Alcan #39383*

MAIN LANDFILL INVESTIGATION

ALCAN ROLLED PRODUCTS COMPANY
TOWN OF SCRIBA
OSWEGO COUNTY, NEW YORK

PREPARED FOR

ALCAN ROLLED PRODUCTS COMPANY

PREPARED BY

DAMES & MOORE
SYRACUSE, NY

MAY 1994

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May 1994

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EXECUTIVE SUMMARY
MAIN LANDFILL INVESTIGATION

ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NEW YORK

The purpose of this study was to conduct an investigation of the Alan Rolled Products Company Main Landfill to permit appropriate classification of the site with respect to the New York State Registry of Inactive Hazardous Waste Disposal Sites. Currently, the landfill is designated as a Class 2a site, a temporary classification for sites which have inadequate and/or insufficient data for inclusion in any other classification.

The Main Landfill is located on the north side of the Alcan Rolled Products Company sheet rolling mill plant, approximately four miles east of Oswego, New York. The landfill is a 10-acre site which was used between 1963 and 1978 for the disposal of office trash, wooden pallets, construction debris and non-hazardous process wastes. An estimated 80,000 cubic yards of plant wastes were landfilled. Rags and adsorbent materials containing minor amounts of polychlorinated biphenyls (PCBs) from a transformer leak were reportedly deposited in the landfill. Rags from maintenance of hydraulic systems containing PCB fluids may also have been deposited in the landfill. The landfill was covered with soil and seeded in 1978.

The site is situated within the Erie-Ontario Plain at an elevation of 275 feet NGVD, approximately 1,000 feet southeast of the Lake Ontario shoreline. Site relief is generally 5 to 8 feet higher than the adjoining natural ground elevations. The humid-continental climate is moderated by proximity to Lake Ontario. The site receives about 35 inches of precipitation annually, including 127 inches of snow. Surface runoff from the landfill drains towards the adjacent Marsh No. 1, part of the North Ponds system used to discharge plant cooling water to Lake Ontario.

Ira and Sodus very stony, well drained soils and ponded Humaquept and Fibrist deposits occur in the area of the landfill. The underlying overburden consists of up to about 13 feet of till which in turn overlies Oswego Sandstone bedrock. A geologic buried valley, scoured approximately 8 to 10 feet deep in the bedrock and filled with fine sand and glaciolacustrine silt deposits, underlies the landfill site.

Ground water in the overburden aquifer beneath the landfill flows to the northwest toward Lake Ontario under a gradient of about one percent and at a velocity of 10^{-7} cm/sec. The nearest users of ground water are summer residents over 1,700 feet to the north of the site, on the shore of Lake Ontario.

The site is located on a 500-acre industrial facility in a sparsely populated rural area; 209 people are estimated to reside within a one-mile radius of the site.

The landfill is covered with grass and herbaceous species, and is periodically mowed. Dominant cover-types in the site area include the adjacent palustrine Class I wetland (OE-58) of the North Ponds system, and deciduous and mixed forest uplands. There are no listed endangered, threatened or rare species on or adjacent to the site. The adjacent ponds and wetlands are a nature reserve and fishing is prohibited by Alcan. No significant adverse impact from the landfill on vegetation, or terrestrial or aquatic life was observed during a habitat value study and ecological assessment performed during the investigation.

Ground water, leachate and surface soil were sampled during the investigation and analyzed for volatile and semivolatile organic compounds, pesticides, PCBs and metals. Air samples were collected and analyzed for volatile organic compounds and PCBs.

The results of the analyses revealed low part per billion (ppb) levels of several volatile and semivolatile organic compounds to be present in ground water down-gradient of the landfill which were up to about 10 times the 6 NYCRR Part 703 Class GA ground water standards. A PCB Aroclor was detected in one of the down-gradient wells sampled at a level of 1 ppb, which is above the Class GA standard of 0.1 ppb. Several low-toxicty metals were detected in samples from the down-gradient monitoring wells at levels higher than backgound and in some cases higher than the Class GA standard.

Some of the volatile organic compounds and metals detected in the ground water were also detected at slightly elevated levels in some of the leachate samples tested. Surface soil samples taken from the landfill were found to contain low part per million (ppm) levels of polynuclear aromatic hydrocarbons (PAHs) and less than 0.3 ppm levels of PCBs.

A baseline risk assessment performed on the levels of compounds detected in the environmental media, does not indicate the landfill to present unacceptable risks to human health.

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MAIN LANDFILL INVESTIGATION

ALCAN ROLLED PRODUCTS COMPANY
TOWN OF SCRIBA
OSWEGO COUNTY, NY

1.0 INTRODUCTION

This report has been prepared as the result of an environmental investigation of the former Main Landfill at the Alcan Rolled Products Company, Oswego, New York facility. Currently, the landfill is listed as Site Code 738015 on the New York State Registry of Inactive Hazardous Waste Disposal Sites. The site has been designated as a Class 2a site, a temporary classification for sites that have inadequate and/or insufficient data for inclusion in any other classification [1]*.

The Alcan Main Landfill, which was operated from 1963 to 1978, is reported to have received primarily construction and demolition debris, pallets, and office refuse. In 1978, the landfill was closed, covered with soil, graded and seeded with grass. Rags and adsorbent materials containing minor amounts of polychlorinated biphenyls (PCBs) from a transformer leak were reportedly deposited in the landfill. Rags from maintenance of hydraulic systems containing PCB fluids may also have been deposited in the landfill [2,3].

NYSDEC's current position regarding the environmental impact of the site is that further investigation is necessary to determine the significance of the PCB disposal at the landfill [1].

The purpose of the Main Landfill Investigation was to conduct a scope of work for an investigation, necessary to meet the requirements of NYSDEC Bureau of Hazardous Site Control, in order to permit appropriate classification of the site with respect to the Registry of Inactive Hazardous Waste Disposal Sites. The investigation included the sampling and analysis of different environmental media including ground water, leachate, surface soil and air, a site ecology and habitat value study, and a baseline risk assessment.

*References are listed in the Reference section of this report.

This introductory section describes the purpose of the report, summarizes site background information, and outlines the structure and organization of the report.

1.1 PURPOSE OF REPORT

The purpose of the report is to present the results of an environmental investigation of the Alcan Main Landfill to characterize the nature and extent of contamination and perform a baseline risk assessment. The report was developed by taking into account the historical, physical, chemical and environmental characteristics of the study area and integrating that information with data collected during the course of the investigation. The investigation represents the most comprehensive work to date evaluating the potential for impact of the landfill on the environment.

1.2 SITE BACKGROUND INFORMATION

Site background information is summarized below in terms of site location, manufacturing processes, description, history and previous studies.

1.2.1 Location of the Main Landfill

The Alcan Rolled Products Company sheet rolling mill facility is located approximately four miles east of Oswego City center on Lake Road North in the Town of Scriba, Oswego County, New York (Figure 1) [4]. The facility is bordered by Lake Road North and North Road to the southeast, largely undeveloped land to the southwest and northeast, and Lake Ontario to the northwest. The facility comprises several large adjoining plant buildings centrally located on a 500-acre parcel. The Main Landfill site is located on the north side of the plant buildings (Figure 2).

1.2.2 Manufacturing Processes

Constructed in 1963, the Alcan plant produces aluminum ingots, sheet and plate products. Approximately 80% of the raw aluminum comes from recycled scrap material such as used beverage containers. The raw material is melted in open-well furnaces, mixed to the required alloy composition, and cast into ingots. The ingots are then passed through hot and cold mill rolling processes to produce aluminum sheet of various widths, lengths and thicknesses, much of which is supplied to manufacturers of beverage containers and other products.

1.2.3 Site Description

The site investigated comprises a low-relief, grassy area of approximately 10-acres located on the north side of the Alcan facility. It is situated outside a security fence which surrounds the plant buildings, and between several ponds, marshes and small wooded upland areas which separate the site from the Lake Ontario shoreline (Figure 2). The ponds and marshes comprise the North Ponds cooling treatment system and are part of the Alcan Nature Reserve and Nature Trail, a privately-owned recreational and educational outdoor resource. The Nature Reserve is open to Alcan employees, and to the public by special permission [5].

The former Main Landfill comprises a grass-covered, elliptical-shaped area abutted by forest on three sides and the Alcan plant on one side. It is the highest elevation of the Alcan property considered in this investigation, sloping down to the north towards the North Pond System, which is relatively flat. The surface of the landfill is approximately five to eight feet above the level of the forest to the north and northeast, although approximately the same level as the Alcan plant to the south. On the surface of the southern edge of the landfill are a few pieces of former manufacturing equipment which are temporarily stored for scrap or parts. On southern corner of the landfill surface are piles of road salt and sand for maintenance of paved roads at the Alcan facility. Along perimeter of the landfill, blocks of concrete, empty metal drums, machinery parts and other debris were observed at the surface.

A one-lane, unpaved road crosses the landfill from a locked gate on its south side to the northern corner. Approximately midpoint on the landfill, the road forks with a branch leading to the western corner of the landfill and North Pond No. 1. The landfill roads are used by security and maintenance workers who travel the site periodically.

1.2.4 Site History

The Main Landfill was operated from 1963 to 1978 and used for the disposal of office trash, wooden pallets, construction debris and non-hazardous process wastes. An estimated 80,000 cubic yards of plant wastes were landfilled. It has been reported that rags and adsorbent material containing minor amounts of PCB fluids from cleanup of leaks or spills at the plant may have been deposited in the landfill. The landfill was covered with soil from on-site construction projects and top soil, and seeded in 1978 [2,3].

1.2.5 Previous Studies

The Main Landfill and adjacent North Pond system have been the subject of several studies, following the discovery of polychlorinated biphenyls (PCBs) in the cooling water effluent during routine monitoring at Outfall 002 in June 1980. A majority of the studies have focused on the distribution and levels of contamination in the pond and wetland sediment and surface water media, with some consideration of the Main Landfill. The results of the studies are summarized below in relation to the Main Landfill.

1.2.5.1 1982 North Pond Project

In 1982, following issuance of Consent Order #7-0469 by NYSDEC, the Alcan facility completed an investigation to find the source of the PCBs in the cooling water effluent [3]. The cooling water discharged from the facility into Pond No. 1 was tested and found to contain no detectable concentrations of PCBs. A sample of leachate from seeps at the north end of the Main Landfill was collected by Alcan and tested for PCBs. No PCBs were detected in the sample; the sampling and analysis was repeated three months later at the request of NYSDEC with the same result.

Since 1971, the Alcan facility has not purchased hydraulic fluids containing PCBs. Hydraulic equipment was tested in the plant in 1981 and found to have a PCB content below 0.1 ppm. Since 1981 the concentration of PCBs in the cooling water effluent at the discharge to Lake Ontario has been generally less than 0.05 part per billion (ppb) [3,6].

1.2.5.2 1989 NYSDEC Phase I Investigation

A Phase I investigation of the Alcan property which included both the Main Landfill and the North Ponds system was completed for NYSDEC in January, 1989 [3]. The purpose of the investigation was to assess the hazard to the environment caused by the condition of the property. The site was assessed a Hazard Ranking System (HRS) score of 22.63, based on consideration of publicly available information on geological, toxicological, environmental, chemical and demographic factors. No ground water data or biological uptake data was considered in making this decision. This score was principally influenced by the toxicity of PCBs, which were detected in the sediments of the North Ponds and marshes. The threshold score for inclusion on USEPA's National Priority List

(NPL) is 28.5. A Phase II study comprising the installation of monitoring wells, sampling and analysis was recommended but not conducted at that time.

1.2.5.3 1990 NYSDEC Preliminary Site Assessment

In December 1990, a Preliminary Environmental Assessment was prepared for NYSDEC [6]. The purpose of the assessment was to provide information necessary to reclassify the site from its 2a classification.

The study identified two areas which were under investigation by NYSDEC: the North Ponds system and the Main Landfill. Field readings were taken with a photoionization detector, radiation detector and explosimeter during a site visit. No readings above background were detected. No sampling or analysis was conducted.

The assessment determined that, (1) since PCBs had been detected in the sediment above 50 ppm, hazardous waste (6 NYCRR 371.4 (e)) had been released to the North Ponds system, and (2) that contaminated sediments posed a significant threat to aquatic and terrestrial wildlife. Also, surface water in the vicinity of Outfall 002 was found to have exceeded the Class D ambient water quality standard of 0.001 ppb PCB (6 NYCRR 371.5) and was considered to pose a significant threat to human health and the environment. Because of this, it was recommended that the area, which included the Main Landfill, be reclassified to Class 2. The Alcan property, as it is currently described in the April 1993 listing of inactive hazardous waste disposal sites in New York State "contains a 'polishing pond' system and an inactive industrial landfill. The 'polishing pond' system is regulated under the NYS SPDES program, and is not considered a part of the site. The inactive industrial landfill is the area of concern on the property."

1.2.5.4 1991 Sampling Program

In 1991, ground water, surface water, leachate, sediment and surface soil were sampled in the areas of the North Ponds treatment system, the Main Landfill, and the area near the channel between Marsh No. 1 and North Pond No. 2, and analyzed for various parameters [7]. A comparative summary of the organic analyses and a table listing the highest concentrations detected are provided in Appendix A. A map and data tabulations are also provided in Appendix A.

A monitoring well, MW-1 was installed near the western edge of the Main Landfill (Figure 3). After well development and purging, ground water samples were

obtained and tested for volatile organic compounds, semivolatile organic compounds, pesticides, PCBs and Target Compound List (TCL) metals. Trace levels of several volatile and semivolatile organic compounds were detected, some of which exceeded the Class GA ground water standards or guidance values. Of the heavy metals tested, chromium and lead levels marginally exceeded the Class GA ground water standards.

A composite 'leachate' sample, taken from surface water near the eastern end of Marsh No. 1 adjacent to the northwest edge of the landfill, was tested for volatile organic compounds, semivolatile organic compounds, pesticides, PCBs, and Target Compound List (TCL) metals. Only iron exceeded the Class D standard for surface water.

1.3 REPORT ORGANIZATION

The scope of work conducted during the Main Landfill Investigation is outlined in Section 2.0 of this report. Section 3.0 summarizes the physical characteristics of the study area in terms of surface features, climate, surface water, soils, geology, hydrogeology, demography, land use, and ecology. The nature and extent of contamination in relation to published standards are described in Section 4.0. A baseline risk assessment of the site is presented in Section 5.0. Section 6.0 contains the summary and conclusions of the investigation.

Tables, figures and reference sections follow Section 6.0. The results of the 1991 Sampling Program are tabulated in Appendix A. Listings of common flora and fauna expected to occur in addition to those observed in the vicinity of the Main Landfill site are provided in Appendix B. Appendix C contains the logs of borings conducted and well construction diagrams from monitoring wells installed along the perimeter of the Main Landfill site. Appendix D summarizes the results of field screening of the soil boring samples using an 11.7 eV HNU photoionization detector. Section E presents the results of a data usability study and the raw analytical data in tables. Appendix F contains the results of laboratory data validation.

2.0 SCOPE OF WORK

This section summarizes the scope of work performed for the Main Landfill Investigation in terms of the planning, field investigations and data analysis. The scope of work for the Main Landfill Investigation was intended to address the following issues which are listed as general provisions to Title 6 NYCRR Part 375 *Inactive Hazardous Waste Disposal Site Remedial Program* [8]:

- Has a 'consequential amount' of hazardous waste been disposed at the site?
- Does the hazardous waste constitute a significant threat to the environment?
- Is there significant 'environmental damage'?

This has been accomplished through sampling and analysis of environmental media and conducting a baseline risk assessment. The work progressed through a series of tasks which are outlined below.

2.1 PLANNING

During the planning stage, the scope of work to be conducted was formulated based on the existing database and the objectives of this investigation. The planning stage involved a literature review, site visits, and preparation of a Work Plan. The Work Plan was reviewed by NYSDEC and comments were incorporated into the scope of work [9].

2.1.1 Literature Review

The literature review included a review of information made available by Alcan comprising data, maps and reports. Publicly available information from published sources was also assembled and reviewed including ecological reports, NYSDEC Significant Habitats, regulated wetlands, streams, lakes and significant fish and wildlife resources within a 2-mile radius of the site. Information was obtained from NYSDEC Natural Heritage Program and NYSDEC Division of Fish and Wildlife.

Soil and geologic maps and reports, aerial photos, floodplain maps, topographic, surface water and wetlands maps, hydrogeologic studies, land use and demographic data, climate and weather information was also reviewed. Applicable PCB-specific and site-specific criteria were identified, including NYSDEC Division of Water Ambient Water

Quality Standards and Guidance Values (6 NYCRR Parts 700-705) and the NYS Freshwater Wetlands Act.

2.1.2 Site Visit

Several site visits to the Main Landfill were made in the fall of 1992 to view site conditions and identify and evaluate general terrestrial conditions. This information was used to develop a qualitative description and characterization of dominant vegetative species, cover-types, and associated fish and wildlife populations within a 0.5-mile radius of the site. In addition, a reconnaissance survey was performed across an area of approximately one mile in radius around the site to characterize land use, ground water and surface water usage.

2.2 PREPARATION OF PLANS

Four specific plans were developed and incorporated into a Work Plan for the Main Landfill Investigation [10]. These included a Sampling and Analysis Plan, a Quality Management Plan, a Health and Safety Plan and a preliminary Community Relations Plan. Data management documents such as chain of custody records, sampling data sheets for each media, boring logs, ground water level and well data sheets, and maps indicating the locations of sampling points were provided in appendices and figures of the Work Plan.

The Sampling and Analysis Plan was developed to define the types of data to be collected and their location, to eliminate unnecessary duplication, and define the protocols to be used in the sampling and laboratory analysis. The Sampling and Analysis Plan specified minimum detection level goals, which could be used to judge whether the site poses a significant threat to public health and the environment.

The Quality Management Plan addressed the level of quality control and quality assurance necessary to satisfy minimum requirements for maintaining sample integrity, maintain accuracy in measurements and reporting, and ensure usability and defensibilty of the data.

A Health and Safety Plan was developed to provide for the protection of personnel during the collection of field data on-site including multimedia sampling. The Health and Safety Plan was written in accordance with the OSHA regulations including

29 CFR Parts 1926 and 1910.120 - Hazardous Waste Operations and Emergency Response.

A preliminary Community Relations Plan for disseminating information on the project and encouraging community input was developed appropriate to the project objectives.

2.3 FIELD INVESTIGATION

Field investigations were performed in accordance with NYSDEC guidelines for site characterization and the Sampling and Analysis Plan. A description of the field sampling methods used is provided in Appendix E. The scope of work conducted is summarized below.

2.3.1 Monitoring Well Installation and Ground Water Sampling

Four new monitoring wells (MW-7, MW-8, MW-9 and MW-10) were installed around the perimeter of the Main Landfill to evaluate the potential for the presence and migration of chemical compounds from the Main Landfill into the adjacent pond and marsh environments via the overburden ground water aquifer. Soil borings were drilled to the top of bedrock, and a 2-inch diameter PVC well was installed in each boring. Soil boring logs are provided in Appendix C. Continuous split-spoon soil samples were taken in each boring, and samples were screened using an 11.7 eV HNU photoionization detector. The HNU screening results are provided in Appendix D.

The locations of the four new monitoring wells and the existing landfill monitoring well MW-1, installed in October 1991, are shown in Figure 4. The elevations of these and five other monitoring wells installed in the vicinity of the landfill and North Ponds (MW-2, MW-3, MW-4, MW-5 and MW-6), and eight monitoring wells located in the vicinity of the Alcan facility were surveyed to 1 foot horizontally and 0.01 foot vertically, and tied to the National Geodetic Vertical Datum (NGVD).

Ground water level measurements were taken from the 14 monitoring wells on the Alcan property and four monitoring wells on adjacent property owned by Sithe Energies, Inc., using an electronic water level meter and recorded to 0.01 foot accuracy. Ground water elevations were calculated for each of the wells using site survey data and are presented in Table 1.

Ground water purging, sampling and analysis was conducted on October 26 and 27; 1993 for the five Main Landfill monitoring wells (MW-1, MW-7, MW-8, MW-9 and MW-10). Samples were analyzed for volatile organics, semivolatile organics, pesticides, PCBs and metals.

2.3.2 Leachate Sampling

No actual leachate seeps were observed emanating from the sides of the landfill, despite a thorough inspection. Leachate samples were collected from two surface water locations adjacent to the landfill on October 28, 1993. L-1-LF was collected from standing water with a slight sheen located within five feet of the northern edge of the landfill, whereas L-2-LF was collected from surface water with a sheen along the edge of Marsh No. 1 and adjacent to the eastern edge of the landfill. Both samples were tested for volatile organics, semivolatile organics, pesticides and PCBs and TCL metals.

2.3.3 Surface Soil Sampling

Surface soil samples were obtained from three locations on the surface of the landfill on October 28, 1993. The results of these samples are compared against a composite sample collected from three locations in the forested area located north of the landfill. Each surface soil sample was tested for volatile organics, semivolatile organics, pesticides and PCBs and TCL metals.

2.3.4 Air Sampling

Samples of air were collected from three separate locations around the landfill and adjacent wetlands on October 26, 1993. The wind direction was out of the southeast at 0 to 9 miles per hour with gusts up to 19 miles per hour. The wind direction was verified by observation of the Alcan wind sock on-site. Wind direction, therefore was directed offshore. As a result, one sampling station was set-up on the southernmost edge of the up-gradient portion of the landfill as an upwind sample location (DM-1 and DM-2, Figure 3). Two other samples were collected at stations set-up downwind of the landfill near the Lake Ontario shoreline. One downwind sampling location was set up near the fish weir where Marsh No. 2 discharges into Lake Ontario (DM-3 and DM-4). A second downwind sampling location was located between North Pond No. 2 and Marsh No. 2 (DM-5 and DM-6). As verified by a sling psychrometer, the on-site ambient temperature was 58 degrees Fahrenheit and the relative humidity was 60 percent.

Samples were analyzed for volatile organics (hydrocarbons, boiling point 36-126°C and aromatic hydrocarbons) and PCBs using NIOSH methods.

2.3.5 Site Ecological Maps

A cover-type map of major on-site vegetative communities and a wetlands map was obtained in addition to based on information collected during the on-site surveys.

2.3.6 Habitat Value Study

A Habitat Value study was conducted and involved a qualitative description of the value of habitats to fish and wildlife species identified on the site and within a 0.5-mile radius. In addition, current and potential uses of the human resources on the site and within 0.5-mile was evaluated.

2.4 LABORATORY ANALYSIS

Ground water, leachate, surface soil and QA/QC samples such as field blanks, trip blanks and MS/MSD samples collected were tested by IEA, Inc. of Monroe, Connecticut in accordance with the methods listed below. In addition, air samples collected were analyzed by Galson Laboratories of East Syracuse, New York.

2.4.1 Analytical Methods

A total of five ground water, two surface water (leachate), four surface soil, three air and related QA/QC samples were submitted for laboratory analysis of PCBs and other analytes (Table 3). The analysis of the soil, ground water and leachate samples were performed in accordance with NYSDEC Analytical Services Protocol (ASP), as follows:

- Volatile organics - NYSDEC ASP 91-1, Superfund Deliverables
- Semivolatile organics - NYSDEC ASP 91-2, Superfund Deliverables
- Pesticides and PCBs - NYSDEC ASP 91-3, Superfund Deliverables
- Metals - CLP-M, 23 Target Analyte List Metals, Superfund Deliverables

The three air samples were analyzed for volatile organics including hydrocarbons (boiling point 36-126°C), aromatic hydrocarbons, and gaseous and particulate PCBs according to the following NIOSH Methods:

- NIOSH Method 1500 - Hydrocarbons, B.P. 36-126°C.
- NIOSH Method 1501 - Aromatic Hydrocarbons
- NIOSH Method 5503 - PCBs: particulates and gaseous

2.4.2 Data Usability

A data usability study was performed on the data as described in Appendix E.

Following laboratory analysis, the raw sample data were reviewed by a third-party data validator, Data Validation Services of North Creek, NY, to verify that the appropriate protocol and laboratory procedures were used, and identify samples which may have questionable reliability (Appendix F). Taking into account field sampling criteria and anomalies, and using the data validation results and the QA/QC control samples, a data usability report was prepared to comment on data utility (Appendix E) .

Both the data usability study and the data validation concluded that there was some contamination in laboratory method blanks, trip blanks and field blanks, which was accounted for in the review of data (Appendix F). Summaries of the usable results are provided in the tables section of the report following Section 6.0.

2.5 DATA ANALYSIS

The information resulting from the field sampling and laboratory testing was reviewed and analyzed to characterize the nature and extent of contamination in environmental media. Levels of compounds detected were compared against NYS Standards, Criteria and Goals.

A baseline risk assessment was performed which included a human health risk assessment and an environmental evaluation. The human health risk assessment consisted of contaminant identification, transport route analysis, identification of human receptors and exposure routes. The assessment involved a review of soil, air, surface and ground water data for PCBs and other "site indicator" compounds, and the identification of potentially functional and complete exposure pathways which may expose humans. Pathways of concern were evaluated in accordance with federal and state procedural

guidance to estimate rates of exposure to humans and derive estimates of potential non-carcinogenic toxicity and risk of excess lifetime cancer for humans exposed under both average and worst case conditions. An environmental evaluation or ecological risk assessment was performed and includes an evaluation of contaminants, potential receptors and exposure routes.

3.0 PHYSICAL CHARACTERISTICS OF THE STUDY AREA

This section summarizes the physical characteristics of the study area in terms of surface features, climate, surface water, soils, geology, hydrogeology, demography, land use and ecology.

3.1 SURFACE FEATURES

The site is located within the Erie-Ontario Plain which comprises the southern part of Oswego County. The Erie-Ontario Plain is characterized by gently rolling, uniform relief, interspersed with moderately large level areas which are commonly swampy [11].

Within the Erie-Ontario Plain, river valleys are not much lower than the surrounding countryside and high valley walls are rare. Drumlins are the most pronounced relief within the plain and reflect the area's history of repeated glaciation [11,12,13].

Marshy areas cover much of the land along the coast of Lake Ontario. Within one-half mile of the coastline, the terrain becomes undulating with numerous drumlins. Elevations are approximately 250 feet National Geodetic Vertical Datum (NGVD) along the coast and rise to greater than 400 feet NGVD on the drumlin tops [11,14].

The Alcan facility adjoins Lake Ontario and is characterized by fairly level topography and marshy areas. Elevations across the facility range from 250 feet NGVD along Lake Ontario to nearly 275 feet near the main plant buildings [14].

3.2 CLIMATE

A humid-continental climate that is broadly representative of the northeastern United States characterizes Oswego County. Weather within the Oswego area is governed by atmospheric flows from various regions of North America: cold, dry air masses from the northwest; warm, humid air from the southwest; and occasional maritime air masses from the Atlantic Ocean. Lake Ontario greatly influences the weather by moderating temperatures and affecting precipitation [11].

Summers are generally warm and pleasant with maximum temperatures between 75° and 80° Fahrenheit during the months of June, July, and August (Table 2).

Temperatures in excess of 90° Fahrenheit are recorded typically less than five days per year. Precipitation during these months averages approximately 2.5 inches per month [11].

Winters typically are long and cold; temperatures range between an average maximum of approximately 32° Fahrenheit and average minimum of 19° Fahrenheit (Table 2). Extremely low temperatures are not common due to the moderating effects of Lake Ontario. Snowfall averages approximately 127 inches annually, as measured in the City of Oswego [11].

3.3 SURFACE WATER

This section summarizes the study area hydrology including surface water bodies and surface drainage.

3.3.1 Surface Water Bodies

Most of Oswego County is drained by three river systems: the Oswego, Little Salmon, and Salmon River systems. The Oswego River drains most of the inland areas of the western and south-central parts of the county while the Salmon River originates in the Tug Hill Plateau and drains the northeastern part. The Little Salmon River drains the area between the Oswego and Salmon River. All surface water within the county eventually drains to Lake Ontario [11]. Lake Ontario is directly adjacent to the Alcan property, and is classified as Class A, suitable for drinking, cooking, food processing, contact recreation, and fishing.

Two ponds and three marsh areas are present on the Alcan property to the north of the plant. The marshy areas near and adjacent to the Alcan facility are classified wetlands according to the New York State Department of Environmental Conservation (NYSDEC) [15]. A north-flowing Class D tributary of Lake Ontario, Tributary 63, borders the southwest boundary of the Alcan property (Figure 2) [2,4,16].

3.3.2 Surface Drainage

As with surface water throughout Oswego County, surface water from the Alcan facility discharges to Lake Ontario (Figure 2) [16]. Surface water drains directly to the Lake, via Tributary 63, or via the on-site pond and marsh system [16]. The ponds and

marshes are used principally as a means of discharging plant cooling water to Lake Ontario although some surface runoff discharge through the system also takes place [16].

Cooling water is discharged from the Alcan Plant to North Pond No. 1, then flows from North Pond No. 1 to Marsh No. 1, which is directly connected to North Pond No. 2. Water drains from North Pond No. 2 into the southwest corner of Marsh No. 2, which discharges into Lake Ontario via a fish weir in its northeast corner (SPDES Outfall 002). Marsh No. 3 receives water from surface water runoff and has no apparent discharge to Lake Ontario. In addition, Marsh No. 3 was traversed in October 1993 and found to contain little standing water and no habitat for fish. Marsh No. 3 was reportedly connected to Marsh No. 1 before 1969, when a road into the nature reserve area was built across this connection [6].

Surface drainage on the Main Landfill area generally follows the landfill topography. In the southern end of the landfill, the topography slopes to the southwest towards the fence gate. The northern end of the landfill is gently domed which results in a more radial flow of surface drainage, with most of the surface water probably draining to the north towards Marsh No. 1. Field observations indicate that following periods of precipitation, surface water also forms large puddles and wet areas on the landfill surface which eventually infiltrate or evaporate.

3.4 SOILS

Surface soils develop as a result of climate, plant and animal life, parent material, topography, and time. These soils are important from the standpoint of infiltration and runoff and the effect on recharge of the ground water aquifer.

The type and texture of surface soils in the region are a reflection of their underlying materials. The extent to which a soil profile develops is determined, to a large degree, by slope, vegetation, and depth to the water table. The soils in the vicinity of the Alcan Main Landfill can be categorized into two general associations: the Ira and Sodus association and Ponded Humaquepts and Fibrists:

- Ira and Sodus very stony soils are moderately steep, deep, moderately well drained to well drained, coarse textured, and have a dense, firm fragipan that causes a perched seasonal high water table. The surface layer of these soils, excluding stones, cobbles and gravel is mainly fine sandy loam. These soils formed in glacial till derived mainly from sandstone.

- Ponded Humaquepts and Fibrists are located in fresh water marshes and consist of mixed organic and mineral deposits. Most of the North Pond treatment system which abuts the landfill to the north and northwest is classified as this soil type.

The landfill covers an area which was formerly occupied by these two associations. Soil borings conducted along the perimeter of the landfill encountered Ira and Sodus soils in MW-9 and MW-10. Ponded Humaquepts and Fibrists were not clearly identified in the remaining soil borings but may be present beneath a portion of the landfill site.

The surface soils of the landfill comprise Cut and Fill land which covers the area including the Main Landfill and the Alcan Plant buildings. This is an area from which the native soils have been removed or on which non-native soils have been deposited to a depth of 3 feet or more.

3.5 GEOLOGY

As mentioned in Section 3.1, the Alcan facility is located within the Erie-Ontario Plain, a region which has been influenced greatly by repeated glaciation. As a result of this glacial activity, the regional geology is typified by sedimentary bedrock overlain by glacial till, glaciolacustrine and glaciofluvial deposits. Overburden throughout the county is characterized principally by glacial till which consists of a dense, unstratified heterogeneous mixture of gravel, sand, silt, and clay. Till was deposited on the surface as materials were carried along the bottom of the glacier and compressed by the weight of successive ice sheets [11].

In the North Ponds area of the Alcan property, the surficial geology has been mapped as either ablation till or lodgement till [12]. Glaciolacustrine deposits formed in areas where glacial melt water pooled, and ponds and lakes formed. Fine grained silts and clays were deposited in these water bodies, along with accumulation of organic matter in the shallower marshes. Glaciofluvial deposits formed where glacial meltwater streams dropped sediment loads into their channels and onto adjacent floodplains. These deposits range from coarse sand and gravels to very fine sand and silt [11]. In the area of the Alcan facility overburden also includes more recent, post-glacial materials such as artificial fill deposits [11].

3.5.1 Overburden

Borings conducted at the Alcan property reveal a geologic sequence which varies from northwest to southeast across the landfill (Figure 5). The sequence consists either of till overlying the Oswego Sandstone bedrock or glaciolacustrine silts overlying till which overly bedrock.

The till deposits largely consist of a poorly sorted, medium dense to very dense, fine to medium sand with variable amounts of fine to coarse gravel. These deposits are characteristic of a glacially deposited lodgement till. The glacial till thins across the site from approximately 13 feet in the southeast (MW-9) to one foot in the northwest (MW-8). The till is thinnest in a buried geologic valley located in the vicinity of MW-8.

Glaciolacustrine silts overly the till in the vicinity of a buried geologic valley, scoured approximately 8 to 10 feet deep in the bedrock in the vicinity of MW-8. This valley appears to be locally backfilled with up to six feet of fine-grained laminated glaciolacustrine silt deposits. The glaciolacustrine deposits are underlain by up to four feet of glacial till which in turn overlies bedrock. The glaciolacustrine silts are overlain by up to four feet of well sorted, very fine-grained clean sand deposits.

Fill materials in the landfill area were encountered in borings MW-1, MW-7, MW-8 and MW-10 at thicknesses ranging from 8 to 14 feet (Figure 5). The fill materials were characterized by loose sand and gravel materials similar to the native Ira and Sodus soils association described above. In addition, small fragments of asphalt, wood and plastic sheeting were observed in the fill.

3.5.2 Bedrock

Bedrock in Oswego County comprises relatively flat-lying sedimentary rocks which traverse the county in broad east-west bands and dip slightly to the south-southwest [4,5,10]. These bedrock formations were formed during the Upper Ordovician, Lower Silurian, and Middle Silurian ages with the oldest formations underlying the northern part of the county [11]. Depth to bedrock across the county ranges from approximately 10 feet to in excess of 150 feet [11].

The Oswego Sandstone Formation, of Upper Ordovician age, underlies the central part of the county from Lake Ontario eastward. Dense, fine- to medium-grained quartz

sandstones comprise this formation [11]. At the Alcan facility, the Oswego Sandstone Formation bedrock is encountered at depths ranging from 4 feet to 24 feet below ground surface, and is typically characterized by a thin weathered zone at the overburden-bedrock interface which is up to 1.5 feet in thickness [17]. The bedrock encountered during coring activities at the adjacent Sithe Energies, Inc. property consisted of a green-gray, hard sandstone, with little or no weathering and minor green shale interbedding. Fractures, where present, were observed at 90 and 45 degrees to the core barrel walls [18].

Two formations, the Pulaski and Whetstone Formations, comprising the Lorraine Group, underlie the Oswego Sandstone Formation. The Pulaski Formation consists principally of sandstones with interbedded graywacke and shale. Shale with thin sandstone interbeds comprise the Whetstone Formation [13].

Beneath the landfill site, the elevation of the bedrock surface appears to slope to the northwest, with a scoured valley in the bedrock surface approximately 8 to 10 feet in relief occurring between MW-1 and MW-7 in the northwestern corner of the landfill (Figure 5).

3.6 HYDROGEOLOGY

Knowledge of the characteristics of the overburden and bedrock aquifers at the Alcan property is limited to localized hydrogeologic studies performed at Alcan and neighboring properties. The aquifers are described below based on information from this investigation and previous studies.

3.6.1 Overburden Aquifer

Ground water levels measured in the five landfill monitoring wells range from 2.05 feet (MW-10) to 11.07 feet (MW-7) below ground surface. The height of the water column above bedrock in the overburden ranges from 0.33 feet (MW-7) to 9.72 feet (MW-8) thick. Ground water contouring of the overburden aquifer, using water level measurement data from 14 on-site and four off-site monitoring wells taken on March 22, 1994 indicates that ground water flows in a northwesterly direction beneath the landfill (Figure 4). A bend in the 255-foot contour north of the landfill may coincide with a buried valley between MW-1 and MW-7 (Figure 5). On a more regional level, a ground water high occurs beneath a hill located on the adjacent Sithe property at MWB-1. From

this point, ground water flows to the southwest towards the Alcan plant and towards Lake Ontario to the northwest.

Ground water recharge within the vicinity of the Alcan property is considered minimal due to the low permeability of the soils [11].

The average hydraulic conductivity of the overburden material consisting of glacial till is approximately 10^{-5} cm/sec [19]. For this reason, yields from monitoring wells around the landfill are generally low with an average of <1 gal/min in the overburden.

An overburden hydraulic gradient of approximately 1.14 feet per 100 feet was calculated beneath the Main Landfill. Ground water flow velocity toward the lake is estimated to be approximately 1.14×10^{-7} cm/sec in the overburden.

Static ground water levels measured in both bedrock and overburden wells in the vicinity of Nine Mile Point nuclear facility, located northeast of the Alcan facility are similar, thereby indicating some hydraulic connectivity between the two aquifers [20].

3.6.2 Bedrock Aquifer

During an assessment of the Sithe property located to the northeast side of the Alcan facility, ground water was primarily encountered in the sandstone bedrock aquifer at depths of 5 to 14 feet below the ground surface [18]. Bedrock monitoring wells were installed in this area to collect ground water samples and map ground water flow directions. Based on observed potentiometric head levels, the ground water flow in the bedrock was estimated to be north-northwesterly [18]. Hydrogeologic studies of bedrock near the Nine Mile Point facility have estimated ground water flow velocity to be approximately 2×10^{-4} cm/sec [20].

Yields from domestic bedrock supply wells within the area of the Alcan plant are highly dependent upon fracturing within the rock and average approximately 10 gal/min [11]. The permeabilities of the Oswego Sandstone bedrock and the underlying Pulaski Formation are estimated to range from 1.5 to 45×10^{-6} cm/sec [20].

The nearest well drawing from the bedrock aquifer and the hydraulically connected overlying sediments is located approximately 1,700 feet north of the landfill at a camp on the shore of Lake Ontario [4].

3.7 DEMOGRAPHY

Oswego County is principally rural with a few small cities. The City of Oswego, approximately three miles southwest of the site, is the largest population center in the County.

The Alcan facility is located in a rural area. Several summer homes are located near the site along the shore of Lake Ontario. Further inland are more year-round homes. Within a one-mile radius of the facility, the population is estimated to be approximately 209 people (Figure 1) [4].

3.8 LAND USE

By the mid-1970s, approximately one-third of the land area within Oswego County was used for agricultural purposes with dairy farms being the predominant farm type. Orchards also are common in towns along the shore of Lake Ontario. Oswego County boasts one of the largest acreages of wetlands in New York State, in excess of 46,500 acres. Approximately one-tenth of these wetlands have been drained for agricultural purposes [11]. Agricultural land is present within one mile of the facility [4].

Several industries are present within the county; these are located primarily near the population centers. The Nine Mile Point nuclear power plant, located approximately two miles northeast of the site, is the nearest operating major industrial facility to the Alcan property. A Sithe Energies, Inc. Cogeneration Plant, known as Independence Station, is currently under construction on the parcel adjacent to the northwest side of Alcan.

