	0.0	0.2	0.6	2.3
10	05/15/2001	11:52	-----	-----	-----	0.0	0.0	0.0	0.8	0.7	2.1
11	05/15/2001	12:07	-----	-----	-----	0.0	0.0	0.0	0.0	0.7	1.9
12	05/15/2001	12:22	-----	-----	-----	0.0	0.0	0.0	0.5	0.7	1.8
13	05/15/2001	12:37	-----	-----	-----	0.0	0.0	0.0	1.9	0.7	1.8
14	05/15/2001	12:52	-----	-----	-----	0.0	0.0	0.0	3.3	0.8	1.9
15	05/15/2001	13:07	-----	-----	-----	0.1	0.0	0.0	5.0	1.0	2.1
16	05/15/2001	13:22	-----	-----	-----	0.0	0.0	0.0	4.8	1.2	2.3
17	05/15/2001	13:37	-----	-----	-----	0.0	0.0	0.0	2.7	1.2	2.3
18	05/15/2001	13:52	-----	-----	-----	0.0	0.0	0.0	2.3	1.3	2.3
19	05/15/2001	14:07	-----	-----	-----	0.0	0.0	0.0	2.3	1.4	2.3
20	05/15/2001	14:22	-----	-----	-----	0.0	0.0	0.0	0.5	1.4	2.2
21	05/15/2001	14:37	-----	-----	-----	0.0	0.0	0.0	1.6	1.4	2.2
22	05/15/2001	14:52	-----	-----	-----	0.0	0.0	0.0	1.0	1.5	2.2
23	05/15/2001	15:07	-----	-----	-----	0.0	0.0	0.0	1.2	1.5	2.1
24	05/15/2001	15:22	-----	-----	-----	0.0	0.0	0.0	1.1	1.6	2.1
25	05/15/2001	15:37	-----	-----	-----	0.0	0.0	0.0	1.6	1.6	2.0
26	05/15/2001	15:52	-----	-----	-----	0.0	0.0	0.0	1.1	1.6	2.0
27	05/15/2001	16:07	-----	-----	-----	0.0	0.0	0.0	2.1	1.7	2.0
28	05/15/2001	16:22	-----	-----	-----	0.0	0.0	0.0	4.0	1.8	2.1
29	05/15/2001	16:37	-----	-----	-----	0.0	0.0	0.0	1.5	1.9	2.1

Instrument: MiniRAE 2000 (PGM7600) Serial Number: 003406
User ID: 00000001 Site ID: 00000001
Data Points: 29 Gas Name: Isobutylene Sample Period: 900 sec
Last Calibration Time: 05/08/2001 04:20
Start At: 05/15/2001 09:37 End At: 05/15/2001 16:37

Measurement Type:	Min(ppm)	Avg(ppm)	Max(ppm)
High Alarm Levels:	100.0	100.0	100.0
Low Alarm Levels:	50.0	50.0	50.0
STEL Alarm Levels:	25.0	25.0	25.0
TWA Alarm Levels:	10.0	10.0	10.0

Measurement Type:	Min(ppm)	Avg(ppm)	Max(ppm)
Peak Data Value:	-----	0.1	6.8
Min Data Value:	-----	0.0	0.0
TWA Data Value:	-----	0.0	1.9
AVG Data Value:	-----	0.0	2.1

Town of Erwin Landfill Daily PID Perimeter Monitoring Results

Site: Town of Erwin Landfill		Name: BDD	
Client: Stueben County		Date: 5/16/01	
Job #: 268.012		Weather Conditions: Clear	
Measurement Type	Min (ppm)	Max (ppm)	Avg (ppm)
High Alarm Levels	100.0	100.0	100.0
Low Alarm Levels	50.0	50.0	50.0
Date/Time	Min (ppm)	Max (ppm)	Avg (ppm)
5/16/01 - 08:30	----	3.3	0.0
5/16/01 - 08:45	----	5.5	0.0
5/16/01 - 09:00	----	8.8	0.1
5/16/01 - 09:15	----	2.0	0.0
5/16/01 - 09:30	----	1.9	0.0
5/16/01 - 09:45	----	2.0	0.0
5/16/01 - 10:00	----	1.7	0.0
5/16/01 - 10:15	----	4.2	0.0
5/16/01 - 10:30	----	4.0	0.1
5/16/01 - 10:45	----	5.5	0.2
5/16/01 - 11:00	----	5.6	0.3
5/16/01 - 11:15	----	5.8	0.3
5/16/01 - 11:30	----	10.0	0.5
5/16/01 - 11:45	----	11.3	0.9
5/16/01 - 12:00	----	10.7	0.5
5/16/01 - 12:15	----	9.6	0.5
5/16/01 - 12:30	----	5.6	0.4
5/16/01 - 12:45	----	7.4	0.6
5/16/01 - 13:00	----	11.3	0.7
5/16/01 - 13:15	----	10.6	0.8
5/16/01 - 13:30	----	11.8	1.3
5/16/01 - 13:45	----	11.4	1.0
5/16/01 - 14:00	----	5.8	0.5

Notes:

Instrument: MiniRAE 2000 (PGM7600) Serial Number: 003406
User ID: 00000001 Site ID: 00000001
Data Points: 23 Gas Name: Isobutylene Sample Period: 900 sec
Last Calibration Time: 05/08/2001 04:20

Measurement Type:	Min(ppm)	Avg(ppm)	Max(ppm)
High Alarm Levels:	100.0	100.0	100.0
Low Alarm Levels:	50.0	50.0	50.0

Line#	Date Time	Min(ppm)	Avg(ppm)	Max(ppm)
1	05/16/2001 08:30	-----	0.0	3.3
2	05/16/2001 08:45	-----	0.0	5.5
3	05/16/2001 09:00	-----	0.1	8.8
4	05/16/2001 09:15	-----	0.0	2.0
5	05/16/2001 09:30	-----	0.0	1.9
6	05/16/2001 09:45	-----	0.0	2.0
7	05/16/2001 10:00	-----	0.0	1.7
8	05/16/2001 10:15	-----	0.0	4.2
9	05/16/2001 10:30	-----	0.1	4.0
10	05/16/2001 10:45	-----	0.2	5.5
11	05/16/2001 11:00	-----	0.3	5.6
12	05/16/2001 11:15	-----	0.3	5.8
13	05/16/2001 11:30	-----	0.5	10.0
14	05/16/2001 11:45	-----	0.9	11.3
15	05/16/2001 12:00	-----	0.5	10.7
16	05/16/2001 12:15	-----	0.5	9.6
17	05/16/2001 12:30	-----	0.4	5.6
18	05/16/2001 12:45	-----	0.6	7.4
19	05/16/2001 13:00	-----	0.7	11.3
20	05/16/2001 13:15	-----	0.8	10.6
21	05/16/2001 13:30	-----	1.3	11.8
22	05/16/2001 13:45	-----	1.0	11.4
23	05/16/2001 14:00	-----	0.5	5.8

