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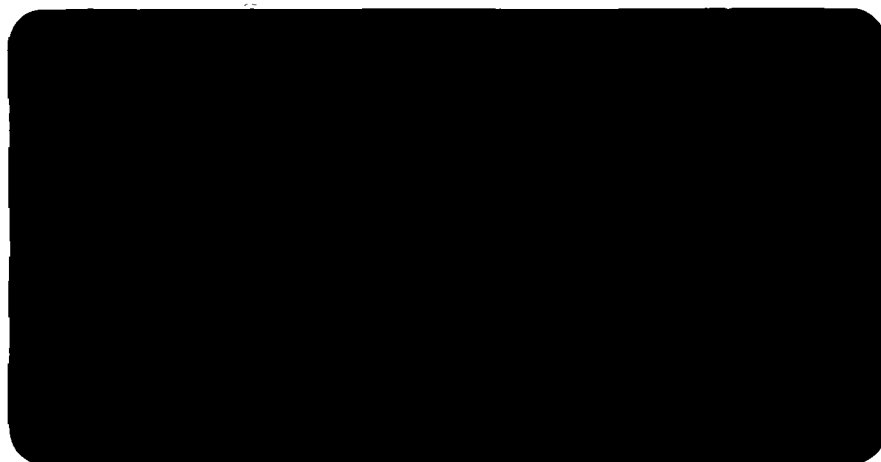
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LIMITED PHASE 2
ENVIRONMENTAL SITE ASSESSMENT
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1.0 INTRODUCTION

1.1 PROJECT BACKGROUND

In October 1998, XCG Consultants Ltd. (XCG) was retained by Norampac, Inc. (Norampac) to conduct a Limited Phase 2 Environmental Site Assessment (ESA) of the property located at 3241 Walden Avenue in Depew, New York. Norampac owns this property and is currently operating a paper fibre recycling facility at the subject site.

This Limited Phase 2 ESA was conducted to address concerns raised by the New York State Department of Environmental Conservation (NYSDEC) regarding historical environmental impacts located in the area of a former on-site lagoon and marshy areas. Specifically, the contaminants of concern include metals (primarily lead, copper, and zinc) and several polynuclear aromatic hydrocarbons (PAHs).

1.2 OBJECTIVES AND SCOPE OF WORK

The overall objective of this Limited Phase 2 ESA was to investigate the soil and groundwater environmental conditions in the former lagoon and marsh and nearby surrounding area.

The initial field work was conducted in general accordance with XCG's letter proposal under the title "Proposal for a Limited Phase 2 Environmental Site Assessment at the Recycling Plant Site in Depew, New York," dated October 8, 1998. However, based on site observations during implementation of the field work, minor modifications were made. Subsequent to the initial field work, additional investigation and laboratory analyses were conducted to further characterize the subsurface environmental conditions. The final scope of work completed at the subject site included the following:

- Clearance of underground public utility services. This task was conducted by both the drilling contractor and on-site Norampac staff;
- Advancing three boreholes in the former lagoon to investigate the soil and groundwater quality in this area. One of these boreholes was completed as a monitoring well. The borehole locations and site layout are shown on Figure 1;
- Advancing two boreholes in the area of the former marsh area, which is located just west of the former lagoon;
- Advancing three boreholes beyond the limits of the former lagoon and marshy area to investigate potential environmental impacts in nearby on-site areas. Monitoring wells were installed in each of these boreholes to collect groundwater samples for chemical analysis, and to determine the shallow groundwater flow direction;
- Advancing six additional shallow boreholes to the northwest and west of the former lagoon and marsh area;

- Field characterization of soil samples by smell and by screening with a field photoionization detector (i.e. HNu), which measures total organic vapours (TOV) in the parts per million range;
- Submitting 21 soil samples for laboratory analyses of the various parameters including metals, PAHs, and volatile organic compounds (VOCs). One of these soil samples was submitted as a blind field duplicate for quality assurance/quality control (QA/QC) purposes. The soil sampling program is summarized in Section 3.2 (Table 1);
- Submitting four soil samples for Toxicity Characteristic Leaching Procedure (TCLP) analysis, to identify the soil waste classification (i.e. hazardous or not);
- Collecting and submitting a groundwater sample from each of the four monitoring wells for parameters identified in Section 3.2 (Table 1). In addition, one of the groundwater samples was split into two samples, with one portion submitted as a blind duplicate for QA/QC purposes. Also, a groundwater sample was collected from a historical 0.13 metre (5 inch) diameter steel well installed in the former lagoon;
- Collecting one surface water sample from standing water situated on top of the former lagoon. Chemical analysis conducted on this sample is summarized in Section 3.2 (Table 1); and
- Preparing a report outlining the surface and subsurface environmental conditions at select locations on the subject property.

2.0 SITE DESCRIPTION

2.1 SITE BACKGROUND

The subject site is located at 3241 Walden Avenue in Depew, New York. It is situated on the south side of Walden Avenue, approximately 107 metres (350 feet) west of Transit Road. The site is located in a mixed commercial/industrial and residential area. Commercial/industrial properties adjoin the east and west sides of the subject site. Residential properties are predominantly located across the street, on the north side of Walden Avenue. A New York Central Railway line borders the south property line. This railway line is elevated by a berm approximately 1.2 to 1.5 metres (4 to 5 feet) high. Photographs of the investigated area are presented in Appendix A.

The property is approximately 2.63 hectares (6.5 acres) in size, of which approximately half is developed. There is one main building located on the east side of the subject property and a small garage situated to the west. Truck loading and unloading operations and trailer parking are conducted on the west side of the plant building. This area is surfaced with gravel and is surrounded by a chain-link fence.

The former lagoon and marsh may have been situated adjacent to the west of the fenced area, along the south side of the property. Based on XCG's discussions with Norampac staff and review of historical drawings, it appears that the fenced area had been extended westwards (at some time after 1987). As such, the east portion of the former lagoon may be currently situated within the fenced area. A borehole advanced in this area provides subsurface information to support this assumption. The site layout is shown on Figure 1.

A Phase 1 ESA was not included in XCG's scope of work prior to the commencement of the Limited Phase 2 ESA. As such, a thorough history of past property owners/occupants and activities conducted at the subject site is not provided in this report. A brief history of the site is provided in a report prepared by NUS Corporation (NUS) for the United States Environmental Protection Agency (US EPA) under the title "Site Inspection Report, N.L. Industries/Buffalo Plant, Depew, New York," dated July 29, 1988. This report was provided to Norampac, by the NYSDEC, on May 19, 1998. Other documents given to XCG by the NYSDEC in November 1998 (including other NUS reports) and by Norampac provided additional historical information. A brief history of the subject property is summarized as follows:

- N.L Industries acquired the subject property from Magnus Co. Inc. in the 1920s or 1930s.
- N.L. Industries conducted foundry operations at the site, which consisted of producing railway journal bearings from a metal alloy. Slag and foundry sand in water were placed in the former lagoon. The settled foundry sand was subsequently removed from the former lagoon for reuse. The deposited waste was removed from the former lagoon every several years.
- On June 23, 1969, the Erie County Department of Health (ECDH), Division of Environmental Health, visited the subject property. An internal memo, prepared by ECDH, indicated that mould sand, slag, and floor sweepings were crushed and washed to reclaim brass particles. These activities were conducted two or three days a month with the wash water disposed of at the lagoon.
- In 1972, Fedders Corporation (Fedders) began occupying the subject site and used the building as a warehouse for a period of approximately one and a half to two years. An internal memo prepared by O'Brien & Gere Engineers, Inc. (O'Brien) suggests that Fedders purchased the property in 1972. However, the property may have been acquired by the Erie County Industrial Development Agency (ECIDA) in 1972 (or earlier), in which case the subject site was leased to Fedders. As such, the change of land ownership during this time period has not been established based on the currently available information.
- An internal memo prepared by Domtar Fiber Products, Inc. (Domtar), dated July 29, 1992, indicates that in 1974, ECIDA began leasing the property to Anglo Recycling Corporation (Anglo), a subsidiary of Reed Paper Company. Anglo later

changed its name to Erie Paper Fibres, Inc. (Erie Paper), and subsequently to Domtar.

- Erie Paper (Domtar) acquired the subject property from the ECIDA on April 1, 1986, for a cost of \$1.00. This option to purchase was written in the 1974 lease agreement and Erie Paper's intent to exercise the option was identified in a letter sent to the ECIDA on February 4, 1986.
- NUS completed an off-site reconnaissance of the subject property on February 26, 1986. A report was prepared on March 14, 1986 under the title "Potential Hazardous Waste Site Preliminary Assessment, N.L. Industries, Inc., 3241 Walden Avenue, Depew, NY, EPA Site ID Number NYD980531636." NUS conducted this background assessment for the USEPA. The report indicates that the site was formerly a secondary lead smelter which reprocessed automobile batteries for the removal of lead. Secondary smelting was also conducted on lead wastes in the form of drosses, slag, etc.
- NUS prepared another report similar to the above mentioned one on March 13, 1986, under the title "Potential Hazardous Waste Site Preliminary Assessment, Magnus Co., Inc., Ellicott Road, Depew, NY, EPA Site ID Number NYD980531719." This report indicates that railway journal bearings were manufactured at this facility, using an alloy which included lead. N.L Industries' records did not include an exact address for this site and NUS was unable to locate the property during its off-site reconnaissance on February 26, 1986. However, a figure in the NUS report shows this Magnus property to be located approximately 1.25 miles (2 kilometres) west of the subject site (3241 Walden Avenue), along the same railway tracks (located near the east end of Ellicott Road). The subject property is currently located on Walden Avenue. However, historical site drawings indicate that Walden Avenue was once called Ellicott Road. Based on these unclear records, it is possible that this Magnus property on Ellicott Road may be the same as the subject property.
- In the spring of 1986, oil was detected in the former lagoon's intake pipe. Analysis conducted by the NYSDEC indicated that the liquid was non-PCB, No. 2 fuel oil. This oil may have either been dumped by unknown parties or the result of an unspecified past activity. Prior to acquiring the property, Norampac retained Environmental Data Resources (EDR) to review regulatory database information on the subject site. On November 7, 1997, EDR prepared a report under the title "Domtar Fibre Products, 3241 Walden Avenue, Depew, NY, 14043, Inquiry Number: 209751.2S." A summary letter prepared by EDR, dated November 14, 1997, stated that the spill was assigned a New York Spills number (No. 8600427). EDR indicated that the spill was cleaned up to standard and no penalty was recommended. The spill incident was closed as of November 17, 1987.
- On March 31, 1987, NUS conducted a site inspection, on behalf of the US EPA, which included the collection of 3 sediment and 4 soil samples for chemical

analyses of Hazardous Substance List (HSL) parameters. HSL parameters detected included several PAHs and metals (e.g. lead, copper, and zinc). The NUS report suggests that contaminants in the soil are situated within the upper 1.8 metres (6 feet). The results of the oil spill and soil samples are summarized in the July 29, 1998, NUS report.

- Various documents provided by Norampac indicate that between approximately December 1991 and August 1992, Domtar was in the process of potentially selling the property to an interested party. The transaction ultimately did not take place. During this process, Domtar had retained a law firm (Hodgson, Russ et. al.) to provide environmental advice regarding the "pipe" protruding from the ground and the bog area. A letter prepared by Hodgson to Domtar, dated March 5, 1992, indicates that Mr. Robert Leary of the NYSDEC visited the site on April 17, 1986, to inspect the "stand pipe" and that after the oil was removed several times, the NYSDEC did not require any further action. The letter also advises Domtar that it may wish to consider having an environmental assessment performed. An internal Domtar memo, dated August 6, 1992, and an internal O'Brien memo, dated July 30, 1992, indicates that a site visit was held with representatives of these two firms to discuss the potential for conducting an environmental site assessment. O'Brien collected some historical information and inspected the site. However, XCG is unaware if O'Brien eventually completed a full Phase 1 ESA or Phase 2 Subsurface Investigations.
- The various sources of information above describe a pipe extending from the ground under different names, including pipe, intake pipe, stand pipe, and underground stand pipe. During the current investigation, XCG encountered a vertical pipe extending from the ground surface in the former lagoon area and called it an unknown well. XCG collected a groundwater sample from this well and identified it as UW1. Although using different names, it appears that these various sources of information are referring to the same pipe observed by XCG.

3.0 FIELD INVESTIGATION

The initial field investigation activities were conducted on October 29 and 30, and November 4, 1998. An additional field investigation was carried out on December 7, 1998. XCG's field activities were supervised by Mr. Basil Wong, P.Eng. A description of the field investigation methodology used is provided below.

3.1 DRILLING INVESTIGATION

As discussed previously, XCG's Limited Phase 2 ESA was undertaken to investigate the subsurface environmental conditions at the former lagoon and marsh, as well as the surrounding areas. The subsurface investigation consisted of a borehole drilling and monitoring well installation program. Boreholes were advanced using a truck-mounted CME-75 drilling rig. XCG subcontracted the drilling operations to Maxim Technologies,

Inc. (Maxim) of Hamburg, New York, who conducted the work under the full-time supervision of XCG personnel. In total, eight boreholes were initially advanced, of which four were completed as monitoring wells. Drilling locations are shown on Figure 1 while the borehole logs are provided in Appendix B.

Subsequent to the initial investigation, XCG conducted an additional subsurface investigation to the northwest and west of the former lagoon and marsh area. The work plan consisted of advancing six shallow boreholes using a direct push drilling rig (Geoprobe). XCG retained Maxim to carry out these drilling activities.

3.2 SOIL SAMPLING METHODOLOGY

Borehole drilling with the truck-mounted CME-75 drilling rig was conducted with hollow stemmed augers. Soil sampling was generally performed at continuous 0.6 metre (2 feet) intervals using a 0.6 metre (2 feet) long, 0.05 metre (2 inch) diameter, stainless steel split-spoon sampler. A standard penetration test was performed during the collection of each soil sample. The boreholes were drilled to depths ranging from approximately 2.4 to 7.9 metres (8 to 26 feet) below ground surface. All boreholes were not completed as monitoring wells, the drilling was terminated just past the fill and native silty clay interface, to minimize the vertical pathway for potential migration.

Soil sampling with the Geoprobe was performed continuously with a 1.2 metre (4 feet) long, 0.05 metre (2 inch) diameter, stainless steel cylindrical sampler. The sampler's interior was lined with a plastic sleeve for soil collection. the Geoprobe boreholes were advanced to depths ranging from approximately 1.2 metres (4 feet) to 2.4 metres (8 feet) below grade.

Augers were decontaminated with a steam cleaner between borehole locations to prevent cross-contamination. Further, the split-spoon samplers and Geoprobe sampler were decontaminated between each sampling point with clean water and detergent. A new plastic sleeve was used for each Geoprobe sampling point.

Soil samples were visually classified and logged for stratigraphy, soil structure, and evidence of contamination. All soil samples were placed in labelled plastic sample bags. Headspace vapours in the sample bags were screened for TOV readings using a field photoionization detector (i.e. HNu meter). TOV readings in parts per million (ppm) for each soil sample are included in the borehole logs (see Appendix B).

Selection of initial soil samples for laboratory analyses was based on visual and olfactory evidence, sample depth, and TOV measurements in an effort to identify "worst case" samples (i.e. fill material). Based on the analytical results of the worst case samples, subsequent analysis of the underlying silty clay soil was conducted. The field observations at the various boreholes are described below and the analytical program is summarized in Table 1. The selected soil samples, which were stored in sample glass jars with teflon-lined lids, were placed in coolers (containing ice/cooler packs) and delivered to Philip Analytical Services Corporation (PASC) of Burlington, Ontario, for analytical testing.

PASC's Burlington laboratory is certified with the New York State Department of Health (ELAP Certification, ID#10756).

**TABLE 1
SUMMARY OF SAMPLING PROGRAM
Norampac, Inc., 3241 Walden Avenue, Depew, New York**

LOCATION	DEPTH (metres)	PARAMETERS	
		Soil	Groundwater
MW98-1	0-0.6	Metals, TCLP Metals	metals, anions, PAHs
MW98-1	2.4-3.0	Metals	N/A
MW98-2	0.6-1.2	Metals, PAHs, TCLP Metals	Metals, anions, PAHs, VOCs
MW98-2	1.8-2.4	Metals	N/A
BW1	-	N/A	Metals, PAHs
MW98-3	0-0.6	Metals, TCLP Metals	metals, anions, PAHs
MW98-3	4.3-4.9	Metals	N/A
MW98-4	-	N/A	Metals, anions
BH98-1	1.8-2.4	Metals, PAHs, VOCs, TCLP Metals	N/A
BH98-1	3.0-3.6	Metals	N/A
BH98-2	1.2-1.8	Metals, PAHs	N/A
BH98-2	2.4-3.0	Metals, PAHs	N/A
BH98-2	3.7-4.3	Metals	N/A
BW2	3.7-4.3	Metals	N/A
BH98-3	0.6-1.2	Metals, PAHs	N/A
BH98-3	1.8-2.4	Metals	N/A
BH98-4	0.6-1.2	Metals, PAHs	N/A
UW	-	N/A	Metals, anions, PAHs, VOCs
Surface Water	-	N/A	Metals
BH98-5	0-0.6	Metals	N/A
BH98-6	0-0.6	Metals	N/A
BH98-7	0-0.15	Metals	N/A
BH98-8	0-0.6	Metals	N/A
BH98-9	0-0.9	Metals	N/A
BH98-10	0-0.6	Metals	N/A

NOTES:

- N/A not applicable or not analyzed
- PAHs polynuclear aromatic hydrocarbons
- MW monitoring well
- BW1 blind duplicate groundwater sample of MW98-2
- BW2 blind duplicate of soil sample BH98-2 (3.7-4.3 m)
- UW unknown historic well installed by others
- VOCs volatile organic compounds
- BH boreholes

Monitoring well MW98-2 and boreholes BH98-1 and BH98-2 were located in the former lagoon. The fill material in these boreholes consisted of a silt, or silty sand to sandy silt material. In MW98-2, this fill material was dark grey in colour but did not contain any noticeable hydrocarbon odours or sheen. A sample of the fill material from approximately

0.6 to 1.2 metres (4 to 6 feet) in MW98-2 was considered representative of the material at this location and was submitted for chemical analyses (see Table 1). In BH98-1, the fill material was dark grey to black and contained a mild hydrocarbon odour and a slight oily sheen between 0.6 and 3.0 metres (2 and 10 feet) below ground surface, which was the depth of the bottom of the former lagoon. The highest TOV reading (2 ppm) was detected in the sample between 1.8 and 2.4 metres (6 and 8 feet) below grade. As such, this was considered the worst case sample in BH98-1 and was submitted for laboratory analyses. In BH98-2, the dark grey silty fill material was covered with approximately 1.2 metres (4 feet) of sand and gravel fill, which was used to create the trailer parking area when the fence line was extended westwards. A very mild hydrocarbon odour and slight oily sheen was detected between approximately 1.2 and 3.6 metres (4 to 12 feet) below grade (the bottom of the former lagoon). All TOV readings in this fill unit were 0 ppm. Two samples from BH98-2 were submitted for laboratory analyses: 1.2 to 1.8 metres (4 to 6 feet) and 2.4 to 3.0 metres (8 to 10 feet). The underlying native silty clay did not exhibit any visual or olfactory evidence of petroleum impacts.

Boreholes BH98-3 and BH98-4 were drilled in the former marsh area, adjacent to the west of the former lagoon. The bottom of the former marsh was encountered at a depth of approximately 1.2 metres (4 feet) below ground surface. The silty clay fill material in this area was dark grey in colour but did not contain any odours or staining. At each of these borehole locations, a sample of the fill was analyzed from a depth of 0.6 to 1.2 metres (2 to 4 feet) below grade.