3.9 SITE ECOLOGY AND HABITAT VALUE

Paladin Associates, Inc. under subcontract to Dames & Moore, conducted a preliminary site visit on June 19, 1992, and a more detailed site survey on October 13 and 20, 1992 to perform a site ecology survey and habitat value study. The following is a description of the cover-types of the wetland and upland areas in the vicinity of the site, in addition to a description of associated fish and wildlife species, habitat value and resource use.

3.9.1 Cover-types

Cover-types and dominant vegetation within each community were identified during the site visits and from published information about the site.

3.9.1.1 Wetlands and Ponds

The North Pond system is part of a wetland regulated by NYSDEC as wetland OE-58, Class I (Figure 6). It is considered Class I because it contains two or more Class II criteria [21]. According to NYSDEC, this classification was made in August of 1980 for the following reasons which are Class II criteria: (1) there are two or more structural groups, indicating diversity; (2) it is associated with permanent open water; (3) there is a special geological feature (barrier beach); and (4) it provides tertiary cooling water treatment [22].

The cover-types in the North Pond system are palustrine, and can be classified as (Figure 7) [23]:

- open water permanent diked/impounded
- scrub/shrub broad-leaved deciduous seasonal saturated
- forested broad-leaved deciduous seasonal saturated
- open water permanent
- forested/scrub shrub broad-leaved deciduous seasonal saturated
- emergent narrow- leaved persistent/open water.

Cover-type designations using NYS Natural Heritage Program information are shrub swamp, hardwood swamp, impounded marsh, and artificial pond [24].

Dominant vegetation in the North Pond System include red maple (Acer rubrum). ashes *(Fraxinus sp.)* arrowwood *(Viburnum recognitum)*, spicebush *(Lindera benzoin)*, winterberry *(Ilex verticillata)*, purple loosestrife *(Lythrum salicaria)*, cattail *(Typha latifolia)*, sensitive fern *(Onoclea sensibilis)*, water-horehound *(Lycopus virgnicus)*, water-smartweed *(Polygonum punctatum)*, bulrush *(Scirpus sp.)*, jewelweed *(Impatiens capensis)*, beggar's-ticks *(Bidens connata)*, halberd-leaved tearthumb *(Polygonum arifolium)*, clearweed *(Pilea pumila)*, bur-reed *(Sparganium eurycarpum)* and duckweed *(Spirodela polyrhiza).*

Other wetland areas within 0.5-mile of the site are identified as NYS wetlands OE-27, OE-6 and OE-4; Class I, III, and III, respectively (Figure 6) [20]. In addition, information from the New York State Natural Heritage Program indicates that there is one area of significant habitat within 2 miles of the site. This area is designated as "Teal Marsh," demarcated by coordinates 43° 29' 22" (Latitude) 76° 28' 18" (Longitude), and is considered to be a Least Bittern nesting area (Figure 6) [25].

Cover-types in wetland OE-27 are palustrine and include (Figure 7):

- forested broad-leaved deciduous seasonal saturated
- open water semipermanent
- forested dead/scrub shrub broad-leaved deciduous seasonal saturated
- open water semipermanent excavated.

Dominant vegetation in this wetland includes red maple, ash *(Frazinus sp.)*, willow *(Salix sp.)* silky dogwood *(Cornus amomum)*, speckled alder *(Alnus incana)*, winterberry, arrowwood, spicebush, purple loosestrife, cattail, blue flag *(Iris versicolor)*, water-smartweed, cinnamon fern *(Osmunda cinnamomea)*, sensitive fern, ostrich fern *(Pteretis pensylvanica)*, royal fern *(Osmunda regalis)*, soft rush *(Juncus effusus)*, bedstraw *(Galium palustre)*, wool-grass *(Scirpus cyperinus)*, sedge *(Carex sp.)*, rush *(Juncus sp.)*, bur-reed, duckweed, and sphagnum moss.

Wetland OE-6 cover-types are palustrine scrub/shrub broad-leaved deciduous seasonal saturated and palustrine forested broad-leaved deciduous seasonal saturated (Figure 7). Dominant vegetation in this wetland includes red maple, ash, willow, speckled alder, silky dogwood, arrowwood, sensitive fern, and royal fern.

Wetland OE-4 cover-type is characterized as palustrine forested broad-leaved deciduous seasonal saturated (Figure 7). Dominant vegetation includes red maple, ash, willow, spicebush, silky dogwood, speckled alder, winterberry, sensitive fern, jewelweed, royal fern, sedge, blue flag and clearweed.

3.9.1.2 Uplands

The few on-site upland cover-types can be characterized as developed areas, disturbed area (Main Landfill) and deciduous forest. Developed areas comprise the access roads and the nature reserve parking lot. The inactive landfill is covered with upland

grass which is mowed and common herbaceous species such as thistle *(Cirsium sp.)*, goldenrod *(Solidago sp.)*, and Queen Anne's lace *(Daucus carota)*. Dominant vegetation in the forested upland areas includes sugar maple *(Acer saccharum)*, American beech *(Fagus grandifolia)*, ground cedar *(Lycopodium complanatum)*, partridge berry *(Mitchella repens)*, and poison ivy *(Rhus toxicodendron)*.

Off-site upland cover-types within 0.5-mile can be characterized as developed, deciduous forest, and mixed forest. The Alcan plant and supporting infrastructure comprise the developed areas. Dominant vegetation in the deciduous and mixed forested uplands include sugar maple, American beech, red oak, red maple, Eastern hemlock *(Tsuga canadensis)*, yellow birch, striped maple *(Acer pensylvanicum)*, tree clubmoss *(Lycopodium obscurum)*, partridge berry, and poison ivy.

3.9.2 Associated Fish and Wildlife Species

During the site visits, a number of wildlife species were observed on and within 0.5-mile of the site, including white-tailed deer *(Odocoileus virginianus)*, red fox *(Vulpes vulpes)*, Eastern cotton tail *(Sylvilagus floridanus)*, gray squirrel *(Sciurus carolinensis)*, Eastern chipmunk *(Tamias striatus)*, double-crested cormorant *(Phalacrocorax auritus)*, great blue heron *(Ardea herodias)*, Canada goose *(Branta canadensis)*, killdeer *(Charadrius vociferous)*, belted kingfisher *(Ceryle alcyon)*, hairy woodpecker *(Picoides pubescens)*, blue jay *(Cyanocitta cristata)*, American crow *(Corvus brachyrhynchos)*, black-capped chickadee *(Parus atricapillus)*, house wren *(Troglodytes aedon)*, red-winged blackbird *(Agelaius phoeniceus)*, snapping turtle *(Chelydra serpentina)*, painted turtle *(Chrysemys picta)*, Northern water snake *(Nerodia sipedon)*, Northern leopard frog *(Rana pipiens)*, carp *(Cyprinus carpio)*, goldfish *(Carassius auratus)*, sunfish *(Lepomis sp.)*, and large-mouthed bass *(Micropeterus salmoides)*. Other species that have previously been documented on the site include: muskrat, raccoon, beaver, mink, green heron, belted kingfisher, marsh hawk, tree swallow, mallard, black duck, wood duck, green-winged teal, common yellowthroat, spring peeper, bullfrog, green frog, red-backed salamander, red-spotted newt, woodchuck, meadow vole, ruffed grouse, downy woodpecker, red-billed woodpecker, American robin, and song sparrow [5].

Information obtained from the New York State Natural Heritage Program indicates that there are no endangered, threatened, or rare species on or adjacent to the site. The Natural Heritage Program Breeding Bird Survey indicates that 64 bird species have been observed in confirmed, probable, or possible breeding status in the area

demarcated by the following 1,000-meter Universal Transverse Mercator (UTM) coordinates: North: 4820000, South: 48150000, East: 385000, and West: 380000, within which the site is located. Of these 64 species, one is considered a species of special concern: the common nighthawk. The Breeding Bird Survey is not specific about where in the surveyed block the sighting of species took place, so it is unknown whether any of these species, besides those directly observed, utilize the site [25,26].

3.9.3 Habitat Value and Resource Use

Wetlands are vitally important habitat for wildlife. The hydrologic regime, plant community composition and structure, soil composition and structure, topography and water chemistry of wetlands provide important food, shelter, and migratory, overwintering, and breeding areas for many mammals, birds, reptiles, and amphibians. The diversity and interspersion of the vegetative structure of a wetland is particularly important in determining the nature of its wildlife habitat; a wide variety of wetland plants are utilized by different species as important areas during summer, winter, and migratory seasons. Because the wetlands within 0.5-mile of the site comprise a number of different cover-types, they provide important habitats for wildlife. The upland areas, because of their proximity to water and vegetated wetlands, also provide important habitat for wildlife that need to migrate between such areas, or that depend on wetlands for part of their life cycle.

Human use of fish resources from the North Pond is precluded. Alcan does not allow fishing in the ponds of the North Pond system or from any location on their property. However, a few Alcan employees fish for salmon in Lake Ontario from Alcan's lake shore when the salmon are running for 2-3 weeks in October. Alcan employees have observed fishing boats near the shore, but since the lake is quite shallow in this area, the boats do not come in close to Alcan's shore.

4.0 NATURE AND EXTENT OF CONTAMINATION

The nature and extent of contamination of various media sampled and analyzed from the Main Landfill site including ground water, leachate, surface soil and air is summarized below.

4.1 GROUND WATER

Ground water samples were collected from five monitoring wells installed in the overburden around the perimeter of the Main Landfill (Figure 3). Four of the monitoring wells (MW-7, MW-8, MW-9 and MW-10) were installed in 1993, MW-1 had been installed and sampled previously in 1991. Each well was purged of water prior to sampling, following the procedures outlined in Appendix E. Ground water samples were analyzed for volatile organics, semivolatile organics, pesticides/PCBs and TCL metals. The analytical results are summarized below.

4.1.1 Volatile Organics

Total volatile organics ranged from non-detect in the up-gradient monitoring well MW-9 to 68 µg/l in the down-gradient monitoring well MW-7 (Table 4). Volatile organic compounds detected which exceeded Class GA ground water quality standards in accordance with NYSDEC Water Quality Regulations 6 NYCRR Part 703.5 were chloroethane, 1,1-dichloroethane, toluene and chlorobenzene. Chloroethane was the most persistent compound as it was detected in MW-1, MW-7 and MW-8.

4.1.2 Semivolatile Organics

Total semivolatile organics ranged from non-detect in MW-9 to 58 µg/l in MW-7 (Table 5). Detected semivolatile organic compounds which exceeded Class GA standards comprise 1,3-dichlorobenzene, 1,4-dichlorobenzene and 1,2-dichlorobenzene, in MW-1 at levels of 9 to 10 µg/l, and 2-methylphenol and 4-methylphenol in MW-7 at levels of 4J and 53 µg/l, respectively.

4.1.3 Pesticides/PCBs

No pesticides were detected in the ground water samples collected (Table 6). With the exception of 1 µg/l of Aroclor 1242 detected in MW-7, no PCBs were detected in the ground water samples. The Class GA standard for PCBs in ground water is 0.1 µg/l.

4.1.4 Metals

Class GA ground water standards were exceeded in each of the five monitoring wells for iron and manganese (Table 7). In addition, standards were exceeded in MW-1, MW-7, MW-8 and MW-10 for sodium and MW-1 for copper. Other metals detected in the monitoring wells were within Class GA standards.

4.2 LEACHATE

No actual leachate seeps were observed emanating from sides of the landfill, despite a thorough inspection. Two samples were collected from surface water located adjacent to the Main Landfill site (Figure 3). L-1-LF was collected from standing water with a slight sheen located within five feet of the northern edge of the landfill, whereas L-2-LF was collected from surface water with a sheen along the edge of Marsh No. 1 and adjacent to the eastern edge of the landfill.

The two leachate samples were analyzed for volatile organics, semivolatile organics, pesticides/PCBs and TCL metals. The analytical results are described below.

4.2.1 Volatile Organics

No volatile organic compounds were detected in sample L-1-LF (Table 8). Chloroethane, benzene and chlorobenzene were detected in sample L-2-LF, at levels below the NYSDEC Class D surface water standards in 6 NYCRR Part 703.

4.2.2 Semivolatile Organics

No semivolatile organic compounds were detected (Table 9).

4.2.3 Pesticides/PCBs

No pesticides or PCBs were detected (Table 10).

4.2.4 Metals

Several metals were detected in the leachate samples including aluminum, barium, calcium, iron, magnesium, manganese, potassium and sodium; of these, iron exceeded the Class D surface water standard (300 µg/l) in both samples L-1-LF (2,020 µg/l) and L-2-LF (647 µg/l) (Table 11).

4.3 SURFACE SOIL

Three surface soil samples were collected from the surface of the Main Landfill (Figure 3). Each sample was collected from the upper 6-inches of soil using a dedicated and previously unused stainless steel trowel. In addition, a composite sample was collected from the surface soil of a wooded area located approximately 100 to 200 feet north of the edge of the Main Landfill. Surface soil samples were analyzed for volatile organics, semivolatile organics, pesticides/PCBs and TCL metals. The analytical results are summarized below.

4.3.1 Volatile Organics

A common laboratory contaminant, 2-butanone, was detected in SS-LF-1 at an estimated concentration of 7 µg/kg (Table 12). Volatile organic compounds were not detected in the other three soil samples.

4.3.2 Semivolatile Organics

Semivolatile organic compounds were detected in the four soil samples tested at levels ranging from 1,204 µg/kg to 14,980 µg/kg (Table 13).

The background sample collected from the forest adjacent to the landfill revealed the presence of several semivolatile organic compounds which were common to the landfill samples. These included phenanthrene, fluoranthene, pyrene, chrysene, benzo(b)fluoranthene and benzo(a)pyrene.

The landfill samples showed the presence of other semivolatile organic compounds, including anthracene, carbazole, benzo(a)anthracene, benzo(k)fluoranthene and indeno(1,2,3-cd)pyrene. The levels of semivolatile organics detected in SS-LF-3 (14,980 µg/kg) were approximately an order of magnitude higher than the other samples collected from the landfill (1,204 to 1,594 µg/kg).

4.3.3 Pesticides/PCBs

A total of 31.4 µg/kg of pesticides was detected in the background sample SS-BKGD collected off-site from the landfill (Table 14). No pesticides were detected in the soil samples collected from the landfill surface.

PCB Aroclor 1260 was detected in the soil samples at levels ranging from 17 µg/kg (SS-LF-2) to 140 µg/kg (estimated value). PCB Aroclor 1254 was detected in soil samples SS-LF-1 and SS-LF-3 at levels of 50 and approximately 110 µg/kg (estimated value), respectively. The level of PCBs in the background sample (74 µg/kg, estimated value) fell within the same range as soil samples from the landfill.

4.3.4 Metals

Fourteen TCL metals were found in the four soil samples collected (Table 15). These included aluminum, arsenic, barium, beryllium, calcium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium and vanadium.

The metals cadmium, mercury, selenium, thallium and zinc were only detected in the background sample. In further comparing the background sample with the landfill samples, the levels of lead in landfill samples were approximately 5 to 10 times lower than the level detected in the background sample. In addition, the highest levels of arsenic, barium, beryllium, lead, cobalt, nickel and vanadium were detected in the background sample.

4.4 AIR

On October 26, 1993, three air samples were collected concurrently over an 8-hour period at the Alcan Rolled Products Company property. One set of samples for each sample location was tested for volatile organic compounds and polychlorinated biphenyls according to reference methods established by the National Institute for Occupational Safety and Health. In addition, one sample for volatile organics was also collected using a passive diffusion badge. Collected samples were analyzed by Galson Laboratories.

Based on the laboratory analysis of the samples collected (Tables 16 and 17), no airborne concentrations of volatile organics and PCBs were detected.

4.5 SUMMARY

A comparative summary of chemicals detected in the environmental media is provided in Table 18.

Ground water was found to be impacted on the down-gradient side of the Main Landfill by a few volatile (chloroethane, methylene chloride, 1,1-dichloroethane, benzene, toluene and chlorobenzene) and semivolatile (1,3-dichlorobenzene, 1,4-

dichlorobenzene, 1,2-dichlorobenzene, 2-methylphenol and 4-methylphenol) organic compounds. These compounds were detected at levels below, or which marginally exceed, Class GA ground water standards. No pesticides were detected. A PCB Aroclor (1242) was found in only one down-gradient monitoring well, at a level close to the Class GA ground water standard. Several metals (copper, iron, manganese and sodium) were found to exceed Class GA ground water standards down-gradient of the Main Landfill, at levels an order of magnitude higher than the up-gradient side.

Several of the same volatile organic compounds found in the monitoring wells (chloroethane, benzene and cholobenzene) were detected at levels below Class D surface water standards in one of the leachate samples. No semivolatile organic compounds, pesticides or PCBs were detected in the leachate samples tested. Iron was found at levels above the Class D surface water standard in both leachate samples.

Volatile organic compounds were not detected in the surface soil samples, other than an estimated low level of 2-butanone detected in one of the samples. A range of compounds, predominantly grouped as polynuclear aromatic hydrocarbons (PAHs), were detected in both on-site samples and the background surface soil sample. One of the on-site samples had levels of PAHs which were an order of magnitude higher than the background sample. Pesticides were detected at low levels in the background sample. Levels of PCBs were detected in both the on-site samples and background sample at concentrations of less than 0.3 part per million. Metals detected in the surface soil were at similar levels in the on-site and the background sample.

Air samples tested did not reveal the presence of volatile organic compounds or PCBs.

5.0 BASELINE RISK ASSESSMENT

In this section, risks to human health and the environment through exposure to chemicals detected in the environmental media at the Main Landfill site, are evaluated.

Risk assessment applied to potentially hazardous contaminants is a qualitative and quantitative determination of the probability of injury to humans, lower organisms, and ecosystems exposed to the measured or estimated levels of hazardous substances present in various exposure media. Factors considered in conducting the risk assessment include such site-specific characteristics as the hydrological and geological nature of the site, land use, climate, and the inherent hazardous properties of the waste constituents of concern. This is consistent with the basic precept of toxicology that the hazardous properties of a material, combined with the level of exposure (i.e., level of intake, or dose) determines the level of risk.

The risk assessment was performed in conjunction with Paladin Associates, Inc. under subcontract to Dames & Moore, in general conformance with the *USEPA Superfund Public Health Evaluation Manual* [27], the *USEPA Risk Assessment Guidance for Superfund Human Health Evaluation Manual Part A* [28], *USEPA Superfund Exposure Assessment Manual* [29], and the *USEPA Environmental Evaluation Manual* [30]. The risk assessment was conducted through step-wise application of the four following components, as described below:

- Contaminant identification
- Toxicity assessment
- Exposure assessment
- Risk characterization

5.1 CONTAMINANT IDENTIFICATION

Samples of ground water, leachate, surface soil and air were collected and analyzed for volatile organic compounds, semivolatile organic compounds, pesticides, PCBs and metals, as summarized in Section 4.0. The relative magnitudes of compounds detected in the media are compared in Table 18.

The following indicates those media and chemical classes which potentially may contribute to increased risk, based on comparison with background data and taking into account NYSDEC standards and guidance values:

	Chemical Class				
Medium	**Volatile Organics**	**Semivolatile Organics**	**Pesticides**	**PCBs**	**Metals**
Ground Water	☑	☑	☒	☐	☑
Leachate	☐	☒	☒	☒	☑
Surface Soil	☐	☑	☒	☑	☒
Air	☒			☒	

Note:

☑ = Detected in samples at several locations, above NYSDEC standards or guidance values, or several times higher than background levels

☐ = Detected in samples with limited distribution, close to or below NYSDEC standards or guidance values, or similar to background levels

☒ = Not detected

= Not sampled

On the basis of the above, those media and chemical classes considered further in the risk assessment will include volatile organic compounds in ground water, semivolatile organic compounds in ground water and surface soil, PCBs in surface soil, and metals in ground water and leachate.

5.2 TOXICITY ASSESSMENT

The chemicals and their corresponding maximum and average mean concentrations detected in the environmental media are listed in Table 19, which also summarizes New York State Standards, Criteria and Guidelines (SCGs) and toxicity effects.

The volatile and semivolatile organic compounds in ground water and leachate will not be considered further because of their relatively low concentrations and lack of toxicity towards human and aquatic life.

Of the PAHs detected in the surface soil, the following seven are regarded by the USEPA as potential human carcinogens and will be considered further in the risk assessment:

Benzo(a)anthracene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(a)pyrene
Benzo(g,h,i)perylene
Dibenzo(a,h)anthracene
Indeno(1,2,3-cd)pyrene

Because benzo(a)pyrene is considered to be the most toxic of the PAHs, the potency of all carcinogenic PAHs will be considered as equivalent to benzo(a)pyrene as a conservative assumption.

Polychlorinated biphenyls (PCBs) detected in the surface soil will be included in the risk assessment although the maximum total concentration found in samples (0.25 mg/kg), is below current regulatory criteria constituting a level of concern for soil contamination (greater than 1.0 mg/kg is regarded by NYSDEC as the risk-based criterion for human ingestion of PCBs in soil). The toxic properties of the more potent congener mixture, Aroclor 1260, was selected to represent the three PCB Aroclors detected.

None of the metals in ground water or leachate (copper, iron, manganese and sodium) will be included further in the risk assessment due to their lack of toxicity to humans and aquatic life at the levels detected.

5.3 EXPOSURE ASSESSMENT

The exposure assessment is the evaluation of the probable exposure to the compounds present at the site under prevailing conditions. Physical characteristics of the site are taken into consideration when evaluating exposure. The objectives of the exposure assessment are to identify the actual or potential routes of exposure, to characterize exposed populations, and to evaluate and estimate the extent of exposure.

The three components of the exposure assessment are:

- Exposure Pathways
- Determination of Exposure Point Concentration
- Estimation of Chemical Intakes

Based on the conduct of the contaminant identification and toxicity assessment steps described above, the occurrence of PAHs and PCBs in surface soils at the Main Landfill constitutes a potential hazard and will be evaluated in the exposure assessment below.

5.3.1 Exposure Pathways

The site is not located near residential neighborhoods and access to the landfill is restricted. The landfill surface is vegetated with dense grass cover.

Primary potential exposure pathways include:

Transport Mechanism	Target Population	Exposure Medium	Exposure Route	Pathway Complete?
Site Entry	Nearest Residents	Surface Soil	Dermal Contact	No
			Ingestion	No
	Alcan Worker	Surface Soil	Dermal Contact	No
			Ingestion	Yes
	Terrestrial Wildlife	Surface Soil	Dermal Contact	Yes
			Ingestion	Yes
	Plants	Surface Soil	Root Uptake	Yes
Wind	Terrestrial Wildlife	Dust	Inhalation	No
Runoff	All Wildlife	Surface Water	Dermal Contact	No
			Ingestion	No

The remote location and restricted access to the landfill limits human exposure to Alcan employees entering the site during the course of their work or for recreational purposes. Exposures would not be expected to be either frequent or extensive. However, for conservatism, ingestion of soil from handling food will be considered to be a functional and complete pathway and will be evaluated further. PAHs and PCBs are tightly adsorbed to soil matrices, and there is expected to be no significant exposure by transfer of these chemicals from soil through the skin.

Dermal contact and ingestion exposure routes for terrestrial wildlife such as mammals and birds feeding on the site are considered complete pathways, as is root uptake of PAHs and PCBs by plants.

The existence of exposed soils to generate windblown particulates is very limited as nearly all of the landfill is vegetated with dense grass; therefore, the potential for

exposure to target populations by dust inhalation is considered negligible. For the same reason, the transport of significant quantities of surface soil by precipitation runoff into nearby surface water bodies is considered an incomplete pathway.

5.3.2 Determination of Exposure Point Concentrations

In order to achieve reasonably conservative exposure estimates, the sum of the mean detected concentrations in the soil were used to determine exposure point concentrations. These values are 2.5 mg/kg for the carcinogenic PAHs and 0.13 mg/kg for PCBs.

5.3.3 Estimation of Chemical Intakes

The qualitative exposure pathway assessment identified one complete human exposure pathway—ingestion of surface soils. The following discussion develops a quantitative estimate of such exposure for use in human risk characterization. Environmental exposure routes are considered further in Section 5.4.2.

To determine the potential level of exposure to PAHs and PCBs via ingestion of landfill surface soils, it was assumed that an employee would contact and subsequently ingest 100 mg of soil during an excursion onto the landfill area. This is a value suggested by the *USEPA Superfund Exposure Assessment Manual* as a conservative estimate, based on several published studies [29].

It is also assumed that all of the compounds in the 100 mg of soil ingested would be totally absorbed by the individual. It is further assumed that exposure will occur once weekly, 20 weeks per year (accounting for snow cover and inclement weather), for 25 years. The body mass of the individual was assumed to be 70 kg.

The following lifetime daily exposure estimate was calculated using the above assumptions and soil concentrations of 2.5 mg/kg for the carcinogenic PAHs and 0.13 mg/kg for PCBs.

$$\text{Exposure} = \frac{(\text{soil concentration mg/kg})\,(0.0001 \text{ kg soil ingested/day})\,(500 \text{ days})}{(25{,}550 \text{ days lifetime})\,(70 \text{ kg})}$$

$$= 7.0 \times 10^{-8} \text{ mg/kg/day for PAHs, and}$$

$$= 3.6 \times 10^{-9} \text{ mg/kg/day for PCBs}$$

5.4 RISK CHARACTERIZATION

Human health and environmental risks corresponding to the complete pathways identified in the exposure assessment are discussed below.

5.4.1 Human Health

To estimate the potential excess cancer risk associated with exposure to a chemical, an estimate of the tumor-producing potency, the cancer potency factor (CPF), is multiplied by lifetime average daily exposure. The resultant product represents an upper-bound estimate of the probability of cancer in excess of the background rate occurring over a 70-year lifetime for the individual or population defined in the assessment.

This cancer potency value is given by the *USEPA Integrated Risk Information System* as 5.79/mg*kg*day for benzo(a)pyrene and 7.7/mg*kg*day for Aroclor 1260 [31].

Chronic non-carcinogenic risks for PAH and PCB exposure were not determined due to lack of quantitative toxicological response data in the Integrated Risk Information System for effects other than carcinogenicity.

The following cancer risk estimate was determined as an upper bound estimate for an Alcan employee:

Lifetime Cancer Risk = lifetime daily exposure rate x cancer potency factor dose

$= (7.0 \times 10^{-8}$ mg/kg/day) (5.79/(mg) (kg) (day))

$= 4.0 \times 10^{-7}$ for PAHs, and

$= (3.6 \times 10^{-9}$ mg/kg/day) (7.7/(mg) (kg) (day))

$= 2.8 \times 10^{-8}$ for PCBs.

The total cancer risk therefore approximates to 4.3×10^{-7}.

This upper bound estimate is less than the 10^{-6} lifetime carcinogenic risk considered acceptable by NYSDOH for hazardous waste sites. Therefore, human exposure to surface soils at the Alcan Main Landfill does not present unacceptable health risks, and the landfill would not be considered to meet risk-based criteria for ranking as a hazardous waste site.

5.4.2 Environmental Risk

The Alcan Main Landfill is a man-made facility and is maintained as an inactive industrial landfill. As such, though it is generally vegetated with grass, it lacks the types of surface cover that would create habitat for resident populations of birds, mammals, and other wildlife except surface-dwelling and soil-burrowing insects and other invertebrates. Given the presence of the adjacent forest and wetland habitats, various non-resident wildlife may occasionally visit the landfill in the course of browsing, hunting, or other activities. Based on observations made during the site investigation, these may include Canadian Geese, white-tailed deer, woodchuck, cotton-tail rabbit and red fox. A variety of other small mammals, birds, reptiles and amphibians may also visit the site on a temporary basis.

As determined in the exposure assessment above, the most likely means of wildlife exposure are direct contact with exposed areas of landfill surface soils, with subsequent ingestion or dermal absorption of contaminants (dermal absorption will be greatly minimized due to the very high affinity of PAHs and PCBs for soil). Ingestion of contaminated prey species such as insects and worms is also a possible exposure route. Root uptake by grass and other flora is possible.

Most of the data available for assessing the ecological risks of PAHs and PCBs pertain to species which are aquatic, or which rely on aquatic organisms for food (i.e. mink and fish-eating birds). Thus, there is insufficient quantitative data in the toxicological literature to adequately support an assessment of ecological effects to terrestrial organisms exposed by ingestion of soil and food items contaminated with trace quantities of these compounds for chronic or subchronic toxicity. Also, appropriate ecologically-based soil criteria for these compounds are not available. Given these toxicological uncertainties, lack of well-defined values for exposure parameters such as site visitation frequency, soil ingestion rates and soil bioavailability, and the limitations of the site analytical data, a quantitative ecological risk assessment for the Alcan Main Landfill could not be performed.

6.0 SUMMARY AND CONCLUSIONS

The former Main Landfill located on the Alcan Rolled Products Company property in Oswego, NY was used mainly for the disposal of office refuse, wooden pallets and construction debris during its operation from 1963 to 1978. Rags and adsorbent materials containing minor amounts of polychlorinated biphenyls (PCBs) from a transformer leak were reportedly deposited in the landfill. According to a records investigation conducted by NYSDEC, rags from maintenance of hydraulic systems containing PCB fluids may also have been deposited in the landfill. In 1978, the landfill was closed, covered with soil, graded and seeded with grass.

Pursuant to Title 6 NYCRR Part 375 *Inactive Hazardous Waste Disposal Site Remedial Program*, the landfill is listed as Site Code 738015, a Class 2a site on the New York State Registry of Inactive Hazardous Waste Disposal Sites. 'Class 2a' is a temporary classification for sites that have inadequate and/or insufficient data for inclusion in any other classification. To be classified on the Registry, a consequential amount of hazardous waste has to have been disposed at a site. An inconsequential amount of hazardous waste is an amount of hazardous waste disposed at a site that does not presently or in the reasonably foreseeable future constitute a significant threat to the environment as described in 375-1.4. The mere presence of hazardous waste at a site or in the environment is not sufficient basis for finding that hazardous waste disposed at a site constitutes a significant threat (375-1.4(c)).

The objective of this investigation was to address the following issues pursuant to 6 NYCRR 375-1.8(a)(1):

- Has a 'consequential amount' of hazardous waste been disposed at the site?
- Does the hazardous waste constitute a significant threat to the environment?
- Is there 'significant environmental damage'?

This was accomplished through the collection of environmental data, the sampling and analysis of environmental media and the conduct a baseline risk assessment as summarized below.

The site is situated within the Erie-Ontario Plain at an elevation of 275 feet NGVD, approximately 1,000 feet southeast of the Lake Ontario shoreline. Site relief is generally 5 to 8 feet higher than the adjoining natural ground elevations. The humid-continental climate is moderated by proximity to Lake Ontario. The site receives about 35 inches of precipitation annually, including 127 inches of snow. Surface runoff from the landfill drains towards the adjacent Marsh No. 1, part of the North Ponds system used to discharge plant cooling water to Lake Ontario.

Ira and Sodus very stony, well drained soils and ponded Humaquept and Fibrist deposits occur in the area of the landfill. The underlying overburden consists of up to about 13 feet of till which in turn overlies Oswego Sandstone bedrock. A geologic buried valley, scoured approximately 8 to 10 feet deep in the bedrock and filled with fine sand and glaciolacustrine silt deposits, underlies the landfill site.

Ground water in the overburden aquifer beneath the landfill flows to the northwest toward Lake Ontario under a gradient of about one percent and at a velocity of 10^{-7} cm/sec. The nearest users of ground water are summer residents over 1,700 feet to the north of the site, on the Lake Ontario shore.

The site is located on a 500-acre industrial facility in a sparsely populated rural area; 209 people are estimated to reside within a one-mile radius of the site.

The landfill is covered with grass and herbaceous species, and is periodically mowed. Dominant cover-types in the site area include the adjacent palustrine Class I wetland (OE-58) of the North Ponds system, and deciduous and mixed forest uplands. There are no listed endangered, threatened or rare species on or adjacent to the site. The adjacent ponds and wetlands are a nature reserve and fishing is prohibited by Alcan. No significant adverse impact from the landfill on vegetation, or terrestrial or aquatic life was observed during a habitat value study and ecological assessment performed during the investigation.

As part of the investigation, samples of the environmental media were collected in the area of the Main Landfill and submitted to a NYSDOH-approved laboratory for analysis. Ground water, leachate and surface soil were analyzed for volatile and semivolatile organic compounds, pesticides, PCBs and metals. Air samples were collected and analyzed for volatile organic compounds and PCBs. The results were reviewed by a third-party data validator and assessed for usability.

The results of the analyses revealed low part per billion (ppb) levels of several volatile and semivolatile organic compounds to be present in ground water down-gradient of the landfill which were up to about 10 times the 6 NYCRR Part 703 Class GA ground water standards. A PCB Aroclor was detected in one of the down-gradient wells sampled at a level of 1 ppb, which is above the Class GA standard of 0.1 ppb. Several low-toxicity metals were detected in samples from the down-gradient monitoring wells at levels higher than background and in some cases higher than the Class GA standard.

Some of the volatile organic compounds and metals detected in the ground water were also found at slightly elevated levels in some of the leachate samples tested. Surface soil samples taken from the landfill were found to contain low part per million (ppm) levels of polynuclear aromatic hydrocarbons (PAHs) and less than 1 ppm levels of PCBs.

The baseline risk assessment concluded that most potential exposure pathways were not functional, including ground water, leachate and air. The risk assessment focused on one potentially functional exposure pathway for humans: dermal contact with surface soils and subsequent ingestion and absorption of associated PAHs and PCBs. The upper-bound carcinogenic risk was estimated to be 4×10^{-7} for an Alcan employee. This estimate is less than the 10^{-6} risk considered acceptable by NYSDOH for hazardous waste sites. Therefore, human exposure to surface soils at the Alcan Main Landfill does not present unacceptable health risks, and the landfill would not be considered to meet risk-based criteria for ranking as a hazardous waste site.

A similar quantitative ecological risk assessment for the Alcan Main Landfill could not be performed on the PAHs and PCBs in the surface soils because of lack of well-defined values for exposure parameters such as site visitation frequency, soil ingestion rates, soil bioavailablity and insufficient quantitative data in the toxicological literature. However, the apparent healthy status of the ecosystem observed around the site during several site visits indicates that 'significant environmental damage' is not occurring due to the presence of the landfill.

Table 20 lists the criteria used by the NYSDEC Commissioner in determining significant threat to the environment and provides a commentary with respect to the Alcan Main Landfill site.

TABLE 1
GROUND WATER ELEVATION AND SURVEY DATA

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

Well Location	Well No.	Surveyed Elevation at Ground Surface (feet)	Surveyed Top of PVC Casing Elevation (feet)	Depth to Water 3/22/94 (feet)	Water Elevation 3/22/94 (feet)
Main Landfill	MW-1	270.3	272.41	14.41	258.00
North Ponds	MW-2	260.8	262.94	9.09	253.85
North Ponds	MW-3	253.83	255.74	6.61	249.13
North Ponds	MW-4	253.02	255.04	5.42	249.62
North Ponds	MW-5	255.76	258.39	8.68	249.71
North Ponds	MW-6	258.95	260.89	4.62	256.27
Main Landfill	MW-7	266.63	268.6	13.04	255.56
Main Landfill	MW-8	265.68	267.62	10.15	257.47
Main Landfill	MW-9	273.96	276.35	8.50	267.85
Main Landfill	MW-10	269.9	272.18	10.05	262.13
Alcan Plant	MW-AC1	270.45	272.58	7.74	264.84
Alcan Plant	MW-AC2	271.06	272.28	14.20	258.08
Alcan Plant	MW-AC3	271.14	272.04	13.78	258.26
Alcan Plant	MW-AC4	270.79	272.35	13.78	258.57
Sithe Property	MWB-1	286.69	288.42	2.10	286.32
Sithe Property	MWB-3	262.46	264.65	3.90	260.75
Sithe Property	MWB-4	255.34	257.45	2.83	254.62
Sithe Property	MWB-5	253.83	256.31	5.04	251.27

Note:

Vertical datum is USGS Benchmark N-25 (NGVD 29)

TABLE 2

TEMPERATURE AND PRECIPITATION DATA

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY

MONTH	TEMPERATURE				PRECIPITATION				
			7 YEARS IN 10 WILL HAVE--			3 YEARS IN 10 WILL HAVE--		SNOWFALL	
	AVERAGE DAILY MAXIMUM (° F)	AVERAGE DAILY MINIMUM (° F)	MAXIMUM TEMPERATURE EQUAL TO OR HIGHER THAN- (° F)	MINIMUM TEMPERATURE EQUAL TO OR LOWER THAN- (° F)	AVERAGE MONTHLY TOTAL (INCHES)	MORE THAN- (INCHES)	LESS THAN-- (INCHES)	AVERAGE MONTHLY TOTAL (INCHES)	7 YEARS IN 10 WILL HAVE MORE THAN-- (INCHES)
JANUARY	31	17	44	-2	2.8	3.3	2.0	37	18
FEBRUARY	32	19	48	1	2.9	3.2	2.4	35	17
MARCH	39	26	59	14	2.7	3.0	2.1	17	8
APRIL	51	37	72	28	2.9	3.4	2.6	2	4*
MAY	62	46	81	36	3.0	3.6	2.2	0	#
JUNE	73	56	88	45	2.4	3.1	1.5	0	0
JULY	78	62	88	55	2.6	3.1	1.9	0	0
AUGUST	77	61	88	51	2.7	3.1	2.1	0	0
SEPTEMBER	70	54	86	42	3.0	4.0	2.2	0	0
OCTOBER	60	45	77	32	3.3	3.7	1.8	#	#
NOVEMBER	47	35	64	24	3.6	3.8	2.7	7	2
DECEMBER	35	23	50	5	3.5	3.8	3.0	29	14
YEAR	55	40	92	-3	35.4	37.9	31.7	127	76

Note:
* 2 Years in 10.
# Trace.
Reference [10]

TABLE 3

SUMMARY OF SAMPLING AND ANALYSIS

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY

EXPLORATION			SAMPLING		FIELD TESTS			LABORATORY TESTS					
Method	Purpose	No.	Medium	Method	Frequency	Head Space Screening	Field Parameters	Frequency	VOAs	SVOAs	Metals	PEST/PCBs	Data Validation
New Monitoring Wells	Evaluate ground water flow patterns and whether Target Compounds are migrating from landfill into ground water	4 (MW-7, MW-8 MW-9, MW-10)	Soil	Continuous Split Spoon	Approx. 10 SPTs/well	Approx. 30							
			Ground Water	Dedicated Bailer	1/well		4	1/well	4	4	4	4	√
Existing Monitoring Well	Same as above	MW-1	Ground Water	Dedicated Bailer	1/well		1	1/well	1	1	1	1	√
	Sample surface water leachate originating from landfill to evaluate levels of contamination	2	Leachate	Bottles	2		2	Sampled from 2 locations	2	2	2	2	√
	Evaluate levels of contamination in surface soil on landfill	3	Surface Soil	Trowel				3 onsite sample locations	3	3	3	3	√
	Evaluate background levels of contamination in surface soils outside landfill	1	Surface Soil	Trowel				Background composite from 3 offsite locations	1	1	1	1	√
	Evaluate impact of potential source areas including landfill and ponds on air quality One upwind and two downwind samples were taken relative to the landfill	3	Air	Pump				1/sample location	3*			3**	√

√ = Data validation includes these samples and associated QA/QC samples.
SPT = Standard Penetration Test using split spoon.
* = Volatile organics includes total hydrocarbons (B.P. 36 - 126°C) & total aromatic hydrocarbons.
** = Gaseous and particulate analysis of PCBs.
For sampling chronology, see Table E-2.