Instrument: MiniRAE 2000 (PGM7600) Serial Number: 003406
User ID: 00000001 Site ID: 00000001
Data Points: 23 Gas Name: Isobutylene Sample Period: 900 sec
Last Calibration Time: 05/08/2001 04:20

Measurement Type:	Min(ppm)			Avg(ppm)			Max(ppm)		
Alarm Type:	STEL	TWA	AVG	STEL	TWA	AVG	STEL	TWA	AVG
Alarm Levels:	25.0	10.0		25.0	10.0		25.0	10.0	

			Min(ppm)			Avg(ppm)			Max(ppm)		
Line#	Date	Time	STEL	TWA	AVG	STEL	TWA	AVG	STEL	TWA	AVG
1	05/16/2001	08:30	-----	-----	-----	0.0	0.0	0.0	3.3	0.1	3.3
2	05/16/2001	08:45	-----	-----	-----	0.0	0.0	0.0	5.5	0.3	4.4
3	05/16/2001	09:00	-----	-----	-----	0.1	0.0	0.0	8.8	0.6	5.9
4	05/16/2001	09:15	-----	-----	-----	0.0	0.0	0.0	2.0	0.6	4.9
5	05/16/2001	09:30	-----	-----	-----	0.0	0.0	0.0	1.9	0.7	4.3
6	05/16/2001	09:45	-----	-----	-----	0.0	0.0	0.0	2.0	0.7	3.9
7	05/16/2001	10:00	-----	-----	-----	0.0	0.0	0.0	1.7	0.8	3.6
8	05/16/2001	10:15	-----	-----	-----	0.0	0.0	0.0	4.2	0.9	3.7
9	05/16/2001	10:30	-----	-----	-----	0.1	0.0	0.0	4.0	1.0	3.7
10	05/16/2001	10:45	-----	-----	-----	0.2	0.0	0.0	5.5	1.2	3.9
11	05/16/2001	11:00	-----	-----	-----	0.3	0.0	0.1	5.6	1.4	4.0
12	05/16/2001	11:15	-----	-----	-----	0.3	0.0	0.1	5.8	1.6	4.2
13	05/16/2001	11:30	-----	-----	-----	0.5	0.0	0.1	10.0	1.9	4.6
14	05/16/2001	11:45	-----	-----	-----	0.9	0.1	0.2	11.3	2.2	5.1
15	05/16/2001	12:00	-----	-----	-----	0.5	0.1	0.2	10.7	2.6	5.5
16	05/16/2001	12:15	-----	-----	-----	0.5	0.1	0.2	9.6	2.9	5.7
17	05/16/2001	12:30	-----	-----	-----	0.4	0.1	0.2	5.6	3.0	5.7
18	05/16/2001	12:45	-----	-----	-----	0.6	0.1	0.2	7.4	3.3	5.8
19	05/16/2001	13:00	-----	-----	-----	0.7	0.2	0.3	11.3	3.6	6.1
20	05/16/2001	13:15	-----	-----	-----	0.8	0.2	0.3	10.6	4.0	6.3
21	05/16/2001	13:30	-----	-----	-----	1.3	0.2	0.3	11.8	4.3	6.6
22	05/16/2001	13:45	-----	-----	-----	1.0	0.3	0.4	11.4	4.7	6.8
23	05/16/2001	14:00	-----	-----	-----	0.5	0.3	0.4	5.8	4.9	6.8

Instrument: MiniRAE 2000 (PGM7600) Serial Number: 003406
User ID: 00000001 Site ID: 00000001
Data Points: 23 Gas Name: Isobutylene Sample Period: 900 sec
Last Calibration Time: 05/08/2001 04:20
Start At: 05/16/2001 08:30 End At: 05/16/2001 14:00

Measurement Type:	Min(ppm)	Avg(ppm)	Max(ppm)
High Alarm Levels:	100.0	100.0	100.0
Low Alarm Levels:	50.0	50.0	50.0
STEL Alarm Levels:	25.0	25.0	25.0
TWA Alarm Levels:	10.0	10.0	10.0

Measurement Type:	Min(ppm)	Avg(ppm)	Max(ppm)
Peak Data Value:	-----	1.3	11.8
Min Data Value:	-----	0.0	1.7
TWA Data Value:	-----	0.3	4.9
AVG Data Value:	-----	0.4	6.8

Town of Erwin Landfill Daily Particulate Monitoring Results

Barton & Loguidice, P.C.
Consulting Engineers

		Job #:	268.012
		Name:	BDD
		Date:	5/14/2001
Site:	Erwin Landfill, Painted Post	Weather Conds:	Sunny - 80's
Client:	Steuben County	Start Time:	10:00 AM