Monitoring wells MW98-1, MW98-3, and MW98-4 were drilled at locations beyond the perimeter of the former lagoon and marsh. No odours or staining were observed in either the fill material or native silty clay at these locations. A representative soil sample of the fill material from MW98-1 and MW98-3 was submitted for chemical analyses.

Based on the elevated metals concentrations in the worst case soil samples (i.e. fill material), samples from the underlying native silty clay stratum in all originally tested locations were subsequently analyzed for metals. These samples did not exhibit any visual or olfactory evidence of hydrocarbon impacts. The analytical soil program is summarized in Table 1.

Soil samples from the fill zone in the Geoprobe boreholes (BH98-5 to BH98-10) were submitted for metals analyses to further define the lateral extent of impact to the northwest and west. No odours or staining were observed in the soil of these borehole locations.

As a result of elevated lead concentrations in most of the fill samples, four of these samples (MW98-1, MW98-3, MW98-4, and BH98-1) were analyzed for TCLP metals, to determine the soil's waste classification (i.e. hazardous or not).

3.3 GROUNDWATER INVESTIGATION

Monitoring well locations are shown on Figure 1 and construction details are presented on the borehole logs (see Appendix B). In general, the monitoring wells were constructed with 50 millimetre (2 inch) diameter Schedule 40 PVC pipe. The bottom 3.0 metres (10 feet) were screened with 3.0 metres (10 feet) of #10 slot PVC screen. The annulus between the borehole wall and screen was filled with #1 quartz sand to a depth of approximately 0.6 metres (2 feet) above the top of the screen. A 0.6 to 0.9 metre (2 to 3 feet) thick bentonite seal was placed above the sand. The remaining annular space was backfilled with hand-mixed concrete. A steel flush-mount or stick-up protective casing was constructed at ground surface. A J-plug and lock was provided for the monitoring wells equipped with flush-mount protective casings. The stick-up protective casings were locked on the outside of the casings.

Prior to groundwater sampling, the water levels in each monitoring well were measured using an electronic water level tape. The monitoring wells were then developed to:

- Remove fine material from the sand pack and develop a good filter area around the well screen; and
- Ensure that a representative groundwater sample was obtained.

Monitoring well development was completed with dedicated WaTerra inertial lift pumps to prevent cross-contamination. The WaTerra pump consists of a polyethylene foot valve installed in each well and connected to the surface with polyethylene tubing. Each monitoring well was developed by surging and purging the water in the well, using the dedicated WaTerra pump. Three well volumes are typically removed during the well development process (a well volume is the amount of standing water in the pipe and surrounding sand backfill). However, due to the slow recovery, the wells were purged dry two to three times each before sampling.

A historical well is located at the south side of the former lagoon. This well was constructed of steel. It is approximately 0.13 metres (5 inches) in diameter and is terminated at the bottom of the former lagoon (near the south side), approximately 1.1 metres (3.7 feet) below ground surface. Norampac staff was unaware of when the well was installed and who installed it. A sample of the perched groundwater in the former lagoon was collected from this well and was identified as UW.

Groundwater samples were placed in laboratory supplied glass jars and stored in coolers (with ice packs) prior to delivery to PASC's laboratory for chemical analysis. The samples were delivered to the laboratory within approximately 24 hours from collection. The groundwater analytical program is summarized in Table 1.

3.4 QA/QC METHODS

A blind groundwater duplicate sample was collected from monitoring well MW98-2 (identified as BW1) for QA/QC purposes. Also, a duplicate of soil sample BH982 (3.7 to 4.3 metres) was analyzed for QA/QC purposes. PASC also has a standard internal QA/QC program. As part of these procedures, a lab method blank, method spiked blank, and surrogates are analyzed during the testing of the samples. In addition, a laboratory duplicate of one soil and one groundwater sample is analyzed for every fourteen samples submitted. A laboratory duplicate analysis of metals was conducted for soil sample MW98-1 (2.4 to 3.0 metres) and BH98-5 (0 to 0.6 metres). In addition, a laboratory duplicate analysis was performed on soil sample MW98-1 (0 to 0.6 metres) for TCLP metals. For the groundwater sample submission, a laboratory duplicate of MW98-1 was conducted.

4.0 APPLICABLE GUIDELINE CRITERIA

In New York State, there are three documents developed by the NYSDEC that is used to compare and assess analytical soil and groundwater data. These documents are summarized as follows:

- NYSDEC Spill Technology and Remediation Series Memo #1 (STARS1) under the title "Petroleum-Contaminated Soil Guidance Policy," dated August 1992 (reprinted July 1993);
- NYSDEC Division of Technical and Administrative Guidance Memorandum (TAGM) 4046 under the title "Determination of Soil Cleanup Objectives and Cleanup Levels," dated January 24, 1994 (revised); and
- NYSDEC's Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1 under the title "Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations," dated October 22, 1993 (reissued June 1998).

The STARS1 manual is used for the assessment and clean-up of sites impacted by petroleum spills. In this manual, there are four criteria that must be satisfied, in order to consider a soil to be not sufficiently contaminated. These are summarized as follows:

1. Protection of the groundwater;
2. Protection of human health;
3. Protection of fish and wildlife (not applicable at this site); and
4. Protection against objectionable nuisance characteristics.

Regional Spills Investigators of the NYSDEC indicated to XCG that their department's main focus is the protection of groundwater. This may be accomplished by comparing the analytical results of select VOCs and semi-volatile compounds (i.e. PAHs) in leachate extract, using the Toxicity Characteristic Leaching Procedure (TCLP), to the TCLP

Guidance Values in either Table 1 (gasoline contaminated soil) or Table 2 (fuel oil contaminated soil) of STARS1. Alternatively, the analytical soil results can be compared to the TCLP Alternative Guidance Values. This alternative method was adopted in assessing the soil quality with respect to petroleum contaminants. The remaining volatile and semi-volatile organic parameters that were tested, which do not have Guidance Values in STARS1, were compared to the Recommended Soil Cleanup Objectives in TAGM 4046.

The TAGM 4046 Recommended Soil Cleanup Objectives for certain metals provide the option of using either the specified value or using site background values. For other metals, the Cleanup Objective is the site background value. Since site background values are currently not available for the subject site, the analytical metal results were compared to the specified Cleanup Objectives (where available) or were compared to the Eastern USA/New York State background values. A range of Eastern USA and New York State background values for most metals are provided in TAGM 4046. Site background values at the subject property is likely in the higher range as it is located in an industrial area and is adjacent to a railway corridor.

The TOGS 1.1.1 was used for comparison of the groundwater analytical results. TOGS 1.1.1 does not have Standards or Guidance Values for groundwater which is not used for potable purposes. The subject site and surrounding area is serviced by a municipal water supply, which draws its water from a surface water body. As such, the Standards and Guidance Values for groundwater used for drinking purposes was used for assessment. A Standard is a value that has been promulgated and placed into regulation. Guidance Values are used where a Standard has not been established.

5.0 RESULTS

5.1 SUBSURFACE CONDITIONS

5.1.1 On-Site Geology

The overburden material encountered during the drilling activities consisted of varying types of fill overlying a native silty clay stratum. A silt layer was also present at some borehole locations. At monitoring wells MW98-1 and MW98-3, which were located in the undeveloped areas to the north and west of the former lagoon and marsh, the fill unit consisted of silty sand to sandy silt with occasional gravel. This fill unit was grey in colour. At boreholes BH98-5 to BH98-6, the fill consisted of a silt or silty clay. In general, the fill in the undeveloped part of the site extended to depths ranging from approximately 0.6 to 0.9 metres (2 to 3 feet) below grade. In the fenced trucking area, the fill consisted of sand and gravel and was encountered at depths ranging from approximately 1.2 to 1.8 metres (4 to 6 feet) below ground surface. A large piece of wood was present in this fill unit at MW98-4.

Borehole BH98-1 was located approximately in the middle of the former lagoon, while MW98-2 and BH98-2 were located near the southwest corner and southeast end,

respectively. The fill in the former lagoon consisted of saturated and very soft silty sand to sandy silt. This material was dark grey in colour and extended to depths ranging from approximately 3.0 to 3.7 metres (10 to 12 feet) below grade. A mild hydrocarbon odour and slight oily sheen was detected in some samples from this fill. In BH98-2, a 1.2 metre (4 feet) thick sand and gravel unit covered this fill material.

In the former marsh area, the fill at BH98-3 and BH98-4 consisted of silty clay with some gravel, which extended to a depth of approximately 1.2 metres (4 feet) below grade. This material was very soft and was saturated at approximately 0.6 metres (2 feet) below grade. Black organic material was encountered near the bottom of this fill.

A silt layer was encountered in boreholes drilled north of the former lagoon and marsh. This unit was present between approximately 0.6 to 1.2 metres (2 to 4 feet) below ground surface. The silt layer was underlain by a native silty clay unit. The native silty clay stratum was present to the bottom of each borehole, which ranged from 2.4 to 7.9 metres (8 to 26 feet) below grade. In the upper zone of the silty clay stratum, the colour was generally mottled grey/brown to reddish brown and the consistency was stiff to hard. Based on field observations, the upper zone of the silty clay appeared to be generally moist. The colour changed to grey and the consistency became less hard as the depth approached the shallow water zone (approximately 4.9 metres below grade).

5.1.2 On-Site Hydrogeology

The depths to groundwater in the monitoring wells were measured, on November 4, 1998, prior to purging and sampling. As mentioned above, evidence of water in the silty clay was encountered at approximately 4.9 metres (16 feet) below grade in a zone with pebbles and gravel. However, the static water levels in the monitoring wells were detected near ground surface suggesting an upward hydraulic gradient from this zone of pebbles and gravel. The monitoring wells were surveyed using an assumed datum to estimate the shallow groundwater flow direction. The groundwater depths and elevations are summarized in Table 2. Based on these measurements, the shallow groundwater is estimated to flow in a northwesterly direction. Scajaquada Creek is located approximately 0.4 kilometres to the north of the subject site while Cayuga Creek is situated approximately 1 kilometre to the south.

**TABLE 2
GROUNDWATER MEASUREMENTS**

Norampac, Inc., 3241 Walden Avenue, Depew, New York

MONITORING WELL #	DEPTH TO WATER (m)	ELEVATION (m)
MW98-1 (flush-mount)	0.98	99.17
MW98-2 (stickup)	1.01	100.35
MW98-3 (stickup)	3.09	98.41
MW98-4 (flush-mount)	0.72	100.11

5.2 ANALYTICAL RESULTS

5.2.1 Soil

In total, 21 soil samples were submitted to PASC for analyses of various parameters including metals, PAHs, VOCs, and TCLP metals. A summary of the analytical results is presented in Tables 3 to 6. Copies of the Certificates of Analyses from PASC are included in Appendix C.

The soil analytical results for metals are presented in Table 3. Soil samples from MW98-2 (0.6 to 1.2 metres), BH98-1 (1.8 to 2.4 metres), BH98-2 (1.2 to 1.8 m), and BH98-2 (2.4 to 3.0 metres) were collected from the fill material used to backfill the former lagoon. In each of these samples, the concentration of a number of metals exceeded the TAGM 4046 Cleanup Objectives or Eastern USA/New York State Background values (where no Cleanup Objectives or Site Background values exist), including arsenic, beryllium, mercury, cadmium, chromium, copper, iron, lead, nickel, and zinc. Of greatest concern are the significantly high concentrations of copper, lead, and zinc, compared to the Cleanup Objectives or Eastern USA/New York State background ranges. The concentrations of copper in MW98-2 (0.6 to 1.2 metres), BH98-1 (1.8 to 2.4 metres), BH98-2 (1.2 to 1.8 metres), and BH98-2 (2.4 to 3.0 metres) were 1, 900 ppm, 54,000 ppm, 37,000 ppm, and 36,000 ppm, respectively. The Cleanup Objective for this parameter is 25 ppm, while the Eastern USA Background values range from 1 to 50 ppm. For these same samples, the concentrations of lead were 1,600 ppm, 86,000 ppm, 45,000 ppm and 45,000 ppm, respectively, compared to a typical range of 200 to 500 ppm in metropolitan areas (identified in TAGM 4046). The concentrations of zinc were 1,700 ppm, 89,000 ppm, 63,000 ppm, and 48,000 ppm, respectively. The Cleanup Objective of zinc is 20 ppm while the Eastern USA Background values range from 9 to 50 ppm.

In MW98-2 (1.8 to 2.4 metres), BH98-1 (3.0 to 3.6 metres), and BH98-2 (3.7 to 4.3 metres), the concentrations of copper, lead, and zinc in the underlying native silty clay were significantly lower than the analytical results of the fill material. The copper and zinc concentrations ranged from 30 to 48 ppm, and 74 to 120 ppm, respectively. Although these concentrations exceeded the cleanup objectives, the values were more comparable to typical Eastern USA background values than the results of the fill material. The concentration of lead in these three samples were well below the range of background values found in metropolitan areas (as identified in TAGM 4046).

Samples from BH98-3 (0.6 to 1.2 metres) and BH98-4 (0.6 to 1.2 metres) were collected from the former marsh area, which is adjacent to the west of the former lagoon. These samples also contained a number of metals that exceeded the Cleanup Objectives or Eastern USA/New York State Background values, including significantly high concentrations of copper, lead, and zinc. In BH98-3 (0.6 to 1.2 metres), the concentrations of copper, lead, and zinc were 11,000 ppm, 7,900 ppm, and 15,000 ppm, respectively. In BH98-4 (0.6 to 1.2 metres), the concentrations of these three metals were 6,500 ppm, 5,200 ppm, and 9,600 ppm, respectively.

TABLE 3
METALS ANALYTICAL RESULTS IN SOIL - NORAMPAC, INC., 3241 WALDEN AVENUE, DEPEW, NEW YORK

PARAMETER (ppm)	MDL	MW98-1 (0-2)	MW98-2 (2-4)	BH98-1 (6-8)	BH98-2 (4-6)	MW98-3 (0-2)	BH98-2 (8-10)	BH98-3 (2-4)	BH98-4 (2-4)	NYSDEC-TAGM 4046	
										Cleanup Objectives	Eastern USA Background
Depth (m)	-	0-0.6	0.6-1.2	1.8-2.4	1.2-1.8	0-0.6	2.4-3.0	0.6-1.2	0.6-1.2		
Lab ID Number	-	055768 98	055769 98	055770 98	055771 98	055772 98	055773 98	055774 98	055775 98		
Sampling Date	-	98/10/29	98/10/29	98/10/29	98/10/30	98/10/30	98/10/30	98/10/30	98/10/30		
Arsenic	0.5	12	11	5.1	21	8.7	3.6	42	29	7.5 or SB	3-12*
Mercury	0.04	0.74	1.7	5.0	0.75	1.2	2.6	29	11	0.1	0.001-0.2
Selenium	0.5	0.5	1.1	<	<	<	<	<	<	2 or SB	0.1-3.9
Aluminum	3	7,600	19,000	15,000	19,000	11,000	11,000	8,700	12,000	SB	33000
Barium	0.1	89	280	71	100	140	92	1,300	870	300 or SB	15-600
Beryllium	0.1	0.5	1.0	<1.0	<1.0	<1.0	<1.0	0.2	0.5	0.16 or SB	0-1.75
Cadmium	0.2	9.2	2.6	9.8	10	12	12	33	18	1 or SB	0.1-1
Calcium	20	5,100	8,800	6,800	9,900	7,000	34,000	41,000	19,000	SB	130-35,000*
Chromium	5	16	29	12	25	22	17	140	63	10 or SB	1.5-40*
Cobalt	1	13	12	18	15	26	18	18	12	30 or SB	2.5-60*
Copper	0.6	29,000	1,900	54,000	37,000	31,000	36,000	11,000	6,500	25 or SB	1-50
Iron	1	22,000	7,4000	20,000	34,000	30,000	25,000	190,000	92,000	2,000 or SB	2,000-550,000
Lead	10	20,000	1,600	86,000	45,000	39,000	45,000	7,900	5,200	SB**	**
Magnesium	5	1,800	2,300	2,400	3,600	2,600	4,700	5,100	3,200	SB	100-5,000
Manganese	0.5	880	960	260	320	530	410	1,600	790	SB	50-5,000
Molybdenum	1	15	4.0	40	31	24	24	10	7.0	NV	NV
Nickel	1	240	29	810	430	480	830	97	80	13 or SB	0.5-25
Phosphorus	6	1,500	2,300	1,600	2,400	2,100	1,200	1,600	1,400	NV	NV
Potassium	100	840	1,100	<1,000	<1,000	1,900	1,600	1,300	1,100	SB	8500-43,000*
Silver	0.5	6.2	0.5	22	9.5	9.2	12	8.9	7.3	SB	NV
Sodium	10	990	100	2,100	650	1,700	900	200	160	SB	6,000-8,000
Thallium	6	<	<	<60	<60	<60	<60	16	11	SB	NV
Vanadium	0.5	15	72	19	31	22	18	30	27	150 or SB	1-300
Zinc	0.5	30,000	1,700	89,000	63,000	41,000	48,000	15,000	9,600	20 or SB	9-50

NOTES:

NYSDEC New York State Department of Environmental Conservation

mg/kg ppm NV No Value

Bold values indicate exceedance of Recommended Soil Cleanup Objectives

MDL Method Detection Limit

Analysis conducted by Philip Analytical Services Corporation. New York State ELAP ID#10756

* New York State Background

** Background levels for lead vary widely. Undeveloped, rural areas may range from 4-61 ppm, Metropolitan or suburban areas or near highways may range from 200-500 ppm

TAGM 4046 NYSDEC Technical and Administrative Guidance Memorandum 4046, "Determination of Soil Cleanup Objectives and Cleanup Levels" revised January 24, 1994, Recommended Soil Cleanup Objectives

TABLE 3
METALS ANALYTICAL RESULTS IN SOIL - NORAMPAC, INC., 3241 WALDEN AVENUE, DEPEW, NEW YORK (cont'd)

PARAMETER (ppm)	MDL	MW98-1 (8-10)	MW98-1 (8-10) dup	MW98-2 (6-8)	MW98-3 (14-16)	BH98-1 (10-12)	BH98-2 (12-14)	BW2	BH98-3 (6-8)	NYSDEC-TAGM 4046	
										Cleanup Objectives	Eastern USA Background
Depth (m)	-	2.4-3.0	2.4-3.0	1.8-2.4	4.3-4.9	3.0-3.6	3.7-4.3	3.7-4.3	1.8-2.4		
Lab ID Number	-	062572 98	062572 98	062573 98	062574 98	062575 98	062576 98	062578 98	062577 98		
Sampling Date	-	98/10/29	98/10/29	98/10/29	98/10/30	98/10/29	98/10/30	98/10/30	98/10/30		
Arsenic	0.5	3.5	3.8	9.9	1.9	9.5	6.4	6.3	13	7.5 or SB	3-12*
Mercury	0.04	<	<	<	<	<	<	<	<	0.1	0.001-0.2
Selenium	0.5	<	<	<	<	<	<	<	<	2 or SB	0.1-3.9
Aluminum	3	12,000	12,000	12,000	6,000	13,000	12,000	12,000	13,000	SB	33000
Barium	0.1	96	96	110	52	100	97	130	110	300 or SB	15-600
Beryllium	0.1	0.6	0.5	0.6	0.3	0.6	0.6	0.5	0.7	0.16 or SB	0-1.75
Cadmium	0.2	0.6	0.6	0.3	<	<	0.3	<	0.3	1 or SB	0.1-1
Calcium	20	67,000	66,000	71,000	80,000	58,000	60,000	62,000	69,000	SB	130-35,000*
Chromium	0.4	17	17	17	8.9	18	17	18	18	10 or SB	1.5-40*
Cobalt	1	12	13	11	5	15	12	12	12	30 or SB	2.5-60*
Copper	0.6	33	33	30	50	48	33	34	45	25 or SB	1-50
Iron	1	24,000	24,000	32,000	12,000	26,000	25,000	24,000	33,000	2,000 or SB	2,000-550,000
Lead	2	22	21	18	51	50	23	31	41	SB**	**
Magnesium	5	22,000	22,000	19,000	30,000	20,000	21,000	22,000	20,000	SB	100-5,000
Manganese	0.5	540	560	560	310	610	530	510	570	SB	50-5,000
Molybdenum	1	2	<	2	<	2	2	2	2	NV	NV
Nickel	1	28	27	31	10	33	28	28	32	13 or SB	0.5-25
Phosphorus	6	590	580	550	520	580	580	590	570	NV	NV
Potassium	100	1,900	2,000	1,500	1,300	2,000	2,100	2,200	1,500	SB	8500-43,000*
Silver	1	<	<	<	<	<	<	<	<	SB	NV
Sodium	10	170	170	140	180	570	400	320	140	SB	6,000-8,000
Thallium	6	11	<	<	<	7	<	8	<	SB	NV
Vanadium	0.5	22	22	25	12	24	22	23	28	150 or SB	1-300
Zinc	0.5	78	80	74	120	120	81	82	90	20 or SB	9-50