TABLE 4
SUMMARY OF VOLATILE ORGANIC ANALYSES
GROUND WATER

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

COMPOUND	Class GA Ground Water Standard (6 NYCRR 703.5) (µg/l)	UPGRADIENT MW-9 (µg/l)	DOWNGRADIENT MW-1 (µg/l)	MW-7 (µg/l)	MW-8 (µg/l)	MW-10 (µg/l)
Chloromethane		-	-	-	-	-
Bromomethane		-	-	-	-	-
Vinyl chloride		-	-	-	-	-
Chloroethane	5	-	4J	24	5J	-
Methylene chloride	5	-	-	-	1J	-
Acetone		-	-	-	-	-
Carbon Disulfide		-	-	-	-	-
1,1-Dichloroethene		-	-	-	-	-
1,1-Dichloroethane	5Ω	-	-	-	-	30
1,2-Dichloroethene (total)		-	-	-	-	-
Chloroform		-	-	-	-	-
1,2-Dichloroethane		-	-	-	-	-
2-Butanone		-	-	-	-	-
1,1,1-Trichloroethane		-	-	-	-	-
Carbon tetrachloride		-	-	-	-	-
Vinyl acetate		-	-	-	-	-
Bromodichloromethane		-	-	-	-	-
1,2-Dichloropropane		-	-	-	-	-
cis-1,3-Dichloropropene		-	-	-	-	-
Trichloroethene		-	-	-	-	-
Dibromochloromethane		-	-	-	-	-
1,1,2-Trichloroethane		-	-	-	-	-
Benzene	0.7	-	0.6J	-	-	-
trans-1,3-Dichloropropene		-	-	-	-	-
Bromoform		-	-	-	-	-
4-Methyl-2-pentanone		-	-	-	-	-
2-Hexanone		-	-	-	-	-
Tetrachloroethene		-	-	-	-	-
1,1,2,2-Tetrachloroethane		-	-	-	-	-
Toluene	5	-	-	44	-	-
Chlorobenzene	5	-	35	-	-	-
Ethyl Benzene		-	-	-	-	-
Styrene		-	-	-	-	-
Total Xylenes		-	-	-	-	-
Total VOCs		-	39.6	68	6J	30

Note:
NYSDEC ASP 1991, (Method 91-1), Plus 10 TICs, Superfund Deliverables
- = Not detected
J = Indicates an estimated value
Ω = Guidance Value
[ ] = Value exceeds standard or guidance value.

TABLE 5
SUMMARY OF SEMIVOLATILE ORGANIC ANALYSES
GROUND WATER

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

	Class GA Ground Water Standard (6 NYCRR 703.5) (µg/l)	UPGRADIENT	DOWNGRADIENT			
		MW-9 (µg/l)	MW-1 (µg/l)	MW-7 (µg/l)	MW-8 (µg/l)	MW-10 (µg/l)
COMPOUND						
Phenol		-	-	-	-	-
bis(2-Chloroethyl) ether		-	-	-	-	-
2-Chlorophenol		-	-	-	-	-
1,3-Dichlorobenzene	5	-	9J	-	-	-
1,4-Dichlorobenzene	4.7	-	10	-	-	-
1,2-Dichlorobenzene	4.7	-	10	-	-	-
2-Methylphenol	1^	-	-	4J	-	-
2,2'-oxybis (1-Chloropropane)		-	-	-	-	-
4-Methylphenol	1^	-	-	53	-	-
N-Nitroso-di-n-propylamine		-	-	-	-	-
Hexachloroethane		-	-	-	-	-
Nitrobenzene		-	-	-	-	-
Isophorone		-	-	-	-	-
2-Nitrophenol		-	-	-	-	-
2,4-Dimethylphenol		-	-	-	-	-
bis(2-Chloroethoxy) methane		-	-	-	-	-
2,4-Dichlorophenol		-	-	-	-	-
1,2,4-Trichlorobenzene		-	-	-	-	-
Naphthalene	10	-	-	1J	-	-
4-Chloroaniline		-	-	-	-	-
Hexachlorobutadiene		-	-	-	-	-
4-Chloro-3-methylphenol		-	-	-	-	-
2-Methylnaphthalene		-	-	-	-	-
Hexachlorocyclopentadiene		-	-	-	-	-
2,4,6-Trichlorophenol		-	-	-	-	-
2,4,5-Trichlorophenol		-	-	-	-	-
2-Chloronaphthalene		-	-	-	-	-
2-Nitroaniline		-	-	-	-	-
Dimethyl phthalate		-	-	-	-	-
Acenaphthylene		-	-	-	-	-
2,6-Dinitrotoluene		-	-	-	-	-
3-Nitroaniline		-	-	-	-	-
Acenaphthene		-	-	-	-	-
2,4-Dinitrophenol		-	-	-	-	-
4-Nitrophenol		-	-	-	-	-
Dibenzofuran		-	-	-	-	-
2,4-Dinitrotoluene		-	-	-	-	-
Diethylphthalate		-	-	-	-	-
4-Chlorophenyl-phenylether		-	-	-	-	-
Fluorene	50Ω	-	0.9J	-	-	-
4-Nitroaniline		-	-	-	-	-
4,6-Dinitro-2-methylphenol		-	-	-	-	-
N-nitrosodiphenylamine		-	-	-	-	-
4-Bromophenyl-phenylether		-	-	-	-	-
Hexachlorobenzene		-	-	-	-	-
Pentachlorophenol		-	-	-	-	-
Phenanthrene		-	-	-	-	-
Anthracene		-	-	-	-	-
Carbazole		-	-	-	-	-
Di-n-butylphthalate		-	-	-	-	-
Fluoranthene		-	-	-	-	-
Pyrene		-	-	-	-	-
Butylbenzylphthalate		-	-	-	-	-
3,3'-Dichlorobenzidine		-	-	-	-	-
Benzo(a)anthracene		-	-	-	-	-
Chrysene		-	-	-	-	-
bis(2-Ethylhexyl) phthalate		-	-	-	-	-
Di-n-octyl phthalate		-	-	-	-	-
Benzo(b)fluoranthene		-	-	-	-	-
Benzo(k)fluoranthene		-	-	-	-	-
Benzo(a)pyrene		-	-	-	-	-
Indeno (1,2,3-cd)pyrene		-	-	-	-	-
Dibenzo (a,h) anthracene		-	-	-	-	-
Benzo(g,h,i)perylene		-	-	-	-	-
Total SVOCs		-	29.9	58	-	-

Note:
NYSDEC ASP 1991 (Method 91-2), Plus 20 TICs, Superfund Deliverables
- = Not detected
J = Indicates an estimated value
^ = Total Phenolic Compounds
Ω = Guidance Value
[ ] = Value exceeds standard or guidance Value

TABLE 6
SUMMARY OF PESTICIDE/PCB ANALYSES
GROUND WATER

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

	Class GA Ground Water Standard (6 NYCRR 703.5) (µg/l)	UPGRADIENT	DOWNGRADIENT			
		MW-9 (µg/l)	MW-1 (µg/l)	MW-7 (µg/l)	MW-8 (µg/l)	MW-10 (µg/l)
COMPOUND						
alpha-BHC		-	-	-	-	-
beta-BHC		-	-	-	-	-
delta-BHC		-	-	-	-	-
gamma-BHC (Lindane)		-	-	-	-	-
Heptachlor		-	-	-	-	-
Aldrin		-	-	-	-	-
Heptachlor epoxide		-	-	-	-	-
Endosulfan I		-	-	-	-	-
Dieldrin		-	-	-	-	-
4,4'-DDE		-	-	-	-	-
Endrin		-	-	-	-	-
Endosulfan II		-	-	-	-	-
4,4'-DDE		-	-	-	-	-
Endosulfan sulfate		-	-	-	-	-
4,4'-DDT		-	-	-	-	-
Methoxychlor		-	-	-	-	-
Endrin-Ketone		-	-	-	-	-
Endrin Aldehyde		-	-	-	-	-
alpha-Chlordane		-	-	-	-	-
gamma-Chlordane		-	-	-	-	-
Toxaphene		-	-	-	-	-
AROCLOR-1016		-	-	-	-	-
AROCLOR-1221		-	-	-	-	-
AROCLOR-1232		-	-	-	-	-
AROCLOR-1242	0.1	-	-	1	-	-
AROCLOR-1248		-	-	-	-	-
AROCLOR-1254		-	-	-	-	-
AROCLOR-1260		-	-	-	-	-

Note:

NYSDEC ASP 1991, (Method 91-3), Superfund Deliverables.

- = Not detected

J = Indicates an estimated value.

P = This flag is used for a pesticide/arochlor target analyte when there is a greater than 25 percent difference for detected contentrations between the two GC columns.

TABLE 7
SUMMARY OF METALS ANALYSES
GROUND WATER

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

ELEMENT	Class GA Ground Water Standard (6 NYCRR 703.5) (µg/l)	UPGRADIENT MW-9 (µg/l)	DOWNGRADIENT MW-1 (µg/l)	MW-7 (µg/l)	MW-8 (µg/l)	MW-10 (µg/l)
Aluminum		1,740	5,520	1,080	5,510	12,500
Antimony		-	-	-	-	-
Arsenic	25	-	5.3B	4.5B	1.9B	-
Barium	1,000	47.0B	404	468	499	692
Beryllium		-	-	-	-	-
Cadmium		-	-	-	-	-
Calcium		38,500	93,000	136,000	169,000	164,000
Chromium	50	-	-	-	-	29.3
Cobalt		3.6B	13.0B	6.4B	6.2B	9.4B
Copper	200	-	264J	-	-	-
Iron	300^	2,680	33,100	83,400	27,900	18,000
Lead		-	-	-	-	-
Magnesium		8,970	47,200	74,600	45,600	48,800
Manganese	300^	250	47,300	26,700	7,700	3,670
Mercury		-	-	-	-	-
Nickel	†	-	17.8B	-	18.0B	22.9B
Potassium		-	18,400	34,200	9,090	6,840
Selenium		-	-	-	-	-
Silver		-	-	-	-	-
Sodium	20,000	-	123,000	254,000	85,900	58,500
Thallium	4Ω	-	-	1.6B	3.1B	1.6B
Vanadium		-	-	-	25.2B	30.0B
Zinc		-	-	-	-	-
Cyanide		-	-	-	-	-

Note:

NYSDEC CLP-M (1989 ASP) Superfund Target Compound List (TCL:23 metals); Superfund-CLP Inorganics

B = Indicates a value greater than or equal to the instrument detection limit but less than the contract required detection limit.

- = Not detected

^ = Standard is 500 µg/l for iron and manganese combined

† = Refer to NYCRR Part 703.5, Sept. 1991.

Ω = Guidance Value

[ ] = Value exceeds standard or guidance value.

TABLE 8
SUMMARY OF VOLATILE ORGANIC ANALYSES
LEACHATE

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

COMPOUND	Class D Surface Water Standard (6 NYCRR 703.5) (µg/l)	L-1-LF (µg/l)	L-2-LF (µg/l)
Chloromethane		-	-
Bromomethane		-	-
Vinyl chloride		-	-
Chloroethane		-	58
Methylene chloride		-	-
Acetone		-	-
Carbon Disulfide		-	-
1,1-Dichloroethene		-	-
1,1-Dichloroethane		-	-
1,2-Dichloroethene (total)		-	-
Chloroform		-	-
1,2-Dichloroethane		-	-
2-Butanone		-	-
1,1,1-Trichloroethane		-	-
Carbon tetrachloride		-	-
Vinyl acetate		-	-
Bromodichloromethane		-	-
1,2-Dichloropropane		-	-
cis-1,3-Dichloropropene		-	-
Trichloroethene		-	-
Dibromochloromethane		-	-
1,1,2-Trichloroethane		-	-
Benzene	6Ω	-	2J
trans-1,3-Dichloropropene		-	-
Bromoform		-	-
4-Methyl-2-pentanone		-	-
2-Hexanone		-	-
Tetrachloroethene		-	-
1,1,2,2-Tetrachloroethane		-	-
Toluene		-	-
Chlorobenzene	50	-	0.6J
Ethyl Benzene		-	-
Styrene		-	-
Total Xylenes		-	-
Total VOCs		-	60.6

Note:
NYSDEC ASP 1991, (Method 91-1), Plus 10 TICs, Superfund Deliverables
- = Not detected
J = Indicates an estimated value
Ω = Guidance value

TABLE 9
SUMMARY OF SEMIVOLATILE ORGANIC ANALYSES
LEACHATE

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

	L-1-LF (µg/l)	L-2-LF (µg/l)
COMPOUND		
Phenol	-	-
bis(2-Chloroethyl) ether	-	-
2-Chlorophenol	-	-
1,3-Dichlorobenzene	-	-
1,4-Dichlorobenzene	-	-
1,2-Dichlorobenzene	-	-
2-Methylphenol	-	-
2,2'-oxybis (1-Chloropropane)	-	-
4-Methylphenol	-	-
N-Nitroso-di-n-propylamine	-	-
Hexachloroethane	-	-
Nitrobenzene	-	-
Isophorone	-	-
2-Nitrophenol	-	-
2,4-Dimethylphenol	-	-
bis(2-Chloroethoxy) methane	-	-
2,4-Dichlorophenol	-	-
1,2,4-Trichlorobenzene	-	-
Naphthalene	-	-
4-Chloroaniline	-	-
Hexachlorobutadiene	-	-
4-Chloro-3-methylphenol	-	-
2-Methylnaphthalene	-	-
Hexachlorocyclopentadiene	-	-
2,4,6-Trichlorophenol	-	-
2,4,5-Trichlorophenol	-	-
2-Chloronaphthalene	-	-
2-Nitroaniline	-	-
Dimethyl phthalate	-	-
Acenaphthylene	-	-
2,6-Dinitrotoluene	-	-
3-Nitroaniline	-	-
Acenaphthene	-	-
2,4-Dinitrophenol	-	-
4-Nitrophenol	-	-
Dibenzofuran	-	-
2,4-Dinitrotoluene	-	-
Diethylphthalate	-	-
4-Chlorophenyl-phenylether	-	-
Fluorene	-	-
4-Nitroaniline	-	-
4,6-Dinitro-2-methylphenol	-	-
N-nitrosodiphenylamine	-	-
4-Bromophenyl-phenylether	-	-
Hexachlorobenzene	-	-
Pentachlorophenol	-	-
Phenanthrene	-	-
Anthracene	-	-
Carbazole	-	-
Di-n-butylphthalate	-	-
Fluoranthene	-	-
Pyrene	-	-
Butylbenzylphthalate	-	-
3,3'-Dichlorobenzidine	-	-
Benzo(a)anthracene	-	-
Chrysene	-	-
bis(2-Ethylhexyl) phthalate	-	-
Di-n-octyl phthalate	-	-
Benzo(b)fluoranthene	-	-
Benzo(k)fluoranthene	-	-
Benzo(a)pyrene	-	-
Indeno (1,2,3-cd)pyrene	-	-
Dibenzo (a,h) anthracene	-	-
Benzo(g,h,i)perylene	-	-

Note:
NYSDEC ASP 1991 (Method 91-2), Plus 20 TICs, Superfund Deliverables
- = Not detected
J = Indicates an estimated value

TABLE 10
SUMMARY OF PESTICIDE/PCB ANALYSES
LEACHATE

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

	L-1-LF (µg/l)	L-2-LF (µg/l)
COMPOUND		
alpha-BHC	-	-
beta-BHC	-	-
delta-BHC	-	-
gamma-BHC (Lindane)	-	-
Heptachlor	-	-
Aldrin	-	-
Heptachlor epoxide	-	-
Endosulfan I	-	-
Dieldrin	-	-
4,4'-DDE	-	-
Endrin	-	-
Endosulfan II	-	-
4,4'-DDE	-	-
Endosulfan sulfate	-	-
4,4'-DDT	-	-
Methoxychlor	-	-
Endrin-Ketone	-	-
Endrin Aldehyde	-	-
alpha-Chlordane	-	-
gamma-Chlordane	-	-
Toxaphene	-	-
AROCLOR-1016	-	-
AROCLOR-1221	-	-
AROCLOR-1232	-	-
AROCLOR-1242	-	-
AROCLOR-1248	-	-
AROCLOR-1254	-	-
AROCLOR-1260	-	-

Note:
NYSDEC ASP 1991, (Method 91-3), Superfund Deliverables.
- = Not detected

TABLE 11
SUMMARY OF METALS ANALYSES
LEACHATE

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

ELEMENT	Class D Surface Water Standard (6 NYCRR 703.5) (µg/l)	L-1-LF (µg/l)	L-2-LF (µg/l)
Aluminum		51.5B	58.0B
Antimony		-	-
Arsenic		-	-
Barium		145B	39.6B
Beryllium		-	-
Cadmium		-	-
Calcium		120,000	43,600
Chromium		-	-
Cobalt		-	-
Copper		-	-
Iron	300	2,020	647
Lead		-	-
Magnesium		42,000	11,400
Manganese		2,630	713
Mercury		-	-
Nickel		-	-
Potassium		23,600	4,950
Selenium		-	-
Silver		-	-
Sodium		51,000	27,400
Thallium		-	-
Vanadium		-	-
Zinc		-	-
Cyanide		-	-

Note:

NYSDEC CLP-M (1989 ASP) Superfund Target Compound List (TCL:23 metals); Superfund-CLP Inorganics

B = Indicates a value greater than or equal to the instrument detection limit but less than the contract required detection limit.

- = Not detected

☐ = Value exceeds standard or guidance value.

TABLE 12
SUMMARY OF VOLATILE ORGANIC ANALYSES
SURFACE SOIL

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

	SS-BKGD (µg/Kg)	SS-LF-1 (µg/Kg)	SS-LF-2 (µg/Kg)	SS-LF-3 (µg/Kg)
COMPOUND				
Chloromethane	-	-	-	-
Bromomethane	-	-	-	-
Vinyl chloride	-	-	-	-
Chloroethane	-	-	-	-
Methylene chloride	-	-	-	-
Acetone	-	-	-	-
Carbon Disulfide	-	-	-	-
1,1-Dichloroethene	-	-	-	-
1,1-Dichloroethane	-	-	-	-
1,2-Dichloroethene (total)	-	-	-	-
Chloroform	-	-	-	-
1,2-Dichloroethane	-	-	-	-
2-Butanone	-	7J	-	-
1,1,1-Trichloroethane	-	-	-	-
Carbon tetrachloride	-	-	-	-
Vinyl acetate	-	-	-	-
Bromodichloromethane	-	-	-	-
1,2-Dichloropropane	-	-	-	-
cis-1,3-Dichloropropene	-	-	-	-
Trichloroethene	-	-	-	-
Dibromochloromethane	-	-	-	-
1,1,2-Trichloroethane	-	-	-	-
Benzene	-	-	-	-
trans-1,3-Dichloropropene	-	-	-	-
Bromoform	-	-	-	-
4-Methyl-2-pentanone	-	-	-	-
2-Hexanone	-	-	-	-
Tetrachloroethene	-	-	-	-
1,1,2,2-Tetrachloroethane	-	-	-	-
Toluene	-	-	-	-
Chlorobenzene	-	-	-	-
Ethyl Benzene	-	-	-	-
Styrene	-	-	-	-
Total Xylenes	-	-	-	-
Total VOCs	-	7J	-	-

Note:
NYSDEC ASP 1991, (Method 91-1), Plus 10 TICs, Superfund Deliverables
- = Not detected
J = Indicates an estimated value

TABLE 13
SUMMARY OF SEMIVOLATILE ORGANIC ANALYSES
SURFACE SOIL

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

	SS-BKGD (µg/Kg)	SS-LF-1 (µg/Kg)	SS-LF-2 (µg/Kg)	SS-LF-3 (µg/Kg)
COMPOUND				
Phenol	-	-	-	-
bis(2-Chloroethyl) ether	-	-	-	-
2-Chlorophenol	-	-	-	-
1,3-Dichlorobenzene	-	-	-	-
1,4-Dichlorobenzene	-	-	-	-
1,2-Dichlorobenzene	-	-	-	-
2-Methylphenol	-	-	-	-
2,2'-oxybis (1-Chloropropane)	-	-	-	-
4-Methylphenol	-	-	-	-
N-Nitroso-di-n-propylamine	-	-	-	-
Hexachloroethane	-	-	-	-
Nitrobenzene	-	-	-	-
Isophorone	-	-	-	-
2-Nitrophenol	-	-	-	-
2,4-Dimethylphenol	-	-	-	-
bis(2-Chloroethoxy) methane	-	-	-	-
2,4-Dichlorophenol	-	-	-	-
1,2,4-Trichlorobenzene	-	-	-	-
Naphthalene	-	-	-	40J
4-Chloroaniline	-	-	-	-
Hexachlorobutadiene	-	-	-	-
4-Chloro-3-methylphenol	-	-	-	-
2-Methylnaphthalene	-	-	-	40J
Hexachlorocyclopentadiene	-	-	-	-
2,4,6-Trichlorophenol	-	-	-	-
2,4,5-Trichlorophenol	-	-	-	-
2-Chloronaphthalene	-	-	-	-
2-Nitroaniline	-	-	-	-
Dimethyl phthalate	-	-	-	-
Acenaphthylene	-	-	-	-
2,6-Dinitrotoluene	-	-	-	12J
3-Nitroaniline	-	-	-	-
Acenaphthene	-	25J	-	340J
2,4-Dinitrophenol	-	-	-	-
4-Nitrophenol	-	-	-	-
Dibenzofuran	-	-	-	150J
2,4-Dinitrotoluene	-	-	-	-
Diethylphthalate	-	-	-	-
4-Chlorophenyl-phenylether	-	-	-	-
Fluorene	-	20J	-	370J
4-Nitroaniline	-	-	-	-
4,6-Dinitro-2-methylphenol	-	-	-	-
N-nitrosodiphenylamine	-	-	-	-
4-Bromophenyl-phenylether	-	-	-	-
Hexachlorobenzene	-	-	-	-
Pentachlorophenol	-	-	-	-
Phenanthrene	90J	120J	110J	1,600
Anthracene	-	28J	13J	340J
Carbazole	-	24J	19J	480
Di-n-butylphthalate	-	-	-	-
Fluoranthene	170J	230J	300J	2,100
Pyrene	150J	170J	250J	2,000
Butylbenzylphthalate	-	-	-	-
3.3'-Dichlorobenzidine	-	-	-	-
Benzo(a)anthracene	-	120J	130J	1,300
Chrysene	120J	140J	200J	1,300
bis(2-Ethylhexyl) phthalate	-	-	-	-
Di-n-octyl phthalate	-	-	-	-
Benzo(b)fluoranthene	160J	110J	230J	1,600J
Benzo(k)fluoranthene	-	95J	96J	1,700J
Benzo(a)pyrene	76J	81J	120J	1,100J
Indeno (1,2,3-cd)pyrene	-	41J	82J	290J
Dibenzo (a,h) anthracene	-	-	-	98J
Benzo(g,h,i)perylene	-	-	44J	120J
Total SVOCs	766	1,204	1,594	14,980

Note:
NYSDEC ASP 1991 (Method 91-2), Plus 20 TICs, Superfund Deliverables
- = Not detected
J = Indicates an estimated value

TABLE 14
SUMMARY OF PESTICIDE/PCB ANALYSES
SURFACE SOIL

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

	SS-BKGD (µg/Kg)	SS-LF-1 (µg/Kg)	SS-LF-2 (µg/Kg)	SS-LF-3 (µg/Kg)
COMPOUND				
alpha-BHC	-	-	-	-
beta-BHC	-	-	-	-
delta-BHC	-	-	-	-
gamma-BHC (Lindane)	-	-	-	-
Heptachlor	-	-	-	-
Aldrin	-	-	-	-
Heptachlor epoxide	-	-	-	-
Endosulfan I	-	-	-	-
Dieldrin	-	-	-	-
4,4'-DDE	14	-	-	-
Endrin	-	-	-	-
Endosulfan II	4.1JP	-	-	-
4,4'-DDE	-	-	-	-
Endosulfan sulfate	2.3J	-	-	-
4,4'-DDT	11P	-	-	-
Methoxychlor	-	-	-	-
Endrin-Ketone	-	-	-	-
Endrin Aldehyde	-	-	-	-
alpha-Chlordane	-	-	-	-
gamma-Chlordane	-	-	-	-
Toxaphene	-	-	-	-
AROCLOR-1016	-	-	-	-
AROCLOR-1221	-	-	-	-
AROCLOR-1232	-	-	-	-
AROCLOR-1242	-	-	-	-
AROCLOR-1248	-	-	-	-
AROCLOR-1254	-	50	-	110JP
AROCLOR-1260	74P	62	17JP	140JP

Note:

NYSDEC ASP 1991, (Method 91-3), Superfund Deliverables.

U = Compound analyzed for but not detected.

J = Indicates an estimated value.

P = This flag is used for a pesticide/arochlor target analyte when there is a greater than 25 percent difference for detected contentrations between the two GC columns.

TABLE 15
SUMMARY OF METALS ANALYSES
SURFACE SOIL

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

ELEMENT	SS-BKGD (mg/Kg)	SS-LF-1 (mg/Kg)	SS-LF-2 (mg/Kg)	SS-LF-3 (mg/Kg)
Aluminum	11,500JE*	16,600JE*	8,510JE*	9,680JE*
Antimony	-	-	-	-
Arsenic	14.2S	1.4B	2.1B	2.4BS
Barium	457	22.2B	55.6	37.8B
Beryllium	1.2B	0.31B	0.30B	0.42B
Cadmium	2.5	-	-	-
Calcium	4,530JE*	14,700JE*	2,750JE*	8,950JE*
Chromium	-	-	-	-
Cobalt	12.6B	4.7B	3.7B	5.4B
Copper	37.2*	39.8*	12.0*	39.3*
Iron	27,900	12,700	12,100	14,200
Lead	53.2	4.1	10.3	10.5
Magnesium	1,640JBE	6,390JE	2,010JE	4,770JE
Manganese	11,200JN	315JN	466JN	714JN
Mercury	0.19	-	-	-
Nickel	18.5	12.6	6.1B	15.7
Potassium	717B	824B	437B	891B
Selenium	1.1B	-	-	-
Silver	-	-	-	-
Sodium	-	-	-	-
Thallium	0.79 B	-	-	-
Vanadium	47.1	17.1	12.8	21.0
Zinc	191.0	-	-	-
Cyanide	-	-	-	-

Note:

NYSDEC CLP-M (1989 ASP) Superfund Target Compound List (TCL:23 metals); Superfund-CLP Inorganics

B = Indicates a value greater than or equal to the instrument detection limit but less than the contract required detection limit.
E = Reported value is estimated because of the presence of interference.
* = Duplicate analysis not within control limits.
S = The reported value was determined by the method of standard additions (MSA).
N = Spiked sample recovery not within control limits.
- = Not detected

TABLE 16
SUMMARY OF VOLATILE ORGANIC ANALYSES
AIR

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

	DM-2	DM-4	DM-6
Total VOCs (ppm)	-	-	-
Total VOCs (mg/m3)	-	-	-

Note:
Samples analyzed using NIOSH Method 5503
- = Not detected
ppm = parts of contaminant per million parts of air
mg/m3 = milligrams of contaminant per cubic meter of air

TABLE 17
SUMMARY OF PCB ANALYSES
AIR

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

	DM-1	DM-3	DM-5
Total PCBs (mg/m3)	-	-	-

Note:
Samples analyzed using NIOSH Method 5503
- = Not detected
mg/m3 = milligrams of contaminant per cubic meter of air

TABLE 18
SUMMARY OF ANALYTICAL RESULTS

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

Medium	Sample Location	Sample ID	VOA	SVOA	PEST	PCBs	METALS
Ground Water	Monitoring Well MW-1	MW-1	2	2	ND	ND	ABG
	Monitoring Well MW-7	MW-7	2	2	ND	1	ABG
	Monitoring Well MW-8	MW-8	1	ND	ND	ND	ABG
	Monitoring Well MW-10	MW-10	2	ND	ND	ND	ABG
	Upgradient Monitoring Well MW-9	MW-9	ND	ND	ND	ND	BG
Leachate	Surface Water near Main Landfill	L-1-LF	ND	ND	ND	ND	ABG
	Surface Water near Main Landfill	L-2-LF	2	ND	ND	ND	BG
Surface Soil	From northwestern side of Main Landfill	SS-LF-1	ND	4	ND	3	BG
	From northeastern side of Main Landfill	SS-LF-2	1	4	ND	2	BG
	From center of Main Landfill	SS-LF-3	ND	5	ND	3	BG
	Composite from forest area north of Main Landfill	SS-BKGD	ND	3	2	2	BG
Air	Upwind of Main Landfill	DM-1,2	ND			ND	
	Downwind of Main Landfill near Pond No. 2	DM-3,4	ND			ND	
	Downwind of Main Landfill near fish weir	DM-5,6	ND			ND	

Notes:

VOA = Volatile Organic Analysis
SVOA = Semivolatile Organic Analysis
PEST = Pesticides
PCB = Polychlorinated Biphenyls
= Not tested
ND = Not Detected
1 = <10 ppb
2 = 10 - 100 ppb
3 = 100 - 1,000 ppb
4 = 1,000 - 10,000 ppb
5 = 10,000 - 100,000 ppb

BG = Levels of metals were less than 10 times background.
ABG = Levels of one or more metals were greater than 10 times background.
The metals in leachate samples are compared to the upgradient ground water sample.

TABLE 19
SUMMARY OF COMPOUNDS

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

Chemical Compound	Ground Water			Surface Water			Surface Soil			Toxicity								
										Human						Fresh Water Aquatic Life		
	Maximum Level Detected~ (mg/l)	Mean Level Detected~ (mg/l)	NYSDEC Class GA Standard (mg/l)	Maximum Level Detected (mg/l)	Mean Level Detected (mg/l)	NYSDEC Class D Standard (mg/l)	Maximum Level Detected (mg/kg)	Mean Level Detected (mg/kg)	Proposed NYSDEC Soil Cleanup Standard¥ (mg/kg)	Carcino-genicinity	Chronic Oral RfD (mg/kg/day)	PCW** (mg/l)	AWQC W&F¬ (mg/l)	AWQC F¬ (mg/l)	MCL (mg/l)	PCW** (mg/l)	Acute (mg/l)	Chronic (mg/l)
Volatiles																		
Chloroethane	0.024	0.008	0.005	0.058	0.032	*				N					NA	*		
1,1-Dichloroethane	0.030	0.011	0.005Ω							N	0.1	*	NA	NA	NA	*	100-500	20
Toluene	0.044	0.015	0.005							N	0.2	14.3	14.3	424	1.0	17.5		
Chlorobenzene	0.035	0.013	0.005	0.0006	0.028	0.05				N					NA	0.129		
Semivolatiles																		
Dichlorobenzenes (total)	0.029	0.011	0.0047							N						0.763		
Methylphenol (total)	0.057	0.018	0.001							N	0.05†	0.304	NA	NA	NA	2.56		
Benzo(a)anthracene							1.3	0.52		C								
Benzo(b)fluoranthene							1.6	0.65		C								
Benzo(k)fluoranthene							1.7	0.63		C								
Benzo(a)pyrene							1.1	0.43	0.061	C								
Benzo(g,h,i)perylene							0.12	0.056		C								
Dibenzo(a,h)anthracene							0.098	0.036		C								
Indeno-(1,2,3-cd)pyrene							0.29	0.138		C								
Total PAHs							6.2	2.5										
PCBs																		
Aroclor 1242	0.001	0.00063	0.0001							C	NA	7.9 x 10E-7	4.4 x 10E-8	4.5 x 10E-8		0.014	0.002	0.014
Aroclor 1260							0.25	0.13	1	C								
Metals																		
Copper	0.264	0.118	0.2							N	0.04	1.00	170	3.43	1.3^	0.056	7.2	NA
Iron	83.4	46.98	0.3	2	1.6	0.3				N	0.5		0.3	NA	0.3Δ	1.0		
Manganese	47.3	21.34	0.3							N	0.10	0.05	0.05	0.10	0.05Δ	*		
Sodium	254	130.4	20							N	NA	200			NA	*		

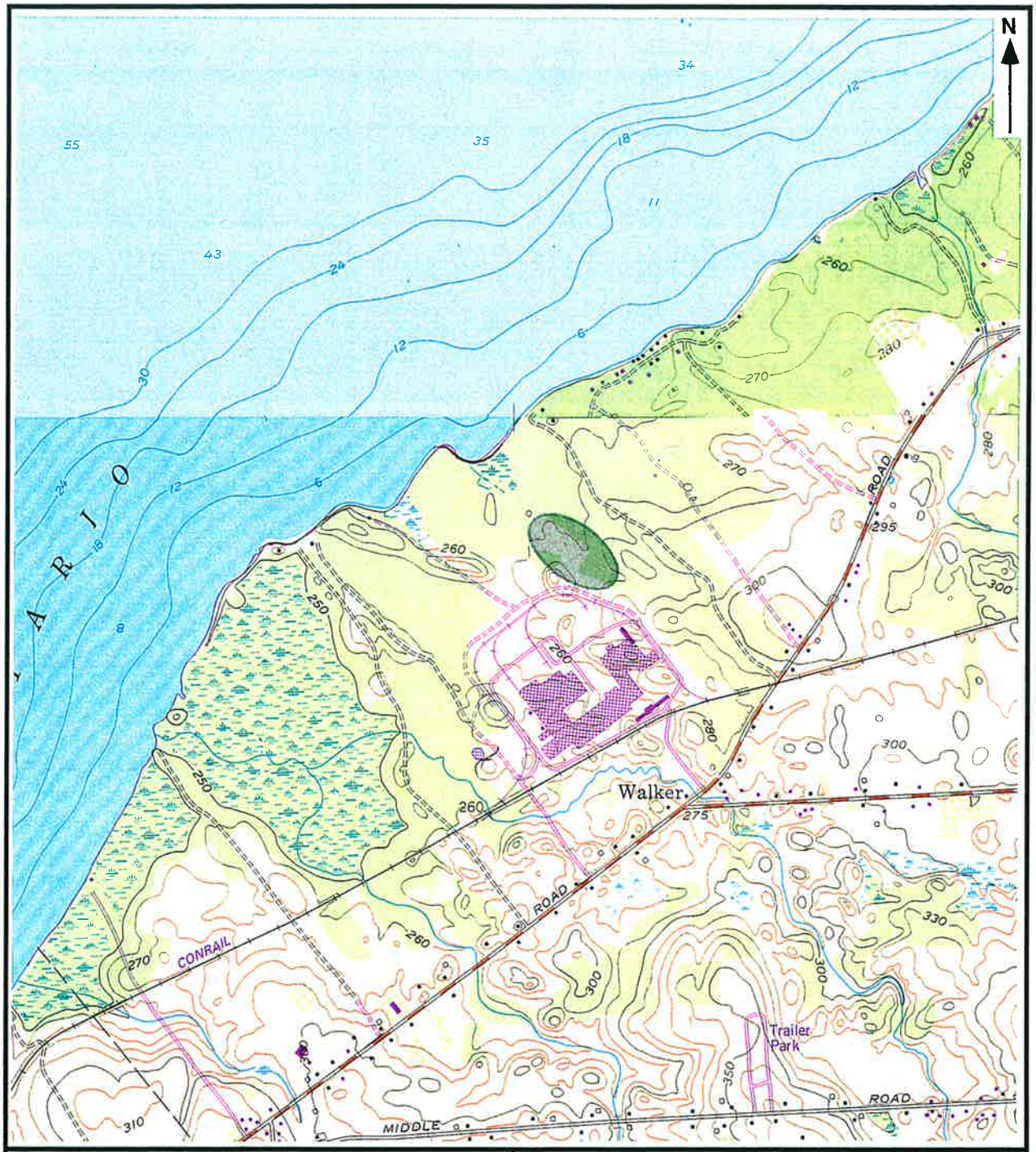
Notes:
AWQC = Ambient Water Quality Criteria
~ = In sampling conducted on October 6, 1991 and October 27, 1993 in down-gradient monitoring wells.
PCW = Permissible Concentration in Water
¬ = Fish and Water Consumption (F&W) or Fish Consumption (F)
† = Applies to 4-Methylphenol
NA = Not Available
Δ = Secondary MCL
^ = MCLG
C = Carcinogenic
N = Noncarcinogenic
Ω = Guidance value
- = No standard or guidance value
GW = Ground Water
L = Leachate
SS = Surface Soil
^ = Based on 1,2-Dichloroethane
* = No criteria set
"" = Reference [32]
¥ = Reference [33]

TABLE 20

DETERMINATION OF SIGNIFICANT THREAT TO THE ENVIRONMENT

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

6 NYCRR 375-1.4			Commentary With Respect To Alcan Main Landfill
(a)	(1)	Hazardous waste disposed at site constitutes a significant threat if there is any of the following:	
		(i) a significant adverse impact upon endangered species, or species of concern	None observed.
		(ii) a significant adverse impact upon protected streams, tidal wetlands or freshwater wetlands	None observed.
		(iii) a bioccumulation of contaminants in flora or fauna that causes or contributes to significant adverse ecotoxicological effects	None expected.
		(iv) contaminant levels that cause significant adverse acute or chronic effects to fish, shellfish, crustecea and wildlife	None expected.
		(v) a significant adverse impact to the environment due to a fire, spill etc., or	None observed.
		(vi) where the site is near people or water supplies	Site is in a low density rural area on 500-acre Alcan industrial facility. Nearest residents, over 1,700 feet to north of site are on domestic water supply, and are seasonal.
	(2)	Hazardous waste disposed at site constitutes a significant threat if it results or is reasonably foreseeable that it will result in environmental damage	See (b) below.
(b)	Consideration of 375-1.4 (a) may take into account any or all of the following:		
	(1)	duration, areal extent, or magnitude of severity of environmental damage	None observed.
	(2)	type, mobility, toxicity, quantity, bioaccumulation, and persistance of hazardous waste present	Rags and adsorbent material containing minor amounts of PCB fluid may have been deposited in the landfill.
	(3)	manner of disposal of the hazardous waste	Site is a landfill used between 1963 and 1978 for disposal of office trash, wooden pallets, construction debris and non-hazardous process waste.
	(4)	nature of soils and bedrock at and near the site	Ira and Sodus very stony soils, and ponded Humaquept and Fibrist soils occur adjacent to the site. Up to about 13 feet of till underlies the landfill. A buried valley in the underlying Oswego Standstone bedrock is filled with lacustrine deposits.
	(5)	ground water hydrology at and near the site	The overburden till is a poor aquifer with a hydraulic conductivity on the order of E-05 cm/sec. Ground water in the overburden flows to the northwest towards Lake Ontario under a gradient of 1% and at a velocity of E-07 cm/sec.
	(6)	location, nature and size of surface waters at and near the site	Lake Ontario, a Class A surface water, is approximately 1,000 feet to the northwest of the site. Tributary 63, a Class D tributary to Lake Ontario, borders the southwest boundary of the Alcan property, 0.5 mile to the southwest of the landfill.
	(7)	levels of contaminants in ground water, surface water, air and soils at and near the site	Ground water, leachate and surface soil were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, PCBs and metals. Air samples were analyzed for total VOCs and PCBs. Results were as follows: Ground water—low ppb levels of several VOCs and SVOCs up to about ten times Class GA standards; PCB in one well detected at 1 ppb, above GA standard of 0.1 ppb; several low-toxicty metals were higher than background and GA standard. Surface water—some of the VOCs and metals in ground water were found at slightly elevated levels in leachate. Surface soil—low ppm levels of PAHs and less than 1 ppm levels of PCBs. Air—no VOCs or PCBs detected.
	(8)	proximity of the site to places where individuals may be present	Site is in a low density rural area on the 500-acre Alcan industrial facility. Nearest residents, over 1,700 feet to north of site, are on domestic water supply and are seasonal.
	(9)	extent to which hazardous waste and/or hazardous waste constituents have or may migrate from the site	See (b)(7) above.
	(10)	proximity of the site to areas of critical environmental concern (as wetlands or aquifers)	A NYS Class I wetland (OE-58) abuts the site. No major water supply aquifers underlie the site area.
	(11)	potential for wildlife or aquatic life exposure that cause increase in morbidity or mortality	None known.
	(12)	integrity of mechanism containing waste, and	Landfill was covered with soil from onsite construction projects and topsoil, and seeded in 1978.
	(13)	climatic and weather conditions	Climate is humid-continental. Lake Ontario greatly influences the weather by moderating temperatures and affecting precipitation. Area receives about 35 inches of precipitation which includes 127 inches of snow.