Dusttrack Results Summary

	Dusttrak 1			Dusttrak 2		
Date	Location	Time	(mg/m^3)	Location	Time	(mg/m^3)
5/14/01	NW Corner	10:54 AM	0.018	SE Corner	11:05 AM	0.012
5/14/01	NW Corner	11:09 AM	0.018	SE Corner	11:20 AM	0.010
5/14/01	NW Corner	11:24 AM	0.016	SE Corner	11:35 AM	0.010
5/14/01	NW Corner	11:39 AM	0.014	SE Corner	11:50 AM	0.010
5/14/01	NW Corner	11:54 AM	0.013	SE Corner	12:05 PM	0.010
5/14/01	NW Corner	12:09 PM	0.013	SE Corner	12:20 PM	0.010
5/14/01	NW Corner	12:24 PM	0.013	SE Corner	12:35 PM	0.010
5/14/01	NW Corner	12:39 PM	0.012	SE Corner	12:50 PM	0.009
5/14/01	NW Corner	12:54 PM	0.012	SE Corner	1:05 PM	0.009
5/14/01	NW Corner	1:09 PM	0.012	SE Corner	1:20 PM	0.009
5/14/01	NW Corner	1:24 PM	0.012	SE Corner	1:35 PM	0.010
5/14/01	NW Corner	1:39 PM	0.014	SE Corner	1:50 PM	0.014
5/14/01	NW Corner	1:54 PM	0.022	SE Corner	2:05 PM	0.015
5/14/01	NW Corner	2:09 PM	0.023	SE Corner	2:20 PM	0.015
5/14/01	NW Corner	2:24 PM	0.023	SE Corner	2:35 PM	0.014
5/14/01	NW Corner	2:39 PM	0.022	SE Corner	2:50 PM	0.014
5/14/01	NW Corner	2:54 PM	0.021	SE Corner	3:05 PM	0.014
5/14/01	NW Corner	3:09 PM	0.021	SE Corner	3:20 PM	0.014
5/14/01	NW Corner	3:24 PM	0.020	SE Corner	3:35 PM	0.015
5/14/01	NW Corner	3:39 PM	0.021	SE Corner	3:50 PM	0.013
5/14/01	NW Corner	3:54 PM	0.022			
5/14/01	NW Corner	4:09 PM	0.023			
5/14/01	NW Corner	4:24 PM	0.029			
5/14/01	NW Corner	4:39 PM	0.022			
5/14/01	NW Corner	4:54 PM	0.016			
5/14/01	NW Corner	5:09 PM	0.015			

Notes:

Town of Erwin Landfill Daily Particulate Monitoring Results

Barton & Loguidice, P.C.
Consulting Engineers

Job #:	268.012		
Name:	BDD		
Date:	5/15/2001		
Site:	Erwin Landfill, Painted Post	Weather Conds:	Sunny - 80's
Client:	Steuben County	Start Time:	9:00 AM

Dusttrack Results Summary

	Dusttrak 1				Dusttrak 2		
Date	Location	Time	(mg/m^3)		Location	Time	(mg/m^3)
5/15/01	NW Corner	9:20 AM	0.034		SE Corner	9:41 AM	0.031
5/15/01	NW Corner	9:35 AM	0.036		SE Corner	9:56 AM	0.027
5/15/01	NW Corner	9:50 AM	0.033		SE Corner	10:11 AM	0.023
5/15/01	NW Corner	10:05 AM	0.031		SE Corner	10:26 AM	0.017
5/15/01	NW Corner	10:20 AM	0.025		SE Corner	10:41 AM	0.016
5/15/01	NW Corner	10:35 AM	0.025		SE Corner	10:56 AM	0.010
5/15/01	NW Corner	10:50 AM	0.013		SE Corner	11:11 AM	0.009
5/15/01	NW Corner	11:05 AM	0.012		SE Corner	11:26 AM	0.010
5/15/01	NW Corner	11:20 AM	0.013		SE Corner	11:41 AM	0.010
5/15/01	NW Corner	11:35 AM	0.013		SE Corner	11:56 AM	0.009
5/15/01	NW Corner	11:50 AM	0.013		SE Corner	12:11 PM	0.010
5/15/01	NW Corner	12:05 PM	0.013		SE Corner	12:26 PM	0.010
5/15/01	NW Corner	12:20 PM	0.013		SE Corner	12:41 PM	0.010
5/15/01	NW Corner	12:35 PM	0.013		SE Corner	12:56 PM	0.010
5/15/01	NW Corner	12:50 PM	0.012		SE Corner	1:11 PM	0.010
5/15/01	NW Corner	1:05 PM	0.012		SE Corner	1:26 PM	0.010
5/15/01	NW Corner	1:20 PM	0.012		SE Corner	1:41 PM	0.010
5/15/01	NW Corner	1:35 PM	0.012		SE Corner	1:56 PM	0.011
5/15/01	NW Corner	1:50 PM	0.012		SE Corner	2:11 PM	0.011
5/15/01	NW Corner	2:05 PM	0.012		SE Corner	2:26 PM	0.010
5/15/01	NW Corner	2:20 PM	0.011		SE Corner	2:41 PM	0.011
5/15/01	NW Corner	2:35 PM	0.011		SE Corner	2:56 PM	0.011
5/15/01	NW Corner	2:50 PM	0.010		SE Corner	3:11 PM	0.011
5/15/01	NW Corner	3:05 PM	0.009		SE Corner	3:26 PM	0.012
5/15/01	NW Corner	3:20 PM	0.008		SE Corner	3:41 PM	0.011
5/15/01	NW Corner	3:35 PM	0.008		SE Corner	3:56 PM	0.011
5/15/01	NW Corner	3:50 PM	0.005		SE Corner	4:11 PM	0.011
5/15/01	NW Corner	4:05 PM	0.002		SE Corner	4:26 PM	0.011
5/15/01	NW Corner	4:20 PM	0.000		SE Corner	4:41 PM	0.011
5/15/01	NW Corner	4:35 PM	-0.002		SE Corner	4:56 PM	0.011
5/15/01	NW Corner	4:50 PM	-0.004				
5/15/01	NW Corner	5:05 PM	-0.004				

Notes:

Town of Erwin Landfill Daily Particulate Monitoring Results

Barton & Loguidice, P.C.
Consulting Engineers

Job #: 268.012
Name: BDD
Date: 5/16/2001

Site: Erwin Landfill, Painted Post
Weather Conds: Sunny - 70's
Client: Steuben County
Start Time: 9:00 AM