NOTES:

NYSDEC New York State Department of Environmental Conservation

Bold values indicate exceedance of Recommended Soil Cleanup Objectives

Analysis conducted by Philip Analytical Services Corporation, New York State ELAP ID#1075

** Background levels for lead vary widely. Undeveloped, rural areas may range from 4-61 ppm, Metropolitan or suburban areas or near highways may range from 200-500 ppm

TAGM 4046 NYSDEC Technical and Administrative Guidance Memorandum 4046, "Determination of Soil Cleanup Objectives and Cleanup Levels" revised January 24, 1994, Recommended Soil Cleanup Objectives.

mg/kg ppm

MDL Method Detection Limit

* New York State Background

NV No Value

TABLE 3
METALS ANALYTICAL RESULTS IN SOIL - NORAMPAC, INC., 3241 WALDEN AVENUE, DEPEW, NEW YORK (cont'd)

PARAMETER (ppm)	MDL	BH98-5 (0-2)	BH98-5 (0-2)dup	BH98-6 (0-2)	BH98-7 (0-0.5)	BH98-8 (0-2)	BH98-9 (0-3)	BH98-10 (0-2)	NYSDEC-TAGM 4046	
									Cleanup Objectives	Eastern USA Background
Depth (m)	-	0-0.6	0-0.6	0-0.6	0-0.15	0-0.6	0-0.9	0-0.6		
Lab ID Number	-	000343 99	000343 99	000344 99	000345 99	000346 99	000347 99	000348 99		
Sampling Date	-	98/12/07	98/12/07	98/12/07	98/12/07	98/12/07	98/12/07	98/12/07		
Arsenic	0.5	11	9.8	11	27	6.5	8.9	7.5	7.5 or SB	3-12*
Mercury	0.04	1.4	-	2.3	5.6	0.2	0.49	1.0	0.1	0.001-0.2
Selenium	0.5	<	<	<	<	<	<	<	2 or SB	0.1-3.9
Aluminum	3	8,900	8,900	9,600	9,200	12,000	13,000	8,500	SB	33000
Barium	0.1	200	200	330	780	160	110	140	300 or SB	15-600
Beryllium	0.1	0.6	0.6	0.6	0.5	1.0	0.6	0.6	0.16 or SB	0-1.75
Cadmium	0.2	13	13	17	15	0.9	2.2	14	1 or SB	0.1-1
Calcium	20	11,000	11,000	16,000	14,000	63,000	29,000	9,000	SB	130-35,000*
Chromium	0.4	19	21	19	40	18	20	11	10 or SB	1.5-40*
Cobalt	1	18	17	13	21	7.0	11	12	30 or SB	2.5-60*
Copper	0.6	22,000	29,000	20,000	12,000	320	4,700	22,000	25 or SB	1-50
Iron	1	31,000	30,000	35,000	66,000	21,000	25,000	23,000	2,000 or SB	2,000-550,000
Lead	2	21,000	22,000	16,000	8,400	520	4,700	15,000	SB**	**
Magnesium	5	3,000	3,100	4,000	3,600	13,000	13,000	2,500	SB	100-5,000
Manganese	0.5	1,300	1,300	1,000	860	650	710	760	SB	50-5,000
Molybdenum	1	14	15	13	8.0	2.0	4.0	14	NV	NV
Nickel	1	340	340	310	96	21	94	480	13 or SB	0.5-25
Phosphorus	6	1,700	1,700	1,300	1,100	490	800	1,100	NV	NV
Potassium	100	990	950	1,200	1,100	1,600	1,500	900	SB	8500-43,000*
Silver	1.0	6.9	6.3	5.8	7.2	<	<	5.7	SB	NV
Sodium	10	750	510	510	200	240	300	1,200	SB	6,000-8,000
Thallium	6	<	<	<	<	<	<	<	SB	NV
Vanadium	0.5	20	19	22	25	20	23	17	150 or SB	1-300
Zinc	0.5	30,000	30,000	26,000	14,000	470	8,100	31,000	20 or SB	9-50

NOTES:

NYSDEC New York State Department of Environmental Conservation

Bold values indicate exceedance of Recommended Soil Cleanup Objectives

Analysis conducted by Philip Analytical Services Corporation. New York State ELAP ID#1075

** Background levels for lead vary widely. Undeveloped, rural areas may range from 4-61 ppm, Metropolitan or suburban areas or near highways may range from 200-500 ppm

TAGM 4046 NYSDEC Technical and Administrative Guidance Memorandum 4046, "Determination of Soil Cleanup Objectives and Cleanup Levels" revised January 24, 1994, Recommended Soil Cleanup Objectives

A soil sample from the underlying native silty clay unit in BH98-3 (1.8 to 2.4 metres) was analyzed for metals. The concentrations of copper (45 ppm) and zinc (90 ppm) exceeded the Cleanup Objectives. However, these concentrations were significantly lower than those detected in the overlying fill unit and were more comparable to the typical Eastern USA background values noted in TAGM 4046. The concentration of lead (41 ppm) in the silty clay was well below the TAGM 4046 range for metropolitan areas (i.e. 200 to 500 ppm).

Monitoring wells MW98-1 and MW98-3 were drilled north of the former lagoon (near Walden Avenue) and northwest of the former marsh area. The soil samples from these locations were collected in the fill zone, which extended to approximately 0.6 metres (2 feet) below grade. The analytical results of metals were similar to those collected in the former lagoon and marsh areas. The concentrations of copper, lead, and zinc in the soil at MW98-1 (0 to 0.6 metres) were 29,000 ppm, 20,000 ppm, and 30,000 ppm, respectively. In MW98-3 (0 to 0.6 metres), these three metals were detected at 31,000 ppm, 39,000 ppm, and 41,000 ppm, in the soil.

Similar to the analytical results in the other boreholes, the concentrations of copper, lead, and zinc in the native silty clay in MW98-1 (2.4 to 3.0 metres) and MW98-3 (4.3 to 4.9 metres) were significantly below the values detected in the overlying fill material.

The Geoprobe boreholes (BH98-5 to BH98-10) were advanced in the undeveloped portion of the site to further characterize the extent of impacted fill. Except for BH98-8, these boreholes were located to the northwest of the former lagoon and marsh, but did not extend past the tree and marsh vegetation covered area (see Figure 2). The analytical results of these samples (see Table 3) indicate that a number of metals exceed the TAGM 4046 Cleanup Objectives or Eastern USA/New York State background values (where no Cleanup Objectives or Site Background values exist). As with the fill samples in the initial investigation, the concentrations of copper (4,700 to 29,000 ppm), lead (4,700 to 22,000 ppm), and zinc (8,100 to 31,000 ppm) in these additional boreholes were relatively high compared to the Cleanup Objectives or typical background values. Of particular note, were the analytical results in BH98-8 (0 to 0.6 metres), which was located west of the tree and marsh vegetation covered area. A number of metals exceeded the Cleanup Objectives or Eastern USA/New York State background values, including copper (320 ppm), lead (520 ppm), and zinc (470 ppm). However, these concentrations were significantly lower than those encountered in the other fill samples. Although only one sample was analyzed from this area, the results of BH98-8 may suggest that the metal impacted soil does not extend significantly to the west, past the tree and vegetation covered area. The lateral extent to the west will be better defined with additional subsurface investigations in this area.

Based on the relatively high concentrations of certain metals, and lead in particular, XCG submitted five soil samples (including one for QA/QC) from the fill zone for TCLP metals analysis to determine the soil waste classification. The results are presented in Table 4. The concentration of lead in the leachate extracted from each sample exceeded the regulatory level (6NYCRR Part 371, Section 371.3) of 5 ppm. As such, the metals impacted fill material is considered to be a hazardous waste. The sample with the lowest

bulk lead concentration, MW98-2 (0.6 to 1.2 metres, 1,600 ppm) had a leachate concentration of 8.7 ppm. Soil sample BH98-1 (1.8 to 2.4 metres) had a bulk lead concentration of 86,000 ppm and a leachate concentration of 210 ppm.

TABLE 4
TCLP METALS ANALYTICAL RESULTS IN SOIL - NORAMPAC, INC.
3241 WALDEN AVENUE, DEPEW, NEW YORK

PARAMETER (mg/L)	MDL	MW98-1 (0-2)	MW98-1 (0-2) dup	MW98-2 (2-4)	BH98-1 (6-8)	MW98-3 (0-2)	NYSDEC Regulatory Level
Depth (m)	-	0-0.6	0-0.6	0.6-1.2	1.8-2.4	0-0.6	
Lab ID Number	-	000256 99	000256 99	000258 99	000260 99	000262 99	
Sampling Date	-	98/10/29	98/12/07	98/12/07	98/12/07	98/12/07	
Arsenic	0.02	<0.022	<0.022	0.026	0.027	0.026	5.0
Barium	0.001	0.49	0.49	1.1	0.95	0.53	100
Cadmium	0.002	0.1	0.1	0.086	0.17	0.16	1.0
Chromium	0.004	<	<	<	<	<	5.0
Lead	0.02	240	240	8.7	210	170	5.0
Mercury	0.00005	<	<	<	0.25	<	0.2
Selenium	0.06	<0.066	<0.066	<0.066	<0.066	<0.066	1.0
Silver	0.01	<0.011	<0.011	<0.011	<0.011	<0.011	5.0

NOTES:

NYSDEC New York State Department of Environmental Conservation, Regulatory Level Hazardous waste level identified in 6 NYCRR Part 371, Section 371.3

MDL Method Detection Limit

Bold values indicate exceedance of NYSDEC Regulatory Level (i.e. Hazardous Waste)

Analysis conducted by Philip Analytical Services Corporation. New York State ELAP ID#1075

Soil samples from the former lagoon and marsh were analyzed for VOCs and PAHs to address the reported, historical #2 fuel oil release located in this area. The analytical results are summarized in Tables 5 and 6, respectively. A sample from BH98-1 (1.8 to 2.4 metres), which contained a mild hydrocarbon odour and sheen, was analyzed for VOCs. The concentration of acetone (0.32 ppm) slightly exceeded the TAGM 4046 Cleanup Objective of 0.2 ppm. However, this might be a laboratory artifact as acetone is commonly used for extraction purposes. The method blank analyzed with this sample contained a detectable concentration of acetone. A majority of the other VOC parameters, including those listed in Table 2 of STARS1, were below the laboratory's method detection limits (MDLs).

TABLE 5
 VOC ANALYTICAL RESULTS IN SOIL
 Norampac, Inc., 3241 Walden Avenue, Depew, New York

PARAMETER (ppm)	MDL	BH98-1 (6-8)	NYSDEC	
			TAGM 4046	STARS1
Depth (m)	-	1.8-2.4		
Lab ID Number	-	055770 98		
Sampling Date	-	98/10/29		
Acetone	0.065	0.32	0.2	NV
Acrolein	0.010	<0.020	NV	NV
Acrylonitrile	0.013	<0.026	NV	NV
Benzene	0.001	<0.002	0.06	0.014
Bromoform	0.004	<0.008	NV	NV
Bromomethane	0.005	<0.010	NV	NV
2-Butanone	0.012	<0.024	0.3	NV
Carbon Disulphide	0.005	<0.010	2.7	NV
Carbon Tetrachloride	0.006	<0.012	0.6	NV
Chlorobenzene	0.002	<0.004	1.7	NV
Chlorodibromomethane	0.004	<0.008	NV	NV
Chloroethane	0.005	<0.010	1.9	NV
2-Chloroethylvinylether	0.013	<0.026	NV	NV
Chloroform	0.002	<0.004	0.3	NV
Chloromethane	0.005	<0.010	NV	NV
1,2-Dichlorobenzene	0.002	<0.004	7.9	NV
1,3-Dichlorobenzene	0.003	<0.006	1.6	NV
1,4-Dichlorobenzene	0.004	<0.008	8.5	NV
Dichlorobromomethane	0.004	<0.008	NV	NV
1,1-Dichloroethane	0.006	<0.012	0.2	NV
1,2-Dichloroethane	0.003	<0.006	0.1	NV
1,1-Dichloroethene	0.002	<0.004	0.4	NV
Methyl-t-butylether	0.005	<0.010	NV	NV
Ethylene Dibromide	0.007	<0.014	NV	NV
1,2-Dibromo-3-Chloropropane	0.050	<0.10	NV	NV
cis-1,2-Dichloroethene	0.003	<0.006	NV	NV
trans-1,2-Dichloroethene	0.003	<0.006	0.3	NV
1,2-Dichloropropane	0.007	<0.014	NV	NV
cis-1,3-Dichloropropene	0.002	<0.004	NV	NV
trans-1,3-Dichloropropene	0.004	<0.008	NV	NV
Ethylbenzene	0.002	<0.004	5.5	0.1
2-Hexanone	0.008	<0.016	NV	NV
Methylene Chloride	0.010	0.052	0.1	NV
4-Methyl-2-Pentanone	0.009	<0.018	1.0	NV
Styrene	0.002	<0.004	NV	NV
1,1,1,2-Tetrachloroethane	0.002	<0.004	NV	NV
1,1,2,2,-Tetrachloroethane	0.004	<0.008	0.6	NV
Tetrachloroethene	0.003	<0.006	1.4	NV
Toluene	0.002	0.008	1.5	0.1

TABLE 6
PAH ANALYTICAL RESULTS IN SOIL
Norampac, Inc., 3241 Walden Avenue, Depew, New York

PARAMETER (ppm)	MDL	MW98-2 (2-4)	BH98-1 (6-8)	BH98-2 (4-6)	BH98-2 (8-10)	BH98-3 (2-4)	BH98-4 (2-4)	NYSDEC	
								TAGM 4046	STARS1
Depth (m)	-	0.6-1.2	1.8-2.4	1.2-1.8	2.4-3.0	0.6-1.2	0.6-1.2		
Lab ID Number	-	055769 98	055770 98	055771 98	055773 98	055774 98	055775 98		
Sampling Date	-	98/10/29	98/10/29	98/10/30	98/10/30	98/10/30	98/10/30		
Naphthalene	0.03	0.15	0.24	0.32	1.9	1.6	0.10	13	0.2
Acenaphthylene	0.04	<	<	<	0.08	1.5	<	41	NV
Acenaphthene	0.07	<	<	0.19	1.8	1.7	<	50	0.4
Fluorene	0.03	0.07	0.25	0.2	2.6	1.6	0.04	50	1
Phenanthrene	0.03	0.56	0.79	1.20	14	2.2	0.39	50	1
Anthracene	0.03	0.12	0.08	0.25	3.9	1.8	0.08	50	1
Fluoranthene	0.02	0.75	0.39	1.3	12	2.1	0.48	50	1
Pyrene	0.03	1.0	0.39	1.8	9.3	2.6	0.53	50	1
Benzo(a)anthracene	0.02	0.45	0.29	0.66	4.6	2.1	0.30	0.224 or MDL	0.00004
Chrysene	0.03	0.61	0.36	0.72	4.9	2.3	0.35	0.4	0.00004
Benzo(b)fluoranthene	0.04	0.43	<	<	3.4	2.1	0.33	1.1	0.00004
Benzo(k)fluoranthene	0.04	0.41	<	<	3.3	2.1	0.29	1.1	0.00004
Benzo(a)pyrene	0.05	0.42	<	<	3.8	2.1	0.33	0.061 or MDL	0.00004
Indeno(1,2,3-cd)pyrene	0.06	0.35	<	<	2.3	1.7	0.24	3.2	0.00004
Dibenzo(ah)anthracene	0.04	<	<	<	0.52	1.4	<	0.014 or MDL	1
Benzo(ghi)perylene	0.04	0.40	<	<	1.9	1.6	0.22	50	0.00004

NOTES:

mg/kg

ppm

MDL

Method Detection Limit

BOLD

values indicate exceedance of applicable guidance or cleanup objective value

Analysis conducted by Philip Analytical Services Corporation. New York State ELAP ID#10756

NYSDEC New York State Department of Environmental Conservation

TAGM 4046 NYSDCE Technical and Administrative Guidance Memorandum 4046, "Determination of Soil Cleanup Objectives and Cleanup Levels" revised January 24, 1994

STARS1

NYSDEC's Spill Technology and Remediation Series Memo#1 "Petroleum-Contaminated Soil Guidance Policy" August 1992

Table 2 TCLP Alternative Guidance Values

Data compared to STARS1 first. If no guidance value, compare to TAGM 4046

5.2.1.1 Summary of Soil Results

In summary, the analytical data has shown that the metal wastes related to the former foundry operations has not only impacted the former lagoon and marsh areas, but appears to have been spread throughout the undeveloped portion of the site (possibly through site regrading operations). A number of metals in the fill material exceeded the TAGM 4046 Cleanup Objectives, but the extremely high concentrations of lead alone is considered a significant environmental concern. TCLP analysis conducted on four fill samples show leachate concentration of lead exceeding the regulatory level, rendering it a hazardous waste.

The lateral extent of impacted soil has not been fully defined, based on the limited number of boreholes advanced beyond the perimeter of the former lagoon and marsh. Considering that the underlying native soil is a stiff to hard silty clay, the metal impact is not expected to extend significantly downwards. This was substantiated by the analytical results of metals in silty clay soil samples as the concentrations copper, lead, and zinc were significantly lower than those detected in the fill material. Although copper and zinc slightly exceeded the Cleanup Objectives in the silty clay, the concentrations of these metals were more comparable to typical Eastern USA background values than those detected in the fill. The lead concentrations in the native silty clay were well below the background range for metropolitan areas, as identified in TAGM 4046.

With respect to the historical release of #2 fuel oil in the area of the former lagoon, the analytical results indicate that a number of PAH parameters exceeded the STARS1 Table 2 TCLP Alternative Guidance Values. As such, the fill material in this area has not been remediated to a level that will satisfy the protection of groundwater, in accordance to STARS1.

5.2.2 Groundwater

In total, 6 groundwater samples were submitted to PASC for analyses of various parameters including metals, PAHs, and VOCs. One of these samples was collected from the historical well installed by an unknown party (identified as UW). In addition, a sample of the standing surface water in the area of the former lagoon was analyzed for metals. The sample identified as BW1 was a blind field duplicate of MW98-2. A summary of the analytical results is presented in Tables 7 to 10. Copies of the Certificates of Analyses from PASC is included in Appendix C.

The groundwater metal results are presented in Table 7. The samples from MW98-1 to MW98-4 were collected from the shallow water zone in the native silty clay layer. In all samples, the concentrations of magnesium exceeded the TOGS 1.1.1 Guidance Value while sodium exceeded the TOGS 1.1.1 Standard. Considering that the site is located in an urbanized area, the high concentrations of sodium may be attributed to road salting during the winter season. In MW98-3, the concentration of lead was 30 parts per billion (ppb), which slightly exceeded the TOGS 1.1.1 Standard of 25 ppb.