Main Landfill

QUADRANGLE LOCATION

SCALE: 1 : 24,000
BASE MAP SOURCE:
USGS 7 1/2 Minute Series Topographic Maps,
Oswego East, New York, 1954 Photorevised 1978,
West of Texas, New York, 1955, Photorevised 1982.

ALCAN ROLLED PRODUCTS COMPANY

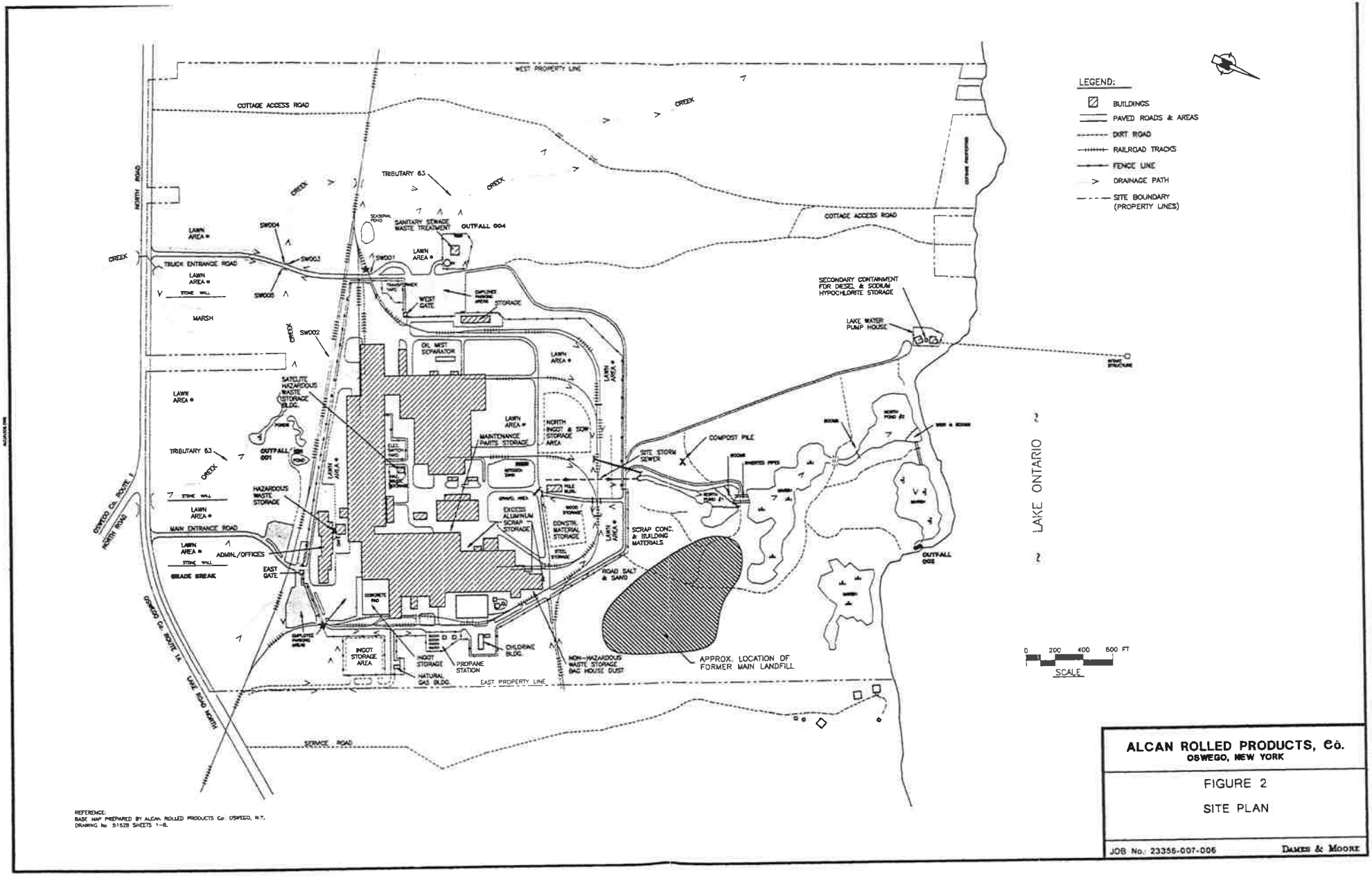
OSWEGO, NEW YORK

FIGURE 1

SITE LOCATION

Job No.: 23356-007

DAMES & MOORE



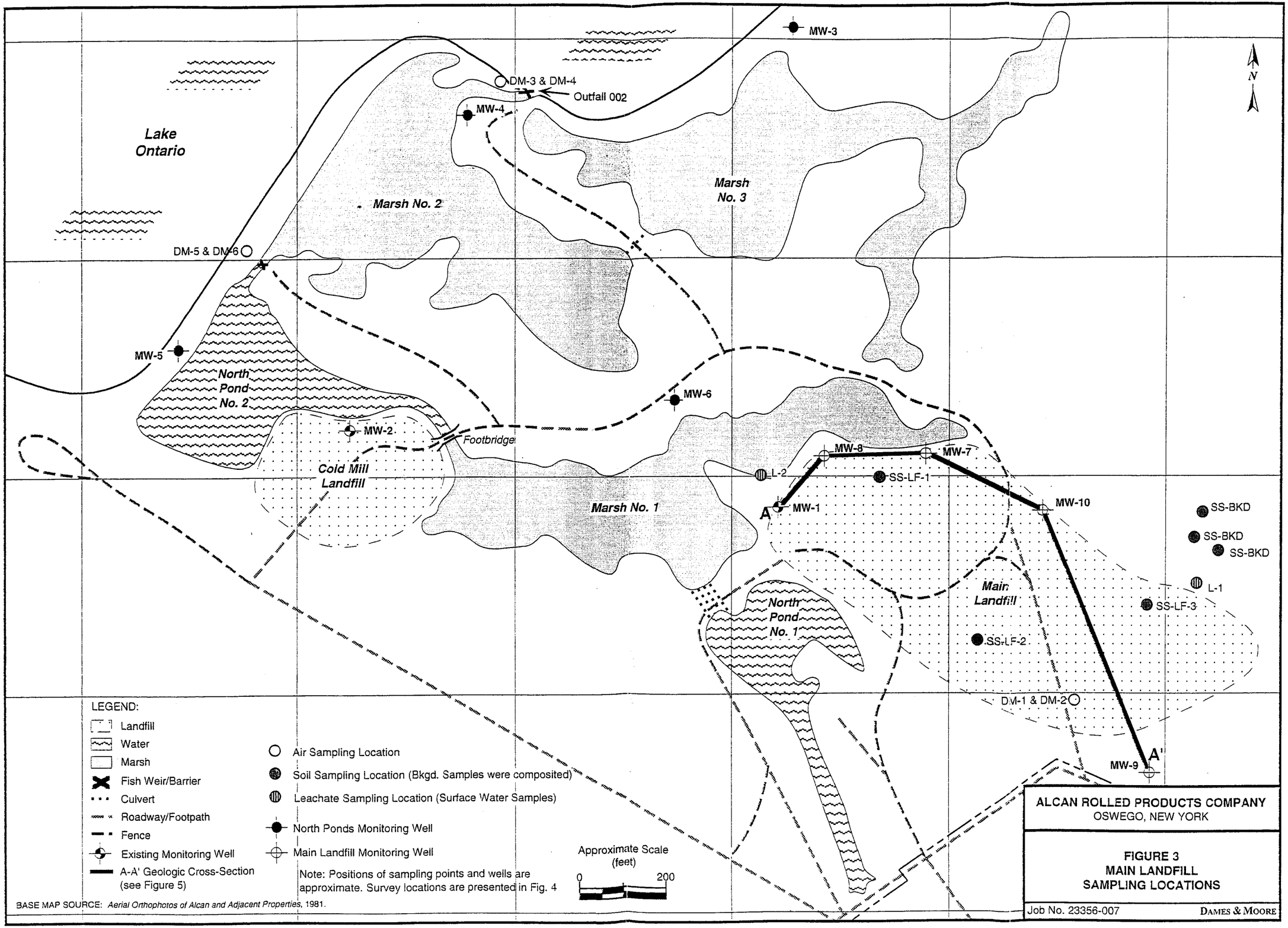
REFERENCE:
BASE MAP PREPARED BY ALCAN ROLLED PRODUCTS Co. OSWEGO, N.Y.
DRAWING No. 51528 SHEETS 1-8.

ALCAN ROLLED PRODUCTS, Co.
OSWEGO, NEW YORK

FIGURE 2

SITE PLAN

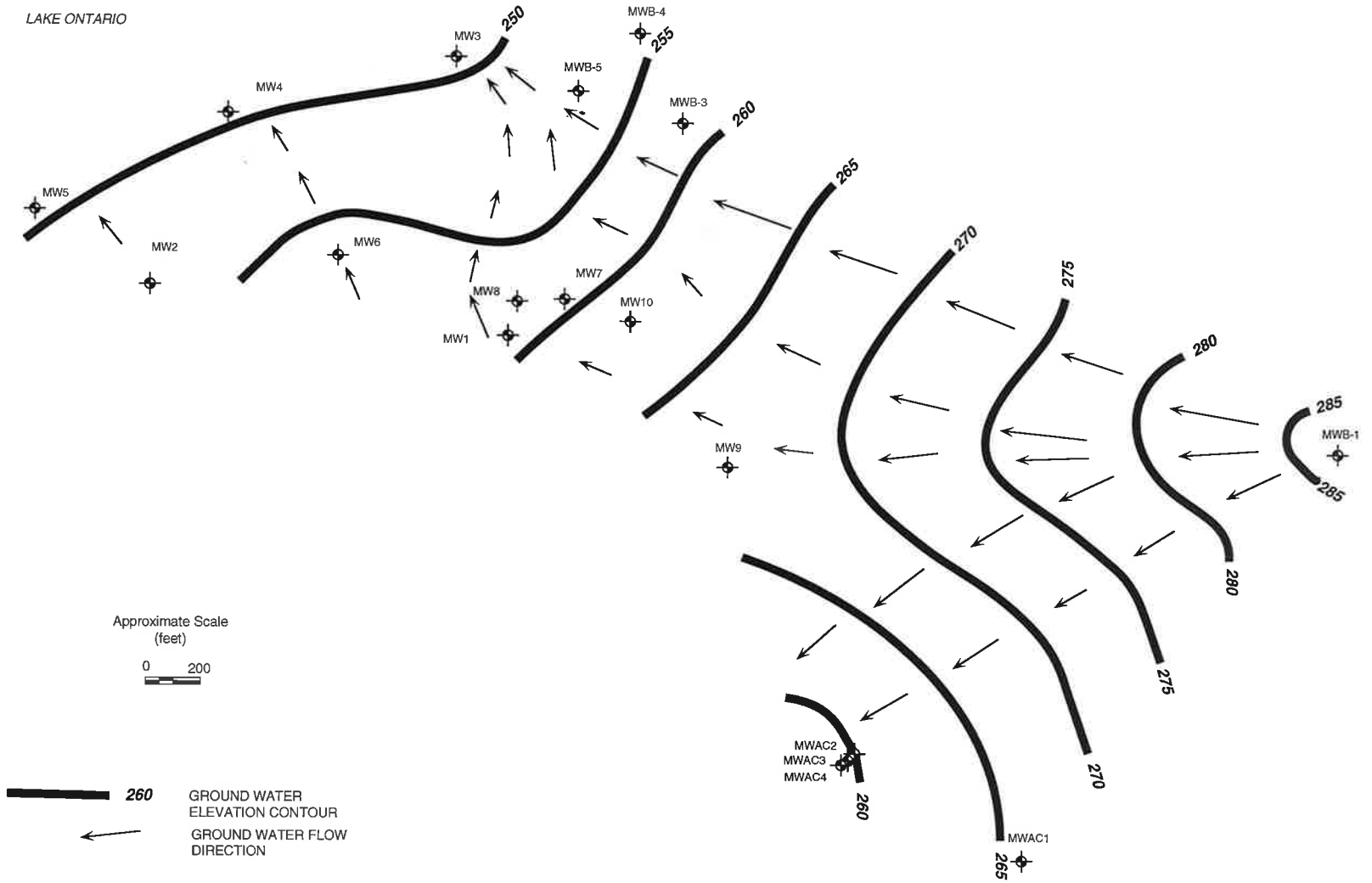
JOB No.: 23355-007-006 DAMES & MOORE



ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NEW YORK

FIGURE 3
MAIN LANDFILL
SAMPLING LOCATIONS

Job No. 23356-007 DAMES & MOORE



Notes:

See Table 1 for ground water elevations
Vertical datum is National Geodetic Vertical Datum (NGVD), 1929
Well locations from *Monitor Well Location Map* prepared by CT Male Associates, 1//29/93

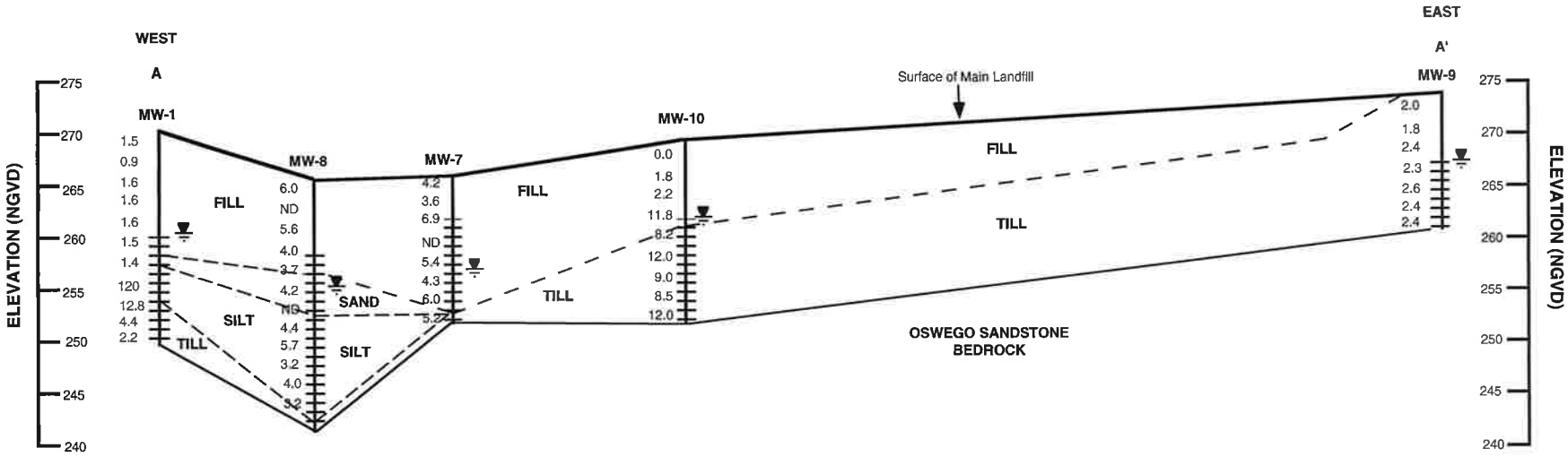
BASE MAP SOURCE: *Aerial Orthophotos of Alcan and Adjacent Properties*, 1981.

ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NEW YORK

FIGURE 4
GROUND WATER FLOW PATTERN
OVERBURDEN AQUIFER

Job No. 23356-007

DAMES & MOORE



LEGEND:

Measured Water Level (3/22/94)

Well Screen

1.8 HNU reading on soil sample head space (measured with 11.7 eV Probe)

Estimated contact between geologic units

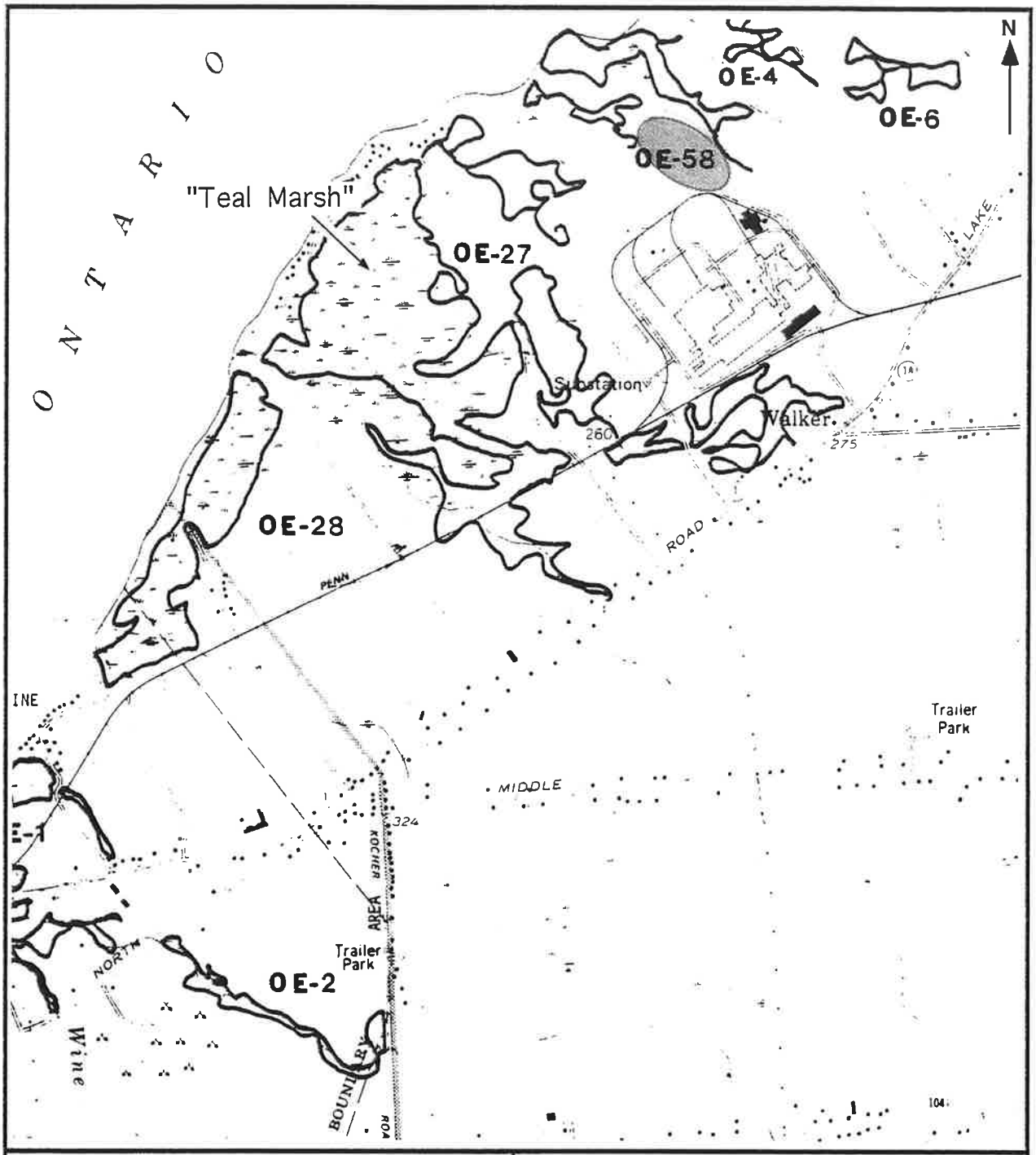
NOTE:

For location of cross section see Figure 3

ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NEW YORK

FIGURE 5
MAIN LANDFILL
GEOLOGIC CROSS SECTION A-A'

JOB NO. 23356-007 DAMES & MOORE



Main Landfill

QUADRANGLE LOCATION

SCALE: 1 : 24,000

BASE MAP SOURCE:
USDOT Freshwater Wetlands Map,
Oswego East, New York,1975.

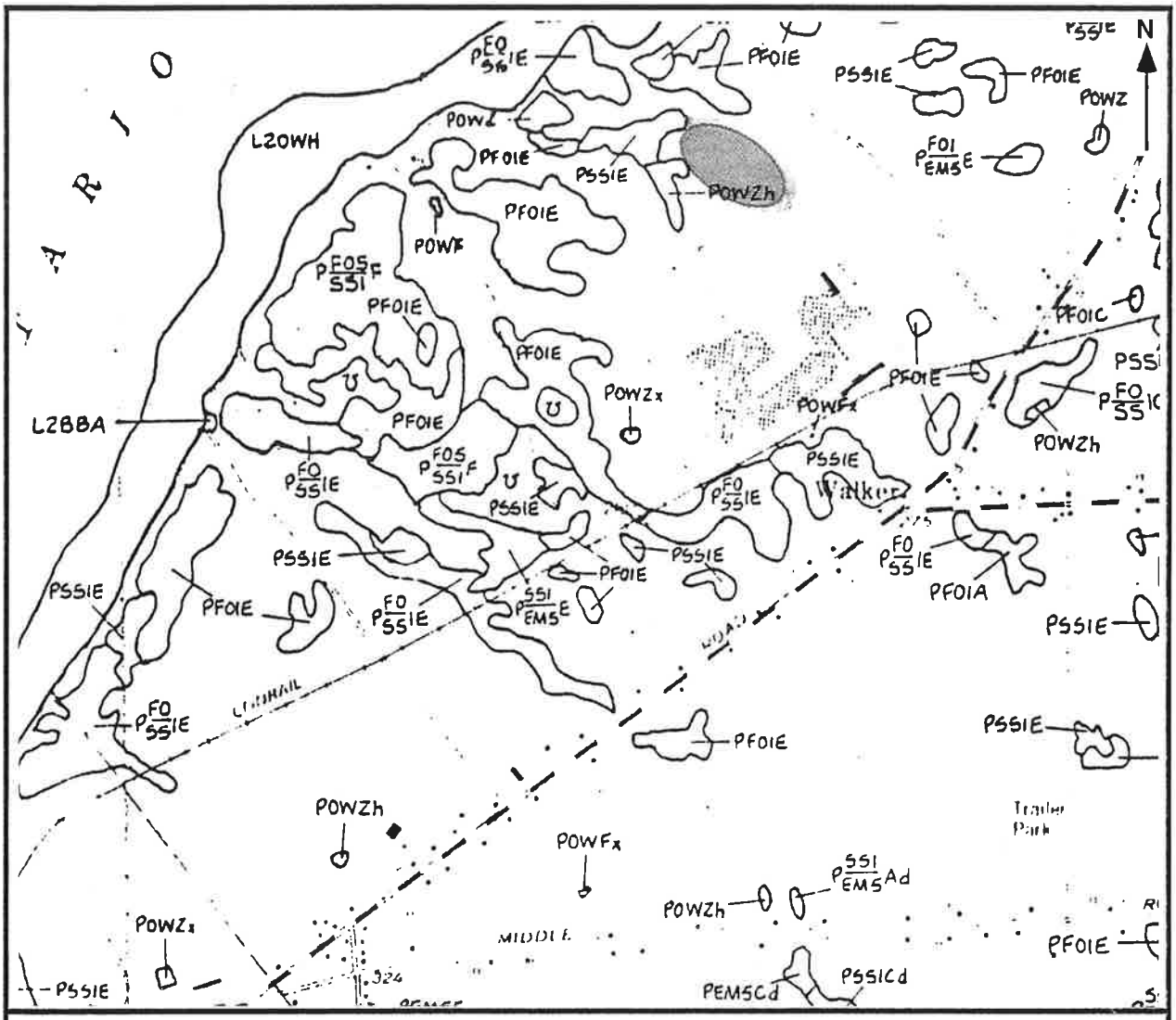
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NEW YORK

FIGURE 6

N.Y.S. REGULATED WETLANDS MAP

Job No.: 23356-007

DAMES & MOORE



Key

PSS1E = Palustrine scrub/shrub broad-leaved deciduous
PFO1E = Palustrine forested broad-leaved deciduous, seasonal saturated
PFO/SS 1E = Palustrine forested/scrub shrub broad-leaved deciduous, seasonal saturated
PFO5/SS 1F = Palustrine forested dead/scrub shrub broad-leaved deciduous, semipermanent
PEM5/OW = Palustrine emergent narrow-leaved persistent/open water
POWF = Palustrine open water, semipermanent
POWFx = Palustrine open water, semipermanent excavated
POWZ = Palustrine open water, permanent
POWZh = Palustrine open water, permanent diked/impounded
POWZx = Palustrine open water, permanent excavated

Main Landfill

QUADRANGLE LOCATION

SCALE: 1 : 24,000
BASE MAP SOURCE:
USDOI National Wetlands Inventory Map,
Oswego East, New York.

ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NEW YORK

FIGURE 7

COVER-TYPES MAP

Job No.: 23356-007

DAMES & MOORE

APPENDIX A

1991 SAMPLING PROGRAM DATA

EXECUTIVE SUMMARY
NORTH POND SEDIMENT SAMPLING PROGRAM

ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NEW YORK

As part of the North Pond Sediment Sampling Program, ground water, surface water, leachate, sediment and surface soil were sampled in the area of the ponds and marshes north of the facility, and submitted to RECRA Environmental, Inc. for analysis.

A comparative summary of the organic chemical results is provided in Table ES-1. A summary of organic and inorganic compounds that exceed regulatory standards or guidance values is provided in Table ES-2.

Two new monitoring wells were installed, MW-1 and MW-2. The monitoring well locations were selected by Alcan downgradient from the Main Landfill and the Cold Mill Landfill. After well development and purging, ground water samples were obtained and tested for volatile organic compounds, semivolatile organic compounds, pesticides, PCBs and Target Compound List (TCL) metals. Low levels of several volatile and semivolatile organic compounds were detected some of which exceeded the Class GA ground water standards or guidance values.

Six surface water samples were collected from the North Polishing Ponds 1 and 2 and tested for PCBs. No PCBs were detected in the samples tested.

A composite 'leachate' sample, taken from the surface water near the northeastern edge of Marsh No. 1, adjacent to the western edge of the landfill was tested for volatile organic compounds, semivolatile organic compounds, organochlorine pesticides, PCBs, and TCL metals. As shown in Table ES-2, iron exceeded the Class D Standard for surface water.

Five sediment samples were collected from North Polishing Pond No. 2, the west end of Marsh No. 1 and near the fish wier where Alcan's pond effluent discharges into Lake Ontario. Sediment samples were tested for volatile organic compounds, semivolatile organic compounds, organochlorine pesticides, PCBs, and Target Compound List (TCL) metals. Analytes were detected in many of the samples tested.

Four surface soil samples were collected around the perimeter of the North Polishing Ponds within the 100-year floodplain. Surface soil samples were analyzed for PCBs and TCL metals. One of the samples tested was found to contain PCBs.

SAMPLING AND ANALYSIS REPORT
NORTH POND SAMPLING PROGRAM

ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NEW YORK

This technical report summarizes the North Pond Sampling Program conducted at the Alcan Rolled Products Company facility in Oswego, NY (Figure 1). Prior to sampling, an electrical resistivity survey was performed at each of the two proposed monitoring well locations to estimate the depth to bedrock prior to drilling. The two shallow ground water monitoring wells were installed and developed. Ground water, surface water, sediment and surface soil samples were subsequently collected and analyzed. The sampling and analysis program is described below.

ELECTRICAL RESISTIVITY SURVEY

Two locations selected by Alcan were tested with vertical electrical resistivity soundings to evaluate the depth to bedrock prior to installing monitoring wells MW-1 and MW-2. At each location, two vertical electrical resistivity soundings were performed using the four electrode method with a Wenner electrode configuration. The soundings are identified as MW-1, MW-1A, MW-2 and MW-2A and are graphically represented in Appendix A, along with a summary of the methods used to obtain and interpret the data.

Interpreted bedrock depths for each of the soundings were as follows: MW-1 (21.4 ft.), MW-1A (21.9 ft.), MW-2 (1.99 ft.) and MW-2A (5.73 ft). The interpretations of MW-2 and MW-2A were anticipated to be not as sound as MW-1 and MW-1A. Raw data collected at MW-2 and MW-2A were noticeably inconsistent. The actual bedrock depths determined through drilling were 20.5 ft. (MW-1) and 19.0 (MW-2).

MONITORING WELL INSTALLATION

Two monitoring wells were installed at the Alcan facility on September 19, 1991 (Figure 2). Monitoring well installation was performed by Parratt Wolff, Inc. using a Mobile B-57 rig and 8-inch hollow stem augers. Borings MW-1 and MW-2 were drilled to 20.5 and 19.0 feet deep respectively, where the augers met bedrock refusal.

During the drilling process, soil samples were taken continuously using a standard 2-inch OD split-barrel sampler according to Standard Penetration Test Method, ASTM-1586. The split spoon samples obtained during drilling were labeled and sealed in glass jars for volatile organic measurements with a photoionization detector in a stable environment. The split spoon samples were allowed to warm up to room temperature and the air contained above the sample in each jar was screened using an HNU Systems, Inc. 11.7 eV PI 101 photoionization analyzer. The results of the screening with the HNU photoionization analyzer are summarized in Appendix B.

Monitoring well construction consisted of 2-inch PVC screen and riser pipe, set appropriately within the geologic formation to screen the entire thickness of the aquifer. A 0.10-inch slot screen with 1-Q sand was used to allow for permeable communication between the well screen and the aquifer. Bentonite pellets and cement-bentonite grout were used to seal the sand pack from infiltration of surface water. Following well installation, a protective steel casing with a locking cap was set into the grout, and a concrete pad was constructed for added protection. Boring logs and well construction diagrams are provided in Appendix C. The two wells were developed using a combination surge-block and pumping method with a centrifugal pump until the well appeared to be clear of sediment. Following development, each well was allowed to stabilize for two weeks prior to purging and sampling. Measurement of ground water levels were taken prior to purging the wells for sampling and are included on the Sample Data Sheets provided in Appendix D.

SAMPLING

The locations of the ground water monitoring wells, surface water, sediment and surface soil sampling locations are shown in Figure 2 attached. A sampling chronology is provided in Table 1. Sampling was conducted over the course of a 24-hour period on October 5 and 6, 1991, following required NYSDEC protocols as described below. Sample data sheets are provided in Appendix D. Laboratory analysis data sheets are separated into two appendices, Appendix E for ground water and surface water analytical data, and Appendix F for sediment and surface soil analytical data.

Ground Water

Over three volumes of water were purged from each well on October 5, 1991 prior to sampling. Ground water samples were collected from monitoring wells MW-1 and

MW-2 on October 6, 1991. Ground water samples were collected using dedicated PVC bailers and polypropylene rope. Ground water samples were tested for volatile organic compounds, semivolatile organic compounds, pesticides, PCBs and Target Compound List (TCL) metals. These data are provided in summary Tables 2, 4, 6, 8 and Tables E-1 through E-4 (Appendix E).

Surface Water

Six surface water samples were collected from the North Polishing Ponds: SW-1, SW-2, SW-3 and SW-4 from North Polishing Pond No. 2, and SW-5 and SW-6 from North Polishing Pond No. 1. The water samples SW-1, 2, 3, and 4 were collected from a flat-bottomed boat by submerging bottles into the water until filled. The order of the samples taken (downcurrent first) was selected in order to limit the potential for collecting samples contaminated by sediment originating from an upcurrent disturbance (eg. paddling in shallow water). Two of the samples, SW-5 and SW-6, were collected from the shore of North Polishing Pond No. 1 by submerging bottles in the surface water adjacent to the bank. The surface water samples were tested for PCBs only. These data are provided in summary Table 6 and appendix Table E-3.

Leachate

Four leachate samples (L-1, L-2, L-3 and L-4) were to be collected near the main landfill by submerging bottles into leachate seeps emanating from the landfill. However no such seeps were located, and with the agreement of Alcan, samples were instead collected from surface water along the northeastern edge of Marsh No. 1, adjacent to the western edge of the landfill. A slight oily sheen was observed on the surface of the water at locations L-2 and L-4. The leachate samples were composited into one sample (L-1,2,3&4) by using empty bottles to transfer approximately equal amounts of liquid collected from the surface water to the composite sample bottles. The surface water 'leachate' sample was tested for volatile organic compounds, semivolatile organic compounds, organochlorine pesticides, PCBs, and TCL metals. The results are provided in summary Tables 2, 4, 6, 8 and Tables E-1 through E-4 (Appendix E).

Sediment

Two sediment samples (SED-1 and SED-2) were collected from North Polishing Pond No. 2, located adjacent to the former Cold Mill Landfill. In addition, two sediment samples (SED-3 and SED-4) were collected from the west end of Marsh No. 1. The order of sampling, like that of the surface water samples was conducted following the surface water samples in an upcurrent sequence, in order to limit the potential for cross-contamination. A flat-bottom boat with paddles and a sediment coring device was used at each location to obtain a sediment sample up to six inches in thickness from the pond bottom, below the vegetation mat. The device was pushed into the sediment by hand from the edge of the boat, whereupon it was drained, hoisted into the boat and unscrewed to recover the sediment, which was carefully emptied into the sample bottles. Prior to usage and between each sample location, the device was scrubbed, washed and rinsed using an Alconox solution and distilled water. Sediment samples were tested for volatile organic compounds, semivolatile organic compounds, organochlorine pesticides, PCBs, and Target Compound List (TCL) metals. These data are provided in summary Tables 3, 5, 7, 9 and appendix Tables F-1 through F-4.

Surface Soil

Four surface soil samples were collected around the perimeter of the North Polishing Ponds within the 100-year floodplain: SS-3 and SS-4 from North Polishing Pond No. 2, and SS-5 and SS-6 from North Polishing Pond No. 1. (SS-1 and SS-2 were not designated sample locations in this sampling program.) Samples were excavated from zero to six inches depth using a previously unused trowel. The trowel was scrubbed and washed with Alconox solution and rinsed with distilled water prior to and between each sample location to minimize cross-contamination. Soil samples were emptied directly from the trowel into the sample bottles. Surface soil samples were analyzed for PCBs and TCL metals. These data are provide in summary Tables 7, 9 and appendix Tables F-3 and F-4.

SAMPLE MANAGEMENT

The appropriate sample bottles were filled for each sample location, placed in a cooler packed with ice and maintained at a temperature of about 4 degrees Celsius. Bottle requirements and sample holding times were met. Nitric acid preservative was added in the field to the ground water and surface water sample bottles requiring TCL metals analysis.

Aqueous samples for metals analysis were not field filtered and aqueous VOA sample bottles were free of air bubbles.

Information such as color, odor, sediment content of sample, etc. have been recorded on Sample Data Sheets provided in Appendix D. Chain-Of-Custody Forms were appropriately filled out and included with each cooler containing sample bottles being shipped to the laboratory and are provided in Appendix G. Field blanks, trip blanks and MS/MSD samples were collected in accordance with the sampling chronology provided in Table 1.

LABORATORY TESTING

The soil samples, leachate, surface water and sediment collected were sent by overnight delivery service on October 8, 1991 to RECRA Environmental, Inc., a NYSDOH ELAP laboratory. The samples submitted were analyzed as follows:

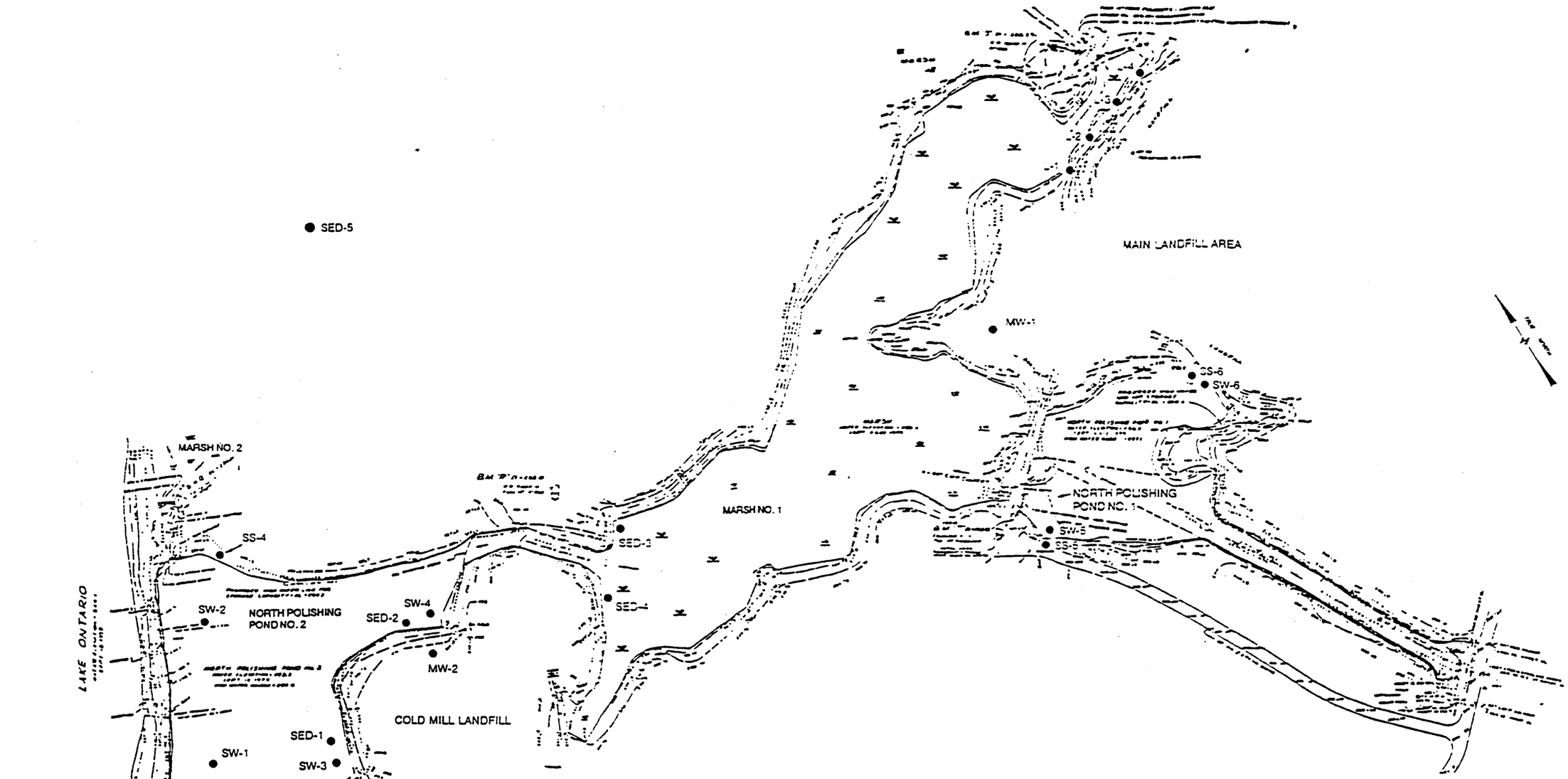
Volatile Organic Analysis - NYSDEC ASP 1989, (Method 89-1), Plus 10 TICs, Superfund Deliverables.