Dusttrack Results Summary

	Dusttrak 1				Dusttrak 2		
Date	Location	Time	(mg/m^3)		Location	Time	(mg/m^3)
5/16/01	NW Corner	8:33 AM	0.033		SE Corner	8:29 AM	0.021
5/16/01	NW Corner	8:48 AM	0.033		SE Corner	8:44 AM	0.021
5/16/01	NW Corner	9:03 AM	0.028		SE Corner	8:59 AM	0.025
5/16/01	NW Corner	9:18 AM	0.025		SE Corner	9:14 AM	0.020
5/16/01	NW Corner	9:33 AM	0.022		SE Corner	9:29 AM	0.015
5/16/01	NW Corner	9:48 AM	0.021		SE Corner	9:44 AM	0.016
5/16/01	NW Corner	10:03 AM	0.017		SE Corner	9:59 AM	0.015
5/16/01	NW Corner	10:18 AM	0.014		SE Corner	10:14 AM	0.013
5/16/01	NW Corner	10:33 AM	0.011		SE Corner	10:29 AM	0.013
5/16/01	NW Corner	10:48 AM	0.010		SE Corner	10:44 AM	0.011
5/16/01	NW Corner	11:03 AM	0.010		SE Corner	10:59 AM	0.010
5/16/01	NW Corner	11:18 AM	0.009		SE Corner	11:14 AM	0.009
5/16/01	NW Corner	11:33 AM	0.007		SE Corner	11:29 AM	0.008
5/16/01	NW Corner	11:48 AM	0.006		SE Corner	11:44 AM	0.008
5/16/01	NW Corner	12:03 PM	0.006		SE Corner	11:59 AM	0.007
5/16/01	NW Corner	12:18 PM	0.006		SE Corner	12:14 PM	0.007
5/16/01	NW Corner	12:33 PM	0.005		SE Corner	12:29 PM	0.008
5/16/01	NW Corner	12:48 PM	0.004		SE Corner	12:44 PM	0.008
5/16/01	NW Corner	1:03 PM	0.003		SE Corner	12:59 PM	0.008
5/16/01	NW Corner	1:18 PM	0.003		SE Corner	1:14 PM	0.008
5/16/01	NW Corner	1:33 PM	0.002		SE Corner	1:29 PM	0.008
5/16/01	NW Corner	1:48 PM	0.001		SE Corner	1:44 PM	0.007
5/16/01	NW Corner	2:03 PM	0.000		SE Corner	1:59 PM	0.007
5/16/01	NW Corner	2:18 PM	0.000		SE Corner	2:14 PM	0.007

Notes:

TrakPro v3.06, Test: Test017, Date: 01/16/2002 08:14:16

Date mm/dd/yyyy	Time hh:mm:ss	Aerosol mg/m^3
01/16/2002	08:29:16	0.021
01/16/2002	08:44:16	0.021
01/16/2002	08:59:16	0.025
01/16/2002	09:14:16	0.020
01/16/2002	09:29:16	0.015
01/16/2002	09:44:16	0.016
01/16/2002	09:59:16	0.015
01/16/2002	10:14:16	0.013
01/16/2002	10:29:16	0.013
01/16/2002	10:44:16	0.011
01/16/2002	10:59:16	0.010
01/16/2002	11:14:16	0.009
01/16/2002	11:29:16	0.008
01/16/2002	11:44:16	0.008
01/16/2002	11:59:16	0.007
01/16/2002	12:14:16	0.007
01/16/2002	12:29:16	0.008
01/16/2002	12:44:16	0.008
01/16/2002	12:59:16	0.008
01/16/2002	13:14:16	0.008
01/16/2002	13:29:16	0.008
01/16/2002	13:44:16	0.007
01/16/2002	13:59:16	0.007
01/16/2002	14:14:16	0.007

Current test: 017
Start time: 08:14:16 01/16/2002
Stop time: 14:14:16 01/16/2002

Logging interval: 900 seconds

Serial Number: 21593
Sensor: Aerosol
Cal. Date: 08/14/2000

Channel: Aerosol
(Units) mg/m^3

Average: 0.012

Minimum: 0.007
Time 11:59:16
Date 01/16/2002

Maximum: 0.025
Time 08:59:16
Date 01/16/2002

TrakPro v3.06, Test: Test003, Date: 01/16/2002 08:18:29

Date mm/dd/yyyy	Time hh:mm:ss	Aerosol mg/m^3
01/16/2002	08:33:29	0.033
01/16/2002	08:48:29	0.033
01/16/2002	09:03:29	0.028
01/16/2002	09:18:29	0.025
01/16/2002	09:33:29	0.022
01/16/2002	09:48:29	0.021
01/16/2002	10:03:29	0.017
01/16/2002	10:18:29	0.014
01/16/2002	10:33:29	0.011
01/16/2002	10:48:29	0.010
01/16/2002	11:03:29	0.010
01/16/2002	11:18:29	0.009
01/16/2002	11:33:29	0.007
01/16/2002	11:48:29	0.006
01/16/2002	12:03:29	0.006
01/16/2002	12:18:29	0.006
01/16/2002	12:33:29	0.005
01/16/2002	12:48:29	0.004
01/16/2002	13:03:29	0.003
01/16/2002	13:18:29	0.003
01/16/2002	13:33:29	0.002
01/16/2002	13:48:29	0.001
01/16/2002	14:03:29	0.000
01/16/2002	14:18:29	0.000

Current test: 003
Start time: 08:18:29 01/16/2002
Stop time: 14:18:29 01/16/2002

Logging interval: 900 seconds

Serial Number: 21591
Sensor: Aerosol
Cal. Date: 10/25/1999

Channel: Aerosol
(Units) mg/m^3

Average: 0.012

Minimum: 0.000
Time 14:03:29
Date 01/16/2002

Maximum: 0.033
Time 08:33:29
Date 01/16/2002

TrakPro v3.06, Test: Test016, Date: 01/15/2002 09:26:59

Date mm/dd/yyyy	Time hh:mm:ss	Aerosol mg/m^3
01/15/2002	09:41:59	0.031
01/15/2002	09:56:59	0.027
01/15/2002	10:11:59	0.023
01/15/2002	10:26:59	0.017
01/15/2002	10:41:59	0.016
01/15/2002	10:56:59	0.010
01/15/2002	11:11:59	0.009
01/15/2002	11:26:59	0.010
01/15/2002	11:41:59	0.010
01/15/2002	11:56:59	0.009
01/15/2002	12:11:59	0.010
01/15/2002	12:26:59	0.010
01/15/2002	12:41:59	0.010
01/15/2002	12:56:59	0.010
01/15/2002	13:11:59	0.010
01/15/2002	13:26:59	0.010
01/15/2002	13:41:59	0.010
01/15/2002	13:56:59	0.011
01/15/2002	14:11:59	0.011
01/15/2002	14:26:59	0.010
01/15/2002	14:41:59	0.011
01/15/2002	14:56:59	0.011
01/15/2002	15:11:59	0.011
01/15/2002	15:26:59	0.012
01/15/2002	15:41:59	0.011
01/15/2002	15:56:59	0.011

:26:59

Date	Time	Aerosol
d/yyyy	hh:mm:ss	mg/m^3
01/15/200	16:11:59	0.011
01/15/200	16:26:59	0.011
01/15/200	16:41:59	0.011
01/15/200	16:56:59	0.011