TABLE 7

METALS ANALYTICAL RESULTS IN GROUNDWATER - NORAMPAC, INC., 3241 WALDEN AVENUE, DEPEW, NEW YORK

PARAMETER ($\mu\text{g/L}$)	MDL	MW98-1	MW98-1 dup	MW98-2	BW1	MW98-3	MW98-4	UW	Surface Water	NYSDEC TOGS 1.1.1	
Lab ID Number	-	056887 98	056887 98	056888 98	056892 98	05889 98	056890 98	056891 98	056893 98	Standards	Guidance Value
Sampling Date	-	98/11/04	98/11/04	98/11/04	98/11/04	98/11/04	98/11/04	98/11/04	98/10/29		
Arsenic	2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	4	<2.2	25	NV
Mercury	0.05	<	<	0.11	<	<	<	<	<	0.7	NV
Selenium	2.0	2.3	-	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	10	NV
Aluminum	30	<33	<33	<33	<33	<33	<33	<33	<33	NV	NV
Barium	1.0	130	130	160	160	160	170	86	55	1,000	NV
Beryllium	1.0	<	<	<	<	<	<	<	<	3	NV
Cadmium	2.0	<	<	<	<	<	<	<	<	5	NV
Calcium	200	65,000	66,000	58,000	61,000	58,000	51,000	91,000	18,000	NV	NV
Chromium	4	<	<	<	<	<	<	<	<	50	NV
Cobalt	10	<11	<11	<11	<11	<11	<11	<11	<11	NV	NV
Copper	5.0	7	7	24	31	130	11	220	100	200	NV
Iron	10	<11	<11	<11	<11	<11	<11	<11	<11	300*	NV
Lead	20	<22	<22	<22	<22	30	<22	<22	73	25	NV
Magnesium	50	84,000	83,000	84,000	82,000	93,000	81,000	22,000	2,300	NV	35,000
Manganese	6.0	140	140	51	67	120	57	1,100	42	300*	NV
Molybdenum	10	15	14	12.0	12.0	18	21	<11	<11	NV	NV
Nickel	10	<11	<11	<11	<11	<11	<11	<11	<11	100	NV
Phosphorus	60	1,300	1,500	400	320	260	540	90	<66	NV	NV
Potassium	1,000	6,100	6,500	4,700	4,300	8,400	9,200	2,700	2,400	NV	NV
Silver	10.0	<11	<11	<11	<11	<11	<11	<11	<11	50	NV
Sodium	100	52,000	51,000	38,000	36,000	60,000	40,000	16,000	3,300	20,000	NV
Thallium	60	<66	<66	<66	<66	<66	<66	<66	<66	NV	0.5
Vanadium	5.0	<6	<6	<6	<6	<6	<6	<6	<6	NV	NV
Zinc	5.0	<6	<6	<6	<6	48	<6	840	160	NV	2,000

NOTES:

MDL Method Detection Limit

 $\mu\text{g/L}$ parts per billion (ppb)

NV no standard or guidance value

BOLD values indicate exceedance of standard or guidance value

Analysis conducted by Philip Analytical Services Corporation. New York State ELAP ID#10756

NYSDEC New York State Department of Environmental Conservation

TOGS 1.1.1 NYSDEC Division of Water Technical and Operational Guidance Series (1.1.1), "Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations" October 22, 1993 (reissued June 1988)

<

MW98-1 dup

BW1

*

indicates less than MDL

laboratory duplicate of MW98-1

blind field duplicate of MW98-2

aesthetic standard for the sum of iron and manganese is 500 $\mu\text{g/L}$

The groundwater sample from UW was collected from perched water, which has collected in the former lagoon. The concentration of copper (220 ppb) slightly exceeded the TOGS 1.1.1 Standard of 200 ppb. Manganese was detected at 1,100 ppb, which exceeds the TOGS 1.1.1 Standard of 300 ppb. The concentration of lead (73 ppb) in the stagnant surface water sample exceeded the TOGS 1.1.1 Standard of 25 ppb.

Other than acetone (13 ppb) in MW98-2, the concentrations of VOCs in this groundwater sample (see Table 8) as well as the sample collected from UW were below the laboratory's MDLs. The detectable concentration of acetone may be a laboratory artifact. The PAH analytical results (see Table 9) in MW98-1, MW98-2, and BW1 were all below the laboratory's MDLs. Although there was no visual or olfactory evidence of petroleum impact in the groundwater sample from MW98-3, a number of PAH parameters, including benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, and benzo(a)pyrene, exceeded the TOGS 1.1.1 Guidance Values.

The analytical groundwater results of anions are presented in Table 10. The concentration of all anions, with the exception of bromide in MW98-4, were below the TOGS 1.1.1 Standards. Bromide in MW98-4 (2,600 ppb) slightly exceeded the TOGS 1.1.1 Guidance Value of 2,000 ppb.

**TABLE 8
VOC ANALYTICAL RESULTS IN GROUNDWATER
Norampac, Inc., 3241 Walden Avenue, Depew, New York**

PARAMETER (µg/L)	MDL	MW98-2	UW	NYSDEC TOGS 1.1.1	
				Standards	Guidance Value
Lab ID Number	-	056888 98	056891 98		
Sampling Date	-	98/11/04	98/11/04		
Acetone	12.7	13.00	<	NV	50
Acrolein	5.1	<	<	5	NV
Acrylonitrile	2.7	<	<	5	NV
Benzene	0.5	<	<	1	NV
Bromoform	0.7	<	<	NV	50
Bromomethane	1.0	<	<	5	NV
2-Butanone	3.2	<	<	NV	NV
Carbon Disulphide	0.9	<	<	NV	NV
Carbon Tetrachloride	0.7	<	<	5	NV
Chlorobenzene	0.6	<	<	5	NV
Chlorodibromomethane	0.4	<	<	NV	NV
Chloroethane	0.9	<	<	5	NV
2-Chloroethylvinylether	2.8	<	<	NV	NV
Chloroform	0.4	<	<	7	NV
Chloromethane	1.4	<	<	NV	NV
1,2-Dichlorobenzene	0.8	<	<	3	NV
1,3-Dichlorobenzene	1.8	<	<	3	NV
1,4-Dichlorobenzene	1.6	<	<	3	NV
Dichlorobromomethane	0.4	<	<	NV	NV
1,1-Dichloroethane	0.5	<	<	5	NV
1,2-Dichloroethane	0.4	<	<	0.6	NV
1,1-Dichloroethene	0.7	<	<	5	NV

TABLE 8
 VOC ANALYTICAL RESULTS IN GROUNDWATER
 Norampac, Inc., 3241 Walden Avenue, Depew, New York (cont'd)

PARAMETER ($\mu\text{g/L}$)	MDL	MW98-2	UW	NYSDEC TOGS 1.1.1	
				Standards	Guidance Value
Lab ID Number	-	056888 98	056891 98		
Sampling Date	-	98/11/04	98/11/04		
Methyl-t-butylether	0.5	<	<	NV	NV
Ethylene Dibromide	0.4	<	<	0.0006	NV
1,2-Dibromo-3-Chloropropane	10.0	<	<	0.04	NV
cis-1,2-Dichloroethene	0.6	<	<	5	NV
trans-1,2-Dichloroethene	0.5	<	<	5	NV
1,2-Dichloropropane	0.7	<	<	1	NV
cis-1,3-Dichloropropene	0.3	<	<	0.4*	NV
trans-1,3-Dichloropropene	0.6	<	<	0.4*	NV
Ethylbenzene	0.5	<	<	5	NV
2-Hexanone	1.3	<	<	NV	50
Methylene Chloride	2.3	<	<	5	NV
4-Methyl-2-Pentanone	1.5	<	<	NV	NV
Styrene	0.6	<	<	5	NV
1,1,1,2-Tetrachloroethane	0.6	<	<	5	NV
1,1,2,2-Tetrachloroethane	0.8	<	<	5	NV
Tetrachloroethene	0.5	<	<	5	NV
Toluene	1.0	<	<	5	NV
1,1,1-Trichloroethane	0.8	<	<	5	NV
1,1,2-Trichloroethane	0.6	<	<	1	NV
Trichloroethene	1.0	<	<	5	NV
Vinyl Acetate	2.4	<	<	NV	NV
Vinyl Chloride	0.9	<	<	2	NV
m&p-Xylene	1.1	<	<	5**	NV
o-Xylene	0.5	<	<	5**	NV

NOTES:

$\mu\text{g/L}$ parts per billion (ppb)

NV no standard or guidance value

MDL Method Detection Limit

* applies to the sum of cis- and trans-1,3-dichloropropene

** Principal organic contaminant standard applies to individual xylenes

Analysis conducted by Philip Analytical Services Corporation. New York State ELAP ID#10756

NYSDEC New York State Department of Environmental Conservation

TOGS 1.1.1 NYSDEC Division of Water Technical and Operational Guidance Series (1.1.1), "Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations," October 22, 1993 (reissued June 1998)

TABLE 9
PAH ANALYTICAL RESULTS IN GROUNDWATER
Norampac, Inc., 3241 Walden Avenue, Depew, New York

Parameter ($\mu\text{g/L}$)	MDL	MW98-1	MW98-2	BW1	MW98-3	UW	NYSDEC TOGS 1.1.1	
Lab ID Number	-	056887 98	056888 98	56892 98	056889 98	056890 98	Standards	Guidance Value
Sampling Date	-	98/11/04	98/11/04	98/11/04	98/11/04	98/11/04		
Naphthalene	0.3	<	<	<	0.7	0.9	NV	10
Acenaphthylene	0.4	<	<	<	<	<	NV	NV
Acenaphthene	0.7	<	<	<	<	<	NV	20
Fluorene	0.3	<	<	<	<	<	NV	50
Phenanthrene	0.3	<	<	<	1.5	<	NV	50
Anthracene	0.3	<	<	<	<	29	NV	50
Fluoranthene	0.2	<	<	<	2.2	1.1	NV	50
Pyrene	0.3	<	<	<	1.7	3.4	NV	50
Benzo(a)anthracene	0.2	<	<	<	0.9	<	NV	0.002
Chrysene	0.3	<	<	<	1	<	NV	0.002
Benzo(b)fluoranthene	0.4	<	<	<	1	<	NV	0.002
Benzo(k)fluoranthene	0.4	<	<	<	0.9	<	NV	0.002
Benzo(a)pyrene	0.5	<	<	<	1	<	ND	NV
Indeno(1,2,3-cd)pyrene	0.6	<	<	<	<	<	NV	0.002
Dibenzo(ah)anthracene	0.4	<	<	<	<	<	NV	NV
Benzo(ghi)perylene	0.4	<	<	<	0.5	<	NV	NV

NOTES:

$\mu\text{g/L}$ parts per billion (ppb)

MDL Method Detection Limit

ND non-detectable concentration by the approved analytical methods reference in Section 700.3

NV no standard or guidance value

BOLD values indicate exceedance of standard or guidance value

Analysis conducted by Philip Analytical Services Corporation. New York State ELAP ID#10756

NYSDEC New York State Department of Environmental Conservation

TOGS 1.1.1 NYSDEC Division of Water Technical and Operational Guidance Series (1.1.1), "Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations" October 22, 1993 (reissued June 1988)

TABLE 10
ANIONS ANALYTICAL RESULTS IN GROUNDWATER
Norampac, Inc., 3241 Walden Avenue, Depew, New York

PARAMETER ($\mu\text{g/L}$)	MDL	MW98-1	MW98-2	MW98-3	MW98-4	UW	NYSDEC TOGS 1.1.1	
		056887 98 98/11/04	056888 98 98/11/04	056889 98 98/11/04	056890 98 98/11/04	056891 98 98/11/04	Standards	Guidance Value
Nitrite (as N)	50	<1,000	<1,000	<1,000	<1,000	1,000	1,000	NV
Nitrate (as N)	50	1,000	<1,000	<1,000	<1,000	3,600	10,000	NV
Fluoride (probe)	30	570	680	690	990	320	1,500	NV
Bromide	100	<1,000	<1,000	<1,000	2,600	<1,000	NV	2,000
Chloride	500	27,000	87,000	35,000	58,000	33,000	250,000	NV
ortho-Phosphate (as P)	100	<1,000	<1,000	<1,000	<1,000	<1,000	NV	NV
Sulphate (as SO_4)	100	250,000	71,000	130,000	140,000	1,200	250,000	NV

NOTES:

$\mu\text{g/L}$ parts per billion (ppb)

MDL Method Detection Limit

NV no standard or guidance value

BOLD values indicate exceedance of standard or guidance value

Analysis conducted by Philip Analytical Services Corporation. New York State ELAP ID#10756

NYSDEC New York State Department of Environmental Conservation

TOGS 1.1.1 NYSDEC Division of Water Technical and Operational Guidance Series (1.1.1), "Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations" October 22, 1993 (reissued June 1988)

5.2.2.1 Summary Groundwater Results

Although there are some exceedances of the TOGS 1.1.1 Standards or Guidance Values, with respect to bromide, metals, and PAHs, these values were developed for groundwater, which is used as a source of drinking water. The subject site and surrounding area is serviced by a municipal drinking water supply, which draws its water from a surface water body. The Erie County Water Authority indicated to XCG that Lake Erie is the water source for water supplied to Depew, New York. Since the subject site area is well developed, the use of water supply wells are not expected to exist in the area of the subject site. Mr. Brian Hourigan of the NYSDEC, Division of Water, indicated that they do not have a database of water supply wells installed in this area of New York State. As such, the exceedances are not expected to be a significant concern.

5.3 QA/QC

The analytical results of the blind groundwater field duplicate (BW1) for metals and PAHs were comparable to MW98-2. In addition, the concentrations of metals in the field soil duplicate (BW2) were comparable to the results of the original sample, BH98-2 (3.7 to 4.3 metres). The analytical results of the laboratory duplicate of metals in the groundwater from MW98-1 and metals in soil samples MW98-1 (2.4 to 3.0 metres) and BH98-5 (0 to 0.6 metres), as well as the TCLP analysis on MW98-1 (0 to 0.6 metres) closely resembled the original sample. Further, the results of PASC's internal QA/QC program (i.e. method blanks, spiked blanks, and surrogate recoveries) were considered representative.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 LIMITATIONS

This Limited Phase 2 Environmental Site Assessment focused on identifying any environmental damages as they relate to existing or potential future environmental liabilities relating specifically to the investigated areas of the property located at 3241 Walden Avenue in Depew, New York.

The conclusions drawn from the Limited Phase 2 ESA were based on information at selected observation and sampling locations on October 29 and 30, November 4, and December 7, 1998. In addition, the conclusions were based on the parameters that were chemically analyzed. Conditions between and beyond these locations may become apparent, during future investigations or on-site work, which could not be detected or anticipated at the time of this study. The sample locations were chosen based upon the area identified by the NYSDEC as a potential environmental concern (i.e. former lagoon/marsh area), visual observations, and limited information provided by persons knowledgeable about the past and current activities on the site. As such, XCG cannot be held responsible for environmental conditions that were not apparent from the available information.

The scope of this report is limited to the matters expressly covered. This report was prepared for the sole benefit of Norampac, Inc. and may not be relied upon by any other person or entity without written authorization of XCG Consultants Ltd. As such, any use or reuse of this document (or the findings, conclusions, or recommendations represented herein), by parties other than Norampac, Inc., is at the sole risk of those parties.

6.2 CONCLUSIONS

The overall conclusion from this Limited Phase 2 Environmental Site Assessment is that the subsurface in the area of former lagoon/marsh and surrounding undeveloped land at the subject site has been impacted by the former foundry operations and a release of an unknown amount of #2 fuel oil.

Supporting conclusions are as follows:

1. With respect to field observations:
 - The overburden soils at the subject site generally consisted of a fill (silty sand, sandy silt, and sand and gravel) overlying a native silty clay stratum. The depth of fill generally ranged from 0.6 to 1.8 metres (2 to 6 feet) below grade. The depth of fill material in the former lagoon was encountered between 3.0 and 3.7 metres (10 to 12 feet) below ground surface. This fill consisted of very soft silty sand to sandy silt material. In the former marsh area, the fill consisted of silty clay with some gravel, which extended to a depth of approximately 1.2 metres (4 feet) below grade. The underlying silty clay is stiff to hard in the upper zone, which acts as a barrier to vertical migration of contaminants.
 - Some of the fill in the former lagoon contained a mild hydrocarbon odour and had a slight oily sheen.
 - No visual or olfactory evidence of petroleum impacts was detected in the native silty clay underlying the former lagoon and marsh area.
 - No visual or olfactory evidence of petroleum impacts was detected in soil at the three monitoring wells installed away from the former lagoon and marsh area (MW98-1, MW98-3, and MW98-4).
2. With respect to analytical results:
 - Analytical testing was conducted in the fill material at all borehole and monitoring well locations (except MW98-4), as the fill samples were considered to be worst case samples in each borehole. Based on the analytical results of these samples, analysis of the underlying native silty clay stratum was subsequently conducted for metals.

- A number of metals in the fill material exceeded the TAGM 4046 Cleanup Objectives or Eastern USA/New York State Background values (where no Cleanup Objectives or Site Background values exist). Of particular concern are the significantly high concentrations of copper, lead, and zinc in the samples collected from the fill material in the former lagoon and marsh areas. The concentrations of these metals were as high as 54,000 ppm, 86,000 ppm, and 89,000 ppm, respectively. In all fill samples collected from the former lagoon and marsh area, at least three PAH parameters exceeded the STARS1 Table 2 TCLP Alternative Guidance Values.
- MW98-1, MW98-3, BH98-5, HB98-6, HB98-7, BH98-9, and BH98-10 were located north and northwest of the former lagoon (near Walden Avenue) and marsh. The concentrations of copper, lead, and zinc in the fill material were also extremely high at these locations. This may suggest that the metal waste related to the former foundry operations had been spread around the undeveloped portion of the subject property.
- The concentrations of copper, lead, and zinc in all soil samples analyzed from the underlying native silty clay stratum were significantly lower than those detected in the fill material. Lead in all samples was well below the typical metropolitan range of values identified in TAGM 4046. Although the concentrations of copper and zinc slightly exceeded the TAGM 4046 Cleanup Objectives, the values were more comparable to Eastern USA background values than the concentrations detected in the fill material.
- The analytical results of fill and native soil samples have provided a relatively clear indication of the extent of petroleum and metal impacts in the area of the former lagoon and marsh. The petroleum impacts have been confined within the fill zone of the former lagoon and adjacent marsh. The metals impact in the former lagoon and marsh also appear to be contained within the fill zone. The underlying native silty clay is acting as an effective barrier to vertical migration of contaminants. Laterally, the metals impact is present from the former lagoon and marsh to the south and has spread as far north as the north property line (adjacent to Walden Avenue). Based on the analytical results of MW98-3, BH98-7, and BH98-9, the metals impacts has spread westwards to at least the tree and marsh covered areas.
- A number of metals and PAH parameters in groundwater samples exceeded the applicable Standards or Guidance values in TOGS 1.1.1. However, this is not considered a significant environmental concern as these TOGS 1.1.1 values apply to potable groundwater. Groundwater in this area is not used for potable purposes. The Erie County Water Authority supplies water to Depew, New York, which is drawn from Lake Erie. Mr. Brian Hourigan of the NYSDEC, Division of Water, indicated that they do not have a database of water supply wells installed in this area of New York State.

- TCLP analysis of four fill samples has shown that the metals impacted material is a hazardous waste.