Semivolatile Organic Analysis - NYSDEC ASP (Method 89-2), Plus 20 TICs, Superfund Deliverables.

Organochlorine Pesticides Analysis - NYSDEC ASP 1989 (Method 89-3), Superfund Deliverables.

PCB Analysis - NYSDEC ASP 1989, (Method 89-3), Superfund Deliverables.

Metals Analysis - NYSDEC CLP-M (1989 ASP) Superfund Target Compound List (TCL: 23 metals), Superfund-CLP Inorganics.



Scale : 1 inch = 157.5 feet

REFERENCE: MAP DRAWN BY

CHARLES L CASTER
LICENSED LAND SURVEYOR
LIVERPOOL, N.Y.
SEPTEMBER 20, 1979

Source : Alcan Map #46083

LEGEND:

- MW = MONITORING WELL
- SW = SURFACE WATER
- L = LEACHATE
- SED = SEDIMENT
- SS = SURFACE SOIL

SAMPLE LOCATION MAP

ALCAN ROLLED PRODUCTS CO.
OSWEGO, NY

FIGURE 2
NORTH POLISHING POND
NOS. 1, 2 AND MARSH

23356-001-006

DAMES & MOORE

TABLE ES-1
SUMMARY OF ORGANIC ANALYSES

NORTH POND SEDIMENT SAMPLING PROGRAM
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

Medium	Sample Location	Sample ID	VOA	SVOA	PEST	PCBs
Ground Water	Monitoring Well MW-1	MW-1	2	2	ND	ND
	Monitoring Well MW-2	MW-2	ND	ND	ND	ND
Surface Water	North Polishing Pond No. 2	SW-1				ND
	North Polishing Pond No. 2	SW-2				ND
	Adjacent to 100 Year FP in NPP No. 2	SW-3				ND
	Adjacent to 100 Year FP in NPP No. 2	SW-4				ND
	Adjacent to 100 Year FP in NPP No. 1	SW-5				ND
	Adjacent to 100 Year FP in NPP No. 1	SW-6				ND
Leachate	Four Seeps Near Main Landfill	L-1,2,3&4	1	ND	1	ND
Sediment	North Polishing Pond No. 2	SED-1	4	ND	5	6
	North Polishing Pond No. 2	SED-2	3	ND	4	5
	West End of Marsh No. 1	SED-3	3	3	2	4
	West End of Marsh No. 1	SED-4	3	3	ND	4
	Next to Fish Weir	SED-5	1	3	2	4
Surface Soil	Within 100 Year FP NPP No. 2	SS-3				ND
	Within 100 Year FP NPP No. 2	SS-4				ND
	Within 100 Year FP NPP No. 1	SS-5				ND
	Within 100 Year FP NPP No. 1	SS-6				4

NOTES:

VOA = Volatile Organic Analysis
SVOA = Semivolatile Organic Analysis
PEST = Pesticides
PCB = Polychlorinated Biphenyls
= Not tested
ND = Not Detected
1 = <10 ppb
2 = 10 - 100 ppb
3 = 100 - 1,000 ppb
4 = 1,000 - 10,000 ppb
5 = 10,000 - 100,000 ppb
6 = 100,000 - 1,000,000 ppb
7 = >1,000,000 ppb

TABLE ES-2
SUMMARY OF GROUND WATER AND SURFACE WATER ANALYSIS
VALUES EXCEEDING STANDARDS OR GUIDANCE VALUES

NORTH POND SEDIMENT SAMPLING PROGRAM
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

Analysis	Compound/Element	Class GA Ground Water Standard (6 NYCRR 703.5) (µg/l)	MW-1 (µg/l)	MW-2 (µg/l)	Class D Surface Water Standard* (6 NYCRR 703.5) (µg/l)	L-1,2,3&4 (µg/l)
Volatile Organics	Chloroethane	5	15			
Semivolatile Organics	1,4-Dichlorobenzene	4.7^	4 J			
	1,2-Dichlorobenzene	4.7^	5 J			
TCL Metals	Chromium	50	58.7			
	Copper	200	213			
	Iron	300^	58,600	28,100	300	2,570
	Lead	25	30	27		
	Magnesium	35,000 Ω	36,200			
	Manganese	300^	19,600	6,340		
	Sodium	20,000	48,200			

Note:
* = Applicable to L-1,2,3&4 only.
^ = Standard refers to sum of para (1,4-) and ortho (1,2-) isomers only.
^ ^ = Standard is 500 µg/l for iron and manganese combined.
Ω = Guidance value.

TABLE 1
SAMPLING CHRONOLOGY

NORTH POND SEDIMENT SAMPLING PROGRAM
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

Date	Time	Sampler	Sample Location	Sample Matrix	Sample Type	Sample ID	Sample Analyses					Field Blank*	Trip Blank*	MS/MSD
							VOA	BNA	PEST	PCBs	TCL METALS			
10/5/91	13:05	SRH	Four Seeps Near Main Landfill	L	Composite	L-1,2,3&4	√	√	√	√	√	FB-1	TB-1	
10/5/91	13:40	SRH	Adjacent to 100 Year FP in NPP No. 1	SW	Grab	SW-6				√				
10/5/91	13:40	SRH	Within 100 Year FP NPP No. 1	SS	Grab	SS-6				√	√			
10/5/91	13:50	SRH	Adjacent to 100 Year FP in NPP No. 1	SW	Grab	SW-5				√				
10/5/91	13:50	SRH	Within 100 Year FP NPP No. 1	SS	Grab	SS-5				√	√			
10/5/91	14:05	SRH	Within 100 Year FP NPP No. 2	SS	Grab	SS-4				√	√			
10/5/91	14:15	SRH	Within 100 Year FP NPP No. 2	SS	Grab	SS-3				√	√			
10/5/91	14:50	SRH	North Polishing Pond No. 2	SW	Grab	SW-2				√				
10/5/91	14:55	SRH	North Polishing Pond No. 2	SW	Grab	SW-1				√				
10/5/91	15:00	SRH	Adjacent to 100 Year FP in NPP No. 2	SW	Grab	SW-3				√				
10/5/91	15:05	SRH	Adjacent to 100 Year FP in NPP No. 2	SW	Grab	SW-4				√				
10/5/91	15:30	SRH	North Polishing Pond No. 2	SED	Grab	SED-1	√	√	√	√	√			SED-1MS/MSD
10/5/91	16:00	SRH	North Polishing Pond No. 2	SED	Grab	SED-2	√	√	√	√	√			
10/5/91	16:30	SRH	West End of Marsh No. 1	SED	Grab	SED-3	√	√	√	√	√			
10/5/91	17:00	SRH	West End of Marsh No. 1	SED	Grab	SED-4	√	√	√	√	√			
10/5/91	18:00	SRH	Next to Fish Weir	SED	Grab	SED-5	√	√	√	√	√			
10/6/91	10:35	SRH	Monitoring Well MW-2	GW	Grab	MW-2	√	√	√	√	√	FB-2		MW-1MS/MSD
10/6/91	10:45	SRH	Monitoring Well MW-1	GW	Grab	MW-1	√	√	√	√	√			

Notes:

VOA = Volatile Organic Analysis
BNA = Base/Neutral and Acid Extractable Organics
PEST = Organochlorine Pesticides
SW = Surface Water
L = Leachate
GW = Ground Water
SED = Sediment
SS = Surface Soil
* = Volatile Organics Analysis only
NPP = North Polishing Pond
FP = Flood Plain

SS-1 and SS-2 are not designated sampling locations in this sampling program.

TABLE 2
SUMMARY OF VOLATILE ORGANIC ANALYSIS

NORTH POND SEDIMENT SAMPLING PROGRAM
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

COMPOUND	MW-1 (µg/l)	MW-2 (µg/l)	L-1,2,3&4 (µg/l)
Chloromethane	-	-	-
Bromomethane	-	-	-
Vinyl chloride	-	-	-
Chloroethane	15	-	2 J
Methylene chloride	-	-	-
Acetone	-	-	-
Carbon Disulfide	-	-	-
1,1-Dichloroethylene	-	-	-
1,1-Dichloroethane	-	-	-
1,2-Dichloroethylene (total)	-	-	-
Chloroform	-	-	-
1,2-Dichloroethane	-	-	-
2-Butanone	-	-	-
1,1,1-Trichloroethane	-	-	-
Carbon tetrachloride	-	-	-
Vinyl acetate	-	-	-
Bromodichloromethane	-	-	-
1,2-Dichloropropane	-	-	-
cis-1,3-Dichloropropene	-	-	-
Trichloroethene	-	-	-
Dibromochloromethane	-	-	-
1,1,2-Trichloroethane	-	-	-
Benzene	-	-	-
trans-1,3-Dichloropropene	-	-	-
Bromoform	-	-	-
4-Methyl-2-pentanone	-	-	-
2-Hexanone	-	-	-
Tetrachloroethene	-	-	-
Toluene	-	-	-
1,1,2,2-Tetrachloroethane	-	-	-
Chlorobenzene	3 J	-	-
Ethyl Benzene	-	-	-
Styrene	-	-	-
Total Xylenes	-	-	-
Total TICs and Unknowns	-	-	-

Note:
NYSDEC ASP 1989, (Method 89-1), Plus 10 TICs, Superfund Deliverables
J = Indicates an estimated value.
(-) = Not detected.
TIC = Tentatively Identified Compound

TABLE 2A
SUMMARY OF VOLATILE ORGANIC ANALYSIS

NORTH POND SEDIMENT SAMPLING PROGRAM
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

COMPOUND	Class GA Ground Water Standard (6 NYCRR 703.5) (µg/l)	Class D Surface Water Standard* (6 NYCRR 703.5) (µg/l)	MW-1 (µg/l)	MW-2 (µg/l)	L-1,2,3&4 (µg/l)
Chloromethane			-	-	-
Bromomethane			-	-	-
Vinyl chloride			-	-	-
Chloroethane	5	¥	15	-	2 J
Methylene chloride			-	-	-
Acetone			-	-	-
Carbon Disulfide			-	-	-
1,1-Dichloroethylene			-	-	-
1,1-Dichloroethane			-	-	-
1,2-Dichloroethylene (total)			-	-	-
Chloroform			-	-	-
1,2-Dichloroethane			-	-	-
2-Butanone			-	-	-
1,1,1-Trichloroethane			-	-	-
Carbon tetrachloride			-	-	-
Vinyl acetate			-	-	-
Bromodichloromethane			-	-	-
1,2-Dichloropropane			-	-	-
cis-1,3-Dichloropropene			-	-	-
Trichloroethene			-	-	-
Dibromochloromethane			-	-	-
1,1,2-Trichloroethane			-	-	-
Benzene			-	-	-
trans-1,3-Dichloropropene			-	-	-
Bromoform			-	-	-
4-Methyl-2-pentanone			-	-	-
2-Hexanone			-	-	-
Tetrachloroethene			-	-	-
Toluene			-	-	-
1,1,2,2-Tetrachloroethane			-	-	-
Chlorobenzene	5	50	3 J	-	-
Ethyl Benzene			-	-	-
Styrene			-	-	-
Total Xylenes			-	-	-
Total TICs and Unknowns			-	-	-

Note:

NYSDEC ASP 1989, (Method 89-1), Plus 10 TICs, Superfund Deliverables
J = Indicates an estimated value.
(-) = Not detected.
TIC = Tentatively Identified Compound
* = Applicable to L-1,2,3&4 only.
¥ = For discharge purposes, NYSDEC may establish a guidance value of 50 µg/l or less for substances which may pose a threat to human health.
[ ] = Value exceeds standard.

TABLE 3
SUMMARY OF VOLATILE ORGANIC ANALYSIS

NORTH POND SEDIMENT SAMPLING PROGRAM
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

COMPOUND	SED-1 (µg/kg)	SED-2 (µg/kg)	SED-3 (µg/kg)	SED-4 (µg/kg)	SED-5 (µg/kg)
Chloromethane	-	-	-	-	-
Bromomethane	-	-	-	-	-
Vinyl chloride	-	-	-	-	-
Chloroethane	-	-	-	-	-
Methylene chloride	-	-	-	-	-
Acetone	270 B	240 B	130 B	120 B	-
Carbon Disulfide	1,400	-	-	-	-
1,1-Dichloroethylene	-	-	-	-	-
1,1-Dichloroethane	-	-	-	-	-
1,2-Dichloroethylene (total)	-	-	-	-	-
Chloroform	-	-	-	-	-
1,2-Dichloroethane	-	-	-	-	-
2-Butanone	-	-	-	-	-
1,1,1-Trichloroethane	-	-	-	-	-
Carbon tetrachloride	-	-	-	-	-
Vinyl acetate	-	-	-	-	-
Bromodichloromethane	-	-	-	-	-
1,2-Dichloropropane	-	-	-	-	-
cis-1,3-Dichloropropene	-	-	-	-	-
Trichloroethene	-	-	-	-	-
Dibromochloromethane	-	-	-	-	-
1,1,2-Trichloroethane	-	-	-	-	-
Benzene	-	-	-	-	-
trans-1,3-Dichloropropene	-	-	-	-	-
Bromoform	-	-	-	-	-
4-Methyl-2-pentanone	-	-	-	-	-
2-Hexanone	-	-	-	-	-
Tetrachloroethene	-	-	-	-	-
Toluene	-	-	-	-	-
1,1,2,2-Tetrachloroethane	-	-	-	-	-
Chlorobenzene	-	-	-	3 J	3 J
Ethyl Benzene	-	-	-	-	-
Styrene	-	-	-	-	-
Total Xylenes	-	-	-	-	-
Total TICs and Unknowns	267 J	274 J	-	-	-

Note:
NYSDEC ASP 1989, (Method 89-1), Plus 10 TICs, Superfund Deliverables
J = Indicates an estimated value.
(-) = Not detected.
TIC = Tentatively Identified Compound
B = Compound also found in Method Blank.

TABLE 4
SUMMARY OF SEMIVOLATILE ORGANIC ANALYSIS

NORTH POND SEDIMENT SAMPLING PROGRAM
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

COMPOUND	MW-1 (µg/l)	MW-2 (µg/l)	L-1,2,3&4 (µg/l)
Phenol	-	-	-
bis(2-Chloroethyl) ether	-	-	-
2-Chlorophenol	-	-	-
1,3-Dichlorobenzene	4 J	-	-
1,4-Dichlorobenzene	4 J	-	-
Benzyl alcohol	-	-	-
1,2-Dichlorobenzene	5 J	-	-
2-Methylphenol	-	-	-
bis(2-Chloroisopropyl) ether	-	-	-
4-Methylphenol	-	-	-
N-Nitroso-di-n-propylamine	-	-	-
Hexachloroethane	-	-	-
Nitrobenzene	-	-	-
Isophorone	-	-	-
2-Nitrophenol	-	-	-
2,4-Dimethylphenol	-	-	-
Benzoic acid	-	-	-
bis(2-Chloroethoxy) methane	-	-	-
2,4-Dichlorophenol	-	-	-
1,2,4-Trichlorobenzene	-	-	-
Naphthalene	-	-	-
4-Chloroaniline	-	-	-
Hexachlorobutadiene	-	-	-
4-Chloro-3-methylphenol	-	-	-
2-Methylnaphthalene	-	-	-
Hexachlorocyclopentadiene	-	-	-
2,4,6-Trichlorophenol	-	-	-
2,4,5-Trichlorophenol	-	-	-
2-Chloronaphthalene	-	-	-
2-Nitroaniline	-	-	-
Dimethyl phthalate	-	-	-
Acenaphthylene	-	-	-
2,6-Dinitrotoluene	-	-	-
3-Nitroaniline	-	-	-
Acenaphthene	-	-	-
2,4-Dinitrophenol	-	-	-
4-Nitrophenol	-	-	-
Dibenzofuran	-	-	-

TABLE 4 (CONTINUED)
SUMMARY OF SEMIVOLATILE ORGANIC ANALYSIS

NORTH POND SEDIMENT SAMPLING PROGRAM
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

COMPOUND (cont)	MW-1 µg/l	MW-2 µg/l	L-1,2,3&4 µg/l
2,4-Dinitrotoluene	-	-	-
Diethylphthalate	-	-	-
4-Chlorophenyl-phenylether	-	-	-
Fluorene	-	-	-
4-Nitroaniline	-	-	-
4,6-Dinitro-2-methylphenol	-	-	-
N-nitrosodiphenylamine	-	-	-
4-Bromophenyl-phenylether	-	-	-
Hexachlorobenzene	-	-	-
Pentachlorophenol	-	-	-
Phenanthrene	-	-	-
Anthracene	-	-	-
Di-n-butylphthalate	-	-	-
Fluoranthene	-	-	-
Pyrene	-	-	-
Butylbenzylphthalate	-	-	-
3.3'-Dichlorobenzidine	-	-	-
Benz(a)anthracene	-	-	-
Chrysene	-	-	-
bis(2-ethylhexyl) phthalate	-	-	-
Di-n-octyl phthalate	-	-	-
Benzo(b)fluoranthene	-	-	-
Benzo(k)fluoranthene	-	-	-
Benzo(a)pyrene	-	-	-
Indeno (1,2,3-cd)pyrene	-	-	-
Dibenz (a,h)anthracene	-	-	-
Benzo(g,h,i)perylene	-	-	-
Total TICs and Unknowns	13 J	18 J	-

Note:

NYSDEC ASP 1989 (Method 89-2), Plus 20 TICs, Superfund Deliverables
J = Indicates an estimated value.
(-) = Not detected.
TIC = Tentatively Identified Compound

TABLE 4A
SUMMARY OF SEMIVOLATILE ORGANIC ANALYSIS

NORTH POND SEDIMENT SAMPLING PROGRAM
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

COMPOUND	Class GA Ground Water Standard (6 NYCRR 703.5) (µg/l)	Class D Surface Water Standard* (6 NYCRR 703.5) (µg/l)	MW-1 (µg/l)	MW-2 (µg/l)	L-1,2,3&4 (µg/l)
Phenol			-	-	-
bis(2-Chloroethyl) ether			-	-	-
2-Chlorophenol			-	-	-
1,3-Dichlorobenzene	5	50	4 J	-	-
1,4-Dichlorobenzene	4.7^	50	4 J	-	-
Benzyl alcohol			-	-	-
1,2-Dichlorobenzene	4.7^	50	5 J	-	-
2-Methylphenol			-	-	-
bis(2-Chloroisopropyl) ether			-	-	-
4-Methylphenol			-	-	-
N-Nitroso-di-n-propylamine			-	-	-
Hexachloroethane			-	-	-
Nitrobenzene			-	-	-
Isophorone			-	-	-
2-Nitrophenol			-	-	-
2,4-Dimethylphenol			-	-	-
Benzoic acid			-	-	-
bis(2-Chloroethoxy) methane			-	-	-
2,4-Dichlorophenol			-	-	-
1,2,4-Trichlorobenzene			-	-	-
Naphthalene			-	-	-
4-Chloroaniline			-	-	-
Hexachlorobutadiene			-	-	-
4-Chloro-3-methylphenol			-	-	-
2-Methylnaphthalene			-	-	-
Hexachlorocyclopentadiene			-	-	-
2,4,6-Trichlorophenol			-	-	-
2,4,5-Trichlorophenol			-	-	-
2-Chloronaphthalene			-	-	-
2-Nitroaniline			-	-	-
Dimethyl phthalate			-	-	-
Acenaphthylene			-	-	-
2,6-Dinitrotoluene			-	-	-
3-Nitroaniline			-	-	-
Acenaphthene			-	-	-
2,4-Dinitrophenol			-	-	-
4-Nitrophenol			-	-	-
Dibenzofuran			-	-	-

TABLE 4A (CONTINUED)
SUMMARY OF SEMIVOLATILE ORGANIC ANALYSIS

NORTH POND SEDIMENT SAMPLING PROGRAM
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

COMPOUND (cont)	Class GA Ground Water Standard (6 NYCRR 703.5) (µg/l)	Class D Surface Water Standard* (6 NYCRR 703.5) (µg/l)	MW-1 µg/l	MW-2 µg/l	L-1,2,3&4 µg/l
2,4-Dinitrotoluene			-	-	-
Diethylphthalate			-	-	-
4-Chlorophenyl-phenylether			-	-	-
Fluorene			-	-	-
4-Nitroaniline			-	-	-
4,6-Dinitro-2-methylphenol			-	-	-
N-nitrosodiphenylamine			-	-	-
4-Bromophenyl-phenylether			-	-	-
Hexachlorobenzene			-	-	-
Pentachlorophenol			-	-	-
Phenanthrene			-	-	-
Anthracene			-	-	-
Di-n-butylphthalate			-	-	-
Fluoranthene			-	-	-
Pyrene			-	-	-
Butylbenzylphthalate			-	-	-
3.3'-Dichlorobenzidine			-	-	-
Benz(a)anthracene			-	-	-
Chrysene			-	-	-
bis(2-ethylhexyl) phthalate			-	-	-
Di-n-octyl phthalate			-	-	-
Benzo(b)fluoranthene			-	-	-
Benzo(k)fluoranthene			-	-	-
Benzo(a)pyrene			-	-	-
Indeno (1,2,3-cd)pyrene			-	-	-
Dibenz (a,h)anthracene			-	-	-
Benzo(g,h,i)perylene			-	-	-
Total TICs and Unknowns			13 J	18 J	-

Note:
NYSDEC ASP 1989 (Method 89-2), Plus 20 TICs, Superfund Deliverables
J = Indicates an estimated value.
(-) = Not detected.
TIC = Tentatively Identified Compound
^ = Standard refers to sum of para (1,4-) and ortho (1,2-) isomers only.
* = Applicable to L-1,2,3&4 only.
[ ] = Value exceeds standard.

TABLE 5
SUMMARY OF SEMIVOLATILE ORGANIC ANALYSIS

NORTH POND SEDIMENT SAMPLING PROGRAM
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

COMPOUND	SED-1 (µg/kg)	SED-2 (µg/kg)	SED-3 (µg/kg)	SED-4 (µg/kg)	SED-5 (µg/kg)
Phenol	-	-	-	-	-
bis(2-Chloroethyl) ether	-	-	-	-	-
2-Chlorophenol	-	-	-	-	-
1,3-Dichlorobenzene	-	-	-	-	-
1,4-Dichlorobenzene	-	-	-	-	-
Benzyl alcohol	-	-	-	-	-
1,2-Dichlorobenzene	-	-	-	-	-
2-Methylphenol	-	-	-	-	-
bis (2-Chloroisopropyl) ether	-	-	-	-	-
4-Methylphenol	-	-	-	-	-
N-Nitroso-di-n-propylamine	-	-	-	-	-
Hexachloroethane	-	-	-	-	-
Nitrobenzene	-	-	-	-	-
Isophorone	-	-	-	-	-
2-Nitrophenol	-	-	-	-	-
2,4-Dimethylphenol	-	-	-	-	-
Benzoic acid	-	-	-	-	-
bis(2-Chloroethoxy) methane	-	-	-	-	-
2,4-Dichlorophenol	-	-	-	-	-
1,2,4-Trichlorobenzene	-	-	-	-	-
Naphthalene	-	-	-	-	-
4-Chloroaniline	-	-	-	-	-
Hexachlorobutadiene	-	-	-	-	-
4-Chloro-3-methylphenol	-	-	-	-	-
2-Methylnaphthalene	-	-	-	-	-
Hexachlorocyclopentadiene	-	-	-	-	-
2,4,6-Trichlorophenol	-	-	-	-	-
2,4,5-Trichlorophenol	-	-	-	-	-
2-Chloronaphthalene	-	-	-	-	-
2-Nitroaniline	-	-	-	-	-
Dimethyl phthalate	-	-	-	-	-
Acenaphthylene	-	-	-	-	-
2,6-Dinitrotoluene	-	-	-	-	-
3-Nitroaniline	-	-	-	-	-
Acenaphthene	-	-	-	-	-
2,4-Dinitrophenol	-	-	-	-	-
4-Nitrophenol	-	-	-	-	-
Dibenzofuran	-	-	-	-	-

TABLE 5 (CONTINUED)
SUMMARY OF SEMIVOLATILE ORGANIC ANALYSIS

NORTH POND SEDIMENT SAMPLING PROGRAM
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

COMPOUND (cont)	SED-1 (µg/kg)	SED-2 (µg/kg)	SED-3 (µg/kg)	SED-4 (µg/kg)	SED-5 (µg/kg)
2,4-Dinitrotoluene	-	-	-	-	-
Diethylphthalate	-	-	-	-	-
4-Chlorophenyl phenyl ether	-	-	-	-	-
Fluorene	-	-	-	-	-
4-Nitroaniline	-	-	-	-	-
4,6-Dinitro-2-methylphenol	-	-	-	-	-
N-nitrosodiphenylamine	-	-	-	-	-
4-Bromophenyl-phenylether	-	-	-	-	-
Hexachlorobenzene	-	-	-	-	-
Pentachlorophenol	-	-	-	-	-
Phenanthrene	-	-	-	-	-
Anthracene	-	-	-	-	-
Di-n-butylphthalate	-	-	-	-	-
Fluoranthene	-	-	-	-	-
Pyrene	-	-	-	-	-
Butylbenzylphthalate	-	-	-	-	-
3,3'-Dichlorobenzidine	-	-	-	-	-
Benzo(a)anthracene	-	-	-	-	-
Chrysene	-	-	-	-	54J
bis(2-Ethylhexyl) phthalate	-	-	140 J	970J	490J
Di-n-octyl phthalate	-	-	-	-	-
Benzo(b)fluoranthene	-	-	-	-	-
Benzo(k)fluoranthene	-	-	-	-	-
Benzo(a)pyrene	-	-	-	-	-
Indeno (1,2,3-cd)pyrene	-	-	-	-	-
Dibenz (a,h)anthracene	-	-	-	-	-
Benzo(g,h,i)perylene	-	-	-	-	-
Total TICs and Unknowns	873,400 J	398,200 J	108,400 J	84,300 J	67,390 J
Total TICs and UnknownsΣ	120,000 B J	-	-	22,000 B J	3,300 B J

Note:

NYSDEC ASP 1989 (Method 89-2), Plus 20 TICs, Superfund Deliverables
J = Indicates an estimated value.
(-) = Not detected.
TIC = Tentatively Identified Compound
B = Compound also found in method blank.
Σ = TICs and Unkowns found in the sample at levels greater than 5 times the same TICs found in the method blank.

TABLE 6
PESTICIDE/PCB ANALYSIS

NORTH POND SEDIMENT SAMPLING PROGRAM
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

COMPOUND	MW-1 (µg/l)	MW-2 (µg/l)	L-1,2,3&4 (µg/l)	SW-1 (µg/l)	SW-2 (µg/l)	SW-3 (µg/l)	SW-4 (µg/l)	SW-5 (µg/l)	SW-6 (µg/l)
alpha-BHC	-	-	-						
beta-BHC	-	-	-						
delta-BHC	-	-	-						
gamma-BHC (Lindane)	-	-	-						
Heptachlor	-	-	-						
Aldrin	-	-	-						
Heptachlor epoxide	-	-	-						
Endosulfan I	-	-	-						
Dieldrin	-	-	-						
4,4'-DDE	-	-	-						
Endrin	-	-	-						
Endosulfan II	-	-	-						
4,4'-DDD	-	-	-						
Endosulfan sulfate	-	-	0.067 J						
4,4'-DDT	-	-	-						
Methoxychlor	-	-	-						
Endrin ketone	-	-	-						
alpha-Chlordane	-	-	-						
gamma-Chlordane	-	-	-						
Toxaphene	-	-	-						
AROCLOR-1016	-	-	-	-	-	-	-	-	-
AROCLOR-1221	-	-	-	-	-	-	-	-	-
AROCLOR-1232	-	-	-	-	-	-	-	-	-
AROCLOR-1242	-	-	-	-	-	-	-	-	-
AROCLOR-1248	-	-	-	-	-	-	-	-	-
AROCLOR-1254	-	-	-	-	-	-	-	-	-
AROCLOR-1260	-	-	-	-	-	-	-	-	-

Note:
NYSDEC ASP 1989, (Method 89-3), Superfund Deliverables.
- = Not Applicable. Samples were not tested for these compounds.
(-) = Compound analyzed for but not detected.
J = Indicates an estimated value.

TABLE 6A
PESTICIDE/PCB ANALYSIS

NORTH POND SEDIMENT SAMPLING PROGRAM
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

COMPOUND	Class GA Ground Water Standard (6 NYCRR 703.5) (µg/l)	Class D Surface Water Standard* (6 NYCRR 703.5) (µg/l)	MW-1 (µg/l)	MW-2 (µg/l)	L-1,2,3&4 (µg/l)	SW-1 (µg/l)	SW-2 (µg/l)	SW-3 (µg/l)	SW-4 (µg/l)	SW-5 (µg/l)	SW-6 (µg/l)
alpha-BHC			-	-	-						
beta-BHC			-	-	-						
delta-BHC			-	-	-						
gamma-BHC (Lindane)			-	-	-						
Heptachlor			-	-	-						
Aldrin			-	-	-						
Heptachlor epoxide			-	-	-						
Endosulfan I			-	-	-						
Dieldrin			-	-	-						
4,4'-DDE			-	-	-						
Endrin			-	-	-						
Endosulfan II			-	-	-						
4,4'-DDD			-	-	-						
Endosulfan sulfate	x	x	-	-	0.067 J						
4,4'-DDT			-	-	-						
Methoxychlor			-	-	-						
Endrin ketone			-	-	-						
alpha-Chlordane			-	-	-						
gamma-Chlordane			-	-	-						
Toxaphene			-	-	-						
AROCLOR-1016			-	-	-	-	-	-	-	-	-
AROCLOR-1221			-	-	-	-	-	-	-	-	-
AROCLOR-1232			-	-	-	-	-	-	-	-	-
AROCLOR-1242			-	-	-	-	-	-	-	-	-
AROCLOR-1248			-	-	-	-	-	-	-	-	-
AROCLOR-1254			-	-	-	-	-	-	-	-	-
AROCLOR-1260			-	-	-	-	-	-	-	-	-

Note:
NYSDEC ASP 1989, (Method 89-3), Superfund Deliverables.
- = Not Applicable. Samples were not tested for these compounds.
(-) = Compound analyzed for but not detected.
J = Indicates an estimated value.
x = No standard or guidance value exists for this compound.
* = Applicable to L-1,2,3&4 only.

TABLE 7
SUMMARY OF PESTICIDES/PCB ANALYSIS

NORTH POND SEDIMENT SAMPLING PROGRAM
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

COMPOUND	SED-1 (µg/kg)	SED-2 (µg/kg)	SED-3 (µg/kg)	SED-4 (µg/kg)	SED-5 (µg/kg)	SS-3 (µg/kg)	SS-4 (µg/kg)	SS-5 (µg/kg)	SS-6 (µg/kg)
alpha-BHC	-	-	-	-	-				
beta-BHC	-	-	-	-	-				
delta-BHC	-	-	-	-	-				
gamma-BHC (Lindane)	-	-	-	-	-				
Heptachlor	-	-	-	-	-				
Aldrin	-	-	-	-	-				
Heptachlor epoxide	-	-	-	-	-				
Endosulfan I	-	-	-	-	-				
Dieldrin	280 J	-	-	-	-				
4,4'-DDE	-	-	-	-	-				
Endrin	1,300 J	800 J	-	-	-				
Endosulfan II	140 J	-	-	-	-				
4,4'-DDD	-	-	-	-	-				
Endosulfan sulfate	-	-	-	-	-				
4,4'-DDT	3,400	550	-	-	19 J				
Methoxychlor	4,400 J	890	27 J	-	-				
Endrin ketone	1,300 J	-	-	-	-				
alpha-chlordane	-	-	-	-	-				
gamma-chlordane	-	-	-	-	-				
Toxaphene	-	-	-	-	-				
AROCLOR-1016	-	-	-	-	-	-	-	-	-
AROCLOR-1221	-	-	-	-	-	-	-	-	-
AROCLOR-1232	-	-	-	-	-	-	-	-	-
AROCLOR-1242	170,000	58,000	4,000	1,100	1,100	-	-	-	-
AROCLOR-1248	-	-	-	-	-	-	-	-	-
AROCLOR-1254	-	-	-	-	-	-	-	-	-
AROCLOR-1260	-	-	-	-	-	-	-	-	2,400

Note:
NYSDEC ASP 1989, (Method 89-3), Superfund Deliverables.
- = Not Applicable. Samples were Not tested for these compounds.
(-) = Compound analyzed but not detected.
J = Indicates an estimated value.

TABLE 8
SUMMARY OF METALS ANALYSIS

NORTH POND SEDIMENT SAMPLING PROGRAM
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

ELEMENT	MW-1 (µg/l)	MW-2 (µg/l)	L-1,2,3&4 (µg/l)
Aluminum	40,700	16,000	108 B
Antimony	-	-	-
Arsenic	9.0 B	6.0 B	-
Barium	359	238	117 B
Beryllium	-	-	-
Cadmium	-	-	-
Calcium	99,100	101,000	61,900
Chromium	58.7	24.4	-
Cobalt	25.2 B	-	-
Copper	213	132	-
Iron	58,600	28,100	2,570
Lead	30.0	27.0	21.0
Magnesium	36,200	25,200	19,800
Manganese	19,600	6,340	3,370
Mercury	-	-	-
Nickel	350	114	57.7
Potassium	11,600	8,730	7,970
Selenium	-	-	-
Silver	29.7	7.8 B	-
Sodium	48,200	18,900	50,500
Thallium	-	-	-
Vanadium	61.0	-	-
Zinc	164	92.0	24.1

Note:

NYSDEC CLP-M (1989 ASP) Superfund Target Compound List (TCL:23 metals); Superfund-CLP Inorganics

B = Indicates a value greater than or equal to the instrument detection limit but less than the contract required detection limit.

(-) = Not detected.

TABLE 8A
SUMMARY OF METALS ANALYSIS

NORTH POND SEDIMENT SAMPLING PROGRAM
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

ELEMENT	Class GA Ground Water Standard (6 NYCRR 703.5) (µg/l)	Class D Surface Water Standard* (6 NYCRR 703.5) (µg/l)	MW-1 (µg/l)	MW-2 (µg/l)	L-1,2,3&4 (µg/l)
Aluminum			40,700	16,000	108 B
Antimony			-	-	-
Arsenic	25	360	9.0 B	6.0 B	-
Barium	1,000		359	238	117 B
Beryllium			-	-	-
Cadmium	10	†	-	-	-
Calcium			99,100	101,000	61,900
Chromium	50	†	58.7	24.4	-
Cobalt		110 Ω	25.2 B	-	-
Copper	200	†	213	132	-
Iron	300^	300	58,600	28,100	2,570
Lead	25	†	30.0	27.0	21.0
Magnesium	35,000 Ω		36,200	25,200	19,800
Manganese	300^		19,600	6,340	3,370
Mercury	2	0.2 Ω	-	-	-
Nickel	†	†	350	114	57.7
Potassium			11,600	8,730	7,970
Selenium	10		-	-	-
Silver	50	†	29.7	7.8 B	-
Sodium	20,000		48,200	18,900	50,500
Thallium	4 Ω	20	-	-	-
Vanadium		190	61.0	-	-
Zinc	300	†	164	92.0	24.1

Note:

NYSDEC CLP-M (1989 ASP) Superfund Target Compound List (TCL:23 metals); Superfund-CLP Inorganics

B = Indicates a value greater than or equal to the instrument detection limit but less than the contract required detection limit.

* = Applicable to L-1,2,3&4 only.

(-) = Not detected.

- = No standard or guidance value exists.

† = Refer to NYCRR Part 703.5, Sept., 1991 (Appendix B).

^ = Standard is 500 µg/l for iron and manganese combined.

Ω = Guidance value.

[ ] = Value exceeds standard or guidance value.

TABLE 9
SUMMARY OF METALS ANALYSIS

NORTH POND SEDIMENT SAMPLING PROGRAM
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

ELEMENT	SED-1 (mg/kg)	SED-2 (mg/kg)	SED-3 (mg/kg)	SED-4 (mg/kg)	SED-5 (mg/kg)	SS-3 (mg/kg)	SS-4 (mg/kg)	SS-5 (mg/kg)	SS-6 (mg/kg)
Aluminum	16,200	16,200	9,400	11,300	19,800	7,540	2,420	11,700	10,400
Antimony	-	-	-	-	-	-	2.2 B	-	-
Arsenic	-	6.0 B	-	-	4.5	5.2	4.0 B	2.6 B	-
Barium	166 B	107 B	51.6 B	110	121	51.0 B	89.4	41.2 B	50.1 B
Beryllium	-	-	-	-	-	-	-	-	-
Cadmium	-	-	-	-	-	-	-	-	-
Calcium	18,000	10,700	5,810	5,760	3,930	1,530	2,510	3,720	11,000
Chromium	54.0	43.5	7.2	-	30.6	9.3	-	14.2	16.0
Cobalt	-	-	-	-	11.3 B	-	-	6.3 B	-
Copper	167	133	7.8 B	5.0 B	25.0	10.2	16.0	45.7	41.0
Iron	24,500	18,100	1,980	1,420	26,000	8,160	2,230	15,600	10,700
Lead	135	118	12.8	13.9	18.5	44.2	84.4	13.8	57.0
Magnesium	8,160	6,530	1,020 B	1050 B	5,030	1,300 B	452 B	4,900	3,900
Manganese	495	434	164	58.4	425	454	50.5	458	301
Mercury	-	-	0.14	-	-	0.16	2.3	-	-
Nickel	41.5 B	32.9 B	7.7 B	-	28.5	19.8	-	22.8	16.9 B
Potassium	1,390 B	2,280 B	285 B	355 B	3,580	576 B	242 B	1,410 B	1,650 B
Selenium	-	-	-	-	-	-	-	-	-
Silver	7.1	5.2	-	-	-	2.3 B	3.7 B	1.7	-
Sodium	-	-	-	-	-	-	-	-	-
Thallium	-	-	-	-	-	-	-	-	-
Vanadium	37.3 B	36.8 B	-	-	43.2	19.3	14.0 B	17.3	22.1 B
Zinc	341	259	16.0	19.2	55.6	48.0	44.6	46.8	48.2

Notes:

NYSDEC CLP-M (1989 ASP) Superfund Target Compound List (TCL:23 metals); Superfund-CLP Inorganics

B = Indicates a value greater than or equal to the instrument detection limit but less than the contract required detection limit.

(-) = Indicates element was analyzed for but not detected.