Current test: 016
Start time: 09:26:59 01/15/2002
Stop time: 16:56:59 01/15/2002

Logging interval: 900 seconds

Serial Number:21593
Sensor: Aerosol
Cal. Date: 08/14/2000

Channel: Aerosol
(Units) mg/m^3

Average: 0.012

Minimum: 0.009
Time 11:11:59
Date 01/15/2002

Maximum: 0.031
Time 09:41:59
Date 01/15/2002

TrakPro v3.06, Test: Test002, Date: 01/15/2002 09:05:21

Date mm/dd/yyyy	Time hh:mm:ss	Aerosol mg/m^3
01/15/2002	09:20:21	0.034
01/15/2002	09:35:21	0.036
01/15/2002	09:50:21	0.033
01/15/2002	10:05:21	0.031
01/15/2002	10:20:21	0.025
01/15/2002	10:35:21	0.025
01/15/2002	10:50:21	0.013
01/15/2002	11:05:21	0.012
01/15/2002	11:20:21	0.013
01/15/2002	11:35:21	0.013
01/15/2002	11:50:21	0.013
01/15/2002	12:05:21	0.013
01/15/2002	12:20:21	0.013
01/15/2002	12:35:21	0.013
01/15/2002	12:50:21	0.012
01/15/2002	13:05:21	0.012
01/15/2002	13:20:21	0.012
01/15/2002	13:35:21	0.012
01/15/2002	13:50:21	0.012
01/15/2002	14:05:21	0.012
01/15/2002	14:20:21	0.011
01/15/2002	14:35:21	0.011
01/15/2002	14:50:21	0.010
01/15/2002	15:05:21	0.009
01/15/2002	15:20:21	0.008
01/15/2002	15:35:21	0.008

:05:21

Date d/yyyy	Time hh:mm:ss	Aerosol mg/m^3
01/15/200	15:50:21	0.005
01/15/200	16:05:21	0.002
01/15/200	16:20:21	0.000
01/15/200	16:35:21	-0.002
01/15/200	16:50:21	-0.004
01/15/200	17:05:21	-0.004

Current test: 002
Start time: 09:05:21 01/15/2002
Stop time: 17:05:21 01/15/2002

Logging interval: 900 seconds

Serial Number:21591
Sensor: Aerosol
Cal. Date: 10/25/1999

Channel: Aerosol
(Units) mg/m^3

Average: 0.013

Minimum: -0.004
Time 16:50:21
Date 01/15/2002

Maximum: 0.036
Time 09:35:21
Date 01/15/2002

TrakPro v3.06, Test: Test015, Date: 01/14/2002 10:50:57

Date mm/dd/yyyy	Time hh:mm:ss	Aerosol mg/m^3
01/14/2002	11:05:57	0.012
01/14/2002	11:20:57	0.010
01/14/2002	11:35:57	0.010
01/14/2002	11:50:57	0.010
01/14/2002	12:05:57	0.010
01/14/2002	12:20:57	0.010
01/14/2002	12:35:57	0.010
01/14/2002	12:50:57	0.009
01/14/2002	13:05:57	0.009
01/14/2002	13:20:57	0.009
01/14/2002	13:35:57	0.010
01/14/2002	13:50:57	0.014
01/14/2002	14:05:57	0.015
01/14/2002	14:20:57	0.015
01/14/2002	14:35:57	0.014
01/14/2002	14:50:57	0.014
01/14/2002	15:05:57	0.014
01/14/2002	15:20:57	0.014
01/14/2002	15:35:57	0.015
01/14/2002	15:50:57	0.013

Current test: 015
Start time: 10:50:57 01/14/2002
Stop time: 15:50:57 01/14/2002

Logging interval: 900 seconds

Serial Number: 21593
Sensor: Aerosol
Cal. Date: 08/14/2000

Channel: Aerosol
(Units) mg/m^3

Average: 0.012

Minimum: 0.009
Time 12:50:57
Date 01/14/2002

Maximum: 0.015
Time 14:05:57
Date 01/14/2002

TrakPro v3.06, Test: Test001, Date: 01/14/2002 10:39:23

Date mm/dd/yyyy	Time hh:mm:ss	Aerosol mg/m^3
01/14/2002	10:54:23	0.018
01/14/2002	11:09:23	0.018
01/14/2002	11:24:23	0.016
01/14/2002	11:39:23	0.014
01/14/2002	11:54:23	0.013
01/14/2002	12:09:23	0.013
01/14/2002	12:24:23	0.013
01/14/2002	12:39:23	0.012
01/14/2002	12:54:23	0.012
01/14/2002	13:09:23	0.012
01/14/2002	13:24:23	0.012
01/14/2002	13:39:23	0.014
01/14/2002	13:54:23	0.022
01/14/2002	14:09:23	0.023
01/14/2002	14:24:23	0.023
01/14/2002	14:39:23	0.022
01/14/2002	14:54:23	0.021
01/14/2002	15:09:23	0.021
01/14/2002	15:24:23	0.020
01/14/2002	15:39:23	0.021
01/14/2002	15:54:23	0.022
01/14/2002	16:09:23	0.023
01/14/2002	16:24:23	0.029
01/14/2002	16:39:23	0.022
01/14/2002	16:54:23	0.016
01/14/2002	17:09:23	0.015

Current test: 001
Start time: 10:39:23 01/14/2002
Stop time: 17:09:23 01/14/2002

Logging interval: 900 seconds

Serial Number:21591
Sensor: Aerosol
Cal. Date: 10/25/1999

Channel: Aerosol
(Units) mg/m^3

Average: 0.018

Minimum: 0.012
Time 12:39:23
Date 01/14/2002

Maximum: 0.029
Time 16:24:23
Date 01/14/2002

- MOWED LAWN
- MOWED LAWN W/ TREES
- CATTAIL EMERGENT SWAMP
- DITCH/ARTIFICIAL INTERMITTENT STREAM
- FORESTED UPLAND
- ASH SWAMP
- TERRESTRIAL/CULTURAL
- ACCESS ROAD

SOURCES: AERIAL PHOTOGRAPH DATED APRIL 16, 1995 (PROVIDED COURTESY OF USGS)
IDENTIFICATION OF HABITAT TYPES PROVIDED BY ECOLOGIC, LLC. (AUG, 2001)

STEUBEN COUNTY DEPT. OF PUBLIC WORKS
ERWIN TOWN LANDFILL REMEDIAL INVESTIGATION

HABITAT TYPE DISTRIBUTION

STEUBEN COUNTY NEW YORK

Figure

E-1

Project No.