6.3 RECOMMENDATIONS

The initial Limited Phase 2 Environmental Site Assessment has provided a general understanding of the range of metals concentrations, and a limited knowledge of its vertical and lateral extent throughout the subject site. The study has also shown that a limited amount of hydrocarbon impacts remain in the former lagoon and marsh area. Based on discussions with Norampac, XCG understands that additional subsurface investigations will be undertaken in the near future to further refine the extent of metals impacts at the subject property. As such, the following future subsurface investigation activities should be considered, in liaison with the NYSDEC:

1. Additional subsurface testing should be conducted west of the tree and marsh plant covered area, and in the trucking area to the east, to refine the extent of the metal impacts. Additional TCLP analysis should be conducted in the supplementary subsurface investigation to further classify the soil's waste classification throughout the site (i.e. hazardous or not).
2. Soil samples in areas beyond the impacted area should be collected and analyzed for metals to establish site background values for comparison with impacted soil samples. This may include the west side of the undeveloped area. However, the use of these samples as background values will depend on their concentrations and will require input from the NYSDEC.
3. Prior to implementing additional subsurface investigations, a Phase 1 ESA should be considered to develop a more complete history of the site's operations, which may clarify some uncertain issues that were raised during this initial study (e.g. past ownership changes). The findings of the Phase 1 ESA could provide essential information in the event Norampac seeks to recover damages from N.L. Industries.

APPENDIX A

**SITE PHOTOGRAPHS OF
THE INVESTIGATED AREA**



PHOTO 1 VIEW OF THE EAST SIDE OF THE INVESTIGATION AREA, LOOKING NORTHEAST.



PHOTO 2 VIEW OF THE WEST SIDE OF THE INVESTIGATION AREA, LOOKING SOUTHEAST.



PHOTO 3 VIEW OF THE WEST SIDE INVESTIGATION AREA, LOOKING WEST.



PHOTO 4 VIEW OF THE WEST SIDE OF THE FENCED TRUCKING AREA, LOOKING SOUTHWEST.

**APPENDIX B
BOREHOLE LOGS**



Project No: 5-997-01-01
 Project: Limited Phase 2 ESA
 Client: Norampac Inc.
 Location: Depew New York

Log of Well MW98-1

Driller: Maxim Technologies Inc.

Borehole Diameter: 19 cm

Drill Method: Truck-Mounted CME 75 Hollow Stem Auger

Start Date: October 29, 1998

Checked By: TW

Sample Method: Standard Split Spoon

Completed: October 29, 1998

Logged By: BW

Depth	Sample No.	N-Value	Recovery (%)	Vapour Reading	Graphic Log	Geology Description	Depth/Elev (m)	Well Completion	Well Details
0						Ground Surface	0		
1	1	13	100	0		FILL silty sand, grey, moist, no odour	-0.65	Concrete	
2									
3	2	19	100	0		SILT dark grey, very stiff, moist, no odour, or staining.	-1.2	Groundwater at 0.98m below T.O.P. Nov 4/98	
4									
5	3	10	83	0		SILTY CLAY mottled grey-brown, stiff, damp to moist, no odour or staining			
6									
7	4	42	100	0		becoming hard			
8									Bentonite seal
9	5	42	100	0		becoming reddish brown			
10									
11	6	41	100	0					
12									
13	7	64	100	0					
14									
15	8	19	100	0		becoming greyish brown, very stiff, moist, some pebbles			
16									#3 Silica
17	9	23	100	0		stiff, moist, some pebbles			Filter Sand
18						grey, becoming very moist.			#10 slot PVC

Groundwater Elevation: 99.17m (assumed datum)
 T.O.P Elevation: 100.15m (assumed datum)
 Ground Surface Elevation: 100.29m (assumed datum)

Monitoring Well Log



Project No: 5-997-01-01
 Project: Limited Phase 2 ESA
 Client: Norampac Inc.
 Location: Depew New York

Log of Well MW98-1

Driller: Maxim Technologies Inc.

Borehole Diameter: 19 cm

Drill Method: Truck-Mounted CME 75 Hollow Stem Auger

Start Date: October 29, 1998

Checked By: TW

Sample Method: Standard Split Spoon

Completed: October 29, 1998

Logged By: BW

Depth	Sample No.	N-Value	Recovery (%)	Vapour Reading	Graphic Log	Geology Description	Depth/Elev (m)	Well Completion	Well Details
19	10	15	100	0		becoming, stiff, some pebbles and gravel		screen	
20									
21	11	9	83	1					
22						some pebbles and gravel			
23	12	15	42	1					
24						End of Borehole	-7.3		
25									
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									

Groundwater Elevation: 99.17m (assumed datum)

T.O.P Elevation: 100.15m (assumed datum)

Ground Surface Elevation: 100.29m (assumed datum)

Monitoring Well Log



Project No: 5-997-01-01
 Project: Limited Phase 2 ESA
 Client: Norampac Inc.
 Location: Depew, New York

Log of Well MW98-2

Driller: Maxim Technologies Inc.

Borehole Diameter: 19 cm

Drill Method: Truck-Mounted CME 75 Hollow Stem Auger

Start Date: October 29, 1998

Checked By: TW

Sample Method: Standard Split Spoon

Completed: October 29, 1998

Logged By: BW

Depth	Sample No	N-Value	Recovery (%)	Vapour Reading	Graphic Log	Geology Description	Depth/Elev (m)	Well Completion	Well Details
0						Ground Surface	0		
1	1	2	83	0		FILL silty sand, dark grey, very moist, no odour, some roots and leaves			T.O.P. is 0.63 m above ground surface
2						becoming silty, saturated			Groundwater at 1.01m below T.O.P. Nov 4/98
3	2	1	50	1					
4									
5	3	5	83	1			-1.6		
6						SILTY CLAY mottled grey-brown, firm to hard, damp to moist, no odour, no staining			
7	4	44	100	1.5					
8						becoming damp, trace pebbles			Concrete
9	5	40	100	1.5					
10									
11	6	31	100	1.5		becoming occasional pebbles and occasional silt inclusions			Bentonite seal
12									
13	7	57	100	1.5					
14						becoming greyish brown, stiff, moist, occ. pebbles and gravel			
15	8	13	100	1.5					
16						becoming grey, very stiff, moist, occ. pebbles and minor fine sand			# 1 Industrial Quartz Sand
17	9	16	100	1.5					
18						becoming soft to firm			#10 slot PVC

Groundwater Elevation: 100.347 m (assumed datum)

T.O.P. Elevation: 101.357 m (assumed datum)

Ground Surface Elevation: 100.73 m (assumed datum)

Monitoring Well Log



Project No: 5-997-01-01
 Project: Limited Phase 2 ESA
 Client: Norampac Inc.
 Location: Depew, New York

Log of Well MW98-2

Driller: Maxim Technologies Inc.

Borehole Diameter: 19 cm

Drill Method: Truck-Mounted CME 75 Hollow Stem Auger

Start Date: October 29, 1998

Checked By: TW

Sample Method: Standard Split Spoon

Completed: October 29, 1998

Logged By: BW

Depth	Sample No.	N-Value	Recovery (%)	Vapour Reading	Graphic Log	Geology Description	Depth/Elev (m)	Well Completion	Well Details
19	10	4	100	1.5				screen	
20						becoming stiff			
21	11	10	83	1.5					
22						occasional pebbles and gravel			
23	12	15	67	0					
24									
25	13	15	67	0					
26							-7.9		
27						End of Borehole			
28									
29									
30									
31									
32									
33									
34									
35									
36									

Groundwater Elevation: 100.347 m (assumed datum)

T.O.P Elevation: 101.357 m (assumed datum)

Ground Surface Elevation: 100.73 m (assumed datum)

Monitoring Well Log



Project No: 5-997-01-01
 Project: Limited Phase 2 ESA
 Client: Norampac Inc.
 Location: Depew, New York

Log of Well MW98-3

Driller: Maxim Technologies Inc.

Borehole Diameter: 19 cm

Drill Method: Truck-Mounted CME 75 Hollow Stem Auger

Start Date: October 30, 1998

Checked By: TW

Sample Method: Standard Split Spoon

Completed: October 30, 1998

Logged By: BW

Depth	Sample No.	N-Value	Recovery (%)	Vapour Reading	Graphic Log	Geology Description	Depth/Elev (m)	Well Completion	Well Details
0						Ground Surface	0		
1	1	11	100	0		FILL sandy silt, grey, moist, no odour, no staining, occasional gravel, minor pieces of paper			T.O.P. at 0.93m above ground surface
2							-0.61		
3	2	12	83	0		SILTY CLAY reddish brown to grey, stiff, damp, no odour, no odour, no staining, occasional pebbles, trace rootlets			Concrete
4									
5	3	25	100	0		becoming very stiff			
6									
7	4	74	100	0		becoming hard			
8									
9	5	19	100	0		becoming greyish brown, very stiff, damp to moist			Groundwater at 3.09m below T.O.P. Nov 4/98
10									
11	6	16	100	0		becoming reddish brown to grey, moist			Bentonite seal
12									
13	7	25	100	0		becoming grey, occasional pebbles			
14									
15	8	13	100	0		becoming stiff, occasional pebbles and gravel			
16									
17	9	22	100	0		becoming very stiff			#1 Industrial Quartz Sand
18									#10 slot PVC

Groundwater Elevation: 98.409 m (assumed datum)

T.O.P. Elevation: 101.493 m (assumed datum)

Ground Surface Elevation: 100.57 m (assumed datum)

Monitoring Well Log



Project No: 5-997-01-01
 Project: Limited Phase 2 ESA
 Client: Norampac Inc.
 Location: Depew, New York

Log of Well MW98-3

Driller: Maxim Technologies Inc.

Borehole Diameter: 19 cm

Drill Method: Truck-Mounted CME 75 Hollow Stem Auger

Start Date: October 30, 1998

Checked By: TW

Sample Method: Standard Split Spoon

Completed: October 30, 1998

Logged By: BW

Depth	Sample No	N Value	Recovery (%)	Vapour Reading	Graphic Log	Geology Description	Depth/Elev (m)	Well Completion	Well Details
19	10	18	75	0		spoon bouncing on large gravel at 6.1m, augered to 6.7m		screen	
20									
21	N/A	-	10	N/A					
22									
23									
23	7	N/A	-	10	N/A	bouncing on large gravel at 7.0m, augered to 7.3m			
24						becoming hard			
25	11	42	33	0					
26	8					End of Borehole	-7.9		
27									
28									
29									
30	9								
31									
32									
33	10								
34									
35									
36									

Groundwater Elevation: 98.409 m (assumed datum)

T.O.P Elevation: 101.493 m (assumed datum)

Ground Surface Elevation: 100.57 m (assumed datum)

Monitoring Well Log



Project No: 5-997-01-01
 Project: Limited Phase 2 ESA
 Client: Norampac Inc.
 Location: Depew, New York

Log of Well MW98-4

Driller: Maxim Technologies Inc.

Borehole Diameter: 19 cm

Drill Method: Truck-Mounted CME 75 Hollow Stem Auger

Start Date: October 30, 1998

Checked By: TW

Sample Method: Standard Split Spoon

Completed: October 30, 1998

Logged By: BW

Depth	Sample No.	N-Value	Recovery (%)	Vapour Reading	Graphic Log	Geology Description	Depth/Elev (m)	Well Completion	Well Details
0 ft 0 m						Ground Surface	0		
1	1	19	50	0.5		FILL sand and gravel, becoming silty sand at 0.25m, brown, damp, no odour, piece of wood at 0.3m		Concrete	
2						augered through wood to 1.2m		Groundwater	at 0.72m
3	2	-	-	-					below T.O.P.
4						sand and gravel, saturated			Nov 4/98
5	3	17	8	0.5					
6							-1.8		
7	4	-	83	0		SILTY CLAY mottled grey-brown, hard, damp, no odour, no staining			
8						trace pebbles			
9	5	50	100	0					
10						becoming brown			
11	6	32	75	0					Bentonite seal
12						trace pebbles			
13	7	96	100	0					
14						becoming brownish grey, very stiff, damp to moist			
15	8	16	100	0					
16						becoming grey, moist, occassional pebbles			# 1 Industrial
17	9	26	100	0					Quartz Sand
18									#10 slot PVC

Groundwater Elevation: 100.109 m (assumed datum)

T.O.P Elevation: 100.829 m (assumed datum)

Ground Surface Elevation: 100.980 m

Monitoring Well Log



Project No: 5-997-01-01
 Project: Limited Phase 2 ESA
 Client: Norampac Inc.
 Location: Depew, New York

Log of Well MW98-4

Driller: Maxim Technologies Inc. Borehole Diameter: 19 cm
 Drill Method: Truck-Mounted CME 75 Hollow Stem Auger Start Date: October 30, 1998 Checked By: TW
 Sample Method: Standard Split Spoon Completed: October 30, 1998 Logged By: BW

Depth	Sample No.	N-Value	Recovery (%)	Vapour Reading	Graphic Log	Geology Description	Depth/Elev (m)	Well Completion	Well Details
19	10	-	-	-					screen
20						becoming very moist, stiff, occasional pebbles			
21	11	10	100	0					
22						becoming stiff to very stiff, occasional pebbles			
23	12	15	83	0					
24							-7.5		
25						End of Borehole			
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									

Groundwater Elevation: 100.109 m (assumed datum)
 T.O.P Elevation: 100.829 m (assumed datum)
 Ground Surface Elevation: 100.980 m

Monitoring Well Log



Project No: 5-997-01-01
 Project: Limited Phase 2 ESA
 Client: Norampac Inc.
 Location: Depew, New York

Log of Borehole BH98-1

Driller: Maxim Technologies Inc.

Borehole Diameter: 19 cm

Drill Method: Truck-Mounted CME 75 Hollow Stem Auger

Start Date: October 29, 1998

Checked By: TW

Sample Method: Standard Split Spoon

Completed: October 29, 1998

Logged By: BW

Depth	Sample No.	N-Value	Recovery (%)	Vapour Reading	Graphic Log	Geology Description	Depth/Elev (m)
0						Ground Surface	0
0						FILL silty sand, dark grey to black, very moist	
1	1	5	67	0			
2						becoming saturated, slight sheen	
3	2	10	67	0		on water	
4						mild hydrocarbon odour and slight sheen	
5	3	5	62	1			
6						mild hydrocarbon odour and slight sheen	
7	4	4	100	2		becoming silt, dark grey, mild hydrocarbon odour and slight	
8						sheen	
9	5	11	83	0.5		occ. pebbles, slight sheen on water, v. mild hydrocarbon odour	
10							-3
11	6	26	50	0		SILTY CLAY mottled grey/brown, very stiff, damp, no odour, no staining, occasional pebbles	
12							-3.7
13						End of Borehole	
14							



Project No: 5-997-01-01

Project: Limited Phase 2 ESA

Client: Norampac Inc.

Location: Depew, New York

Log of Borehole BH98-2

Driller: Maxim Technologies Inc.

Borehole Diameter: 19 cm

Drill Method: Truck-Mounted CME 75 Hollow Stem Auger

Start Date: October 30, 1998

Checked By: TW

Sample Method: Standard Split Spoon

Completed: October 30, 1998

Logged By: BW

Depth	Sample No.	N-Value	Recovery (%)	Vapour Reading	Graphic Log	Geology Description	Depth/Elev (m)
0 ft/m						Ground Surface	0
1	1	53	25	0.5		FILL sand and gravel, brown, damp, no odour, no staining	
2							
3	2	18	25	0		becoming saturated	
4							-1.2
5	3	2	100	0		FILL sandy silt, dark grey, saturated, slight sheen, very mild hydrocarbon odour	
6							
7	4	8	100	0		becoming silt, dark grey, saturated, slight sheen, very mild hydrocarbon odour, minor sand	
8							
9	5	7	25	0		occasional gravel and sand, trace rootlets	
10							
11	6	13	100	0			
12							-3.7
13	7	44	100	0		SILTY CLAY mottled grey/brown, hard, damp, no odour, no staining, occasional pebbles, trace silt inclusions	
14							-4.3
15						End of Borehole	
16							



Project No: 5-997-01-01
 Project: Limited Phase 2 ESA
 Client: Norampac Inc.
 Location: Depew, New York

Log of Borehole BH98-3

Driller: Maxim Technologies Inc.

Borehole Diameter: 19 cm

Drill Method: Truck-Mounted CME 75 Hollow Stem Auger

Start Date: October 30, 1998

Checked By: TW

Sample Method: Standard Split Spoon

Completed: October 30, 1998

Logged By: BW

Depth	Sample No.	N-Value	Recovery (%)	Vapour Reading	Graphic Log	Geology Description	Depth/Elev (m)
0						Ground Surface	0
0.5	1	5	83	0		FILL silty clay, grey, very moist, no odour, some gravel at top, some sand	
2.5	2	2	100	0		5 cm layer of black organic material	
4.0	3	14	67	0		SILTY CLAY grey, becoming mottled grey/brown, soft to stiff, moist to damp, no odour, no staining, occasional pebbles	-1.2
7.0	4	61	100	0			-2.4
8.0						End of Borehole	
14.0							



Project No: 5-997-01-01
 Project: Limited Phase 2 ESA
 Client: Norampac Inc.
 Location: Depew, New York

Log of Borehole BH98-4

Driller: Maxim Technologies Inc.

Borehole Diameter: 19 cm

Drill Method: Truck-Mounted CME 75 Hollow Stem Auger

Start Date: October 30, 1998

Checked By: TW

Sample Method: Standard Split Spoon

Completed: October 30, 1998

Logged By: BW

Depth	Sample No.	N-Value	Recovery (%)	Vapour Reading	Graphic Log	Geology Description	Depth/Elev (m)
0						Ground Surface	0
1	1	3	75	0		FILL silty clay, dark grey, very moist, no odour, some medium sand, becoming brown at 30 cm	
2						becoming saturated, some black organic material	
3	2	2	33	0			
4							-1.2
5	3	10	67	0		SILTY CLAY mottled grey/brown, stiff, damp, no odour, no staining	
6						Becoming hard, trace pebbles	
7	4	68	100	0			
8							-2.4
						End of Borehole	



Project No: 5-997-01-01

Project: Limited Phase 2 ESA

Client: Norampac Inc.

Location: Depew, New York

Log of Borehole BH98-5

Driller: Maxim Technologies Inc.

Borehole Diameter: 5cm

Checked By: TW

Drill Method: Truck Mounted Geoprobe

Start Date: December 7, 1998

Sample Method: Standard Split Spoon

Completed: December 7, 1998

Logged By: BW

Depth	Sample No.	N-Value	Recovery (%)	Soil Vapour (ppm)	Graphic Log	Geology Description	Depth/Elev (m)
0						Ground Surface	0
0						<i>FILL</i> silt, some sand, dark brown, moist, no odours or staining, occasional gravel	
1	1	-	88	1			-0.6
2						<i>SILT</i> dark brown, moist, a saturated zone with some sand at 1.1 metres, no odour staining	
3	1	-	88	0.5			-1.2
4						<i>SILTY CLAY</i> Mottled grey/brown, damp to moist, no odour	
5							
6	2	-	100	0.5			
7							
8						End of Borehole	-2.4
9							
10							
11							
12							



Project No: 5-997-01-01

Project: Limited Phase 2 ESA

Client: Norampac Inc.

Location: Depew, New York

Log of Borehole BH98-6

Driller: Maxim Technologies Inc.

Borehole Diameter: 5cm

Drill Method: Truck Mounted Geoprobe

Start Date: December 7, 1998

Checked By: TW

Sample Method: Standard Split Spoon

Completed: December 7, 1998

Logged By: BW

Depth	Sample No.	N-Value	Recovery (%)	Soil Vapour (ppm)	Graphic Log	Geology Description	Depth/Elev (m)
0						Ground Surface	0
1	1	-	100	0.5		FILL silt, dark brown, moist, no odour or staining	-0.6
2						SILT dark brown, moist, no odour staining	
3	1	-	100	1			-1.2
4						SILTY CLAY Mottled grey/brown, damp, no odour or staining	
5	2	-	100	1			-1.8
6						End of Borehole	
7							
8							
9							
10							
11							
12							



Project No: 5-997-01-01
 Project: Limited Phase 2 ESA
 Client: Norampac Inc.
 Location: Depew, New York

Log of Borehole BH98-7

Driller: Maxim Technologies Inc.