APPENDIX B

SITE ECOLOGY

Common Palustrine Wetland Plants

Giant Bur-reed	*(Sparganium eurycarpum)*
Frunged Loosestrife	*(Lysimachia ciliata)*
Swamp Loosestrife	*(Decodon verticillutus)*
Purple Loosestrife	*(Lythrum salicaria)*
Buttonbush	*(Cephalanthus occidentialis)*
Swamp Lousewort	*(Pedicularis Lanceplata)*
Canada Hemlock	*(Tsuga canadensis)*
Arrow-arum	*(Peltandra virginica)*
Arrowheads	*(Sagittaria spp.)*
Cattails	*(Typha spp.)*
Duckweeds	*(Lemna spp.)*
Bulrushes	*(Scirpus spp.)*
Water Lillies	*(Nymphaea spp.)*

Common Wetland Animals

Muskrat	*(Ondatra zibethicus zibethicus)*
Raccoon	*(Procyon lotor lotor)*
Beaver	*(Castor canadensis)*
Mink	*(Mustela vison)*
Silver Haired Bat	*(Lasionycteris noctivagans)*
Little Brown Myotis	*(Myotis lucifugous)*
Big Brown Bat	*(Eptesicus fuscus fuscus)*

Common Wetlands Fish

Carp	*(Cyprinus carpio)*
Goldfish	*(Carassius auratus)*
Sunfish	*(Lepomis spp.)*
Large-mounted Bass	*(Micropterus salmoides)*

Common Wetland Birds

Great Blue Heron	*(Area herodias)*
Green Heron	*(Butorides striatus)*
Belted Kingfisher	*(Megaceryle alcyon)*
Common Snipe	*(Capella gallinoga)*
Common Crow	*(Corvus brachyrhynchos)*
Turkey Vulture	*(Cathartes aura)*
Red-winged Blackbird	*(Agelaius phaeniceus)*
Marsh Hawk	*(Dircus cyaneus)*
Tree Swallow	*(Iridoprocne bicolor)*
Mallard	*(Anas platyrhynchos)*
Black Duck	*(Anas rubripes)*
Wood Duck	*(Aix sponsa)*
Green-winged Teal	*(Anas crecca)*
Canada Goose	*(Branta canadensis)*

Other Waterfowl Common to Lake Ontario, Especially During Migration

Whistling Swan	*(Olor columbianus)*
American Coot	*(Fulica americana)*
Gadwall	*(Anas strepera)*
White-winged Scooter	*(Melanitta deglandi)*
Ring-necked Duck	*(Aytha collaris)*
Greater Scaup	*(Aythya marila)*
Lesser Scaup	*(Aytha affinis)*
Common Goldeneye	*(Bucephala clangula)*
Bufflehead	*(Bucephala albeola)*
Oldsquaw	*(Clangula hyemalis)*
Hooded Merganser	*(Lophodytes cucullatus)*
Common Merganser	*(Mergus merganser)*
Red-breasted Merganser	*(Mergus serrator)*

Wetlands Reptiles and Amphibians

Common Snapping Turtle	*(Chelydra seperntina sepentina)*
Midland Painted Turtle	*(Chrysemys picta marginata)*
Northern Water Snake	*(Nerodia sipedon sipedon)*
Spring Peeper Frog	*(Hyla crucifer)*
Bullfrog	*(Rana catesbeiana)*
Green Frog	*(Rana clamitans malanota)*
Northern Leopard Frog	*(Rana pipiens)*
Red-backed Salamander	*(Plethodon cinerius cinerius)*
Spotted Salamander	*(Ambystoma maculatum)*
Red-spotted Newt	*(Notophthalmus viridescens viridescens)*

Ground Cover Plants of the Upland Forest

Doll's Eye	*(Acteae alba)*
Solomon's Seal	*(Polygonatum biflorum)*
False Solomon's Seal	*(Smilacina racemosa)*
Red Trillium	*(Trillium erectum)*
White Trilium	*(Trillium grandiglorum)*
Painted Trillium	*(Trillium undulatum)*
Ground Cedar	*(Lycopodium tristachyum)*
Poison Ivy	*(Rhus toxicodendron)*
Beech Drops	*(Epifagus virginiana)*
Jack-in-the-Pulpit	*(Arisaema triphyllum)*
Indian Cucumber Root	*(Medeola virginiana)*

Understory Bushes and Small Trees of the Upland Forest

Shadbush	*(Amelanchier arborea)*
Striped Maple	*(Acer pensylvanicum)*
Canada Yew	*(Taxus canadensis)*
Maple-leaved Viburnum	*(Viburnum acerifolium)*
Purple-flowering Raspbberry	*(Rubus odoratus)*

Canopy Layer Trees of the Upland Forest

Eastern (Canada) Hemlock	*(Tsuga canadensis)*
Yellow Birch	*(Betula alleghaniensis)*
American Beech	*(Fagus grandifolia)*
Northern Red Oak	*(Quercus rubra)*
Wild Black Cherry	*(Prunua serotina)*
Red Maple	*(Acer rubrum)*
Sugar Maple	*(Acer saccharum)*

Perching and Woodland Birds

Ruffed Grouse	*(Bonasa umbellus)*
Downy Woodpecker	*(Picoides pubescens)*
Hairy Woodpecker	*(Picoides villosus)*
Red-bellied Woodpecker	*(Melanerous carolinus)*
Blue Jay	*(Cyanocitta cristata)*
American Robin	*(Turdus migratorius)*
Northern Cardinal	*(Cardinalis cardinalis)*
Song Sparrow	*(Melospiza melodia)*
Brown Creeper	*(Certhia familiaris)*

Common Shorebirds of Lake Ontario

Great Black-backed Gull	*(Larus marinus)*
Herring Gull	*(Larus argentatus)*
Ring-billed Gull	*(Larus delewarensis)*
Common Tern	*(Sterna hirundo)*
American Bittern	*(Botaurus lentiginosus)*

APPENDIX C

BORING LOGS

ALCAN MONITORING WELL INSTALLATION

OSWEGO, NEW YORK

parratt wolff inc
FISHER RD., EAST SYRACUSE, N.Y. 13057
TELEPHONE AREA CODE 315/437-1429
800/782-7260 FAX 315/437-1770

September 24, 1993

Mr. Stewart Holtzclaw
Dames and Moore
Suite 108C
200 Salina Street
Liverpool, New York 13088

Re: 9316
Alcan Monitoring Well Installation
Oswego, New York

Dear Mr. Holtzclaw:

Enclosed are the logs of a groundwater monitoring well abandonment, a replacement for the abandoned well and a new well installed for you at this site.

Soil samples from the new well have been delivered to your office under separate cover.

The well locations were established in the field by you. Drilling, sampling and the well installation were done at your direction.

Thank you for this opportunity to work with you.

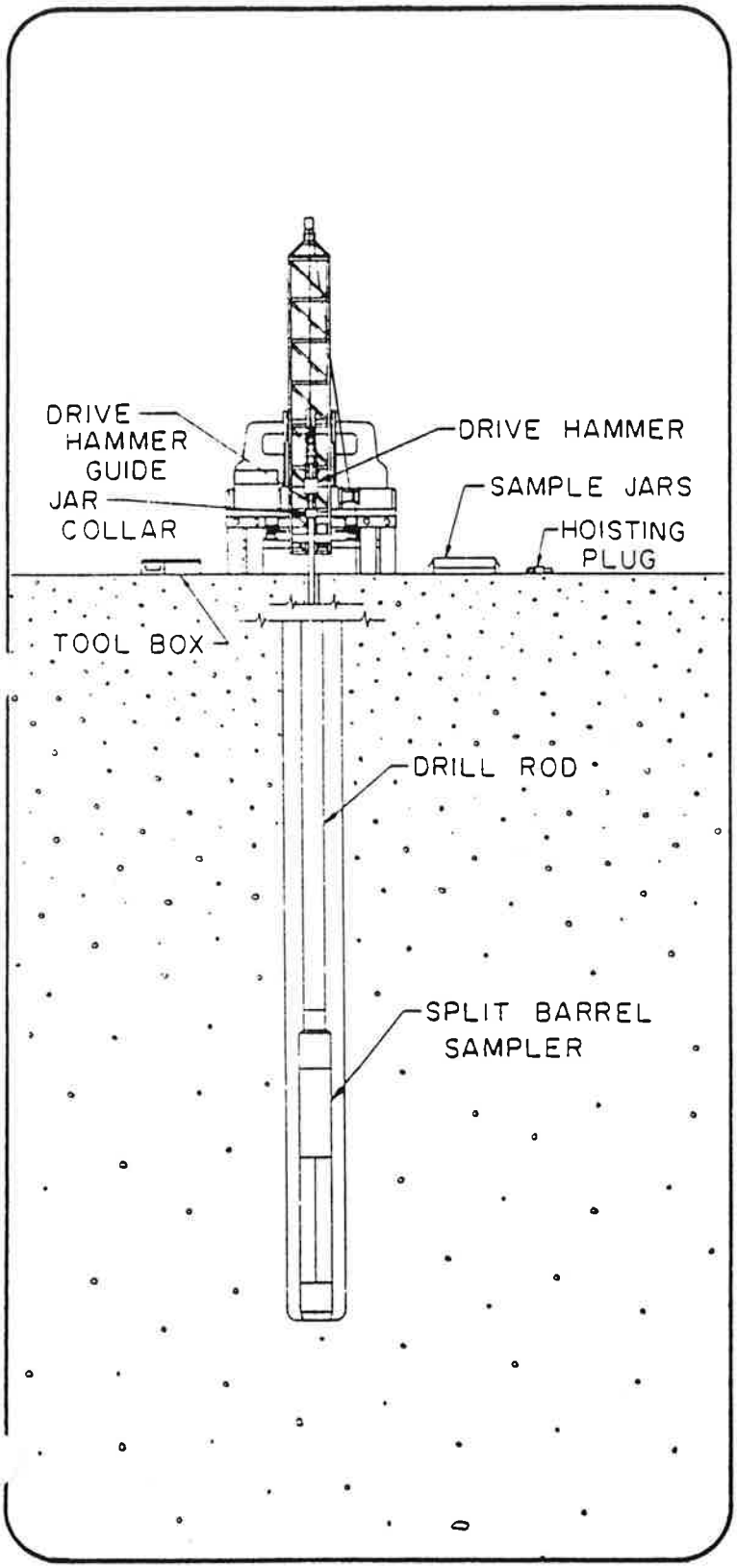
Very truly yours,

PARRATT - WOLFF, INC.

Steffen Wolff
SW/lc
encs:

SOIL SAMPLING - METHODS

parratt wolff inc
FISHER RD., EAST SYRACUSE, N.Y. 13057
TELEPHONE AREA CODE 315/437-1429
800/782-7260 FAX 315/437-1770



Split barrel sampling

The following excerpts are from "Standard Method for penetration test and split-barrel sampling of soils."[1] (ASTM designation: D-1586-67 AASHO Designation: T-206-70.)

1. Scope

1.1 This method describes a procedure for using a split-barrel sampler to obtain respresentative samples of soil for identification purposes and other laboratory tests, and to obtain a measure of the resistance of the soil to penetration of the sampler.

2. Apparatus

2.1 Drilling Equipment – Any drilling equipment shall be acceptable that provides a reasonably clean hole before insertion of the sampler to ensure that the penetration test is performed on undisturbed soil, and that will permit the driving of the sampler to obtain the sample and penetration record in accordance with the procedure described in 3. Procedure. To avoid "whips" under the blows of the hammer, it is recommended that the drill rod have stiffness equal to or greater than the A-rod. An "A" rod is a hollow drill rod or "steel" having an outside diameter of 1-5/8 in. or 41.2 mm and an inside diameter of 1-1/8 in. or 28.5 mm, through which the rotary motion of drilling is transferred from the drilling motor to the cutting bit. A stiffer drill rod is suggested for holes deeper than 50 ft (15m). The hole shall be limited in diameter to between 2-1/4 and 6 in. (57.2 and 152mm).

2.2 Split-Barrel Sampler – The sampler shall be constructed with the dimensions indicated (in Fig. 1.) The drive shoe shall be of hardened steel and shall be replaced or repaired when it becomes dented or distorted. The coupling head shall have four 1/2-in. (12.7-mm) (minimum diameter) vent ports and shall contain a ball check valve. If sizes other than the 2-in. (50.8-mm) sampler are permitted, the size shall be conspicuously noted on all penetration records.

2.3 Drive Weight Assembly – The assembly shall consist of a 140-lb (63.5-kg) weight, a driving head, and a guide permitting a free fall of 30 in. (0.76 m). Special precautions shall be taken to ensure that the energy of the falling weight is not reduced by friction between the drive weight and the guides.

2.4 Accessory Equipment – Labels, data sheets, sample jars, paraffin, and other necessary supplies should accompany the sampling equipment.

parratt wolff inc
FISHER RD., EAST SYRACUSE, N.Y. 13057
TELEPHONE AREA CODE 315/437-1429
800/782-7260 FAX 315/437-1770

GENERAL NOTES

1. Soil boring logs, notes and other data shown are the results of personal observations and interpretations made by Parratt-Wolff, Inc.

Exploration records prepared by our drilling foreman in the field form the basis of all logs, and samples of subsurface materials retained by the driller are observed by technical personnel in our laboratory to check field classifications.

2. Explanation of the classifications and terms:

a. Bedrock — Natural solid mineral matter occurring in great thickness and extent in its natural location. It is classified according to geological type and structure (joints, bedding, etc.) and described as solid, weathered, broken or fragmented depending on its condition.

b. Soils — Sediments or other unconsolidated accumulations of particles produced by the physical and chemical disintegration of rocks and which may or may not contain organic matter.

PENETRATION RESISTANCE

COHESIONLESS SOILS

Blows Per Ft.	Relative Density
0 to 4	Very Loose
4 to 10	Loose
10 to 30	Medium Dense
30 to 50	Dense
Over 50	Very Dense

COHESIVE SOILS

Blows Per Ft.	Consistency
0 to 2	Very Soft
2 to 4	Soft
4 to 8	Medium Stiff
8 to 15	Stiff
15 to 30	Very Stiff
Over 30	Hard

Size Component Terms

Boulder	Larger than 8 inches		
Cobble	8 inches to 3 inches		
Gravel — coarse	3 inches to 1 inch		
— medium	1 inch to 3/8 inch		
— fine	3/8 inch to 4.76 mm		
Sand — coarse	4.76 mm to 2.00 mm	(#10 sieve)	
— medium	2.00 mm to 0.42 mm	(#40 sieve)	
— fine	0.42 mm to 0.074 mm	(#200 sieve)	
Silt and Clay	Finer than 0.074 mm		

Proportion By Weight

Major component is shown with all letters capitalized.

Minor component percentage terms of total sample are:

and	35 to 50 percent
some	20 to 35 percent
little	10 to 20 percent
trace	1 to 10 percent

c. Gradation Terms — The terms coarse, medium and fine are used to describe gradation of Sand and Gravel.

d. The terms used to describe the various soil components and proportions are arrived at by visual estimates of the recovered soil samples. Other terms are used when the recovered samples are not truly representative of the natural materials, such as soil containing numerous cobbles and boulders which cannot be sampled, thinly stratified soils, organic soils, and fills.

e. Ground water — The measurement was made during exploration work or immediately after completion, unless otherwise noted. The depth recorded is influenced by exploration methods, soil type and weather conditions during exploration. Where no water was observed it is so indicated. It is anticipated that the ground water will rise during periods of wet weather. In addition, perched ground water above the water levels indicated (or above the bottom of the hole where no ground water is indicated) may be encountered at changes in soil strata or top of rock.

parratt wolff inc
FISHER RD., EAST SYRACUSE, N.Y. 13057
TELEPHONE AREA CODE 315/437-1429

A BRIEF DESCRIPTION OF THE UNIFIED SOIL SYSTEM

The Unified Classification System is an engineering soil classification that is an outgrowth of the Air-Field classification developed by Casagrande.

The system incorporates the textural characteristics of a soil into the engineering classification. All soils are classified into fifteen groups, each group being designated by two letters. These letters are as follows: G—gravel, S—sand, M—Non plastic or low plasticity fines, C—plastic fines, Pt—peat, humus and swamp soils, O—organic, W—well graded, P—poorly graded, L—low liquid limit, H—high liquid limit.

GW and SW Groups

These groups comprise well graded gravelly and sandy soils which contain less than 5% of non plastic fines passing a #200 sieve. Fines which are present must not noticeably change the strength characteristics of the coarse grain fraction and must not interfere with its free draining characteristics. In areas subject to frost action the material should not contain more than about 3% of soil grains smaller than .02 millimeters in size.

GP and SP Groups

These groups are poorly graded gravels and sands containing less than 5% non plastic fines. They may consist of uniform gravels, uniform sands, or non uniform mixtures of very coarse material and very fine sand with intermediate sizes lacking. Materials of this latter type are sometimes referred to as skip graded, cap graded, or step graded.

GM and SM Groups

In general, these groups include gravels or sands which contain more than 12% of fines having little or no plasticity. The plasticity index and liquid limit of a soil in either of these groups plot below the "A" line on a plasticity chart. Gradation is not important and both low grade and poorly graded materials are included. Some sands and gravels in these groups may have a binder composed of natural cementing agents so proportioned that the mixture shows negligible swelling or shrinkage. Thus, the dry strength is provided by a small amount of soil binder or dry cementation of calcareous materials or iron oxide. A fine fraction of non cemented materials may be composed of silts or rock flour types having little or no plasticity, and the mixture will exhibit no dry strength.

GC and SC Groups

These groups comprise gravelly or sandy soils with more than 12% of fines which exhibit either low or high plasticity. The plasticity index and liquid limit of a soil in either of these groups plot above the "A" line on the plasticity chart. Gradation of these materials is not important. Plasticity of the binder fraction has more influence on the behavior of the soils than does the variation in gradation. A fine fraction is generally composed of clays.

ML and MH Groups

These groups include predominantly silty materials and micaceous or diatomaceous soils. An arbitrary division between the two groups has been established with a liquid limit of 50. Soils in these groups are sandy silts, clayey silts or organic silts with relatively low plasticity. Also included are loessial soils and rock flours. Micaceous and diatomaceous soils generally fall within the MH group, but may extend into the ML group when their liquid limit is less than 50. The same is true for certain types of kaolin clays and some illite clays having relatively low plasticity.

CL and CH Groups

The CL and CH groups embrace clays with low and high liquid limits respectively. They are primarily inorganic clays. Low plasticity clays are classified as CL and are usually lean clays, sandy clays, and silty clays. The medium plasticity and high plasticity clays are classified as CH. These include fat clays, gumbo clays, certain volcanic clays and bentonite.

OL and OH Groups

The soils in these groups are characterized by the presence of organic matter including organic silts and clays. They have a plasticity range that corresponds with the ML and MH groups.

Pt Group

Highly organic soils which are very compressible have undesirable construction characteristics and are classified in one group with the symbol Pt. Peat, humus and swamp soils with a highly organic texture are typical of the group. Particles of leaves, grass, branches of bushes and other fibrous vegetable matter are common components of these soils.

Borderline Classification

Soils in the GW, SW, GP and SP groups are non plastic materials having less than 5% passing the #200 sieve, while GM, SM, GC, and SC soils have more than 12% passing the #200 sieve. When these coarse grain materials contain between 5% and 12% of fines they are classified as borderline, and are designated by the dual symbol such as GW-GM. Similarly coarse grain soils which have less than 5% passing the #200 sieve, but which are not free draining or in which the fine fraction exhibits plasticity are also classed as borderline and are given a dual symbol. Still another type of borderline classification occurs when a liquid limit of a fine grain soil is less than 29 and the plasticity index lies in the range of four to seven. These limits are indicated by the shaded area on the plasticity chart.

Silty and Clayey

In the Unified System, these terms are used to describe soils whose Atterberg limits plot below and above the "A" line on the plasticity chart. The adjectives silty and clayey are used to describe soils whose limits plot close to the "A" line.

parratt wolff inc

TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT · Alcan Monitoring Well Installation
LOCATION Oswego, New York

HOLE NO. MW-4
SURF. EL.

DATE STARTED 9/16/93 DATE COMPLETED 9/16/93

JOB NO. 9316

GROUND WATER DEPTH
WHILE DRILLING
BEFORE CASING REMOVED
AFTER CASING REMOVED

N — NO. OF BLOWS TO DRIVE SAMPLER 12" W/140# HAMMER FALLING 30" — ASTM D-1586, STANDARD PENETRATION TEST

C — NO. OF BLOWS TO DRIVE CASING 12" W/ # HAMMER FALLING
"/OR — % CORE RECOVERY

CASING TYPE - HOLLOW STEM AUGER

SHEET 1 OF 1

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
5.0						Removed protective casing and grouted existing well to surface with 2 bags of Portland cement	
10.0							
15.0							
20.0							
25.0						Bottom of Boring	21.3'

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TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT: Alcan Monitoring Well Installation
LOCATION: Oswego, New York

HOLE NO. MW-4R
SURF. EL.

DATE STARTED 9/16/93 DATE COMPLETED 9/16/93

JOB NO. 9316

GROUND WATER DEPTH
WHILE DRILLING 8.0'
BEFORE CASING REMOVED 14.0'
AFTER CASING REMOVED 2.5'

N — NO. OF BLOWS TO DRIVE SAMPLER 12" W/140# HAMMER FALLING 30" — ASTM D-1586, STANDARD PENETRATION TEST

C — NO. OF BLOWS TO DRIVE CASING 12" W/ # HAMMER FALLING
"/OR — % CORE RECOVERY

CASING TYPE - HOLLOW STEM AUGER

SHEET 1 OF 1

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
						Drilled to 24.0' without sampling	
5.0							
WL ▼							
10.0							
15.0							
20.0							
25.0						Bottom of Boring	24.0'
						Note: Installed 2" PVC 10 slot screen 24.0' to 9.0', 2" PVC riser to surface with locking standpipe protective casing.	

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TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT Alcan Monitoring Well Installation
LOCATION Oswego, New York

HOLE NO. MW-3
SURF. EL.
JOB NO. 9316

DATE STARTED 1/21/93 DATE COMPLETED 1/22/93

GROUND WATER DEPTH
WHILE DRILLING 5.0'
BEFORE CASING REMOVED
AFTER CASING REMOVED Installed Well

N — NO. OF BLOWS TO DRIVE SAMPLER 12" W/140# HAMMER FALLING
30" — ASTM D-1586, STANDARD PENETRATION TEST

C — NO. OF BLOWS TO DRIVE CASING 12" W/ # HAMMER FALLING
"/OR — % CORE RECOVERY

CASING TYPE - HOLLOW STEM AUGER
DRILLER'S FIELD LOG

SHEET 1 OF 1

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
	0.0'-	1		4/6		Black moist medium stiff SILT, little roots, trace fine sand	0.5'
	2.0'			31/10	37		
	2.0'-	2		9/7		Red-brown moist loose fine SAND, little roots	1.0'
	4.0'			9/5	16		
5.0▼	4.0'-	3		5/10		Gray-brown dry dense fine to coarse GRAVEL, little fine to coarse sand	2.0'
WL	6.0'			15/19	25		
	6.0'-	4		10/12		Brown moist to wet medium dense to dense fine to coarse SAND, some fine to coarse gravel	10.5'
	8.0'			24/17	36		
	8.0'-	5		6/11			
10.0	10.0'			23/31	34		
	10.0'-	6		9/38		Brown moist very dense fine to coarse SAND, some fine to coarse gravel	
	12.0'			43/44	81		
	12.0'-	7		55/80			
	13.0'						
15.0	14.0'-	8		40/23			
	15.9'			35/66-.4'	58		
						Bottom of Boring	15.9'
						Note: Installed 2" PVC 10 slot screen 15.0' to 5.0', 2" PVC riser to surface with locking standpipe protective casing.	
20.0							

parratt wolff inc

TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT Alcan Monitoring Well Installation
LOCATION Oswego, New York

HOLE NO. MW-4
SURF. EL.
JOB NO. 9316

DATE STARTED 1/19/93 DATE COMPLETED 1/20/93

GROUND WATER DEPTH
WHILE DRILLING 4.0'
BEFORE CASING REMOVED
AFTER CASING REMOVED Installed Well

N — NO. OF BLOWS TO DRIVE SAMPLER 12" W/140# HAMMER FALLING 30" — ASTM D-1586, STANDARD PENETRATION TEST

C — NO. OF BLOWS TO DRIVE CASING 12" W/ # HAMMER FALLING
"/OR — % CORE RECOVERY

CASING TYPE - HOLLOW STEM AUGER
DRILLER'S FIELD LOG

SHEET 1 OF 1

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
	0.0'-	1		5/6		Brown moist stiff SILT, some fine to coarse gravel, little fine to coarse sand	
	2.0'			7/8	13		
	2.0'-	2	No	6/7			
WL ▼	4.0'		Rec	9/11	16		
5.0	4.0'-	3		13/4			4.5'
	6.0'			5/2	9	Brown wet loose fine to coarse GRAVEL, little fine to coarse sand, trace silt	
	6.0'-	4		4/2			
	8.0'			4/6	6		
	8.0'-	5		3/2			
10.0	10.0'			2/3	4		
	10.0'-	6		3/3			11.8'
	12.0'			3/4	6	Brown moist medium stiff SILT	12.0'
	12.0'-	7		2/3		Black wet medium stiff PEAT	13.0'
	14.0'			10/9	13	Gray wet medium dense fine SAND	
15.0	14.0'-	8		6/6			16.0'
	16.0'			7/10	13	Gray-brown wet dense fine SAND	
	16.0'-	9		12/17			18.0'
	18.0'			22/25	39	Gray-brown wet dense fine to coarse SAND, some fine to medium gravel	20.5'
	18.0'-	10		12/17			
20.0	20.0'			18/22	35	Gray dry very dense weathered SANDSTONE	
	20.0'-	11		13/43		Bottom of Boring	21.3'
	21.3'			50-.3'			
25.0							

Note: Installed 2" PVC 10 slot screen 19.0' to 4.0', 2" PVC riser to surface with locking standpipe protective casing.

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TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT: Alcan Monitoring Well Installation
LOCATION: Oswego, New York

HOLE NO. MW-5
SURF. EL.
JOB NO. 9316

DATE STARTED 1/21/93 DATE COMPLETED 1/21/93

GROUND WATER DEPTH
WHILE DRILLING 4.0'
BEFORE CASING REMOVED
AFTER CASING REMOVED Installed Well

N — NO. OF BLOWS TO DRIVE SAMPLER 12" W/140# HAMMER FALLING 30" — ASTM D-1586, STANDARD PENETRATION TEST

C — NO. OF BLOWS TO DRIVE CASING 12" W/ # HAMMER FALLING
"/OR — % CORE RECOVERY

CASING TYPE - HOLLOW STEM AUGER
DRILLER'S FIELD LOG

SHEET 1 OF 1

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
	0.0'-	1		WH/4		Black moist very soft SILT, trace roots	
	2.0'			5/3	9		0.5'
	2.0'-	2		17/25		Brown moist loose very dense fine to coarse SAND, some fine to coarse gravel	
WL ▼	3.4'			50-.4'			
5.0	4.0'-	3		30/23			4.0'
	6.0'			17/9	40	Green wet dense fine to coarse SAND, some fine to coarse gravel	
	6.0'-	4		9/12			7.0'
	7.4'			50-.4'		Green wet very dense weathered SANDSTONE	
10.0						Bottom of Boring	7.4'

Note: Installed 2" PVC 10 slot screen 7.3' to 3.3', 2" PVC riser to surface with locking standpipe protective casing.

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TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT: Alcan Monitoring Well Installation
LOCATION: Oswego, New York

HOLE NO. MW-6
SURF. EL.
JOB NO. 9316

DATE STARTED 1/19/93 DATE COMPLETED 1/19/93

GROUND WATER DEPTH
WHILE DRILLING 8.0'
BEFORE CASING REMOVED
AFTER CASING REMOVED Installed Well

N — NO. OF BLOWS TO DRIVE SAMPLER 12" W/140# HAMMER FALLING 30" — ASTM D-1586, STANDARD PENETRATION TEST

C — NO. OF BLOWS TO DRIVE CASING 12" W/ # HAMMER FALLING
"/OR — % CORE RECOVERY

CASING TYPE - HOLLOW STEM AUGER
DRILLER'S FIELD LOG

SHEET 1 OF 1

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
	0.0'-	1		2/2		Black moist soft SILT, little fine sand, trace roots	1.0'
	2.0'			6/11	8		
	2.0'-	2		50-.4'		Brown moist medium dense fine to coarse sand, little fine to medium gravel	2.0'
	2.4'						
5.0	4.0'-	3		95/66			
	5.0'					Gray-brown dry hard SILT, some fine to medium gravel, little fine to coarse sand	8.0'
WL ▼							
	8.0'-	4		34/43		Brown wet hard SILT and fine to coarse GRAVEL, little fine to coarse sand	12.5'
10.0	10.0'			16/5	59		
	10.0'-	5	No	6/11			
	12.0'		Rec	18/16	29		
	12.0'-	6		70/50-.2'		Green dry very dense weathered SANDSTONE	
	12.7'					Bottom of Boring	14.0'
15.0							

Note: Installed 2" PVC 10 slot screen 12.5' to 6.5', 2" PVC riser to surface with locking standpipe protective casing.

APPENDIX D

HNU SCREENING RESULTS

TABLE D-1

ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY FACILITY

SOIL VAPOR DATA SHEET
Measured From Head Space in Split-Spoon Sample Jars

Boring No.	Sample No.	Depth (Feet)	Sample Type	Soil Vapor 11.7 eV Probe Ambient	Soil Vapor 11.7 eV Probe Sample	Ambient Temp. °F	Comments
MW-1	1	0 - 2	Overburden	0	1.5	76	
	2	2 - 4	Overburden	0	0.9	76	
	3	4 - 6	Overburden	0	1.6	76	
	4	6 - 8	Overburden	0	1.6	76	
	5	8 - 10	Overburden	0	1.6	76	
	6	10 - 12	Overburden	0	1.5	76	
	7	12 - 14	Overburden	0	1.4	76	
	8	14 - 16	Overburden	0	120.0	76	Strong petroleum odor
	9	16 - 18	Overburden	0	12.8	76	Slight odor
	10	18 - 20	Overburden	0	4.4	76	
	11	20 - 20.5	Overburden	0	2.2	76	Top of Bedrock at 20.5 feet
Control Sample	Blank 1	-	Tap Water	0	3.4	76	
Control Sample	Blank 2	-	Potting Soil	0	5.3	76	

TABLE D-2

ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY FACILITY

SOIL VAPOR DATA SHEET
Measured From Head Space in Split-Spoon Sample Jars

Boring No.	Sample No.	Depth (Feet)	Sample Type	Soil Vapor 11.7 eV Probe		Ambient Temp. °F	Comments
				Ambient	Sample		
MW-7	1	0 - 2	Overburden	0.2	4.2	72	
	2	2 - 4	Overburden	0.2	3.6	72	
	3	4 - 6	Overburden	0.2	6.9	72	
	4	6 - 8	No Sample	0.2		72	
	5	8 - 8.3	Overburden	0.2	5.4	72	
	6	10 - 12	Overburden	0.2	4.3	72	
	7	12 - 13	Overburden	0.2	6.0	72	
	8	14 - 14.5	Overburden	0.2	5.2	72	Top of Bedrock at 14.5 feet
Control Sample	Blank 1	-	Tap Water	0.0	6.2	72	
Control Sample	Blank 2	-	Potting Soil	0.0	5.2	72	

TABLE D-3

ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY FACILITY

SOIL VAPOR DATA SHEET
Measured From Head Space in Split-Spoon Sample Jars

Boring No.	Sample No.	Depth (Feet)	Sample Type	Soil Vapor 11.7 eV Probe Ambient	Soil Vapor 11.7 eV Probe Sample	Ambient Temp. °F	Comments
MW-8	1	0 - 2	Overburden	0.2	6.0	72	
	2	2 - 4	No Sample	0.2		72	
	3	4 - 6	Overburden	0.2	5.6	72	
	4	6 - 7.4	Overburden	0.2	4.0	72	
	5	8 - 10	Overburden	0.2	3.7	72	
	6	10 - 12	Overburden	0.2	4.2	72	
	7	12 - 14	No Sample	0.2		72	
	8	14 - 16	Overburden	0.2	4.4	72	15-20 feet: strong detergent-like odor
	9	16 - 18	Overburden	0.2	5.7	72	
	10	18 - 20	Overburden	0.2	3.2	72	
	11	20 - 22	Overburden	0.2	4.0	72	
	12	22 - 24	Overburden	0.2	3.2	72	Top of Bedrock at 24.1 feet
Control Sample	Blank 1	-	Tap Water	0.0	6.2	72	
Control Sample	Blank 2	-	Potting Soil	0.0	5.2	72	

TABLE D-4

ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY FACILITY

SOIL VAPOR DATA SHEET
Measured From Head Space in Split-Spoon Sample Jars

Boring No.	Sample No.	Depth (Feet)	Sample Type	Soil Vapor 11.7 eV Probe		Ambient Temp. °F	Comments
				Ambient	Sample		
MW-9	1	0 - 2	Overburden	0.2	2.4	72	
	2	2 - 2.5	Overburden	0.2	3.0	72	
	3	4 - 6	Overburden	0.2	3.5	72	
	4	6 - 8	Overburden	0.2	3.2	72	
	5	8 - 10	Overburden	0.2	3.0	72	
	6	10 - 12	Overburden	0.2	2.8	72	
	7	12 - 13.3	Overburden	0.2	2.8	72	Top of Bedrock at 13.3 feet
Control Sample	Blank 1	-	Tap Water	0.0	6.2	72	
Control Sample	Blank 2	-	Potting Soil	0.0	5.2	72	

TABLE D-5

ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY FACILITY

SOIL VAPOR DATA SHEET
Measured From Head Space in Split-Spoon Sample Jars

Boring No.	Sample No.	Depth (Feet)	Sample Type	Soil Vapor 11.7 eV Probe		Ambient Temp. °F	Comments
				Ambient	Sample		
MW-10	1	0 - 1.8	Overburden	0.0	0.0	72	
	2	2 - 3.7	Overburden	0.0	1.8	72	
	3	4 - 6	Overburden	0.2	2.2	72	
	4	6 - 8	Overburden	0.2	11.8	72	
	5	8 - 10	Overburden	0.2	8.2	72	
	6	10 - 12	Overburden	0.2	12.0	72	
	7	12 - 13.5	Overburden	0.2	9.0	72	
	8	14 - 16	Overburden	0.2	8.5	72	
	9	16 - 17.5	Overburden	0.2	12.0	72	Top of Bedrock at 17.5 feet
Control Sample	Blank 1	-	Tap Water	0.2	6.2	72	
Control Sample	Blank 2	-	Potting Soil	0.2	5.2	72	

APPENDIX E

DATA USABILITY

DATA USABILITY REPORT

The following describes the procedures used in the field sampling, laboratory analysis, and subsequent data validation and evaluation of data usability.

FIELD SAMPLING

Ground water, leachate, surface soil and air samples were collected from October 26 to October 28, 1994 as described below:

Ground Water

In order to obtain representative samples of formation water, the five Alcan Main Landfill monitoring wells were purged on October 26, 1993 and sampled on October 27, 1993 as described below.

The boring and well installation logs were reviewed by the field sampling team prior to purging. The initial water level was determined and recorded for each well. The wells were then purged using one of two techniques described below, dependent upon the rate of ground water recharge. A minimum of three saturated well volumes were purged from each well, where practical. Purging data are included in Table E-1 of this appendix.

In two of the five monitoring wells, the well water was evacuated using a centrifugal pump at a rate of less than 2 gpm. Virgin polypropylene potable water hose and a decontaminated brass foot valve were used in each well where a centrifugal pump was used. The following wells were purged using this method: MW-1, MW-8 and MW-10.

In three monitoring wells, where recharge was slow, dedicated PVC bailers were used in combination with virgin polypropylene rope. The following wells were purged using this method: MW-7 and MW-9.

Sampling was conducted within 24 hours of purging. The sampling chronology is provided in Table E-2 of this appendix. Dedicated PVC bailers were used to sample the

five monitoring wells. During sampling, the bailer was carefully lowered into the well on previously unused polypropylene rope. Samples were decanted into bottles supplied by the testing laboratory, IEA, Inc. of Monroe, Connecticut. The appropriate sample bottles were filled for each well, placed in a cooler and packed with ice.

Concentrated nitric acid had been added by the laboratory to the appropriate sample bottles for primary metals analysis; these samples were not field filtered. The VOC sample bottles were free of air bubbles.

Information such as color, odor and sediment content of sample was recorded. In addition, field parameters such as temperature, pH, specific conductivity and turbidity were measured at each monitoring well and are tabulated in Table E-1 of this appendix. Chain-Of-Custody Forms were appropriately filled out and included with the coolers containing sample bottles shipped to the laboratory.

Field blanks, trip blanks and MS/MSD samples were collected as shown in Table E-2.

Leachate

Leachate samples were collected from two areas adjacent to the landfill identified as containing surface water which may have been impacted by the landfill. A surface sheen was observed at both of the sampling points. Latex gloves were used when each bottle was carefully submerged into the surface water to collect the samples. Latex gloves were changed between sampling locations.

Surface Soil

Surface soil samples were collected from three areas on the landfill surface and an area offsite. A new pair of latex gloves and a previously unused stainless steel trowel was used at each sample location to obtain the sample from within the upper six-inches of the soil column. Soil was transferred directly from the trowel into the sample jars. In addition to the onsite sample locations, one background sample was collected from a forested area located about 100 feet north of the landfill. This background sample was collected by

compositing three samples taken from three locations into the sample jar. The soil was homogenized within the jar to reduce the potential for cross-contamination.

Air

Air sampling for volatile organic compounds and PCBs was conducted according to the reference methods established by the National Institute for Occupational Safety and Health (NIOSH Methods 1500, 1501 and 5503, respectively). Samples were collected by CT Male Associates of North Syracuse, NY. One sample for volatile organics was collected using a passive diffusion badge. Field blanks were also collected and submitted with the samples. Collected samples were submitted to Galson Laboratories for analysis with appropriate chain-of-custody documentation.

LABORATORY ANALYSIS

The aqueous and soil samples collected were sent by overnight delivery service to IEA, Inc. of Monroe, Connecticut. The samples submitted were analyzed as follows:

- Volatile organics - NYSDEC ASP 91-1, Superfund Deliverables
- Semivolatile organics - NYSDEC ASP 91-2, Superfund Deliverables
- Pesticides and PCBs - NYSDEC ASP 91-3, Superfund Deliverables
- Metals - CLP-M, 23 Target Analyte List Metals, Superfund Deliverables

The air samples were analyzed according to the following NIOSH Methods:

- NIOSH Method 1500 - Hydrocarbons, B.P. 36-126°C.
- NIOSH Method 1501 - Aromatic Hydrocarbons
- NIOSH Method 5503 - PCBs: particulates and gaseous

Requirements for the laboratory's QC checks are included within the analytical method protocols. These checks will include internal QC methods, including spiked

samples, matrix spike/matrix spike duplicates, internal standards, QC samples, calibration standards, calibration devices, and surrogates, as appropriate.

DATA USABILTY

The following narrative describes the protocol used to assess the usability of laboratory data in this report. The protocol assesses the usability of results by comparing them with various quality control samples, referred to as blanks.

Raw laboratory data are tabulated in Tables E-3 through E-16 of Appendix E. These tables include the results of method blanks, field blanks, trip blanks and project samples for each batch or subbatch of samples analyzed together.

The results of the sample blanks are inspected to check for the occurrence of false positives created by the laboratory or field methodologies used. The following hierarchy is used in comparing project sample results with blank results.

Method Blanks

Project samples are first compared against method blanks. Method blanks are samples of laboratory water or air which are analyzed with the project sample batches as control samples. These blanks originate and remain in the laboratory, and are used to indicate whether contamination was present in the laboratory at the time of the sample analysis. Each sample batch has its own specific method blank. However, all method blanks associated with the case are considered in assessing the potential for laboratory-based false positives. Specifically for the air samples, a method blank is used only when a field blank has not been prepared for a batch of samples. Lab blank 3520 was a method blank analyzed with DM-4, a passive diffusion badge, which did not have a field blank.