268.012

Photo 1. **Mowed Lawn**. Top of the Landfill, dominated by Red fescue (*Festuca rubra*) and reed canary grass (*Phalaris arundinacea*) along with other grass species.

Photo 2. **Mowed Lawn**. Red fescue (*Festuca rubra*) and reed canary grass (*Phalaris arundinacea*) and other grass species.

Photo # 3. **Mowed Lawn withTrees**. Reed canary grass (*Phalaris arundinacea*) groundcover with scattered trees of Box elder (*Acer negundo*) and Eastern cottonwood (*Populus deltoides*).

Photo # 4. **Mowed Lawn with Trees**. Japanese knotweed (*Polygonum arundinacea*) and Common Winter-cress (*Barbarea vulgaris*) in the foreground, boxelder overstory in the background.

Photo # 5. **Cattail Emergent Marsh**. Narrow-leaf cattail (*Typha angustifolia*) and reed canary grass.

Photo # 6. **Mowed Lawn with Trees**. Grass swale of reed canary grass flowing into emergent marsh.

Photo # 7. **Ash swamp**. Green ash (*Fraxinus americana*) in background with dead trees on the left, reed canary grass dominating the foreground groundcover.

Photo # 8. **Dead trees**. A few isolated dead trees were adjacent to the Town of Erwin landfill.

Photo # 9. **Cohocton River**. Looking upstream.

Photo # 10. **Cohocton River**. Sampling macroinvertebrates.

Photo 11. **Terrestrial/Cultural.** Adjacent areas to the closed landfill.

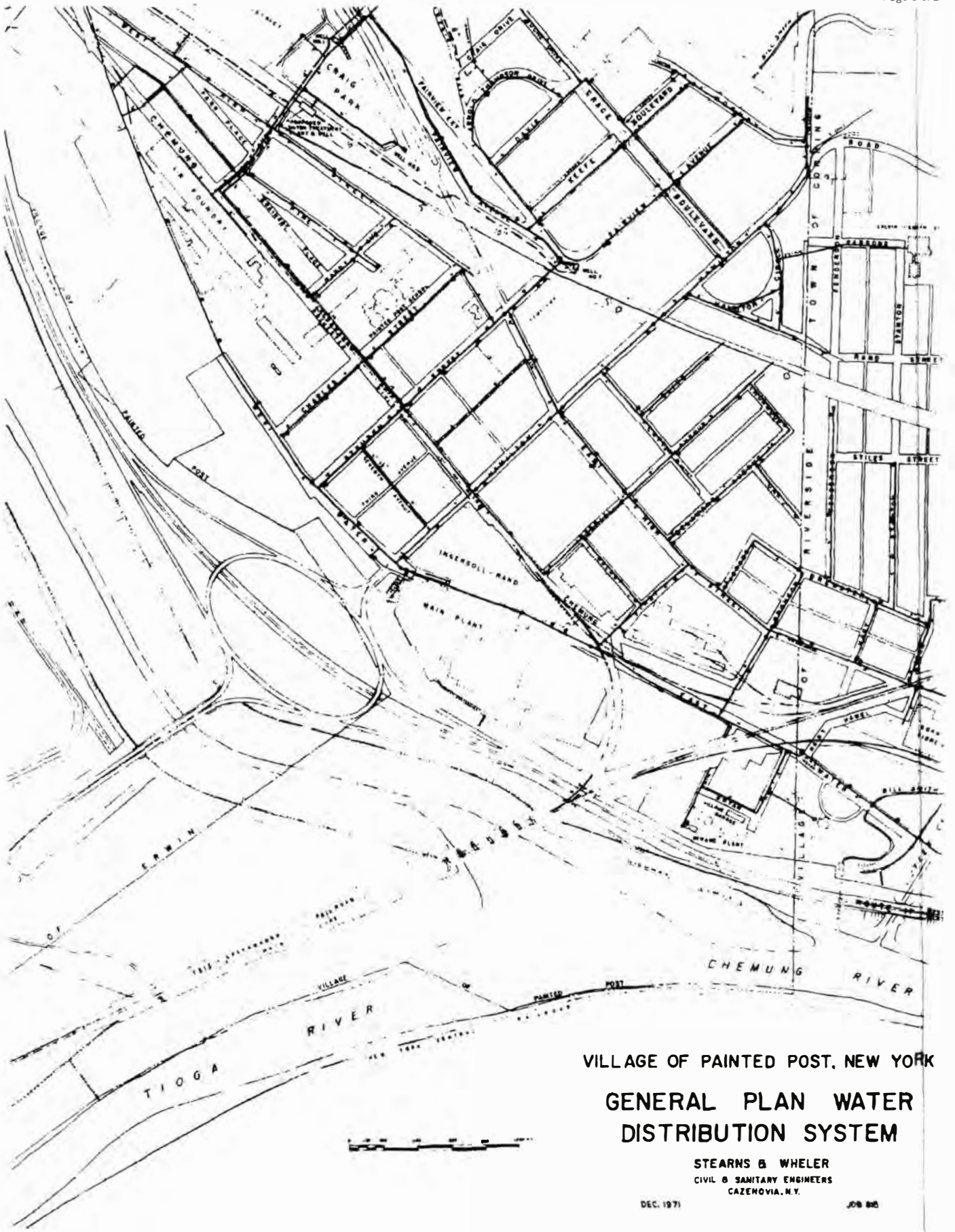
Photo # 12. **Access road**. Access road to the Town of Erwin Landfill and adjacent garage and storage.

Photo 13. **Small tributary to the Tioga River.**

Photo # 14. **Tioga River**. Tioga River looking downstream.

APPENDIX F

RESIDENTIAL WELL SURVEY LAYOUT/ LAYOUT OF LOCAL MUNICIPAL WATER SERVICE SUPPLY LINES



VILLAGE OF PAINTED POST, NEW YORK

GENERAL PLAN WATER DISTRIBUTION SYSTEM

STEARNS & WHELER
CIVIL & SANITARY ENGINEERS
CAZENOVIA, N.Y.