Borehole Diameter: 5cm

Drill Method: Truck Mounted Geoprobe






Start Date: December 7, 1998

Checked By: TW

Sample Method: Standard Split Spoon

Completed: December 7, 1998

Logged By: BW

Depth	Sample No.	N-Value	Recovery (%)	Soil Vapour (ppm)	Graphic Log	Geology Description	Depth/Elev (m)
0						Ground Surface	0
0	1	-	100	0.5		<i>FILL</i> silt, dark brown, moist, no odour or staining, some rootlets	-0.15
1						<i>SILTY CLAY</i> reddish brown, damp, no odour or staining	
2	1	-	100	0.5			
3							
4							-1.2
4						End of Borehole	
5							
6							
7							
8							
9							
10							
11							
12							



Project No: 5-997-01-01
 Project: Limited Phase 2 ESA
 Client: Norampac Inc.
 Location: Depew, New York

Log of Borehole BH98-8

Driller: Maxim Technologies Inc.

Borehole Diameter: 5cm

Drill Method: Truck Mounted Geoprobe

Start Date: December 7, 1998

Checked By: TW

Sample Method: Standard Split Spoon

Completed: December 7, 1998

Logged By: BW

Depth	Sample No.	N-Value	Recovery (%)	Soil Vapour (ppm)	Graphic Log	Geology Description	Depth/Elev (m)
0						Ground Surface	0
0						<i>FILL</i> silty clay, grey, moist, no odour or staining, occasional brick fragments	
1	1	-	100	1			
2						<i>SILTY CLAY</i> reddish brown, damp, no odour or staining	-0.6
3	1	-	100	0.5			
4						End of Borehole	-1.2
5							
6							
7							
8							
9							
10							
11							
12							



Project No: 5-997-01-01

Project: Limited Phase 2 ESA

Client: Norampac Inc.

Location: Depew, New York

Log of Borehole BH98-9

Driller: Maxim Technologies Inc.

Borehole Diameter: 5cm

Checked By: TW

Drill Method: Truck Mounted Geoprobe

Start Date: December 7, 1998

Sample Method: Standard Split Spoon

Completed: December 7, 1998

Logged By: BW

Depth	Sample No.	N-Value	Recovery (%)	Soil Vapour (ppm)	Graphic Log	Geology Description	Depth/Elev (m)
0						Ground Surface	0
0						<i>FILL</i> silty clay, with gravel, moist, no odour or staining, some rootlets	
1	1	-	75	1			
2							
3						<i>SILTY CLAY</i> reddish brown, damp, no odour or staining	-0.9
3	1	-	75	0.5			
4						End of Borehole	-1.2
5							
6							
7							
8							
9							
10							
11							
12							



Project No: 5-997-01-01

Project: Limited Phase 2 ESA

Client: Norampac Inc.

Location: Depew, New York

Log of Borehole BH98-10

Driller: Maxim Technologies Inc.

Borehole Diameter: 5cm

Checked By: TW

Drill Method: Truck Mounted Geoprobe

Start Date: December 7, 1998

Completed: December 7, 1998

Logged By: BW

Depth	Sample No.	N-Value	Recovery (%)	Soil Vapour (ppm)	Graphic Log	Geology Description	Depth/Elev (m)
0						Ground Surface	0
1	1	-	100	0.5		FILL silt, dark brown, moist, no odour or staining, some silty clay some medium sand	
3	1	-	100	1		SILT dark brown, very moist, no odour or staining	-0.9
5	2	-	100	1		SILTY CLAY grey becoming mottled grey/brown, damp, no odour or staining	-1.2
7	2	-	100	1			
8						End of Borehole	-2.4

APPENDIX C
LABORATORY CERTIFICATES
OF ANALYSES



5735 McAdam Road
Mississauga, Ontario L4Z 1N9

Tel: (905) 890-8566
Fax: (905) 890-8575
Wats: 1-800-263-9040

Work Order #

Comments

CHAIN OF CUSTODY RECORD

Client: XCF Consultants Ltd

PASC Quote # BL 810-1035

Page 1 of 1

LEG 4N1

Client P.O. # 4

Analytical methods
at per quote.

Client Project # 5-99T-01-01

Sampled by: Rachel Wang

Contact: Rachel Wang

Phone: _____ Fax: _____

Please specify Guideline (if applicable): Analysis by Buching + in Lab (in New York State
Classification)

Analysis Required:

Invoice to (if other than above):

Samples in ziplock bags are not
to be analyzed yet. Send to Dave
Boudreau and Rachel Wang will
pick it up from him.

Sample #	Client Sample I.D.	Date Sampled	metals	PAHs	VOCs	Matrix	Nº of Containers	Comments/Contamination/ Site History
1	MW48-1 (0-2)	Oct 27, 98	✓				1	
2	MW48-2 (2-4)	"	✓	✓			2	
3	BH48-1 (6-8)	"	✓	✓	✓		3	
4	BH48-2 (4-6)	Oct 30, 98	✓	✓			1	
5	MW48-3 (0-2)	"	✓				1	
6	BH48-2 (8-10)	"	✓	✓			1	
7	BH48-3 (2-4)	"	✓	✓			1	
8	BH48-4 (2-4)	"	✓	✓			1	
9								
10								
11								
12								

Expeditions apply, please contact Lab
S.D. 5-7 Business Days

RUSH Specify Date
Time

Samples Relinquished to PASC by (Client Signature) _____ Date: Oct 31 98 Time: 10:10 Method of Shipment: Pickup by PASC in check to way

Samples Received in lab by _____ Date: 10 31 98 Time: 10:10 Condition of Samples upon receipt at lab: _____



Certificate of Analysis

CLIENT INFORMATION

Attention: Basil Wong
Client Name: XCG Consultants Ltd.
Project: 5-997-01-01
Project Desc:

Address: 1 Port St., East
Suite 201
Mississauga, Ontario
L5G 4N1

Fax Number: 905 891-2554

Phone Number: 905 891-2400

LABORATORY INFORMATION

Contact: Ada Blythe, B.Sc., C.Chem.
Project: AN981300
Date Received: 98/10/31
Date Reported: 98/11/19

Submission No.: 8K0033
Sample No.: 055767-055775

NOTES:

'-' = not analysed '<' = less than Method Detection Limit (MDL) 'NA' = no data available

LOQ can be determined for all analytes by multiplying the appropriate MDL X 3.33

All organic data is blank corrected except for PCDD/F, Hi-Res MS and CLP volatile analytes

Solids data is based on dry weight except for biota analyses.

Organic analyses are not corrected for extraction recovery standards except for isotope dilution methods. (i.e. CARB 429 PAH, all PCDD/F and DBD/DBF analyses)

Methods used by PASC are based upon those found in 'Standard Methods for the Examination of Water and Wastewater', Nineteenth Edition. Other methods are based on the principles of MISA or EPA methodologies. New York State: ELAP Identification Number 10756.

All work recorded herein has been done in accordance with normal professional standards using accepted testing methodologies, quality assurance and quality control procedures except where otherwise agreed to by the client and testing company in writing. Any and all use of these test results shall be limited to the actual cost of the pertinent analysis done. There is no other warranty expressed or implied. Your samples will be retained at PASC for a period of three weeks from receipt of data or as per contract.

COMMENTS:

Revised report for total metals

Certified by 

Page 1



11/19/98

PASC - Certificate of Analysis

Page 2 of 3

	Client ID:	Method	MW98-1	MW98-2	BH98-1	BH98-2	MW98-3	
	Lab No.:	Blank	(0-2)	(2-4)	(6-8)	(4-6)	(0-2)	
	Date Sampled:	055767 98	055768 98	055769 98	055770 98	055771 98	055772 98	
		98/10/29	98/10/29	98/10/29	98/10/29	98/10/30	98/10/30	
Component	MDL	Units						
Arsenic (gfaa)	0.5	mg/kg	<	12	31	5.1	21	8.7
Mercury	0.04	"	<	0.74	1.7	5.0	0.75	1.2
Selenium (gfaa)	0.5	"	<	0.5	1.1	<	<	<
Aluminum	3	mg/kg	<	7600	19000	15000	19000	11000
Barium	0.1	"	<	89	280	71	100	140
Beryllium	0.1	"	<	0.5	1.0	<1.0	<1.0	<1.0
Cadmium	0.2	"	<	9.2	2.6	9.8	10	12
Calcium	20	"	<	5100	8800	6800	9900	7000
Chromium	5	"	<	16	29	12	25	22
Cobalt	1	"	<	13	12	18	15	26
Copper	0.6	"	2.0	29000	1900	54000	37000	31000
Iron	1	"	<	22000	74000	20000	34000	30000
Lead	10	"	<	20000	1600	86000	45000	39000
Magnesium	5	"	<	1800	2300	2400	3600	2600
Manganese	0.5	"	<	880	960	260	320	530
Molybdenum	1	"	<	15	4.0	40	31	24
Nickel	1	"	<	240	29	810	430	480
Phosphorus	6	"	<	1500	2300	1600	2400	2100
Potassium	100	"	<	840	1100	<1000	<1000	1900
Silver	0.5	"	<	6.2	0.5	22	9.5	9.2
Sodium	10	"	<	990	100	2100	650	1700
Thallium	6	"	<	<	<	<60	<60	<60
Vanadium	0.5	"	<	15	72	19	31	22
Zinc	0.5	"	2.4	30000	1700	89000	63000	41000

11/19/98

PASC - Certificate of Analysis

Page 3 of 3

			BH98-2	BH98-3	BH98-4
	<i>Client ID:</i>		(8-10)	(2-4)	(2-4)
	<i>Lab No.:</i>		055773 98	055774 98	055775 98
	<i>Date Sampled:</i>		98/10/30	98/10/30	98/10/30
Component	MDL	Units			
Arsenic (gfaa)	0.5	mg/kg	3.6	42	29
Mercury	0.04	"	2.6	29	11
Selenium (gfaa)	0.5	"	<	<	<
Aluminum	3	mg/kg	11000	8700	12000
Barium	0.1	"	92	1300	870
Beryllium	0.1	"	<1.0	0.2	0.5
Cadmium	0.2	"	12	33	18
Calcium	20	"	34000	41000	19000
Chromium	5	"	17	140	63
Cobalt	1	"	18	18	12
Copper	0.6	"	36000	11000	6500
Iron	1	"	25000	190000	92000
Lead	10	"	45000	7900	5200
Magnesium	5	"	4700	5100	3200
Manganese	0.5	"	410	1600	790
Molybdenum	1	"	24	10	7.0
Nickel	1	"	830	97	80
Phosphorus	6	"	1200	1600	1400
Potassium	100	"	1600	1300	1100
Silver	0.5	"	12	8.9	7.3
Sodium	10	"	900	200	160
Thallium	6	"	<60	16	11
Vanadium	0.5	"	18	30	27
Zinc	0.5	"	48000	15000	9600

Client: XCG Consultants Ltd. Project: 5-997-01-01

** TOTAL PAGE.03 **



Certificate of Analysis

CLIENT INFORMATION

Attention: Basil Wong
 Client Name: XCG Consultants Ltd.
 Project: 5-997-01-01
 Project Desc:

Address: 1 Port St., East
 Suite 201
 Mississauga, Ontario
 L5G 4N1

Fax Number: 905 891-2554
 Phone Number: 905 891-2400

LABORATORY INFORMATION

Contact: Ada Blythe, B.Sc., C.Chem.
 Project: AN981300
 Date Received: 98/10/31
 Date Reported: 98/11/16

Submission No.: 8K0033
 Sample No.: 055767-055775

NOTES:

'-' = not analysed ' $<$ ' = less than Method Detection Limit (MDL) 'NA' = no data available
 LOQ can be determined for all analyses by multiplying the appropriate MDL x 3.33
 All organic data is blank corrected except for PCDD/F, HxCRes MS and ClP volatile analyses
 Solids data is based on dry weight except for blank analyses.
 Organic analyses are not corrected for extraction recovery standards except for isotope
 dilution methods, (i.e. CARB 429 PAH, all PCDD/F and DED/DFB analyses)

Methods used by PASC are based upon those found in 'Standard Methods for the Examination of Water and Wastewater', Nineteenth Edition. Other methods are based on the principles of MISA or EPA methodologies. New York State: ELAP Identification Number 10756.

All work recorded herein has been done in accordance with normal professional standards using accepted testing methodologies, quality assurance and quality control procedures except where otherwise agreed to by the client and testing company in writing. Any and all use of these test results shall be limited to the actual cost of the pertinent analysis done. There is no other warranty expressed or implied. Your samples will be retained at PASC for a period of three weeks from receipt of data or as per contract.

COMMENTS:

Certified by:

Page 1

PHILIP ANALYTICAL SERVICES CORPORATION

5555 North Service Road, Burlington, Ontario, Canada L7L 5H7 Tel: (905) 332-9169 Fax: (905) 332-9169



11/16/98

PASC - Certificate of Analysis

Page 2 of 4

Component	MDL	Units	Method	Blank	% Recovery	Blank Spike	% Recovery	MW98-2	BH98-1	BH98-2
			Blank	Spike		Duplicate	(2-4)	(6-8)	(4-6)	
<i>Client ID:</i>										
<i>Lab No.:</i>			055767 98	055767 98	055767 98	055767 98	055767 98	055769 98	055770 98	055771 98
<i>Date Sampled:</i>			98/10/29	98/10/29	98/10/29	98/10/29	98/10/29	98/10/29	98/10/29	98/10/10
PAH via SW846 Method 8270										
Naphthalene	0.03	mg/kg	<	1.7	85	1.8	87	0.15	0.24	0.32
Acenaphthylene	0.04	"	<	1.8	92	1.9	94	<	<	<
Acenaphthene	0.07	"	<	1.9	94	1.9	95	<	<	0.19
Fluorene	0.03	"	<	1.8	92	1.9	93	0.07	0.25	0.20
Phenanthrene	0.03	"	<	1.9	93	1.9	94	0.56	0.79	1.2
Anthracene	0.03	"	<	1.9	93	1.9	94	0.12	0.08	0.25
Fluoranthene	0.02	"	<	1.8	91	2.0	100	0.75	0.39	1.3
Pyrene	0.03	"	<	2.0	100	1.7	83	1.0	0.39	1.8
Benz(a)anthracene	0.02	"	<	1.9	96	1.9	96	0.45	0.29	0.66
Chrysene	0.03	"	<	1.9	97	2.0	98	0.61	0.36	0.72
Benzo(b)fluoranthene	0.04	"	<	1.9	94	1.9	95	0.43	<	<
Benzo(k)fluoranthene	0.04	"	<	1.9	94	2.0	97	0.41	<	<
Benzo(a)pyrene	0.05	"	<	1.9	94	2.0	98	0.42	<	<
Indeno(1,2,3-cd)pyrene	0.06	"	<	1.9	92	1.8	92	0.35	<	<
Dibenzo(ah)anthracene	0.04	"	<	1.9	93	1.8	88	<	<	<
Benzo(ghi)perylene	0.04	"	<	1.8	91	1.7	87	0.40	<	<
Surrogate Recoveries		%								
d5-Nitrobenzene			75	81	81	83	83	62	74	78
2-Fluorobiphenyl			76	85	85	87	87	70	64	71
d14-p-Terphenyl			100	97	97	84	84	105	86	121

Client XCG Consultants Ltd. Project:5-997-01-01

NOV-17-98 TUE 09:36 AM XCG
 NOV 15 1998 17:20 FR PHILLIP ANALYTICAL
 FAX NO. 905 891 2554
 525 332 5159 TD 15058912554
 P. 02/04

11/16/98

PASC - Certificate of Analysis

Page 3 of 4

			BH98-2	BH98-3	BH98-4	BH98-4	BH98-4
			(8-10)	(2-4)	(2-4)	(2-4)	(2-4)
			055773 98	055774 98	055775 98	055775 98	055775 98
			98/10/30	98/10/30	98/10/30	98/10/30	98/10/30
Client ID:							
Lab No.:							
Date Sampled:							
Component	MDL	Units				M. Spike	MS % Rec.
PAH via SW846 Method 8270							
Naphthalene	0.03	mg/kg	1.9	1.6	0.10	2.7	82
Acenaphthylene	0.04	"	0.08	1.5	<	2.4	77
Acenaphthene	0.07	"	1.8	1.7	<	2.6	83
Fluorene	0.03	"	2.6	1.6	0.04	2.7	84
Phenanthrene	0.03	"	14	2.2	0.39	3.2	90
Anthracene	0.03	"	3.9	1.8	0.08	2.8	86
Fluoranthene	0.02	"	12	2.1	0.48	3.1	82
Pyrene	0.03	"	9.3	2.6	0.53	4.1	110
Benz(a)anthracene	0.02	"	4.6	2.1	0.30	3.1	88
Chrysene	0.03	"	4.9	2.3	0.35	3.3	94
Benzo(b)fluoranthene	0.04	"	3.4	2.1	0.33	3.1	89
Benzo(k)fluoranthene	0.04	"	3.3	2.1	0.29	3.2	92
Benzo(a)pyrene	0.05	"	3.8	2.1	0.33	3.0	85
Indeno(1,2,3-cd)pyrene	0.06	"	2.3	1.7	0.24	2.5	73
Dibenzo(ah)anthracene	0.04	"	0.52	1.4	<	2.4	76
Benzo(ghi)perylene	0.04	"	1.9	1.6	0.22	2.4	69
Surrogate Recoveries		%					
d5-Nitrobenzene			67	43	52	73	73
2-Fluorobiphenyl			73	42	55	75	75
d1,4-p-Terphenyl			104	55	85	107	107

Client: XCG Consultants Ltd. Project: 5-997-01-01

NOV-17-98 TUE 09:36 AM
 NOV 16 1998 17:20 FR PHILIP ANALYTICAL
 XCG
 FAX NO: 905 891 2524
 905 332 9159 TD 1505912524
 P. 03/04

11/16/98

PASC - Summary of Analysis Pre. Dates

Page MS-4 of 4

Batch Code:	1106KHA2
PAH	055767 98
	055769 98
	055770 98
	055771 98
	055773 98
	055774 98
	055775 98
Date analysed	98/11/09
Date prepared	98/11/06

Client: XCG Consultants Ltd. Project: 5-997-01-01

*** TOTAL PAGE. 04 ***



Certificate of Analysis

CLIENT INFORMATION

Attention: Basil Wong
Client Name: XCG Consultants Ltd.
Project: 5-997-01-01
Project Desc:

Address: 1 Port St., East
Suite 201
Mississauga, Ontario
L5G 4N1

Fax Number: 905 891-2554
Phone Number: 905 891-2400

LABORATORY INFORMATION

Contact: Ada Blythe, B.Sc., C.Chem.
Project: AN981300
Date Received: 98/10/31
Date Reported: 98/11/13

Submission No.: 8K0033
Sample No.: 055767

NOTES:

'-' = not analysed '<' = less than Method Detection Limit (MDL) 'NA' = no data available
LOQ can be determined for all analytes by multiplying the appropriate MDL X 3.33
All organic data is blank corrected except for PCDD/F, Hi-Res MS and CLP volatile analyses
Solids data is based on dry weight except for biota analyses.
Organic analytes are not corrected for extraction recovery standards except for isotope
dilution methods; (i.e. CARB 429 PAH, all PCDD/F and DBD/DBF analyses)

Methods used by PASC are based upon those found in 'Standard Methods for the Examination of Water and Wastewater', Nineteenth Edition. Other methods are based on the principles of MISA or EPA methodologies. New York State: ELAP Identification Number 10756.