Trip Blanks

Trip blanks originate in the laboratory at the time of bottle preparation. The purpose of the trip blank is to evaluate whether contamination may have been present in the laboratory at the time of bottle preparation, or if contamination was introduced during

packing and shipping. Deionized laboratory water is placed in a set of sample bottles and shipped with the empty sample bottles. There are no trip blanks required for the air sampling and analysis. The trip blank bottles accompany the project sample bottles to the field and are shipped back to the laboratory for analysis with the project samples. The trip blanks remain sealed at all times. The purpose of trip blanks is to determine whether contaminants are seeping into the sample vials, or if any cross-contamination of samples is occurring during shipment or storage of sample containers. Trip blanks are required only for volatile organic analyses; therefore, the containers must contain no head space. One trip blank is needed for one group of samples shipped to satisfy trip blank requirements for all matrices for that group if the volatile samples are shipped in the same cooler. Trip blanks are not required for solid matrix samples.

One trip blank (TB-1) was included with the shipment of project samples. The trip blank for this round of sampling was analyzed for volatile organic compounds, semivolatiles, pesticides/PCBs, and TCL metals.

Field Blanks

Field blanks are prepared by the field sampling team while in the field. The purpose of the field blank is to indicate whether contamination was introduced as a result of field sampling activities. In the case of the aqueous and soil samples, articles of sampling equipment such as rope, stainless steel trowel, polypropylene hose, foot valves and surgical gloves, which may come in contact with sample media are immersed in a container of distilled water used by the samplers in the field. The field blank water is then poured from the container of distilled water into a set of sample bottles. A separate field rinse blank will be collected for each type of equipment associated to a particular sample matrix which will be analyzed. In the case of air samples, a sample tube was opened in the field for the duration of the sampling event for each type of analysis. Air was passively exposed to the tubes in the field.

The purpose of these blanks is to determine whether the sampling equipment is causing cross-contamination of samples. The field blank samples are shipped with the project samples and analyzed for the same chemical compounds as the project samples.

Two aqueous and two gaseous field blanks were prepared during the October 1993 sampling event. FB-1 was taken during the first day of sampling as a blank representative of the purging and sampling processes for aqueous samples. FB-2 was taken during the second day of sampling as a blank representative of the surface soil sampling equipment including a virgin stainless steel trowel and surgical gloves. DM-7 was submitted with the air samples to be tested for PCBs, whereas DM-8 was submitted with air samples to be tested for volatile organics.

Disqualification Criteria Based on Blank Contamination

In the data tabulations which follow, project sample results are compared against blank results. First, method blanks are compared against those project samples analyzed in the same batch. Then, trip blanks are compared against samples in all batches. Finally, field blanks are compared with their related samples. If methylene chloride, acetone, toluene, 2-butanone, or pthalate esters are detected in the method, field or trip blanks, then any project sample displaying a positive result for these compounds less than ten times the corresponding blank value is flagged with an "x" in the Appendix E tables as being disqualified and reported as not detected in the *Tables* section of this report. Adjacent to the disqualifier "x" is a notation which indicates the origin of contamination: "b" for method blank, "t" for trip blank, and "f" for field blank. For other compounds appearing in the blanks, a margin of five times the blank value is used as the criterion for disqualification.

Once this phase of the usability assessment is performed, a second phase is performed by comparing all method, field and trip blanks with the sample results, since ultimately, the criteria for evaluating laboratory results apply to any blank associated with the project samples. If problems with a blank exist, the data were carefully evaluated to determine whether or not there was an inherent pattern in the data, or if the problem was an isolated occurrence not affecting other data. That is, the reviewer exercised professional judgment to decide whether contamination of a sample reported by the laboratory was real or not, by comparing the persistence of a contaminant in a blank to other blanks in the same round.

Dilutions

Dilutions are performed when project samples contain concentrations of contaminants which are greater than the instrument calibration range. In such cases, laboratory water is used to dilute the project sample such that the levels of contamination fall within the calibration range of the analytical method employed. The analytical result is then multiplied by the dilution factor to yield the actual result. In situations where dilutions are performed and common laboratory contaminants are detected in the method blank, it may be assumed that the dilution water contains similar levels of contamination. In such cases, a reported sample result may show higher than actual levels of contamination due to multiplication by the dilution factor. For example, if a method blank for a given batch of samples shows acetone contamination at a level of 1 µg/l and the sample dilution factor was 5:1 then levels of five-times the actual value for acetone may be reported in the project sample.

When contaminated water appears to have been used for sample dilutions, any sample which was diluted and displays contamination also found in the associated method blank may have those values disqualified. They will be disqualified if they are less than the dilution factor multiplied by the five- or ten-times disqualification criteria described earlier. As in the case above, if a method blank for a given batch of samples shows acetone contamination at a level of 1 µg/l and the sample dilution factor was 5:1, then levels of acetone up to 50 µg/l (using the ten-times criteria for acetone) could be disqualified in an associated project sample.

Data Validation

The laboratory data was submitted to a third-party, Data Validation Services, of North Creek, NY, for data validation to facilitate more confidence in the data, and thus preparation of a more accurate risk assessment. The purpose of data validation is to evaluate the analytical data, verify that the appropriate protocols and laboratory procedures were used, and identify samples which have questionable reliability. In addition to the sample data from monitoring points, QA/QC sample data such as method blanks, field blanks, trip blanks and MS/MSD samples were reviewed. The data validator contacted the laboratory with questions regarding the data during preparation of the data

validation report. Following issuance of the report, the comments were incorporated into the data usability tables and summary tables by Dames & Moore.

COMMENTARY

Based on this data quality review and the data validation of the raw analytical data which followed, the data have been found to be generally consistent with the project requirements and objectives, and are suitable for use except as otherwise indicated in the tabulations which follow. The data validator's report is provided in Appendix F.

The levels of Tentatively Identified Compounds (TICs) reported in the volatile organics and semivolatile organics analysis of the aqueous and soil samples appeared to be closely associated with the laboratory method blanks, trip blanks and field blanks and are considered likely to have been introduced either during laboratory analysis or during the field sampling. These data should be treated with caution.

TABLE E-1
WELL PURGING DATA

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

	MW-1	MW-7	MW-8	MW-9	MW-10	L-1-LF	L-2-LF
Volume to be Purged (Calculated) (gal.)	15.4	14.3	24.7	11.5	15.9		
Volume Purged (gal.) (Actual)	15	6.5	25	8.5	28		
Number of Well Volumes	2.9	1.4	3.0	2.2	5.3		
Conductivity (x100 µmhos/cm)	441	715	537	160	502	444	414
Temperature (°F)	53.1	55.6	53.6	56.3	54.6	48.7	57.3
pH	6.7	6.4	6.6	7.7	6.7	7.6	6.4
NTU	39.3	20.8	51.4	48.3	12.24	10.4	7.63
Color	Sl. Grey	Sl. Black	Sl. Grey	Sl. Brown	Sl. Brown	Clear	Clear
Odor	Sulfer	Sulfer	Sulfer	None	None	None	None
Sediment Content	Clear	Clear	Clear	Sl. Silty	Sl. Silty	Vegetation	Vegetation

Note:

Sl. = Slight, Slightly
MW = Monitoring well sample
L = Surface water leachate sample

TABLE E-2
SAMPLING CHRONOLOGY

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

Date	Sample Medium	Sample ID	Field Tests	Laboratory Analysis				Field Blank	Trip Blank	MS/MSD
			FP	VOA	SVOA	PEST/PCBs	M			
10/26/93	AIR	DM-1		√		√ *				
		DM-2		√		√ *				
		DM-3		√		√ *				
		DM-4		√		√ *				
		DM-5		√		√ *		DM-7		
		DM-6		√		√ *		DM-8		
10/27/93	GW	MW-1†	√	√	√	√	√			
		MW-7†	√	√	√	√	√			
		MW-8†	√	√	√	√	√	FB-GW-1	TB-1	MW-8MS/MSD
		MW-9†	√	√	√	√	√			
10/28/93	L	L-1-LF	√	√	√	√	√			
		L-2-LF	√	√	√	√	√			
	SS	SS-LF-1		√	√	√	√	FB-SS-1		SS-LF-1MS/MSD
		SS-LF-2		√	√	√	√			
		SS-LF-3		√	√	√	√			
		SS-BKGD		√	√	√	√			

Notes:

FP = Field Parameters (temperature, pH, specific conductivity and turbidity)
VOA = Volatile Organic Analysis
M = Metals Analysis
SVOA = Semivolatile Organic Analysis
PEST/PCBs = Pesticide and PCB Analysis
* = PCB Analysis only
GW = Ground Water
L = Leachate
SS = Surface Soil

TABLE E-3
VOLATILE ORGANIC ANALYSIS
GROUND WATER

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

	VBLKG2 (µg/l)	TB-1 (µg/l)	FB-GW-1 (µg/l)	MW-1 (µg/l)	MW-7 (µg/l)	MW-8 (µg/l)	MW-8MS (µg/l)	MW-8MSD (µg/l)	MW-9 (µg/l)	MW-10 (µg/l)
Dilution Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
COMPOUND										
Chloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl chloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U	4J	24	5J	6J	6J	10 U	10 U
Methylene chloride	10 U	10 U	10 U	10 U	10 U	1J	10 U	10 U	10 U	10 U
Acetone	8J	10 U	6JBxb	10 U	12Bxb	18Bxb	20Bxb	21Bxb	10 U	10 U
Carbon Disulfide	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	49X	45X	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	30
1,2-Dichloroethene (total)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroform	10 U	1J	4J	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Butanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl acetate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	45X	47X	10 U	10 U
Dibromochloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzene	10 U	10 U	10 U	0.6J	10 U	10 U	50X	51X	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	10 U	10 U	10 U	10 U	44	10 U	46X	48X	10 U	10 U
Chlorobenzene	10 U	10 U	10 U	35	10 U	10 U	47X	48X	10 U	10 U
Ethyl Benzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Total Xylenes	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TICs										
Unknown		11J				13J				
1,1,2-Trichloro-1,1,2-triftuoro				10JN						
Benzene,1,4-dichloro				7JN						
Benzene,1,3-dichloro				6JN						
Benzene,1,2-dichloro				6JN						
Total TICs and Unkowns	0	11J	0	29JN	0	13J	0	0	0	0

Note:

NYSDEC ASP 1991, (Method 91-1), Plus 10 TICs, Superfund Deliverables
U = Compound analyzed for but not detected
J = Indicates an estimated value
TIC = Tentatively Identified Compound
FB-GW-1 = Field blank taken with MW samples
VBLKG2 = Method blank for aqueous samples
x = Value disqualified
b = This result is qualitatively suspect since this compound was detected in an associated method blank at similar levels.
X = Matrix Spike Compound

TABLE E-4
SEMIVOLATILE ORGANIC ANALYSIS
GROUND WATER

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

	SBLK50 (µg/l)	TB-1 (µg/l)	FB-GW-1 (µg/l)	MW-1 (µg/l)	MW-7 (µg/l)	MW-8 (µg/l)	MW-8MS (µg/l)	MW-8MSD (µg/l)	MW-9 (µg/l)	MW-10 (µg/l)
Dilution Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
COMPOUND										
Phenol	10 U	10 U	45	10 U	10xl	10 U	70X	55X	10 U	10 U
bis(2-Chloroethyl) ether	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	66X	56X	10 U	10 U
1,3-Dichlorobenzene	10 U	10 U	10 U	9J	10 U	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	10 U	10 U	10 U	10	10 U	10 U	43X	38X	10 U	10 U
1,2-Dichlorobenzene	10 U	10 U	10 U	10	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylphenol	10 U	10 U	10 U	10 U	4J	10 U	10 U	10 U	10 U	10 U
2,2'-oxybis (1-Chloropropane)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methylphenol	10 U	10 U	10 U	10 U	53	10 U	10 U	10 U	10 U	10 U
N-Nitroso-di-n-propylamine	10 U	10 U	10 U	10 U	10 U	10 U	51X	46X	10 U	10 U
Hexachloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Isophorone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitrophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroethoxy) methane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	38X	43X	10 U	10 U
Naphthalene	10 U	10 U	10 U	10 U	1J	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-methylphenol	10 U	10 U	10 U	10 U	10 U	10 U	71X	73X	10 U	10 U
2-Methylnaphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
2-Chloronaphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
Dimethyl phthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
Acenaphthene	10 U	10 U	10 U	10 U	10 U	10 U	40X	44X	10 U	10 U
2,4-Dinitrophenol	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4-Nitrophenol	25 U	25 U	25 U	25 U	25 U	25 U	94X	88X	25 U	25 U
Dibenzofuran	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U	10 U	48X	43X	10 U	10 U
Diethylphthalate	0.7J	0.4JBxb	10 U	10 U	10 U	10 U	0.6JBxb	0.3JBxb	0.3JBxb	0.9JBxb
4-Chlorophenyl-phenylether	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluorene	10 U	10 U	10 U	0.9J	10 U	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4,6-Dinitro-2-methylphenol	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U

TABLE E-4 (CONTINUED)
SEMIVOLATILE ORGANIC ANALYSIS
GROUND WATER

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

	SBLK50 (µg/l)	TB-1 (µg/l)	FB-GW-1 (µg/l)	MW-1 (µg/l)	MW-7 (µg/l)	MW-8 (µg/l)	MW-8MS (µg/l)	MW-8MSD (µg/l)	MW-9 (µg/l)	MW-10 (µg/l)
Dilution Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
COMPOUND										
N-nitrosodiphenylamine	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Bromophenyl-phenylether	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	25 U	25 U	25 U	25 U	25 U	25 U	100X	110X	25 U	25 U
Phenanthrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbazole	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-butylphthalate	0.8J	10 U	0.6JBxb	10 U	10 U	1JBxb	10 U	10 U	10 U	1JBxb
Fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pyrene	10 U	10 U	10 U	10 U	10 U	10 U	44X	52X	10 U	10 U
Butylbenzylphthalate	10 U	10 U	10 U	10 U	10 U	0.3Jxf	10 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(a)anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chrysene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Ethylhexyl) phthalate	0.7J	13B	2JBxb	1JBxb	0.7JBxb	7JBxt	2JBxb	1JBxb	1JBxb	16Bxt
Di-n-octyl phthalate	10 U	10 U	2J	10 U	10 U	0.4Jxf	10 U	10 U	10 U	10 U
Benzo(b)fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(k)fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(a)pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Indeno (1,2,3-cd)pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibenzo (a,h) anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(g,h,i)perylene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TICs										
Unknown	20J	28JB	563J	24J	257J	29J			73J	20JB
Adol condensation product	9JA	13JABxb	8JAB	4JABxb	13JABxb	13JABxb			12JABxb	13JAB
2-Cyclohexen-1-one	3JN	5JNBxb		2JNBxb	4JNBxb	3JNBxb			5JNBxb	4JNB
Cyclohexanol, 4-chloro	2JN	3JNBxb			5JNBxb	5JNBxb				
2,5-Cyclohexadiene-1,4-di				6JN					4JN	
2-Cyclohexanol, 4-chloro-trans				5JNB						
Cyclotrisiloxane, hexamethyl					2JN					
Unknown alkane			90J		14J	29J				
Benzene propanoic acid					17JN					
Benzoic acid					9JN				37JN	
Hexadecanoic acid			100JN			3JN				
Phenol, 4,4'-butylidenebis [2-(1,1			18JN							
Dodecanamide, n,n-bis(2-hydro			11JN							
Total TICs and Unknowns	34J	49J	790J	41J	321J	82J			131J	37J

Note:

NYSDEC ASP 1991 (Method 91-2), Plus 20 TICs, Superfund Deliverables
Specific quantitation limits are highly matrix dependent
TIC = Tentatively Identified Compound
U = Compound analyzed for but not detected. Reported within the detection limit.
J = Indicates an estimated value
X = Matrix Spike Compound
x = Value disqualified
b = This result is qualitatively suspect since this compound was detected in an associated method blank at similar levels.
t = This result is qualitatively suspect since this compound was detected in an associated trip blank at similar levels.
f = This result is qualitatively suspect since this compound was detected in an associated field blank at similar levels.
SBLK50 = Method Blank

TABLE E-5
PESTICIDE/PCB ANALYSIS
GROUND WATER

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

	PBLK93 (µg/l)	TB-1 (µg/l)	FB-GW-1 (µg/l)	MW-1 (µg/l)	MW-7 (µg/l)	MW-8 (µg/l)	MW-8MS (µg/l)	MW-8MSD (µg/l)	MW-9 (µg/l)	MW-10 (µg/l)
Dilution Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
COMPOUND										
alpha-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
beta-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
delta-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
gamma-BHC (Lindane)	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.31	0.30	0.05 U	0.05 U
Heptachlor	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.36	0.34P	0.05 U	0.05 U
Aldrin	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.34P	0.32P	0.05 U	0.05 U
Heptachlor epoxide	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Endosulfan I	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Dieldrin	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.81P	0.82P	0.10 U	0.10 U
4,4'-DDE	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endrin	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.90P	0.91P	0.10 U	0.10 U
Endosulfan II	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4'-DDD	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan sulfate	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4'-DDT	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.74P	0.65P	0.10 U	0.10 U
Methoxychlor	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Endrin-Ketone	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.02JP	0.10 U	0.10 U
Endrin Aldehyde	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
alpha-Chlordane	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
gamma-Chlordane	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Toxaphene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
AROCLOR-1016	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
AROCLOR-1221	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
AROCLOR-1232	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
AROCLOR-1242	1.0 U	1.0 U	1.0 U	1.0 U	1	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
AROCLOR-1248	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
AROCLOR-1254	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
AROCLOR-1260	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

Note:

NYSDEC ASP 1991, (Method 91-3), Superfund Deliverables.

U = Compound analyzed for but not detected.

J = Indicates an estimated value.

P = This flag is used for a pesticide/arochlor target analyte when there is a greater than 25 percent difference for detected contentrations between the two GC columns.

PBLK93 = Method blank

TABLE E-6
METALS ANALYSIS
GROUND WATER

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

ELEMENT	TB-1 (µg/l)	FB-GW-1 (µg/l)	MW-1 (µg/l)	MW-7 (µg/l)	MW-8 (µg/l)	MW-9 (µg/l)	MW-10 (µg/l)
Aluminum	37.0 U	54.4B	5,520	1,080	5,510	1,740	12,500
Antimony	21.0 U	21.0 U	21.0 U	21.0 U	21.0 U	21.0 U	21.0 U
Arsenic	1.0 U	1.0 U	5.3B	4.5B	1.9B	1.0 U	1.0 UW
Barium	2.0 U	2.0 U	404	468	499	47.0B	692
Beryllium	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Cadmium	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Calcium	60.2 B	2,540B	93,000	136,000	169,000	38,500	164,000
Chromium	3.0 U	4.1B	3.7Bxf	3.0 U	5.9Bxf	3.0 U	29.3
Cobalt	3.0 U	3.0 U	13.0B	6.4B	6.2B	3.6B	9.4B
Copper	7.0 U	33.4	264J	12.7Bxf	102xf	25.5xf	93.8xf
Iron	89.3 U	147	33,100	83,400	27,900	2,680	18,000
Lead	1.0 U	16.9	24.5xf	1.7Bxf	6.8xf	1.0 U	7.5xf
Magnesium	29.4 U	283B	47,200	74,600	45,600	8,970	48,800
Manganese	12.2 U	5.4B	47,300	26,700	7,700	250	3,670
Mercury	0.20 U	0.20U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel	11.0 U	11.0U	17.8B	11.0 U	18.0B	11.0 U	22.9B
Potassium	473 U	542B	18,400	34,200	9,090	1,680Bxf	6,840
Selenium	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 UW
Silver	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Sodium	121 U	4,030B	123,000	254,000	85,900	11,100xf	58,500
Thallium	1.0 U	1.0 U	1.0 U	1.6B	3.1B	1.0 U	1.6B
Vanadium	16.0 U	16.0 U	16.0 U	16.0 U	25.2B	16.0 U	30.0B
Zinc	10.3 B	300	47.0xt	11.0Bxt	45.8xt	26.8xt	65.5xf
Cyanide	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Note:

NYSDEC CLP-M (1989 ASP) Superfund Target Compound List (TCL:23 metals); Superfund-CLP Inorganics

B = Indicates a value greater than or equal to the instrument detection limit but less than the contract required detection limit.

U = Indicates element was analyzed for but not detected. Reported with the detection limit value.

W = Post-digest spike recovery furnace analysis was out of 85-115 percent control limit, while sample absorbance was less than 50 percent of spike absorbance.

x = Value disqualified

t = This result is qualitatively suspect since the compound was detected in an associated trip blank at similar levels.

f = This result is qualitatively suspect since the compound was detected in an associated field blank at similar levels.

TABLE E-7
VOLATILE ORGANIC ANALYSIS
LEACHATE

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

	VBLKG2 (µg/l)	TB-1 (µg/l)	FB-L-1 (µg/l)	L-1-LF (µg/l)	L-2-LF (µg/l)
Dilution Factor	1.0	1.0	1.0	1.0	1.0
COMPOUND					
Chloromethane	10 U	10 U	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U	10 U	10 U
Vinyl chloride	10 U	10 U	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U	10 U	58
Methylene chloride	10 U	10 U	10 U	10 U	10 U
Acetone	8J	10 U	7JBxb	46Bxb	5JBxb
Carbon Disulfide	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethene (total)	10 U	10 U	10 U	10 U	10 U
Chloroform	10 U	1J	4J	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U	10 U	10 U
2-Butanone	10 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	10 U	10 U	10 U	10 U	10 U
Vinyl acetate	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U	10 U	10 U
Benzene	10 U	10 U	10 U	10 U	2J
trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	10 U	10 U	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U	10 U	10 U
Toluene	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U	10 U	0.6J
Ethyl Benzene	10 U	10 U	10 U	10 U	10 U
Styrene	10 U	10 U	10 U	10 U	10 U
Total Xylenes	10 U	10 U	10 U	10 U	10 U
TICs					
Unknown		11J	12J		6J
Unknown C3 alkylbenzene					12J
Unknown cycloalkane					8J
Total TICs and Unkowns	0	11J	12J	0	26J

Note:

NYSDEC ASP 1991, (Method 91-1), Plus 10 TICs, Superfund Deliverables
U = Compound analyzed for but not detected
J = Indicates an estimated value
x = Value disqualified
b = This result is qualitatively suspect since this compound was detected in an associated method blank at similar levels
TIC = Tentatively Identified Compound
FB-L-1 = Field blank taken with leachate samples
VBLKG2 = Method blank for aqueous samples

TABLE E-8
SEMIVOLATILE ORGANIC ANALYSIS
LEACHATE

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

	SBLK50 (µg/l)	TB-1 (µg/l)	FB-L-1 (µg/l)	L-1-LF (µg/l)	L-2-LF (µg/l)
Dilution Factor	1.0	1.0	1.0	1.0	1.0
COMPOUND					
Phenol	10 U	10 U	4 0	10 U	10 U
bis(2-Chloroethyl) ether	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	10 U	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U
1,2-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U
2-Methylphenol	10 U	10 U	10 U	10 U	10 U
2,2'-oxybis (1-Chloropropane)	10 U	10 U	10 U	10 U	10 U
4-Methylphenol	10 U	10 U	10 U	10 U	10 U
N-Nitroso-di-n-propylamine	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	10 U	10 U	10 U	10 U	10 U
Isophorone	10 U	10 U	10 U	10 U	10 U
2-Nitrophenol	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroethoxy) methane	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	10 U	10 U	10 U	10 U	10 U
Naphthalene	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	10 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-methylphenol	10 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10 U	10 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	25 U	25 U	25 U	25 U	25 U
2-Chloronaphthalene	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	25 U	25 U	25 U	25 U	25 U
Dimethyl phthalate	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	25 U	25 U	25 U	25 U	25 U
Acenaphthene	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrophenol	25 U	25 U	25 U	25 U	25 U
4-Nitrophenol	25 U	25 U	25 U	25 U	25 U
Dibenzofuran	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U
Diethylphthalate	0.7J	0.4JBxb	10 U	10 U	10 U
4-Chlorophenyl-phenylether	10 U	10 U	10 U	10 U	10 U
Fluorene	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	25 U	25 U	25 U	25 U	25 U
4,6-Dinitro-2-methylphenol	25 U	25 U	25 U	25 U	25 U

TABLE E-8 (CONTINUED)
SEMIVOLATILE ORGANIC ANALYSIS
LEACHATE

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

	SBLK50 (µg/l)	TB-1 (µg/l)	FB-L-1 (µg/l)	L-1-LF (µg/l)	L-2-LF (µg/l)
Dilution Factor	1.0	1.0	1.0	1.0	1.0
COMPOUND					
N-nitrosodiphenylamine	10 U	10 U	10 U	10 U	10 U
4-Bromophenyl-phenylether	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	25 U	25 U	25 U	25 U	25 U
Phenanthrene	10 U	10 U	10 U	10 U	10 U
Anthracene	10 U	10 U	10 U	10 U	10 U
Carbazole	10 U	10 U	10 U	10 U	10 U
Di-n-butylphthalate	0.8J	10 U	0.4JBxb	10 U	10 U
Fluoranthene	10 U	10 U	10 U	10 U	10 U
Pyrene	10 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	10 U	10 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	10 U	10 U	10 U	10 U	10 U
Benzo(a)anthracene	10 U	10 U	10 U	10 U	10 U
Chrysene	10 U	10 U	10 U	10 U	10 U
bis(2-Ethylhexyl) phthalate	0.7J	13B	0.3JBxb	2JBxb	1JBxb
Di-n-octyl phthalate	10 U	10 U	10 U	10 U	10 U
Benzo(b)fluoranthene	10 U	10 U	10 U	10 U	10 U
Benzo(k)fluoranthene	10 U	10 U	10 U	10 U	10 U
Benzo(a)pyrene	10 U	10 U	10 U	10 U	10 U
Indeno (1,2,3-cd)pyrene	10 U	10 U	10 U	10 U	10 U
Dibenzo (a,h) anthracene	10 U	10 U	10 U	10 U	10 U
Benzo(g,h,i)perylene	10 U	10 U	10 U	10 U	10 U
TICs					
Unknown	20J	28JB	234J	81J	36J
Adol condensation product	9JA	13JABxb	10JABxb	16JABxb	10JABxb
Bicyclo [2,2,1] Heptan-2-ol, 1,7,7					7JN
Unknown chloroisocyanato benzene				27J	
2-Cyclohexen-1-one	3JN	5JNBxb		3JNBxb	
Cyclohexanol, 4-chloro	2JN	3JNBxb			
Hexanoic acid, 2-ethyl-			99JN		
Hexadecanoic acid			4JN		
Hexanedioic acid, dioctyl ester			3JN		
Dodecanamide, n,n-bis (2-hyd			11JN		
Pthalate anhydride			5JN		
1,2-Benzenedicarbolic acid			3JN		
2H-pyran-3-ol, 6-ethenyltrahyd				6JN	
2(3H)-furanone, dihydro-4,5-dimeth				3JN	
Total TICs and Unknowns	34J	49J	369J	136J	53J

Note:

NYSDEC ASP 1991 (Method 91-2), Plus 20 TICs, Superfund Deliverables
Specific quantitation limits are highly matrix dependent
TIC = Tentatively Identified Compound
U = Compound analyzed for but not detected. Reported within the detection limit.
J = Indicates an estimated value
N = Indicates that the compound was analyzed for but not requested as an analyte.
x = Value disqualified
b = This result is qualitatively suspect since this compound was detected in an associated method blank at similar levels.
SBLK50 = Method Blank

TABLE E-9
PESTICIDE/PCB ANALYSIS
LEACHATE

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

	PBLK93 (µg/l)	TB-1 (µg/l)	FB-L-1 (µg/l)	L-1-LF (µg/l)	L-2-LF (µg/l)
Dilution Factor	1.0	1.0	1.0	1.0	1.0
COMPOUND					
alpha-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
beta-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
delta-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
gamma-BHC (Lindane)	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Aldrin	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor epoxide	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Endosulfan I	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Dieldrin	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4'-DDE	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endrin	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan II	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4'-DDD	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan sulfate	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4'-DDT	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Methoxychlor	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Endrin-Ketone	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endrin Aldehyde	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
alpha-Chlordane	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
gamma-Chlordane	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Toxaphene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
AROCLOR-1016	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
AROCLOR-1221	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
AROCLOR-1232	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
AROCLOR-1242	1.0 U	1.0 U	1.0 U	1.0 U	0.31JPx
AROCLOR-1248	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
AROCLOR-1254	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
AROCLOR-1260	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

Note:

NYSDEC ASP 1991, (Method 91-3), Superfund Deliverables.

x = Value rejected due to data validation analysis.
U = Compound analyzed for but not detected.
J = Indicates an estimated value.
P = This flag is used for a pesticide/arochlor target analyte when there is a greater than 25 percent difference for detected contentrations between the two GC columns.
PBLK93 = Method blank

TABLE E-10
METALS ANALYSIS
LEACHATE

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

ELEMENT	TB-1 (µg/l)	FB-L-1 (µg/l)	L-1-LF (µg/l)	L-2-LF (µg/l)
Aluminum	37.0 U	37.0 U	51.5B	58.0B
Antimony	21.0 U	21.0 U	21.0 U	21.0 U
Arsenic	1.0 U	1.0 U	1.0 U	1.0 U
Barium	2.0 U	2.0B	145B	39.6B
Beryllium	1.0 U	1.0 U	1.0 U	1.0 U
Cadmium	2.0 U	2.0 U	2.0 U	2.0 U
Calcium	60.2 B	130B	120,000	43,600
Chromium	3.0 U	3.0 U	3.0 U	3.0 U
Cobalt	3.0 U	3.5B	3.0 U	3.0 U
Copper	7.0 U	29.1	7.0 U	7.0 U
Iron	89.3 U	87.0U	2,020	647
Lead	1.0 U	1.0 U	1.0 U	1.0 UW
Magnesium	29.4 U	104B	42,000	11,400
Manganese	12.2 U	2.0U	2,630	713
Mercury	0.20 U	0.20U	0.20 U	0.20 U
Nickel	11.0 U	13.7B	11.0 U	11.0 U
Potassium	473 U	473U	23,600	4,950
Selenium	2.0 U	2.0 U	2.0 U	2.0 U
Silver	2.0 U	2.0 U	2.0 U	2.0 U
Sodium	121 U	3,100B	51,000	27,400
Thallium	1.0 U	1.0 U	1.0 U	1.0 U
Vanadium	16.0 U	16.0 U	16.0 U	16.0 U
Zinc	10.3B	67.5	8.9Bxt	11.7Bxt
Cyanide	10.0 U	10.0 U	10.0 U	10.0 U

Note:

NYSDEC CLP-M (1989 ASP) Superfund Target Compound List (TCL:23 metals); Superfund-CLP Inorganics

B = Indicates a value greater than or equal to the instrument detection limit but less than the contract required detection limit.

U = Indicates element was analyzed for but not detected. Reported with the detection limit value.

W = Post-digest spike recovery furnace analysis was out of 85-115 percent control limit, while sample absorbance was less than 50 percent of spike absorbance.

x = Value disqualified

t = This result is qualitatively suspect since the compound was detected in an associated trip blank at similar levels.

TABLE E-11
VOLATILE ORGANIC ANALYSIS
SURFACE SOIL

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

	VBLKBQ (µg/Kg)	FB-SS-1 (µg/l)	SS-BKGD (µg/kg)	SS-LF-1 (µg/Kg)	SS-LF-1MS (µg/Kg)	SS-LF-1MSD (µg/Kg)	SS-LF-2 (µg/Kg)	SS-LF-3 (µg/Kg)
Dilution Factor	1.0	1.0	1.89	1.16	1.16	1.16	1.30	1.16
COMPOUND								
Chloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl chloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylene chloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acetone	14	10 U	10 U	28Bxb	9JBxb	10 U	8JBxb	11JBxb
Carbon Disulfide	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U	10 U	50X	54X	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethene (total)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroform	10 U	4J	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Butanone	10 U	10 U	10 U	7J	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl acetate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U	10 U	47X	50X	10 U	10 U
Dibromochloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzene	10 U	10 U	10 U	10 U	52X	57X	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	10 U	10 U	10 U	10 U	50X	50X	10 U	10 U
Chlorobenzene	10 U	10 U	10 U	10 U	48X	50X	10 U	10 U
Ethyl Benzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Total Xylenes	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TICs								
Unknown branched alkane				9J			9J	
Unknown siloxane			14J					28J
Cyclotetrasiloxane, octamethyl								25JN
Total TICs and Unkowns	0	0	14J	9J	0	0	9J	53J

Note:

NYSDEC ASP 1991, (Method 91-1), Plus 10 TICs, Superfund Deliverables
U = Compound analyzed for but not detected
J = Indicates an estimated value
X = Matrix Spike Compound
x = Value disqualified
b = This result is qualitatively suspect since this compound was detected in an associated method blank at similar levels.
TIC = Tentatively Identified Compound
FB-SS-1 = Field blank taken with surface soil samples
VBLKBQ = Method blank for soil samples

TABLE E-12
SEMIVOLATILE ORGANIC ANALYSIS
SURFACE SOIL

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

	SBLK52 (µg/Kg)	FB-SS-1 (µg/l)	SS-LF-1 (µg/Kg)	SS-LF-1MS (µg/Kg)	SS-LF-1MSD (µg/Kg)	SS-LF-2 (µg/Kg)	SS-LF-3 (µg/Kg)	SS-LF-3RE (µg/Kg)	SS-BKGD (µg/Kg)
Dilution Factor	1.0	1.0	1.15	1.15	1.15	1.30	1.12	1.12	2.08
COMPOUND									
Phenol	330 U	27	330 U	2,000X	2,200X	330 U	330 U	330 U	330 U
bis(2-Chloroethyl) ether	330 U	10 U	330 U	330 U	330 U	330 U	330 U	330 U	330 U
2-Chlorophenol	330 U	10 U	330 U	1,900X	2,000X	330 U	330 U	330 U	330 U
1,3-Dichlorobenzene	330 U	10 U	330 U	330 U	330 U	330 U	330 U	330 U	330 U
1,4-Dichlorobenzene	330 U	10 U	330 U	1,400X	1,400X	330 U	330 U	330 U	330 U
1,2-Dichlorobenzene	330 U	10 U	330 U	330 U	330 U	330 U	330 U	330 U	330 U
2-Methylphenol	330 U	10 U	330 U	330 U	330 U	330 U	330 U	330 U	330 U
2,2'-oxybis (1-Chloropropane)	330 U	10 U	330 U	330 U	330 U	330 U	330 U	330 U	330 U
4-Methylphenol	330 U	10 U	330 U	330 U	330 U	330 U	330 U	330 U	330 U
N-Nitroso-di-n-propylamine	330 U	10 U	330 U	1,500X	1,600X	330 U	330 U	330 U	330 U
Hexachloroethane	330 U	10 U	330 U	330 U	330 U	330 U	330 U	330 U	330 U
Nitrobenzene	330 U	10 U	330 U	330 U	330 U	330 U	330 U	330 U	330 U
Isophorone	330 U	10 U	330 U	330 U	330 U	330 U	330 U	330 U	330 U
2-Nitrophenol	330 U	10 U	330 U	330 U	330 U	330 U	330 U	330 U	330 U
2,4-Dimethylphenol	330 U	10 U	330 U	330 U	330 U	330 U	330 U	330 U	330 U
bis(2-Chloroethoxy) methane	330 U	10 U	330 U	330 U	330 U	330 U	330 U	330 U	330 U
2,4-Dichlorophenol	330 U	10 U	330 U	330 U	330 U	330 U	330 U	330 U	330 U
1,2,4-Trichlorobenzene	330 U	10 U	330 U	1,500X	1,400X	330 U	330 U	330 U	330 U
Naphthalene	330 U	10 U	330 U	330 U	330 U	330 U	40J	40J	330 U
4-Chloroaniline	330 U	10 U	330 U	330 U	330 U	330 U	330 U	330 U	330 U
Hexachlorobutadiene	330 U	10 U	330 U	330 U	330 U	330 U	330 U	330 U	330 U
4-Chloro-3-methylphenol	330 U	10 U	330 U	2,100X	2,100X	330 U	330 U	330 U	330 U
2-Methylnaphthalene	330 U	10 U	330 U	330 U	330 U	330 U	40J	41J	330 U
Hexachlorocyclopentadiene	330 U	10 U	330 U	330 U	330 U	330 U	330 U	330 U	330 U
2,4,6-Trichlorophenol	330 U	10 U	330 U	330 U	330 U	330 U	330 U	330 U	330 U
2,4,5-Trichlorophenol	800 U	25 U	800 U	800 U	800 U	800 U	800 U	800 U	800 U
2-Chloronaphthalene	330 U	10 U	330 U	330 U	330 U	330 U	330 U	330 U	330 U
2-Nitroaniline	800 U	25 U	800 U	800 U	800 U	800 U	800 U	800 U	800 U
Dimethyl phthalate	330 U	10 U	330 U	330 U	330 U	330 U	330 U	330 U	330 U
Acenaphthylene	330 U	10 U	330 U	330 U	330 U	330 U	12J	10J	330 U
2,6-Dinitrotoluene	330 U	10 U	330 U	330 U	330 U	330 U	330 U	330 U	330 U
3-Nitroaniline	800 U	25 U	800 U	800 U	800 U	800 U	800 U	800 U	800 U
Acenaphthene	330 U	10 U	25J	1,500X	1,500X	330 U	340J	320J	330 U
2,4-Dinitrophenol	800 U	25 U	800 U	800 U	800 U	800 U	800 U	800 U	800 U
4-Nitrophenol	800 U	25 U	800 U	2,800X	2,900X	800 U	800 U	800 U	800 U
Dibenzofuran	330 U	10 U	330 U	330 U	330 U	330 U	150J	150J	330 U
2,4-Dinitrotoluene	330 U	10 U	330 U	1,600X	1,600X	330 U	330 U	330 U	330 U
Diethylphthalate	330 U	10 U	330 U	330 U	330 U	330 U	11Jxf	9Jxf	24Jxf
4-Chlorophenyl-phenylether	330 U	10 U	330 U	330 U	330 U	330 U	330 U	330 U	330 U
Fluorene	330 U	10 U	330 U	330 U	330 U	330 U	370J	300J	330 U
4-Nitroaniline	800 U	25 U	800 U	800 U	800 U	800 U	800 U	800 U	800 U
4,6-Dinitro-2-methylphenol	800 U	25 U	800 U	800 U	800 U	800 U	800 U	800 U	800 U