DEC. 1971

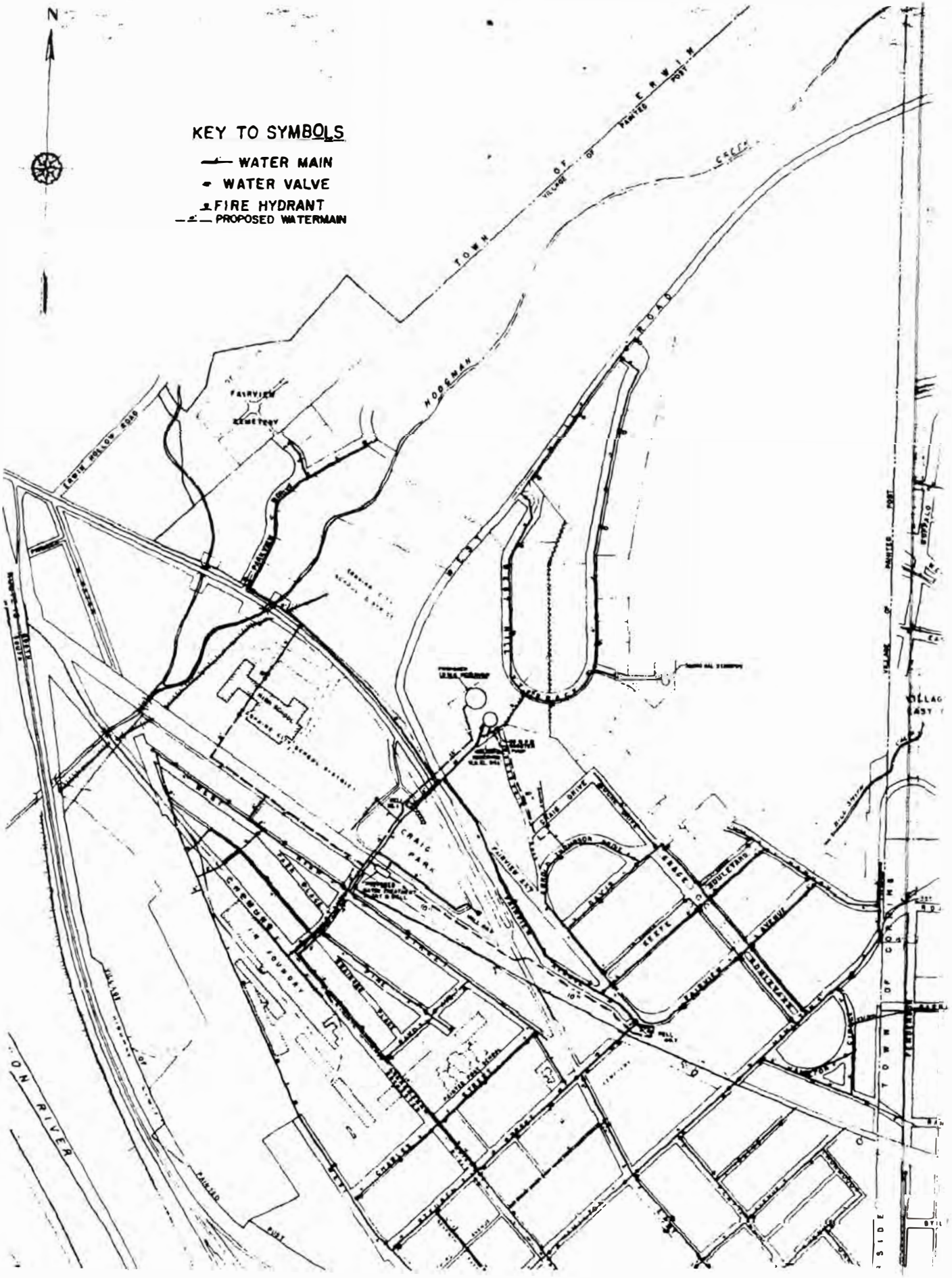
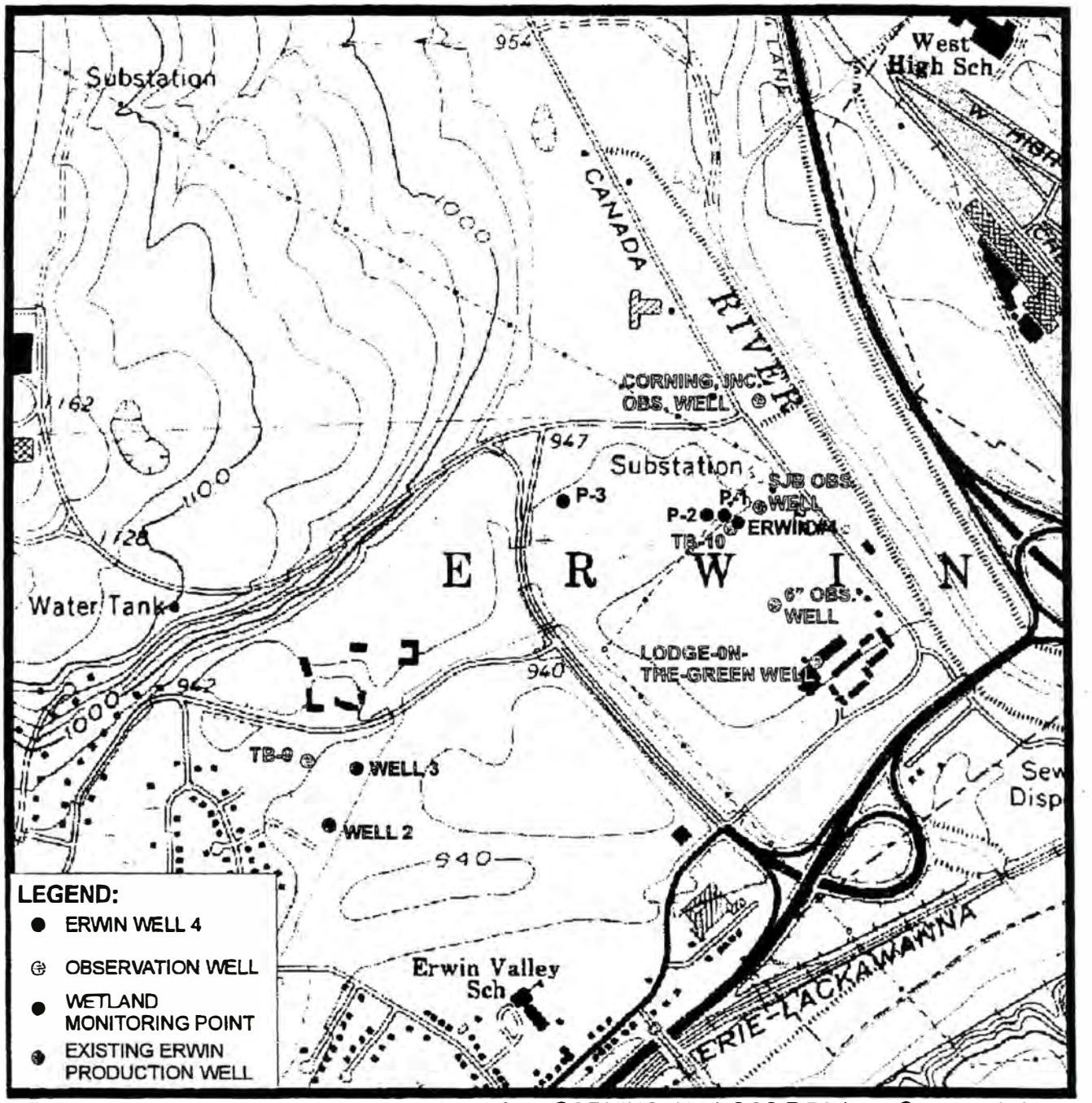