All work recorded herein has been done in accordance with normal professional standards using accepted testing methodologies, quality assurance and quality control procedures except where otherwise agreed to by the client and testing company in writing. Any and all use of these test results shall be limited to the actual cost of the pertinent analysis done. There is no other warranty expressed or implied. Your samples will be retained at PASC for a period of three weeks from receipt of data or as per contract.

COMMENTS:

NS = "Not spiked"

Certified by:



11/13/98

PASC - Certificate of Analysis

Page 2 of 4

Component	MDL	Units	Method	Blank	% Recovery	BH98-1
			Blank	Spike		(6-8)
<i>Client ID:</i>						
<i>Lab No.:</i>			055767 98	055767 98	055767 98	055770 98
<i>Date Sampled:</i>			98/10/29	98/10/29	98/10/29	98/10/29
Volatiles via SW846 Method 8260						
Acetone	0.065	mg/kg	0.099	0.34	95	0.32
Acrolein	0.010	"	<	0.57	110	<0.020
Acrylonitrile	0.013	"	<	0.56	110	<0.026
Benzene	0.001	"	<	0.24	95	<0.002
Bromoform	0.004	"	<	0.26	100	<0.008
Bromomethane	0.005	"	<	0.28	110	<0.010
2-Butanone	0.012	"	<	0.32	130	<0.024
Carbon Disulfide	0.005	"	<	0.24	95	<0.010
Carbon Tetrachloride	0.006	"	<	0.27	110	<0.012
Chlorobenzene	0.002	"	<	0.23	94	<0.004
Chlorodibromomethane	0.004	"	<	0.25	100	<0.008
Chloroethane	0.005	"	<	0.26	100	<0.010
2-Chloroethylvinylether	0.013	"	<	0.25	100	<0.026
Chloroform	0.002	"	<	0.24	95	<0.004
Chloromethane	0.005	"	<	0.25	100	<0.010
1,2-Dichlorobenzene	0.002	"	<	0.23	92	<0.004
1,3-Dichlorobenzene	0.003	"	<	0.23	92	<0.006
1,4-Dichlorobenzene	0.004	"	<	0.23	92	<0.008
Dichlorobromomethane	0.004	"	<	0.24	94	<0.008
1,1-Dichloroethane	0.006	"	<	0.23	93	<0.012
1,2-Dichloroethane	0.003	"	<	0.23	92	<0.006
1,1-Dichloroethene	0.002	"	<	0.24	98	<0.004
Methyl-t-butylether	0.005	"	<	NS	-	<0.010
Ethylene Dibromide	0.007	"	<	0.25	100	<0.014
1,2-Dibromo-3-Chloropropane	0.050	"	<	0.29	120	<0.10
cis-1,2-Dichloroethene	0.003	"	<	0.23	92	<0.006
trans-1,2-Dichloroethene	0.003	"	<	0.21	86	<0.006
1,2-Dichloropropane	0.007	"	<	0.24	92	<0.014
cis-1,3-Dichloropropene	0.002	"	<	0.25	98	<0.004
trans-1,3-Dichloropropene	0.004	"	<	0.25	98	<0.008
Ethylbenzene	0.002	"	<	0.24	96	<0.004
2-Hexanone	0.008	"	<	0.31	130	<0.016
Methylene Chloride	0.010	"	<	0.23	93	0.052
4-Methyl-2-Pentanone	0.009	"	<	0.29	120	<0.018
Styrene	0.002	"	<	0.25	98	<0.004
1,1,1,2-Tetrachloroethane	0.002	"	<	0.24	95	<0.004
1,1,2,2-Tetrachloroethane	0.004	"	<	0.26	100	<0.008
Tetrachloroethene	0.003	"	<	0.24	96	<0.006
Toluene	0.002	"	<	0.24	95	0.008
1,1,1-Trichloroethane	0.003	"	<	0.25	100	<0.006
1,1,2-Trichloroethane	0.004	"	<	0.25	100	<0.008
Trichloroethene	0.003	"	<	0.24	94	<0.006
Vinyl Acetate	0.009	"	<	0.29	110	<0.018

11/13/98

PASC - Certificate of Analysis

Page 3 of 4

	Method	Blank	% Recovery	BH98-1
<i>Client ID:</i>	Blank	Spike		(6-8)
<i>Lab No.:</i>	055767 98	055767 98	055767 98	055770 98
<i>Date Sampled:</i>	98/10/29	98/10/29	98/10/29	98/10/29

Component	MDL	Units				
Vinyl Chloride	0.003	"	<	0.27	110	<0.006
m&p-Xylene	0.004	"	<	0.49	97	<0.008
o-Xylene	0.002	"	<	0.24	96	<0.004
Isopropylbenzene	0.013	"	<	0.23	92	<0.026
Surrogate Recoveries		%				
d4-1,2-Dichloroethane				101	102	102
d8-Toluene				103	98	103
Bromofluorobenzene				86	101	86

11/13/98

PASC - Summary of Analysis Pre. Dates

Page MS-4 of 4

Batch Code:	1110SM01	1112SM02
Volatiles	055767 98	055770 98
	055770 98	
Date analysed	98/11/10	98/11/12
Date prepared	98/11/10	98/11/12

Client:XCG Consultants Ltd. Project:5-997-01-01

** TOTAL PAGE.04 **



PHILIP ANALYTICAL SERVICES CORPORATION

LABORATORY USE ONLY

PHILIP SERVICES

5735 McAdam Road
Mississauga, Ontario L4Z 1N9

Tel: (905) 890-8566
Fax: (905) 890-8575
Wats: 1-800-263-9040

Work Order: _____

Comments: _____

CHAIN OF CUSTODY RECORD

Client: 1 Dept. Supervisor Field Mississauga Ont
ESG UNIT

PASC Quote #: BL810-1033

Page 1 of 1

Client P.O. #: _____

Client Project #: 577-01-01

Contact: Paul Whelan

Sampled by: Paul Wang

Phone: 905-890-2400 Fax: 905-890-2534

Please specify Guideline (if applicable): Analytical methods as per quote. To be conducted by Burlington Lab (i.e. New York Lab) (Turnaround Time)

Analysis Required:

Invoice to (if other than above):

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Some exceptions apply; please contact Lab
STD: 5-7 Business Days

RUSH: Specify Date _____

Time _____

Sample #	Client Sample ID	Date Sampled	Analysis Required	Sample Matrix	No. of Containers	Comments/Contamination/ Site History
1	MW1-1		✓	Groundwater	3	
2	MW1-2		✓	Groundwater	6	
3	MW1-3		✓	Groundwater	3	
4	MW1-4		✓	Groundwater	1	
5	CAW		✓	Groundwater	6	
6	BIW1		✓	Groundwater	3	
7	Surface Water		✓	Surface Water	1	
8						
9						
10						
11						
12						

Samples Relinquished to PASC by (Client Signature): _____

Date: Nov 5, 98

Time: 9:40

Method of Shipment: ProVia by PASC in Checktown

Samples Received in Lab by: _____

Date: Nov 1, 98

Time: 9:10

Condition of samples upon receipt at lab: _____



Certificate of Analysis

CLIENT INFORMATION

Attention: Basil Wong
Client Name: XCG Consultants Ltd.
Project: 5-997-01-01
Project Desc:

Address: 1 Port St., East
Suite 201
Mississauga, Ontario
L5G 4N1

Fax Number: 905-519-741-5627
Phone Number: 905 891-2400

LABORATORY INFORMATION

Contact: Ada Blythe, B.Sc., C.Chem.
Project: AN981300
Date Received: 98/11/05
Date Reported: 98/11/17

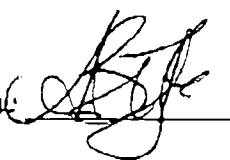
Submission No.: 8K0217
Sample No.: 056886-056893

NOTES: 'N' = not analysed '<' = less than Method Detection Limit (MDL) 'NA' = no data available
LOQ can be determined for all analytes by multiplying the appropriate MDL X 3.33
All organic data is blank corrected except for PCDD/F, Hi-Res MS and CLP volatile analyses
Solids data is based on dry weight except for biota analyses.
Organic analyses are not corrected for extraction recovery standards except for isotope dilution methods, (i.e. CARB 429 PAH, all PCDD/F and DED/DBF analyses)

Methods used by PASC are based upon those found in 'Standard Methods for the Examination of Water and Wastewater', Nineteenth Edition. Other methods are based on the principles of MISA or EPA methodologies. New York State: ELAP Identification Number 10756.

All work recorded herein has been done in accordance with normal professional standards using accepted testing methodologies, quality assurance and quality control procedures except where otherwise agreed to by the client and testing company in writing. Any and all use of these test results shall be limited to the actual cost of the pertinent analysis done. There is no other warranty expressed or implied. Your samples will be retained at PASC for a period of three weeks from receipt of data or as per contract.

COMMENTS:
NS = Not spiked

Certified by: 



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PASC - Certificate of Analysis

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Component	MDL	Units	Method	Blank	% Recovery		MW98-1	
			Blank	Spike			MW98-1	MW98-1
<i>Client ID:</i>								
<i>Lab No.:</i>			056886 98	056886 98	056886 98	056887 98	056887 98	
<i>Date Sampled:</i>			98/11/04	98/11/04	98/11/04	98/11/04	98/11/04	
								Duplicate
<i>Total Metals via SW846 Method 6010/7000 Series</i>								
Arsenic (gfaa)	0.0020	mg/L	<0.0022	0.051	91	<0.0022	<0.0022	
Mercury	0.05	ug/L	<	1.0	100	<	<	
Selenium (gfaa)	0.0020	mg/L	<0.0022	0.054	97	0.0023	-	
Aluminum	0.030	mg/L	<	2.0	100	<0.033	<0.033	
Barium	0.001	"	<	1.0	100	0.13	0.13	
Beryllium	0.001	"	<	0.51	100	<	<	
Cadmium	0.002	"	<	0.51	100	<	<	
Calcium	0.20	"	<	10	100	65	66	
Chromium	0.004	"	<	1.0	100	<	<	
Cobalt	0.010	"	<	1.0	100	<0.011	<0.011	
Copper	0.005	"	<0.006	1.0	100	0.007	0.007	
Iron	0.010	"	<	12	100	<0.011	<0.011	
Lead	0.020	"	<	1.0	100	<0.022	<0.022	
Magnesium	0.050	"	<	11	99	84	83	
Manganese	0.006	"	<	1.0	100	0.14	0.14	
Molybdenum	0.010	"	<	0.48	96	0.015	0.014	
Nickel	0.010	"	<	0.51	100	<0.011	<0.011	
Phosphorus	0.060	"	<	5.1	100	1.3	1.5	
Potassium	1.000	"	<	9.7	100	6.1	6.5	
Silver	0.010	"	<	0.51	100	<0.011	<0.011	
Sodium	0.100	"	<	9.9	98	52	51	
Thallium	0.060	"	<	1.0	100	<0.066	<0.066	
Vanadium	0.005	"	<	0.48	97	<0.006	<0.006	
Zinc	0.005	"	0.020	2.0	100	<0.006	<0.006	

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PASC - Certificate of Analysis

Client ID: MW98-1 MW98-1 MW98-2 MW98-3 MW98-4
 Lab No.: 056887 98 056887 98 056888 98 056889 98 056890 98
 Date Sampled: 98/11/04 98/11/04 98/11/04 98/11/04 98/11/04

Component	MDL	Units	M. Spike	MS % Rec.			
<i>Total Metals via SW846 Method 6910/7000 Series</i>							
Arsenic (gfaa)	0.0020	mg/L	0.047	83	<0.0022	<0.0022	<0.0022
Mercury	0.05	ug/L	0.86	86	0.11	<	<
Selenium (gfaa)	0.0020	mg/L	0.046	83	<0.0022	<0.0022	<0.0022
Aluminum	0.030	mg/L	2.2	100	<0.033	<0.033	<0.033
Barium	0.001	"	1.3	100	0.16	0.16	0.17
Beryllium	0.001	"	0.56	100	<	<	<
Cadmium	0.002	"	0.53	97	<	<	<
Calcium	0.20	"	78	110	58	58	51
Chromium	0.004	"	1.1	100	<	<	<
Cobalt	0.010	"	1.1	100	<0.011	<0.011	<0.011
Copper	0.005	"	1.1	100	0.024	0.13	0.011
Iron	0.010	"	15	110	<0.011	<0.011	<0.011
Lead	0.020	"	1.1	99	<0.022	0.030	<0.022
Magnesium	0.050	"	99	120	84	93	81
Manganese	0.006	"	1.3	100	0.051	0.12	0.057
Molybdenum	0.010	"	0.60	110	0.012	0.018	0.021
Nickel	0.010	"	0.54	100	<0.011	<0.011	<0.011
Phosphorus	0.060	"	5.9	91	0.40	0.26	0.54
Potassium	1.000	"	17	96	4.7	8.4	9.2
Silver	0.010	"	0.53	98	<0.011	<0.011	<0.011
Sodium	0.100	"	64	110	38	60	40
Thallium	0.060	"	1.1	95	<0.066	<0.066	<0.066
Vanadium	0.005	"	0.53	98	<0.006	<0.006	<0.006
Zinc	0.005	"	2.1	97	<0.006	0.048	<0.006

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PASC - Certificate of Analysis

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Component	MDL	Units	Surface Water		
			UW	BW1	056893 98
<i>Client ID:</i>			UW	BW1	Surface Water
<i>Lab No.:</i>			056891 98	056892 98	056893 98
<i>Date Sampled:</i>			98/11/04	98/11/04	98/10/29
Total Metals via SW846 Method 6010/7000 Series					
Arsenic (gfaa)	0.0020	mg/L	0.0040	<0.0022	<0.0022
Mercury	0.05	ug/L	<	<	<
Selenium (gfaa)	0.0020	mg/L	<0.0022	<0.0022	<0.0022
Aluminum	0.030	mg/L	<0.033	<0.033	<0.033
Barium	0.001	"	0.086	0.16	0.055
Beryllium	0.001	"	<	<	<
Cadmium	0.002	"	<	<	<
Calcium	0.20	"	91	61	18
Chromium	0.004	"	<	<	<
Cobalt	0.010	"	<0.011	<0.011	<0.011
Copper	0.005	"	0.22	0.031	0.10
Iron	0.010	"	<0.011	<0.011	<0.011
Lead	0.020	"	<0.022	<0.022	0.073
Magnesium	0.050	"	22	82	2.3
Manganese	0.006	"	1.1	0.067	0.042
Molybdenum	0.010	"	<0.011	0.012	<0.011
Nickel	0.010	"	<0.011	<0.011	<0.011
Phosphorus	0.060	"	0.090	0.32	<0.066
Potassium	1.000	"	2.7	4.3	2.4
Silver	0.010	"	<0.011	<0.011	<0.011
Sodium	0.100	"	16	36	3.3
Thallium	0.060	"	<0.066	<0.066	<0.066
Vanadium	0.005	"	<0.006	<0.006	<0.006
Zinc	0.005	"	0.84	<0.006	0.16

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PASC - Certificate of Analysis

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Component	MDL	Units	Method	Blank	% Recovery	MW98-2	MW98-2
			Blank	Spike			
			Client ID:	056886 98	056886 98	056886 98	056888 98
			Lab No.:	056886 98	056886 98	056888 98	056888 98
			Date Sampled:	98/11/04	98/11/04	98/11/04	98/11/04
Volatiles via SW846 Method 8260							M. Spike
Acetone	12.7	ug/L	<	51	100	13	48
Acrolein	5.1	"	<	92	92	<	66
Acrylonitrile	2.7	"	<	88	88	<	82
Benzene	0.5	"	<	51	100	<	47
Bromoform	0.7	"	<	44	88	<	43
Bromomethane	1.0	"	<	61	120	<	51
2-Butanone	3.2	"	<	44	89	<	43
Carbon Disulfide	0.9	"	<	54	110	<	45
Carbon Tetrachloride	0.7	"	<	55	110	<	47
Chlorobenzene	0.6	"	<	50	100	<	45
Chlorodibromomethane	0.4	"	<	44	89	<	43
Chloroethane	0.9	"	<	60	120	<	49
2-Chloroethylvinylether	2.8	"	<	43	87	<	13
Chloroform	0.4	"	<	56	110	<	53
Chloromethane	1.4	"	<	62	120	<	50
1,2-Dichlorobenzene	0.8	"	<	46	93	<	43
1,3-Dichlorobenzene	1.8	"	<	48	96	<	41
1,4-Dichlorobenzene	1.6	"	<	46	93	<	39
Dichlorobromomethane	0.4	"	<	48	96	<	47
1,1-Dichloroethane	0.5	"	<	53	110	<	50
1,2-Dichloroethane	0.4	"	<	52	100	<	52
1,1-Dichloroethene	0.7	"	<	53	110	<	44
Methyl-t-butylether	0.5	"	<	NS	-	<	NS
Ethylene Dibromide	0.4	"	<	47	94	<	47
1,2-Dibromo-3-Chloropropane	10	"	<	40	80	<	41
cis-1,2-Dichloroethene	0.6	"	<	54	110	<	49
trans-1,2-Dichloroethene	0.5	"	<	50	100	<	41
1,2-Dichloropropane	0.7	"	<	50	100	<	50
cis-1,3-Dichloropropene	0.3	"	<	47	94	<	44
trans-1,3-Dichloropropene	0.6	"	<	47	93	<	45
Ethylbenzene	0.5	"	<	55	110	<	48
2-Hexanone	1.3	"	<	45	89	<	42
Methylene Chloride	2.3	"	<	51	100	<	47
4-Methyl-2-Pentanone	1.5	"	<	45	90	<	45
Styrene	0.6	"	<	54	110	<	47
1,1,1,2-Tetrachloroethane	0.6	"	<	52	100	<	49
1,1,2,2-Tetrachloroethane	0.8	"	<	47	94	<	48
Tetrachloroethene	0.5	"	<	49	98	<	42
Toluene	1.0	"	<	53	110	<	48
1,1,1-Trichloroethane	0.8	"	<	53	110	<	49
1,1,2-Trichloroethane	0.6	"	<	47	93	<	47
Trichloroethene	1.0	"	<	48	95	<	43
Vinyl Acetate	2.4	"	<	47	93	<	44

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Component	MDL	Units	Method	Blank	% Recovery	MW98-2	MW98-2
			Blank	Spike			
			056886 98	056886 98	056886 98	056888 98	056888 98
			98/11/04	98/11/04	98/11/04	98/11/04	98/11/04
							M. Spike
Vinyl Chloride	0.9	"	<	67	130	<	53
m&p-Xylene	1.1	"	<	110	110	<	98
o-Xylene	0.5	"	<	55	110	<	49
Surrogate Recoveries		%					
d4-1,2-Dichloroethane			112	102	102	110	108
d8-Toluene			109	107	107	111	106
Bromofluorobenzene			86	96	96	89	92

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PASC - Certificate of Analysis