TABLE E-12 (CONTINUED)
SEMIVOLATILE ORGANIC ANALYSIS
SURFACE SOIL

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

	SBLK52 (µg/Kg)	FB-SS-1 (µg/l)	SS-LF-1 (µg/Kg)	SS-LF-1MS (µg/Kg)	SS-LF-1MSD (µg/Kg)	SS-LF-2 (µg/Kg)	SS-LF-3 (µg/Kg)	SS-LF-3RE (µg/Kg)	SS-BKGD (µg/Kg)
Dilution Factor	1.0	1.0	1.15	1.15	1.15	1.30	1.12	1.12	2.08
COMPOUND									
N-nitrosodiphenylamine	330 U	10 U	330 U	330 U	330 U	330 U	330 U	330 U	330 U
4-Bromophenyl-phenylether	330 U	10 U	330 U	330 U	330 U	330 U	330 U	330 U	330 U
Hexachlorobenzene	330 U	10 U	330 U	330 U	330 U	330 U	330 U	330 U	330 U
Pentachlorophenol	800 U	25 U	800 U	1,900X	2,000X	800 U	800 U	800 U	800 U
Phenanthrene	330 U	10 U	120J	23J	41J	110J	1,600	1,600	90J
Anthracene	330 U	10 U	28J	330 U	8J	13J	340J	380	330 U
Carbazole	330 U	10 U	24J	330 U	330 U	19J	480	500	330 U
Di-n-butylphthalate	330 U	10 U	100Jxf	100Jxf	93Jxf	96Jxf	120Jxf	120Jxf	2,000x
Fluoranthene	330 U	10 U	230J	60J	88J	300J	2,100	2,200	170J
Pyrene	330 U	10 U	170J	1,800X	1,900X	250J	2,000	2,600	150J
Butylbenzylphthalate	330 U	10 U	330 U	330 U	330 U	330 U	330 U	330 U	31Jxf
3,3'-Dichlorobenzidine	330 U	10 U	330 U	330 U	330 U	330 U	330 U	330 U	330 U
Benzo(a)anthracene	330 U	10 U	120J	36J	50J	130J	1,300	1,200	330 U
Chrysene	330 U	10 U	140J	39J	57J	200J	1,300	1,200	120J
bis(2-Ethylhexyl) phthalate	20J	0.5JBxb	130JBxf	28JBxb	45JBxb	32JBxb	52JBxb	46JBxb	89JBxb
Di-n-octyl phthalate	330 U	3J	330 U	330 U	330 U	17Jxf	110Jxf	170Jxf	290Jxf
Benzo(b)fluoranthene	330 U	10 U	110J	42J	49J	230J	1,600J	1,600J	160J
Benzo(k)fluoranthene	330 U	10 U	95J	37J	59J	96J	1,700J	1,400J	330 U
Benzo(a)pyrene	330 U	10 U	81J	31J	46J	120J	1,100J	1,300J	76J
Indeno (1,2,3-cd)pyrene	330 U	10 U	41J	24J	31J	82J	290J	500J	330 U
Dibenzo (a,h) anthracene	330 U	10 U	330 U	330 U	330 U	330 U	98J	110J	330 U
Benzo(g,h,i)perylene	330 U	10 U	330 U	330 U	15J	44J	120J	210J	330 U
TICs									
Unknowns	5,989J	149J	14,060J			2,020J	11,180J	18,370J	25,830J
Aldol condensation product	21,000JA	10JABxb	31,000JABxb				24,000JABxb	56,000JABxb	14,000JABxb
2-Cyclohexen-1-one	89JN	3JNBxb	240JNBxb			370JNBxb			
3-Hexene-2,5-dione	320JN		410JNBxb			390JNBxb	390JNBxb	600JNBxb	
1,2-Cyclohexanediol, trans		17JN							
2-Propanol, 1,1'-[(1-methyl-1,2-		12JN							
Dodecanamide, n,n'-bis (2-hydrox		5JN							
Hexanoic acid, 2-ethyl		110JN							
Benzene acetic acid									4,700JN
Unknown alkane			130J				5,840J	5,730J	4,810J
Unknown ketone							430J	450J	
Unknown PAH MW=252							670J		
Unknown PAH MW=216							350J		
Unknown PAH MW=190							330J	290J	
Total TICs and Unknowns	27,547J	306J	59,900J			2,780J	43,190J	81,440J	49,340J

Note:

NYSDEC ASP 1991 (Method 91-2), Plus 20 TICs, Superfund Deliverables
Specific quantitation limits are highly matrix dependent
TIC = Tentatively Identified Compound
U = Compound analyzed for but not detected. Reported within the detection limit.
J = Indicates an estimated value
X = Matrix Spike Compound
x = Value disqualified
b = This result is qualitatively suspect since this compound was detected in an associated method blank at similar levels.
SBLK50 = Method Blank

TABLE E-13
PESTICIDE/PCB ANALYSIS
SURFACE SOIL

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

	PBLK91 (µg/Kg)	FB-SS-1 (µg/l)	SS-BKGD (µg/Kg)	SS-LF-1 (µg/Kg)	SS-LF-1MS (µg/Kg)	SS-LF-1MSD (µg/Kg)	SS-LF-2 (µg/Kg)	SS-LF-3 (µg/Kg)
Dilution Factor	1.0	1.0	2.08	1.15	1.15	1.15	1.30	1.12
COMPOUND								
alpha-BHC	1.7 U	0.05 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
beta-BHC	1.7 U	0.05 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
delta-BHC	1.7 U	0.05 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
gamma-BHC (Lindane)	1.7 U	0.05 U	1.7 U	1.7 U	17	18	1.7 U	1.7 U
Heptachlor	1.7 U	0.05 U	1.7 U	1.7 U	18P	20	1.7 U	1.7 U
Aldrin	1.7 U	0.05 U	1.7 U	1.7 U	21	22	1.7 U	1.7 U
Heptachlor epoxide	1.7 U	0.05 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
Endosulfan I	1.7 U	0.05 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
Dieldrin	3.3 U	0.10 U	3.3 U	3.3 U	37P	40P	3.3 U	3.3 U
4,4'-DDE	3.3 U	0.10 U	14	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U
Endrin	3.3 U	0.10 U	3.3 U	3.3 U	40P	50P	3.3 U	3.3 U
Endosulfan II	3.3 U	0.10 U	4.1JP	3.3 U	7.3	3.3 U	3.3 U	3.3 U
4,4'-DDD	3.3 U	0.10 U	3.3 UJ	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U
Endosulfan sulfate	3.3 U	0.10 U	2.3J	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U
4,4'-DDT	3.3 U	0.10 U	11P	3.3 U	36P	44P	3.3 U	3.3 U
Methoxychlor	1.3JP	0.05 U	17 U	17 U	17 U	17 U	17 U	17 U
Endrin-Ketone	3.3 U	0.10 U	3.3 U	3.3 U	5.2P	1.7P	3.3 U	3.3 U
Endrin Aldehyde	3.3 U	0.10 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U
alpha-Chlordane	1.7 U	0.05 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
gamma-Chlordane	1.7 U	0.05 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
Toxaphene	170 U	5.0 U	170 U	170 U	170 U	170 U	170 U	170 U
AROCLOR-1016	33 U	1.0 U	33 U	33 U	33 U	33 U	33 U	33 U
AROCLOR-1221	67 U	2.0 U	67 U	67 U	67 U	67 U	67 U	67 U
AROCLOR-1232	33 U	1.0 U	33 U	33 U	33 U	33 U	33 U	33 U
AROCLOR-1242	33 U	1.0 U	33 U	33 U	33 U	33 U	33 U	33 U
AROCLOR-1248	33 U	1.0 U	33 U	33 U	33 U	33 U	33 U	33 U
AROCLOR-1254	33 U	1.0 U	33 U	50	63	60P	1.0 U	110JP
AROCLOR-1260	33 U	1.0 U	74P	62	65P	75	17JP	140JP

Note:

NYSDEC ASP 1991, (Method 91-3), Superfund Deliverables.

U = Compound analyzed for but not detected.

J = Indicates an estimated value.

P = This flag is used for a pesticide/arochlor target analyte when there is a greater than 25 percent difference for detected contentrations between the two GC columns.

PBLK91 = Method blank

TABLE E-14
METALS ANALYSIS
SURFACE SOIL

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

ELEMENT	FB-SS-1 (µg/l)	SS-LF-1 (mg/Kg)	SS-LF-2 (mg/Kg)	SS-LF-3 (mg/Kg)	SS-BKGD (mg/Kg)
Aluminum	104B	16,600JE*	8,510JE*	9,680JE*	11,500JE*
Antimony	21.0 U	4.3 U	5.1 U	4.0 U	7.9 U
Arsenic	1.0 U	1.4B	2.1B	2.4BS	14.2S
Barium	2.0B	22.2B	55.6	37.8B	457
Beryllium	1.0 U	0.31B	0.30B	0.42B	1.2B
Cadmium	2.0 U	0.41 U	0.48 U	0.38 U	2.5
Calcium	137B	14,700JE*	2,750JE*	8,950JE*	4,530JE*
Chromium	3.0B	10.8xf	9.7xf	10.6xf	11.6xf
Cobalt	3.0 U	4.7B	3.7B	5.4B	12.6B
Copper	7.0 U	39.8*	12.0*	39.3*	37.2*
Iron	87.0 U	12,700	12,100	14,200	27,900
Lead	1.0 U	4.1	10.3	10.5	53.2
Magnesium	52.7B	6,390JE	2,010JE	4,770JE	1,640JBE
Manganese	3.4B	315JN	466JN	714JN	11,200JN
Mercury	0.20 U	0.10 U	0.12 U	0.11 U	0.19
Nickel	11.0 U	12.6	6.1B	15.7	18.5
Potassium	473 U	824B	437B	891B	717B
Selenium	2.0 U	0.44 U	0.49 U	0.38 U	1.1B
Silver	2.0 U	0.41 U	0.48 U	0.38 U	0.75 U
Sodium	3,000B	59.4Bxf	41.8Bxf	56.9Bxf	62.3 Bxf
Thallium	1.0 U	0.22 U	0.25 U	0.19 U	0.79 B
Vanadium	16.0 U	17.1	12.8	21.0	47.1
Zinc	24.4	30.2Jxf	38.7Jxf	48.2xf	191.0
Cyanide	10.0 U	2.9 U	3.2 U	2.8 U	5.0 U

Note:

NYSDEC CLP-M (1989 ASP) Superfund Target Compound List (TCL:23 metals); Superfund-CLP Inorganics

B = Indicates a value greater than or equal to the instrument detection limit but less than the contract required detection limit.

U = Indicates element was analyzed for but not detected. Reported with the detection limit value.

E = Reported value is estimated because of the presence of interference.

* = Duplicate analysis not within control limits.

S = The reported value was determined by the method of standard additions (MSA).

N = Spiked sample recovery not within control limits.

x = Value disqualified

f = This result is qualitatively suspect since the compound was detected in an associated field blank at similar levels.

TABLE E-15
VOLATILE ORGANIC ANALYSES
AIR

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

	BATCH 1		BATCH 2		
	Lab Blank 3520	DM-4	DM-8 Blank	DM-2	DM-6
Air Volume (Liters)	NA	NA	NA	71.42	65.69
Time (minutes)	NA	453	NA	NA	NA
Front (µg)	<15	<15	<10	<10	<10
Back (µg)	<15	<15	<10	<10	<10
Total (µg)	<15	<15	<10	<10	<10
Total VOCs (ppm)	NA	<0.3	NA	<0.04	<0.04
Total VOCs (mg/m3)	NA	NA	NA	<0.2	<0.4

Note:
Samples analyzed using NIOSH Methods 1500 and 1501
NA = Not Applicable
ppm = parts of contaminant per million parts of air
mg/m3 = milligrams of contaminant per cubic meter of air

TABLE E-16
PCB ANALYSIS
AIR

MAIN LANDFILL INVESTIGATION
ALCAN ROLLED PRODUCTS COMPANY
OSWEGO, NY

	DM-7 BLANK	DM-1	DM-3	DM-5
Air Volume (Liters)	NA	61.35	56.22	44.81
Front (µg)	<.05	<.05	<.05	<.05
Back (µg)	<.05	<.05	<.05	<.05
Total (µg)	<.05	<.05	<.05	<.05
Total VOCs (mg/m3)	NA	<0.001	<0.0009	<0.0008
Arochlor	NA	NA	NA	NA

Note:
Samples analyzed using NIOSH Method 5503
NA = Not Applicable
mg/m3 = milligrams of contaminant per cubic meter of air

APPENDIX F

DATA VALIDATION REPORT

Data Validation Services

Cobble Creek Road P. O. Box 208
North Creek, N. Y. 12853
Phone 518-251-4429

TO: Dames & Moore

FROM: Judy Harry, Data Validation Services J. Harry

DATE: 3-29-94

RE: Validation of Alcan Site air analysis data packages
Galson Labs Login No. 15390

Review is complete for the data package generated by Galson Labs pertaining to air analyses of samples collected at the Alcan Site. One OVM badge and two charcoal tubes were analysed for volatile components. Three filter/tubes were analysed for PCBs. The front and back sections of each sample were analysed, and laboratory blanks were processed for each matrix/analysis type. Methods used were NIOSH 5503, OVM 3M, and NIOSH 1500/1501

In summary, no volatile organics or PCB components were detected in the samples. Although certain noncompliancies were present in the volatile processing, as discussed below, no qualifications to the sample reported results are recommended.

Holding times were met for the sample processing. Method and solvent blanks were processed at proper frequencies, and showed no presence of target compound contaminants. The PCB analysis package included initial and continuing calibration data to support system linearity and consistency of response. Reported results are substantiated by the raw data.

The volatile analysis was not compliant in that, although a daily calibration standard (charcoal tube spiked with specific analytes of interest) was processed, an initial calibration curve was not run with the samples. Upon request, the laboratory provided documentation of hexane standard curve data from 12/92, 2/93, and newly generated curve data from 3/94. The samples were analysed in October of 1993. All three initial calibrations showed good linearity (below 4%RSD for hexane). The instrument shows consistent responses from December 1992 to March 1994, with standard response factors varying less than 4%. The daily calibration processed with the samples produced good correlation to all curves. Therefore, there is confidence in the reported detection limit of the samples.

COMPLIANCY CHART

Project: Alcan Site

SDG Nos: Galson Login No. 15390

Protocol: NIOSH 1550/1501/5503; OVM 3M

RecDate	Sample ID	Matrix	VOA	PCB	Other	Noncompl
12-27-93	DM-1	Air tube	NR	OK	OK	
12-27-93	DM-2	Air tube	NO	NR	OK	1
12-27-93	DM-3	Air tube	NR	OK	OK	
12-27-93	DM-4	Air badge	NO	NR	OK	1
12-27-93	DM-5	Air tube	NR	OK	OK	
12-27-93	DM-6	Air tube	NO	NR	OK	1
12-27-93	DM-7	Air blank	NR	OK	OK	
12-27-93	DM-8	Air blank	NO	NR	OK	1

1. No initial calibration standards run at time of sample processing (NIOSH 1500 section 8.b)

Galson Laboratories

6601 Kirkville Road
E. Syracuse, NY 13057
Tel: (315) 432-0506
1-800-950-0506

January 31, 1994

DOH ELAP # 10186

Mr. Brian King
C.T. Male Associates, P.C.
200 Gateway Park Drive, Bldg. A
P.O. Box 3246
Syracuse, NY 13220

Re: Client Account # 11616 Login # 15390

Dear Mr. King:

Enclosed are the chromatograms and back-up data that you requested for login 15390 for which samples were originally received in our laboratory on October 27, 1993. The analytical report was sent to you on November 9, 1993.

PCB and total volatile organics samples were analyzed according to NIOSH Methods 5503 and 1500/1501 respectively. All supporting documentation has been included for your review.

Calibration for the PCBs was achieved using a five point curve and point-to-point quantification. A daily continuing check standard of n-hexane was used to quantify the total volatile organics. The response of n-hexane was used to quantify the total ug values.

No detectable amounts of PCBs or volatile organics were found in any of the samples. The field blank and laboratory blanks were also clean.

Please contact our Industrial Hygiene Client Services, at (800) 724-0669 extension 305 or 135, if you require additional information regarding this report.

Thank you for using Galson Laboratories.

Sincerely,

Galson Laboratories

Gale G. Sutton, CIH
Laboratory Director

Enclosure(s)

Data Validation Services

Cobble Creek Road P. O. Box 208
North Creek, N. Y. 12853
Phone 518-251-4429

TO: Dames & Moore

FROM: Judy Harry, Data Validation Services J Harry

DATE: 01-06-94

RE: Validation of Alcan Site data package
IEA SDG No. Z1217

Review is complete for the data package generated by IEA Labs pertaining to samples collected at the Alcan Site. Four soil and eleven aqueous samples (including field and trip blanks) were processed for TCL/TAL analytes. Matrix spike/duplicate analyses were performed on each of the matrices. The methodologies utilized are those of the 1991 NYSDEC ASP CLP.

In summary, the analyses were conducted in compliance with the protocol requirements with exceptions as noted in the text below, and on the attached compliancy chart. Also attached to this report are the laboratory case narratives and sample preparation/analysis summary forms. No additional laboratory submissions were required.

Certain of the sample reported results are recommended for qualification, as detailed below, due to outlying QC values or transcription error. Other quality issues are discussed in the subsequent sections.

Recommended edits and qualification of sample reported results are as follows:

1. Due to detection in the associated field, trip, and/or method blanks, the reported values of acetone and chloroform in the samples should be rejected for consideration as sample components. The reported results for these compounds should be edited to reflect nondetection at either the CRQL, or at the originally reported value, whichever is greater. Although methylene chloride was not detected in the associated blanks, it is a common laboratory contaminant, and reported detection in the samples should be considered suspect.

2. The volatile Tentatively Identified Compounds (TICs) identified as siloxanes and trichlorotrifluoroethane (freon) should also not be regarded as sample components. The siloxanes were reported in associated blanks. The freon, although not reported in method blank VBLKBQ, was evident in the acetone spectrum submitted for the blank (due to coelution).

3. All semivolatile and volatile TICs which are reported with the "B" (present in method blank) or "A" (aldol condensate-extraction artifact) flag should be rejected for consideration as sample components.

4. The reported detection of phthalate compounds in the semivolatile sample analyses should be rejected, as these compounds were also present at similar levels in the associated field and/or method blanks. The reported results for these compounds should be edited to reflect nondetection at either the CRQL, or at the originally reported value, whichever is greater. The exception to these rejections is the di-n-butylphthalate reported for sample SS-BKGD, which is at a level sufficiently high (greater than ten times the levels in the associated blanks) as to not warrent qualfication.

5. Phenol was detected/reported in the semivolatile field blanks FB-SS-1, FB-GW-1, and FF-L-1 at levels from 27 ug/L to 40 ug/L. Consequently, the reported detection of phenol at 10 ug/L in the sample MW-7 should be rejected, and the reported result edited to reflect nondetection at that level.

6. The semivolatile analysis of SS-LF-3 produced repeated depressed recovery of internal standard d14-perylene (41% and 24% of daily standard, below acceptance limit of 50%). The initial analysis produced a better response than the reanalysis, and is most usable. Due to the matrix effect indicated by the outlying recovery, the reported values/detection limits of the following compounds in the sample should be considered estimated:
   di-n-octylphthalate, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene, and benzo(g,h,i)perylene).

   In addition, the reported detection limits for compounds 3-nitroaniline, 4-chloroaniline, and 3,3'-dichlorobenzidine in this sample, SS-LF-3, should be considered estimated due to low recovery in the daily calibration standard (percent differences of 38% to 49%).

7. Due to poor chromatography, certain semivolatile TICs were not detected correctly by the software, and not therefore evaluated and reported. These compounds have chromatographic properties usually indicative of organic acids:
   a. TICs at about 16.6' and 23' in sample MW-7.
   b. A single TIC at about 10-11' in sample MW-1 was split by the software into numerous integrations which, individually were less than the required limit (10% of internal standard response), but cumulatively well exceed the limit.

8. When the dual column quantitative pesticide/PCB values exceed 25% difference in correlation, the reported results are flagged as "P". In some cases, the variance can be explained by interferences, at other times the variance may indicate that the identification of the target analyte is tentative, possibly a matrix artifact. Evaluation of the following compounds has determined that the reported values should be edited to reflect nondetection at the CRQL:

Sample ID	Compound	
MW-1	gamma-chlordane	(100%D)
L-2-LF	Aroclor 1260	(50%D-also poor isomer correlation)

Sample SS-LF-3 reported values for Aroclor 1254 and 1260, both of which showed poor dual column correlation (27%D and 71%D). The reported values are the better of the two quantitation determinations, but the values should be considered estimated due to the implied error in characterizing similar/overlapping Aroclor mixtures in a sample showing matrix interference.

9. The reported detection limit for 4,4'-DDD in SS-BKGD should be considered estimated. Presence of 4,4'-DDD is observed on column RTX-35, and 4,4'-DDD coelutes with the detected/reported Endosulfan II on column DB-1701, indicating the possible confirmed presence of the compound. The possible presence is further indicated by the fact that the column DB-1701 response for Endosulfan II is about twice that of the Endosulfan II response on RTX-35.

10. The value for lead in FB-GW-1 was inaccurately reported as nondetected at the IDL. The actual value should be 16.9 ug/L.

11. Due to presence of certain elements in the associated field blanks, the following sample detected results (less than five times the blank value) should be rejected:

Field Blank	Element, Field Blank Value	Associated Samples
FB-L-1	Zinc, 67 ug/L	L-1-LF and L-2-LF
FB-GW-1	Copper, 33 ug/L	MW-7, MW-8, MW-9, MW-10
	Zinc, 300 ug/L	MW-1, MW-7, MW-8, MW-9, MW-10
	Lead, 17 ug/L	MW-1, MW-7, MW-8, MW-9, MW-10

The value of copper in MW-1 should be considered estimated (less than ten times the blank level).
The values of zinc in SS-LF-1 and SS-LF-2 should be considered estimated (less than ten times the blank level).

12. Manganese recovered at 135% in the matrix spike of sample SS-LF-1, indicating the consideration of the reported values for manganese as estimated in all soil samples (SS-LF-1, SS-LF-2, SS-LF-3, and SS-BKGD).

13. Due to poor duplicate correlation (60%RPD), the reported values for aluminum in all soil samples should be considered estimated.

14. Due to poor serial dilution correlation of aluminum, calcium, and magnesium (25%D, 102%D, and 52%D, respectively), the reported values for these elements in all soil samples should be considered estimated.

Other concerns not resulting in qualification of sample reported results are as follows:

VOLATILE ANALYSES

Holding times were met for sample processing. Surrogate recoveries, method blanks, and instrumental tunes were all within required criteria. Sample matrix spikes were performed on MW-8 and SS-LF-1, with all recoveries and duplicate correlation values falling within recommended criteria. Matrix spike blanks met required recovery criteria.

Initial and continuing calibration standards were acceptable, and indicated no additional qualification of reported values. Internal standard retention times and response areas met protocol requirements.

All reported results are substantiated by the raw data.

SEMIVOLATILE ANALYSES

Holding times were met for sample processing. Surrogate recoveries and instrumental tunes were all within required criteria. Sample matrix spikes were performed on MW-8 and SS-LF-1, with all duplicate correlation values falling within recommended criteria. The recoveries of the matrix spikes of SS-LF-1 were within recommended limits. The matrix

spikes of MW-8 produced elevated recoveries of 4-nitrophenol (125% and 117%; above the limit of 80%) and pentachlorophenol (133% and 147%, above the limit of 103%). The aqueous and soil matrix spike blanks produced elevated recoveries for 4-nitrophenol (109% and 84%; above required limit of 80%), but the recoveries are in accordance with the methodologies, and do not impact sample reported results.

Initial and continuing calibration standards were within protocol requirements. Certain elevated % difference values were observed, but no additional qualification of reported values was indicated, except for those noted in item #6 above. Internal standard retention times and response areas met protocol requirements, with the exception of sample SS-LF-3, discussed earlier.

The method blanks associated with this delivery group were quite contaminated with non-target compounds reported as TICs, with as many as thirteen in a given blank. The laboratory made obvious efforts to indicate ("B" flag) those compound present in the samples which were also present in the associated blank, but it is not always possible to be complete in this situation. Presence of laboratory contaminants in the samples prohibits optimum evaluation of sample TIC components.

All reported results are substantiated by the raw data.

PESTICIDES/PCBS

Holding times and method blanks met protocol requirements. Surrogate DCB recoveries were slightly out of range on one column for samples MW-8, MW-7, MW-1, and TB-1 (recoveries as low as 48%, recommended limit is 60%). Recoveries of all surrogates in L-1-LP were depressed, at 39% to 51%. The DCB recoveries were significantly low on both columns (14% to 26%) for all three field blanks. Evaluation of reported IDLs and column results utilized for the sample, has resulted in no recommendation for qualification of reported values based upon these surrogate recoveries.

Matrix spikes were performed on samples MW-8 and SS-LF-1, and resulted in acceptable values for recovery and duplicate correlation. Matrix spike blanks (MSB) also were within criteria. It is noted, however, that excessive differences in dual column quantitative values were noted in the spike values in the MSB, indicating a possible instrumental contribution to the variances.

All requirements for pesticide/PCB analysis were reviewed, including linearity, resolution, breakdown, cleanup recovery, sequencing, surrogate retention times, performance and individual standard responses, etc. All were found to be compliant and acceptable.

METALS/CN

All criteria required by protocol were reviewed for compliance and acceptability. All sample reported results were reviewed for accuracy. Unless noted specifically within this text, all were found to be acceptable. Please see recommended edits/qualifications discussed earlier.

Matrix spikes were performed on samples MW-8 and SS-LF-1. The aqueous recoveries and duplicate correlation values were within recommended limits. In addition to the outlying manganese recovery and the elevated duplicate correlation for aluminum in SS-LF-1 (noted earlier), slightly elevated duplicate correlation values (above 20%RPD) were observed for calcium (20.6%RPD) and copper (20.1 %RPD).

Serial dilution correlation on sample MW-8 was good. The outlying values for the serial dilution of SS-LF-2 were discussed earlier.

COMPLIANCY CHART

Project: Alcan Site

SDG Nos: IEA SDG No. Z1217

Protocol: 1991 NYSDEC ASP CLP

RecDate	Sample ID	Matrix	VOA	BNA	Pest/PCB	Metals/CN	Other	Noncompl
10-29-93	MW-8	Aqueous	OK	NO	OK	OK	OK	1,2
10-29-93	MW-10	Aqueous	OK	NO	OK	OK	OK	1,2
10-29-93	MW-9	Aqueous	OK	NO	OK	OK	OK	1,2
10-29-93	MW-7	Aqueous	OK	NO	OK	OK	OK	1,2
10-29-93	MW-1	Aqueous	OK	NO	OK	OK	OK	1,2
10-29-93	L-1-LF	Aqueous	OK	NO	OK	OK	OK	1,2
10-29-93	L-2-LF	Aqueous	OK	NO	OK	OK	OK	1,2
10-29-93	SS-BKGD	Soil	OK	NO	OK	OK	OK	1,2
10-29-93	SS-LF-1	Soil	OK	NO	OK	OK	OK	1,2
10-29-93	SS-LF-2	Soil	OK	NO	OK	OK	OK	1,2
10-29-93	SS-LF-3	Soil	OK	NO	OK	OK	OK	1,2
10-29-93	FB-L-1	Aqueous	OK	NO	OK	OK	OK	1,2
10-29-93	FB-GW-1	Aqueous	OK	NO	OK	OK	OK	1,2
10-29-93	FB-SS-1	Aqueous	OK	NO	OK	OK	OK	1,2
10-29-93	TB-1	Aqueous	OK	NO	OK	OK	OK	1,2

1. BNA matrix spike blank with outlying recoveries (1991 NYSDEC ASP pg. E-59).
2. BNA method blanks with excessive Tentatively Identified Compounds (pg. D-III-67).

016

IEA
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30930-1217
DAMES & MOORE

SDG Narrative

Volatile Organics - No problems were reported.

Semi-Volatile Organics - Sample SS-LF-3 exhibited suppressed internal standard areas for perylene-d_{12}. The sample was reanalyzed with similar results, therefore proving matrix interference. Both analyses have been reported with the reanalysis designated with the suffix "RE".

Pesticides/PCB's - Samples FB-L-1, FB-GW-1, MW-9, MW-8, MW-7, MW-1, TB-1, L-1-LF, FB-SS-1 and MW-8 MSD had surrogate recoveries outside QC advisory limits.

Method blank PBLK91 was contaminated with methoxychlor, however, it was below the CRQL limits.

Due to software limitations, the scaling factors could not be displayed on the chromatograms.

The third peak for Aroclor-1260 (RT:34.07) had matrix interference on column RTX-35 in sample SS-LF-2. Therefore, the only three peaks representing Aroclor-1260 that could be used for calculation resulted in a very high concentration from column RTX-35. The reported value was unaffected since the lower value has been reported on the Form 1. However, the results have been flagged with a "P" due to the >25 percent difference.

Metals - IEC's are electronically employed by the TJA ICAP-61. However, the ICSA is utilized as a monitoring device to detect any additional adjustments that may be required. These modifications are calculated and applied manually. They are so noted in the raw data.

An "E" flag resulted from serial dilution of sample SS-LF-1 for aluminum, calcium and magnesium. It appears that a matrix interference could be the cause for the resultant flag since the occurrence of this many flags is rare. Futher study would be required to confirm this.

An asterisk "*" occurred from duplicate analysis of sample SS-LF-1 for aluminum, calcium and copper. Once again, a matrix interference appears to be present.

Manganese failed the control limits for spike recovery analysis of sample SS-LF-1, resulting in an "N" flag. The previously mentioned matrix effect appears to be the cause of this flag.

No other problems were noted.

0161

I certify that this data package is in compliance with the terms of this contract, both technically and for completeness, for other than the conditions detailed above. Release of this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Jeffrey C. Curran
Laboratory Manager

Dec. 3/1993
Date

02

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE IDENTIFICATION AND
ANALYTICAL REQUIREMENT SUMMARY

JOB # : 3093-1217

CUSTOMER SAMPLE CODE	LABORATORY SAMPLE CODE	ANALYTICAL REQUIREMENTS*						
		*VOA GC/MS	*BNA GC/MS	*VOA GC	*PEST PCB	*METALS	*OTHER	*OTHER
FB-L-1	1217001	X	X		X	X		
FB-GW-1	1217002	X	X		X	X		
MW-6	1217003	X	X		X	X		
MW-10	1217004	X	X		X	X		
MW-9	1217005	X	X		X	X		
MW-7	1217006	X	X		X	X		
MW-1	1217007	X	X		X	X		
TB-1	1217008	X	X		X	X		
L-1-LF	1217009	X	X		X	X		
L-2-LF	1217010	X	X		X	X		
FB-SS-1	1217011	X	X		X	X		
SS-BKGD	1217012	X	X		X	X		
SS-LF-1	1217013	X	X		X	X		
SS-LF-2	1217014	X	X		X	X		
SS-LF-3	1217015	X	X		X	X		

* Check Appropriate Boxes

* CLP, Non-CLP
* HSL, Priority Pollutant

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

03

SAMPLE PREPARATION AND ANALYSIS SUMMARY
VOA - TCL + TIC's
ANALYSIS

JOB # : 3093-1217

SAMPLE ID	MATRIX	DATE COLLECTED	DATE RECVD AT LAB	DATE EXTRACTED	DATE ANALYZED
FB-L-1	Aqueous	10/28/93	10/29/93	N/A	11/03/93
FB-GW-1	Aqueous	10/27/93	10/29/93		
MW-8	Aqueous		10/29/93		
MW-10	Aqueous		10/29/93		
MW-9	Aqueous		10/29/93		
MW-7	Aqueous		10/29/93		
MW-1	Aqueous		10/29/93		
TG-1	Aqueous		10/29/93		
L-1-LF	Aqueous	10/28/93	10/29/93		
L-2-LF	Aqueous		10/29/93		
FB-SS-1	Aqueous		10/29/93		
SS-8X6D	Soil		10/29/93		11/3/93
SS-LF-1	Soil		10/29/93		
SS-LF-2	Soil		10/29/93		
SS-LF-3	Soil		10/29/93		

04

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
B/N-A - TCL + TIC's
ORGANIC ANALYSIS

JOB # : 3093-1217

SAMPLE ID	MATRIX	ANALYTICAL PROTOCOL	EXTRACTION METHOD	AUXILARY CLEAN UP	DIL/CONC FACTOR
FB-L-1	Aqueous	NYSCLP	CONT	NONE	1.0
FB-GW-1	Aqueous				
MW-8	Aqueous				
MW-10	Aqueous				
MW-9	Aqueous				
MW-7	Aqueous				
MW-1	Aqueous				
TB-1	Aqueous				
L-1-LF	Aqueous				
L-2-LF	Aqueous				
FB-SS-1	Aqueous				
SS-BKGD	Soil		SONC	GPC	
SS-LF-1	Soil				
SS-LF-2	Soil				
SS-LF-3	Soil				
SS-LF-1 MS					
SS LF 1 MSD					
S LF 1 MSB					
SS LF 3 RE					
MW-8MS	Aqueous		CONT	NONE	
MW 8MSD					
MW 8MSB					

04A

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
B/N-A - TCL + TIC's
ANALYSIS

JOB # : 3093-1217

SAMPLE ID	MATRIX	DATE COLLECTED	DATE RECVD AT LAB	DATE EXTRACTED	DATE ANALYZED
FB-L-1	Aqueous	10/28/93	10/29/93	11/01/93	11/22/93
FB-GW-1	Aqueous	10/27/93	10/29/93	↓	↓
MW-8	Aqueous	↓	10/29/93	↓	11/23/93
MW-10	Aqueous	↓	10/29/93	↓	↓
MW-9	Aqueous	↓	10/29/93	↓	↓
MW-7	Aqueous	↓	10/29/93	↓	↓
MW-1	Aqueous	↓	10/29/93	↓	11/25/93
TB-1	Aqueous	—	10/29/93	↓	11/23/93
L-1-LF	Aqueous	10/28/93	10/29/93	↓	11/24/93
L-2-LF	Aqueous	↓	10/29/93	↓	11/25/93
FB-SS-1	Aqueous	↓	10/29/93	↓	10/24/93
SS-BKGD	Soil	↓	10/29/93	↓	11/25/93
SS-LF-1	Soil	↓	10/29/93	↓	↓
SS-LF-2	Soil	↓	10/29/93	↓	↓
SS-LF-3	Soil	↓	10/29/93	↓	11/30/93
SSLF1MS	↓	↓	↓	↓	11/27/93
SSLF1MSD	↓	↓	↓	↓	↓
SSLF1MSB	↓	↓	↓	↓	11/25/93
SSLF3RE	↓	↓	↓	↓	12/6/93
MW8MS	Aqueous	10/27/93	↓	↓	11/25/93
MW-8MSD	↓	↓	↓	↓	11/23/93
MW-8MSB	↓	↓	↓	↓	↓

ONE 12/20/93

05

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
PESTICIDE/PCB - TCL
ANALYSIS

JOB # : 3093-1217

SAMPLE ID	MATRIX	DATE COLLECTED	DATE RECVD AT LAB	DATE EXTRACTED	DATE ANALYZED
FB-L-1	Aqueous	10/28/93	10/29/93	11/02/93	11/04/93
FB-GW-1	Aqueous	10/27/93	10/29/93		
MW-8	Aqueous		10/29/93		
MW-10	Aqueous		10/29/93		11/05/93
MW-9	Aqueous		10/29/93		
MW-7	Aqueous		10/29/93		
MW-1	Aqueous		10/29/93		
TB-1	Aqueous		10/29/93		
L-1-LF	Aqueous	10/28/93	10/29/93		
L-2-LF	Aqueous		10/29/93		
FB-SS-1	Aqueous		10/29/93		
SS-BKGD	Soil		10/29/93	11/01/93	11/13/93
SS-LF-1	Soil		10/29/93		
SS-LF-2	Soil		10/29/93		
SS-LF-3	Soil		10/29/93		

Exhibit A

Task I: Completeness

The Validator shall review the data package to determine completeness. A complete data package will consist of the following eight (8) components:

1. All sample chain of custody forms.

2. The case narrative(s) including all sample/analysis summary forms*.

3. Quality Assurance/Quality Control summaries including all supporting documentation.

4. All relevant calibration data including all supporting documentation.

5. Instrument and method performance data.

6. Documentation showing the laboratory's ability to attain the contract specified method detection limits for all target analytes in all required matrices.

7. All data report forms including examples of the calculations used in determining final concentrations.

8. All raw data used in the identification and quantitation of the contract specified target compounds.

*These forms appear as an addendum to the NYSDEC CLP forms package and will be required for all data submissions regardless of the protocol requested.

All deficiencies in the requirement for completeness shall be reported to the consultant immediately. The laboratory shall be contacted by the consultants QAO and shall be given ten (10) calendar days to produce the documentation necessary to remove the deficiencies.

Task II: Compliance

The Validator shall review the submitted data package to determine compliance with those portions of the work plan that pertain to the production of laboratory data. Compliance is defined by the following criteria.

1. The data package is complete as defined in Task 1 above.

2. The data has been produced and reported in a manner consistent with the requirements of the QAPjP and the laboratory subcontract.

3. All protocol required QA/QC criteria have been met.

4. All instrument tune and calibration requirements have been met for the time frame during which the analyses were completed.

5. All protocol required initial and continuing calibration data is present and documented.

6. All data reporting forms are complete for all samples submitted. This will include all requisite flags, all sample dilution/concentration factors and all premeasurement sample cleanup procedures.

7. All problems encountered during the analytical process have been reported in the case narrative along with any and all actions taken by the laboratory to correct these problems.

The data validation task requires that the Validator conduct a detailed comparison of the reported data with the raw data submitted as part of the supporting documentation package. It is the responsibility of the Validator to determine that the reported data can be completely substantiated by applying protocol defined procedures for the identification and quantitation of the individual analytes. To assist the Validator in this determination the following documents are recommended; however, the EPA Functional Guidelines will be used for format only. The specific requirements noted in the Project Quality Assurance Project Plan are prerequisite, for example holding times or special analytical project needs, to those noted in the Functional Guidelines.

1. The particular protocol(s) under which the data was generated e.g., NYSDEC Contract Laboratory Protocol; EPA SW-846; EPA Series 500 Protocols.

2. Data validation guidance documents such as:

   a. "Functional Guidelines for Evaluation Inorganic Data" (published by EPA Region 2).

   b. "Functional Guidelines for Evaluation Organics Analyses" Technical Directive Document NO. HQ-8410-01 (published by EPA).

   c. "Functional Guidelines for Evaluating Pesticides/PCB's Analyses" Technical Directive Document NO. HQ-8410-01 (published by EPA).

   NOTE: These documents undergo periodic revision. It is assumed that the selected firm will have access to the most current applicable documents and guidelines.

The Validator shall submit a final report covering the results of the data review process. This report shall be submitted to the Project Manager or his designee and shall include the following:

1. A general assessment of the data package as determined by the accomplishment of Tasks I-II above.

2. Detailed descriptions of any and all deviations from the required protocols. (These descriptions must include references to the portions of the protocols involved in the alleged deviations).

3. Any and all failures in the Validator's attempt to reconcile the reported data with the raw data from which it was derived. (Again, specific references must be included). Telephone logs should be included in the validation report.

4. A detailed assessment by the Validator of the degree to which the data has been compromised by any deviations from protocol, QA/QC breakdowns, lack of analytical control, etc., that occurred during the analytical process.

5. The report shall include, as an attachment, a copy of the laboratory's case narrative including the DEC required sample and analysis summary sheets.

6. The report shall include an overall appraisal of the data package.

7. The validation report shall include a chart presented in a spread sheet format, consisting of site name, sample numbers, data submitted to laboratory, year of CLP or analytical protocol used, matrix, fractions analyzed, e.g., volatiles, semi-volatiles, Pest/PCB, Metals, CN. Space should be provided for a reference to the NYSDEC CLP when non compliancy is involved and a column for an explanation of such violation. (See attached form)