N
KEY TO SYMBOLS
WATER MAIN
WATER VALVE
FIRE HYDRANT
PROPOSED WATERMAIN
TOWN OF
ROAD
HODGMAN
FAIRVIEW
CEMETERY
CRAIG PARK
CRAIG DRIVE
ON RIVER

FIGURE 2



from CORNING, NY USGS 7.5 Minute Quadrangle Maps

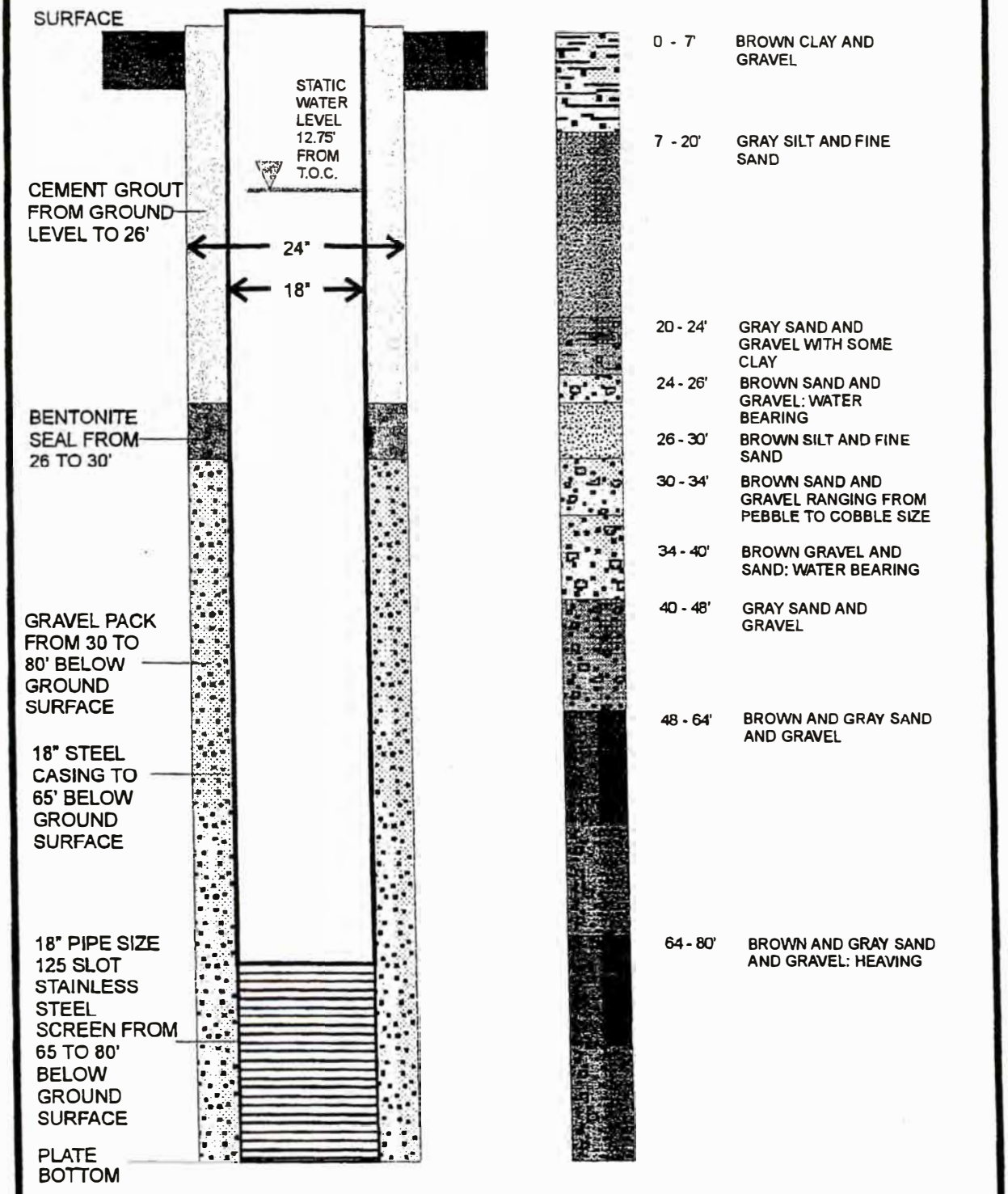
N

LOCATION MAP OF WELLS AND MONITORING POINTS FOR ERWIN WELL 4 72-HOUR PUMP TEST TOWN OF ERWIN, STEUBEN COUNTY, NEW YORK

SCALE: 1 inch = 1000 feet

Prepared by: Moody and Associates, Inc. - 1998 -

FIGURE 3



PRODUCTION WELL #4 WELL SCHEMATIC AND LITHOGRAPHIC LOG	VERTICAL SCALE 1" = 10'	**Moody** **and Associates, Inc.**
TOWN OF ERWIN STEUBEN COUNTY, NEW YORK	COMPLETED AUGUST 1998	11548 Cotton Road Meadville, Pennsylvania 16335