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Component	MDL	Units	MS % Rec.	MS Dup	MSD % Rec.	
<i>Volatiles via SW846 Method 8260</i>						
Acetone	12.7	ug/L	96	43	86	<
Acrolein	5.1	"	130	56	110	<
Acrylonitrile	2.7	"	160	80	160	<
Benzene	0.5	"	94	49	98	<
Bromoform	0.7	"	86	39	78	<
Bromomethane	1.0	"	100	54	110	<
2-Butanone	3.2	"	86	43	86	<
Carbon Disulfide	0.9	"	90	49	99	<
Carbon Tetrachloride	0.7	"	93	50	100	<
Chlorobenzene	0.6	"	91	46	92	<
Chlorodibromomethane	0.4	"	87	42	85	<
Chloroethane	0.9	"	97	54	110	<
2-Chloroethylvinylether	2.8	"	27	13	26	<
Chloroform	0.4	"	110	55	110	<
Chloromethane	1.4	"	100	55	110	<
1,2-Dichlorobenzene	0.8	"	86	42	84	<
1,3-Dichlorobenzene	1.8	"	82	41	82	<
1,4-Dichlorobenzene	1.6	"	78	40	80	<
Dichlorobromomethane	0.4	"	94	46	93	<
1,1-Dichloroethane	0.5	"	99	50	100	<
1,2-Dichloroethane	0.4	"	100	51	100	<
1,1-Dichloroethene	0.7	"	88	49	98	<
Methyl-t-butylether	0.5	"	-	NS	-	<
Ethylene Dibromide	0.4	"	94	46	92	<
1,2-Dibromo-3-Chloropropane	10	"	82	40	80	<
cis-1,2-Dichloroethene	0.6	"	97	50	100	<
trans-1,2-Dichloroethene	0.5	"	83	44	89	<
1,2-Dichloropropane	0.7	"	100	50	99	<
cis-1,3-Dichloropropene	0.3	"	88	43	87	<
trans-1,3-Dichloropropene	0.6	"	90	43	86	<
Ethylbenzene	0.5	"	96	51	100	<
2-Hexanone	1.3	"	85	40	81	<
Methylene Chloride	2.3	"	94	49	98	<
4-Methyl-2-Pentanone	1.3	"	90	42	84	<
Styrene	0.6	"	93	49	98	<
1,1,1,2-Tetrachloroethane	0.6	"	98	51	100	<
1,1,1,2,2-Tetrachloroethane	0.8	"	95	45	90	<
Tetrachloroethene	0.5	"	84	45	90	<
Toluene	1.0	"	97	51	100	<
1,1,1-Trichloroethane	0.8	"	97	52	100	<
1,1,2-Trichloroethane	0.6	"	94	45	89	<
Trichloroethene	1.0	"	87	45	91	<
Vinyl Acetate	2.4	"	88	47	93	<

Client: XCG Consultants Ltd. Project: 5-997-01-01

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	<i>Client ID:</i>	MW98-2	MW98-2	MW98-2	UW	
	<i>Lab No.:</i>	056888 98	056888 98	056888 98	056891 98	
	<i>Date Sampled:</i>	98/11/04	98/11/04	98/11/04	98/11/04	
Component	MDL	Units	MS % Rec.	MS Dnp	MSD % Rec.	
Vinyl Chloride	0.9	"	110	59	120	<
m&p-Xylene	1.1	"	98	100	100	<
o-Xylene	0.5	"	97	51	100	<
Surrogate Recoveries		%				
d4-1,2-Dichloroethane			108	100	100	111
d8-Toluene			106	108	108	108
Bromofluorobenzene			92	93	93	87

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<i>Client ID:</i>	Method	Blank	% Recovery			
<i>Lab No.:</i>	Blank	Spike	MW98-1	MW98-2		
<i>Date Sampled:</i>	056886 98	056886 98	056886 98	056887 98	056888 98	
	98/11/04	98/11/04	98/11/04	98/11/04	98/11/04	

Component	MDL	Units					
<i>PAH via SW846 Method 8270</i>							
Naphthalene	0.3	ug/L	<	14	72	<	<
Acenaphthylene	0.4	"	<	16	79	<	<
Acenaphthene	0.7	"	<	16	81	<	<
Fluorenc	0.3	"	<	17	83	<	<
Phenanthrene	0.3	"	<	18	91	<	<
Anthracene	0.3	"	<	18	90	<	<
Fluoranthene	0.2	"	<	18	92	<	<
Pyrene	0.3	"	<	18	91	<	<
Benz(a)anthracene	0.2	"	<	19	95	<	<
Chrysene	0.3	"	<	20	98	<	<
Benzo(b)fluoranthene	0.4	"	<	20	100	<	<
Benzo(k)fluoranthene	0.4	"	<	20	100	<	<
Benzo(a)pyrene	0.5	"	<	20	98	<	<
Indeno(1,2,3-cd)pyrene	0.6	"	<	18	90	<	<
Dibenzo(ah)anthracene	0.4	"	<	17	86	<	<
Benzo(ghi)perylene	0.4	"	<	16	81	<	<
Surrogate Recoveries		%					
d5-Nitrobenzene				86	75	75	91
2-Fluorobiphenyl				82	73	73	80
d14-p-Terphenyl				93	84	84	43

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Client ID: MW98-3 UW BWI
 Lab No.: 056889 98 056891 98 056892 98
 Date Sampled: 98/11/04 98/11/04 98/11/04

Component	MDL	Units			
<i>PAH via SW846 Method 8270</i>					
Naphthalene	0.3	ug/L	0.70	0.90	<
Accnaphthylene	0.4	"	<	<	<
Acenaphthenc	0.7	"	<	<	<
Fluorene	0.3	"	<	<	<
Phenanthrene	0.3	"	1.5	<	<
Anthracenc	0.3	"	<	29	<
Fluoranthene	0.2	"	2.2	1.1	<
Pyrene	0.3	"	1.7	3.4	<
Benz(a)anthracene	0.2	"	0.9	<	<
Chrysenc	0.3	"	1.0	<	<
Benzo(b)fluoranthene	0.4	"	1.0	<	<
Benzo(k)fluoranthene	0.4	"	0.9	<	<
Benzo(a)pyrene	0.5	"	1.0	<	<
Indeno(1,2,3-cd)pyrene	0.6	"	<	<	<
Dibenzo(ah)anthracene	0.4	"	<	<	<
Benzo(ghi)perylene	0.4	"	0.5	<	<
Surrogate Recoveries		%			
d5-Nitrobenzene			85	90	90
2-Fluorobiphenyl			67	83	88
d14-p-Terphenyl			35	66	79

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PASC - Summary of Analysis Pre. Dates

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Batch Code: **1111MGA1**
 Arsenic (gfaa) **056886 98**
 056887 98
 056888 98
 056889 98
 056890 98
 056891 98
 056892 98
 056893 98

Date analysed **98/11/13**
 Date prepared **98/11/11**

Batch Code: **1109MGA2 1109MGA3**
 Mercury **056886 98 056891 98**
 056887 98 056892 98
 056888 98 056893 98
 056889 98
 056890 98

Date analysed **98/11/09 98/11/09**
 Date prepared **98/11/09 98/11/09**

Batch Code: **1111MGA1**
 Selenium (gfaa) **056886 98**
 056887 98
 056888 98
 056889 98
 056890 98
 056891 98
 056892 98
 056893 98

Date analysed **98/11/13**
 Date prepared **98/11/11**

Batch Code: **1112MGA1 1125AWZ1**
 Metals **056886 98 056887 98**
 056887 98 056888 98
 056888 98 056889 98
 056889 98 056890 98
 056890 98 056891 98
 056891 98 056892 98
 056892 98 056893 98
 056893 98

Date analysed **98/11/13 98/11/25**
 Date prepared **98/11/12 98/11/25**

Batch Code: **1111SM01**
 Volatiles **056886 98**
 056888 98

11/27/98

PASC - Summary of Analysis Pre. Dates

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	056891 98
Date analysed	98/11/11
Date prepared	98/11/11

Batch Code:	1109DFR1
PAH	056886 98
	056887 98
	056888 98
	056889 98
	056891 98
	056892 98

Date analysed	98/11/13
Date prepared	98/11/09

Client: XCG Consultants Ltd. Project: 5-997-01-01



PHILIP ANALYTICAL SERVICES CORPORATION

5735 McAdam Road
Mississauga, Ontario L4Z 1N9

Tel: (905) 890-8566
Fax: (905) 890-8575
Wats: 1-800-263-9040

LABORATORY USE ONLY

Work Order: _____

Comments: _____

CHAIN OF CUSTODY RECORD

Client: XCG Consultants Ltd
1 Port Street East
Mississauga, Ont. L5G 4N1

Contact: Basil Wong

Phone: 905-891-2400 Fax: 905-891-2554

PASC Quote #: BL 810-1033 Page 1 of 1

Client P.O. #: _____

Client Project #: 5-997-01-01

Sampled by: Basil Wong

Please specify Guideline (if applicable): Analysis by Burlington lab (i.e. New York State Certification)

Analytical methods as per quote

Invoice to (if other than above):
Lat _____

Analysis Required:

TAT (Turnaround Time)

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

*some exceptions apply, please contact Lab

STD 5-7 Business Days

RUSH Specify Date _____

Method Blank - 000342

Sample #	Client Sample I.D.	Date Sampled	metals	6010-S	7060-HS-S	7740-S-S	747-Hg-S	Sample Matrix	No. of Containers	Comments/Contamination/ Site History
343	BH98-5(0-2)	Dec 7, 98	/					Sol	1	
44	BH98-6(0-2)	u	/					u	1	
45	BH98-7(0-1/2)	u	/					u	1	
46	BH98-8(0-2)	u	/					u	1	
47	BH98-9(0-3)	u	/					u	1	
48	BH98-10(0-2)	u	/					u	1	
7										
8										
9										
10										
11										
12										

Samples Relinquished to PASC by (Client Signature): [Signature] Date: JAN 6, 99 Time: 8:50 AM Method of Shipment: Dropped off

Samples Received in lab by: [Signature] Date: 9/10/16 Time: 8:30 Condition of samples upon receipt at lab: _____

White: Philip Yellow: Mail Pink: Receiver Goldenrod: Client



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Certificate of Analysis

CLIENT INFORMATION

Attention: Basil Wong
 Client Name: XCG Consultants Ltd.
 Project: 5-997-01-01
 Project Desc:

Address: 1 Port St., East
 Suite 201
 Mississauga, Ontario
 L5G 4N1

Fax Number: 905 891-2554
 Phone Number: 905 891-2400

LABORATORY INFORMATION

Contact: Ada Blythe, B.Sc., C.Chem.
 Project: AN981300
 Date Received: 99/01/06
 Date Reported: 99/01/18

Submission No.: 9A0073
 Sample No.: 000342-000348

NOTES:

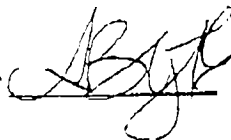
'-' = not analysed ' $<$ ' = less than Method Detection Limit (MDL) 'NA' = no data available
 LOQ can be determined for all analytes by multiplying the appropriate MDL X 3.33
 All organic data is blank corrected except for PCDD/F, Hi-Res MS and CLP volatile analyses
 Solids data is based on dry weight except for biota analyses.
 Organic analyses are not corrected for extraction recovery standards except for isotope dilution methods, (i.e. CARB 429 PAH, all PCDD/F and DDD/DBF analyses)

Methods used by PASC are based upon those found in 'Standard Methods for the Examination of Water and Wastewater', Nineteenth Edition. Other methods are based on the principles of MISA or EPA methodologies. New York State: ELAP Identification Number 10756.

All work recorded herein has been done in accordance with normal professional standards using accepted testing methodologies, quality assurance and quality control procedures except where otherwise agreed to by the client and testing company in writing. Any and all use of these test results shall be limited to the actual cost of the pertinent analysis done. There is no other warranty expressed or implied. Your samples will be retained at PASC for a period of three weeks from receipt of data or as per contract.

COMMENTS:

- (1) Suspected contamination
- (2) Difficult to accurately determine recoveries due to high levels of metals in the sample.

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PASC - Certificate of Analysis

Component	MDL	Units	Method	Blank	% Recovery	BH98-5	BH98-5	BH98-5	BH98-5	BH98-6
			Blank	Spike		(0-2)	(0-2)	(0-2)	(0-2)	(0-2)
<i>Client ID:</i>			000342 99	000342 99	000342 99	000343 99	000343 99	000343 99	000343 99	000344 99
<i>Lab No.:</i>			98/12/07	98/12/07	98/12/07	98/12/07	98/12/07	98/12/07	98/12/07	98/12/07
<i>Date Sampled:</i>						Duplicate	M. Spike	MS % Rec.		
<i>Metals via SW846 Method 6010/7000 Series</i>										
Arsenic (gfaa)	0.5	mg/kg	<	4.7	90	11	9.8	31	83	11
Mercury	0.04	"	<	1.0	100	1.4	-	-	-	2.3
Selenium (gfaa)	0.5	"	<	5.3	110	<	<	1.1	23(3)	<
			(1)							
Aluminum	3	mg/kg	<	210	100	8900	8900	9800	490(2)	9600
Barium	0.1	"	0.1	100	100	200	200	310	110	330
Beryllium	0.1	"	<	51	100	0.6	0.6	52	100	0.6
Cadmium	0.2	"	<	51	100	13	13	65	100	17
Calcium	20	"	<	1000	100	11000	11000	12000	77(2)	16000
Chromium	0.4	"	<	110	100	19	21	120	100	19
Cobalt	1	"	<	100	100	18	17	120	100	13
Copper	0.6	"	2.3	100	100	22000	29000	29000	(2)	20000
Iron	1	"	1.0	1300	110	31000	30000	33000	140(2)	35000
Lead	2	"	<	110	110	21000	22000	22000	320(2)	16000
Magnesium	5	"	<	1100	100	3000	3100	4200	100	4000
Manganese	0.5	"	<	100	100	1300	1300	1400	120	1000
Molybdenum	1	"	<	50	100	14	15	61	94	13
Nickel	1	"	<	53	110	340	340	360	43(2)	310
Phosphorus	6	"	<	510	100	1700	1700	2200	100	1300
Potassium	100	"	<	1000	110	990	950	2000	100	1200
Silver	1.0	"	<	52	100	6.9	6.3	58	100	5.8
Sodium	10	"	<	1000	100	750	710	1800	100	510
Thallium	6	"	<	100	100	<	<	110	100	<
Vanadium	0.5	"	<	50	99	20	19	70	100	22
Zinc	0.5	"	0.7	200	100	30000	30000	31000	240(2)	26000

			BH98-7	BH98-8	BH98-9	BH98-10
	<i>Client ID:</i>		(0-1/2)	(0-2)	(0-3)	(0-2)
	<i>Lab No.:</i>		000345 99	000346 99	000347 99	000348 99
	<i>Date Sampled:</i>		98/12/07	98/12/07	98/12/07	98/12/07
Component	MDL	Units				
<i>Metals via SW846 Method 6010/7000 Series</i>						
Arsenic (gfaa)	0.5	mg/kg	27	6.5	8.9	7.5
Mercury	0.04	"	5.6	0.20	0.49	1.0
Selenium (gfaa)	0.5	"	<	<	<	<
Aluminium	3	mg/kg	9200	12000	13000	8500
Barium	0.1	"	780	160	110	140
Beryllium	0.1	"	0.5	1.0	0.6	0.6
Cadmium	0.2	"	15	0.9	2.2	14
Calcium	20	"	14000	63000	29000	9000
Chromium	0.4	"	40	18	20	11
Cobalt	1	"	21	7.0	11	12
Copper	0.6	"	12000	320	4700	22000
Iron	1	"	66000	21000	25000	23000
Lead	2	"	8400	520	4700	15000
Magnesium	5	"	3600	13000	13000	2500
Manganese	0.5	"	860	650	710	760
Molybdenum	1	"	8.0	2.0	4.0	14
Nickel	1	"	96	21	94	480
Phosphorus	6	"	1100	490	800	1100
Potassium	100	"	1100	1600	1500	900
Silver	1.0	"	7.2	<	<	5.7
Sodium	10	"	200	240	300	1200
Thallium	6	"	<	<	<	<
Vanadium	0.5	"	25	20	23	17
Zinc	0.5	"	14000	470	8100	31000

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PASC - Summary of Analysis Pre. Dates

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Batch Code: 0111MNA1
Arsenic (gfaa) 000342 99
000343 99
000344 99
000345 99
000346 99
000347 99
000348 99
Date analysed 99/01/13
Date prepared 99/01/11

Batch Code: 0107MNA1
Mercury 000342 99
000343 99
000344 99
000345 99
000346 99
000347 99
000348 99
Date analysed 99/01/07
Date prepared 99/01/07

Batch Code: 0111MNA1
Selenium (gfaa) 000342 99
000343 99
000344 99
000345 99
000346 99
000347 99
000348 99
Date analysed 99/01/12
Date prepared 99/01/11

Batch Code: 0111MNBI
Metals 000342 99
000343 99
000344 99
000345 99
000346 99
000347 99
000348 99
Date analysed 99/01/12
Date prepared 99/01/11



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Certificate of Analysis

CLIENT INFORMATION

Attention: Basil Wong
 Client Name: XCG Consultants Ltd.
 Project: 5-997-01-01
 Project Desc:

Address: 1 Port St., East
 Suite 201
 Mississauga, Ontario
 L5G 4N1

Fax Number: 905 891-2554
 Phone Number: 905 891-2400

LABORATORY INFORMATION

Contact: Ada Blythe, B.Sc., C.Chem.
 Project: AN981300
 Date Received: 99/01/06
 Date Reported: 99/01/18

Submission No.: 9A0058
 Sample No.: 000254-000262

NOTES:

'-' = not analysed '<' = less than Method Detection Limit (MDL) 'NA' = no data available
 LOQ can be determined for all analytes by multiplying the appropriate MDL X 3.33
 All organic data is blank corrected except for PCDD/F, Hi-Res MS and GLP volatile analytes
 Solids data is based on dry weight except for biota analyses.
 Organic analyses are not corrected for extraction recovery standards except for isotope
 dilution methods, (i.e. CARB 429 PAH, all PCDD/F and DBD/DBF analyses)

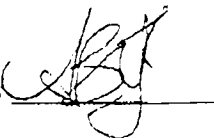
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COMMENTS:

(1) Sample concentration(s) too high to differentiate spike

Note that all samples failed TCLP criteria for Lead.

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PASC - Certificate of Analysis

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Client ID:	Method	Blank	% Recovery	MW98-1	MW98-1	MW98-1		
	Blank	Spike		(0-2) TCLP	(0-2) TCLP	(0-2) TCLP		
Lab No.:	000254 99	000254 99	000254 99	000256 99	000256 99	000256 99		
Date Sampled:	98/10/29	98/10/29	98/10/29					
Component	MDL	Units			Duplicate	M. Spike		
TCLP Metals via SW846 Method 6010/7000 Series								
Mercury	0.05	ug/L	<	1.0	100	<	<	1.1
Arsenic	0.020	mg/L	<0.022	0.56	100	<0.022	<0.022	0.62
Barium	0.001	"	<	1.2	110	0.49	0.49	1.7
Cadmium	0.002	"	<	0.59	110	0.10	0.10	0.69
Chromium	0.004	"	<	1.2	110	<	<	1.2
Lead	0.020	"	<0.022	1.2	110	240	240	230
Selenium	0.060	"	<0.066	0.59	110	<0.066	<0.066	0.63
Silver	0.010	"	<0.011	0.60	110	<0.011	<0.011	0.59

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PASC - Certificate of Analysis

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	MW98-1	MW98-2	BH98-1	MW98-3
<i>Client ID:</i>	(0-2) TCLP	(2-4) TCLP	(6-8) TCLP	(0-2) TCLP
<i>Lab No.:</i>	000256 99	000258 99	000260 99	000262 99

Date Sampled:

Component	MDL	Units	MS % Rec.			
TCLP Metals via SW846 Me						
Mercury	0.05	ug/L	100	<	0.25	<
Arsenic	0.020	mg/L	110	0.026	0.027	0.026
Barium	0.001	"	110	1.1	0.95	0.53
Cadmium	0.002	"	110	0.086	0.17	0.16
Chromium	0.004	"	110	<	<	<
Lead	0.020	"	(1)	8.7	210	170
Selenium	0.060	"	120	<0.066	<0.066	<0.066
Silver	0.010	"	110	<0.011	<0.011	<0.011

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PASC - Summary of Analysis Pre. Dates

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Batch Code: 0108MGB1
Mercury 000254 99
000256 99
000258 99
000260 99
000262 99
Date analysed 99/01/08
Date prepared 99/01/08

Batch Code: 0108MGC1
Metals 000254 99
000256 99
000258 99
000260 99
000262 99
Date analysed 99/01/12
Date prepared 99/01/08