

PHASE II
ENVIRONMENTAL SITE ASSESSMENT

FIRST AIR MAINTENANCE HANGAR
(NOSE DOCK HANGAR - BUILDING T-325)
IQALUIT, NUNAVUT

PREPARED FOR:

FIRST AIR
20 Cope Drive
Kanata, Ontario
K2M 2V8

WESAVA

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File: CB8809

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EXECUTIVE SUMMARY

WESA Inc. (WESA) was retained by First Air to perform a Phase II Environmental Site Assessment (ESA) of their maintenance hangar, also known as the nose hangar (herein referred to as the “subject building” or the “subject property”) located at the Iqaluit Airport in Iqaluit, Nunavut. First Air occupied the subject building from approximately 2001 to 2010. The key objective of the Phase II ESA was to characterize subsurface environmental conditions at the subject property in light of current environmental standards and to establish baseline soil and groundwater conditions as of 2010, in order to fulfill requirements to surrender the subject building’s lease. In addition, the results are used to compare the current environmental conditions to those prior to the occupancy of First Air based on previous environmental investigations.

Previous Investigations at the Subject Property (1998 and 2001)

A summary of soil samples exceeding the applicable CCME criteria during previous investigations conducted at the subject property in 1998 (PWGSC) is provided below:

- IQ-ND-01 (surface sample collected north of the subject building): total petroleum hydrocarbon (TPH);
- IQ-ND-04 (surface sample collected south of the subject building): zinc;
- IQ-ND-05 (surface sample collected immediately south of the subject building): zinc and TPH; and
- IQ-ND-06 (surface sample collected within subject building nose, below drain with sump): chromium, lead, zinc and TPH.

A summary of soil samples exceeding the applicable CCME criteria during previous investigations conducted at the subject property in 2001 (Dillon) is provided below:

- NDS9-2 (1.5 mbgs beside 25,000 L AST, northwest corner of site): petroleum hydrocarbon (PHC) fraction F2; and
- NDS13-1 (surface sample near floor drain within south end of subject building): lead, zinc, PHC fractions F2 and F3.

A summary of water samples exceeding the applicable CCME criteria during previous investigations conducted at the subject property in 2001 (Dillon) is provided below:

- NDW1 (collected on south side of building nose): aluminium, arsenic, iron, and zinc; and
- NDW2 (collected off southwest corner of subject building): aluminium, arsenic, cadmium, copper, iron, lead, mercury, and zinc.

Phase II ESA (2010)

The 2010 investigation included the advancement of nine test pits, the collection of two grab soil samples, the collection of two water samples from groundwater seeping into test pits, and the collection of one water sample from the standing water in the vicinity of the subject building. Wherever possible, attempts were made during the 2010 Phase II ESA to collect soil samples in the approximate vicinity of areas of concern identified during previous investigations. However, the exact coordinates of the 1998 and 2001 sample locations were not available, so WESA used its professional judgment in selecting sampling locations in 2010. A total of 15 soil samples and three water samples were submitted to the laboratory for analysis. All soil and water samples were submitted for analysis of PHCs in the F1 to F4 range, benzene, toluene, ethylbenzene and xylenes (BTEX), and metal parameters. Select soil and water samples were also analyzed for VOCs, PCBs, and certain semi-volatile parameters. The CCME assessment criteria have been applied to the analytical results of the Phase II ESA.

A summary of soil samples exceeding the applicable CCME criteria during the 2010 Phase II ESA at the subject building is provided below:

- TP2 S1 (0.25 mbgs, collected on south side of building nose): PHC fraction F2 (both TP2 S1 and its duplicate Dup #1 exceeded);
- TP2 S2 (1.0 mbgs, collected on south side of building nose): PHC fractions F1 and F2, ethylbenzene;
- TP3 S1 (0.4-0.5 mbgs, beside 25,000 L AST, northwest corner of site): PHC fractions F3 and F4;
- TP3 S3 (1.6-1.7 mbgs, beside 25,000 L AST, northwest corner of site): PHC fraction F2, ethylbenzene;
- GS1 (0.15-0.2 mbgs, inside electrical/mechanical room on north side of building nose): PHC fraction F2; and
- GS2 (0.15-0.2 mbgs, collected within subject building nose, below drain with sump): PHC fractions F2 and F3, copper, lead, and zinc.

A summary of water samples exceeding the applicable CCME criteria during the 2010 Phase II ESA at the subject building is provided below:

- TP2 GW (collected on south side of building nose): PHC fraction F2, aluminum, copper, and iron; and
- TP5 GW (collected on the north side of building nose): aluminum.

During the 2010 investigation, the soil at the subject property for the Phase II ESA was found to be impacted above applicable regulatory guidelines by petroleum hydrocarbons, ethylbenzene, copper, lead and zinc. Groundwater at the subject site has been found to be impacted above applicable regulatory guidelines by PHC fraction F2, aluminum, copper, and iron. The majority of the soil and water exceedances are associated with the PHC F2 fraction.

Comparison of 2010 Phase II ESA Results to Previous Investigations

A comparison of the 2010 results to the 1998 and/or 2001 results is provided herein for the purpose of assessing changes in environmental conditions, if any, for the general areas of concern. The interpretation is based on field observations and laboratory testing of soil and water samples collected at the specified location. Every effort was made to collect representative samples from the general areas of concern and the interpretation of data represents our professional opinion, in light of the limitations noted herein.

Compared to the previous investigations conducted at the subject property in 1998 and 2001, concentrations of certain parameters of concern in areas of the subject property remain elevated above the CCME guidelines, as summarized below:

Northwest side of subject building, near large above ground storage tank (AST), as characterized by soil samples TP3 S3 (1.6-1.7 mbgs) in 2010 and NDS9-2 (1.5 mbgs) in 2001:

- PHC F2 fraction at TP3 S3 (2,010 $\mu\text{g/g}$) was elevated compared to sample NDS9-2 (1,300 $\mu\text{g/g}$) and remained above the CCME guideline (260 $\mu\text{g/g}$);
- Ethylbenzene at TP3 S3 (0.2 $\mu\text{g/g}$) was elevated compared to sample NDS9-2 (<0.1 $\mu\text{g/g}$) and exceeded the CCME guideline (0.082 $\mu\text{g/g}$); and
- PHC fractions F3 (2,040 $\mu\text{g/g}$) and F4 (3,610 $\mu\text{g/g}$) also exceeded the CCME guidelines (1,700 $\mu\text{g/g}$ and 3,300 $\mu\text{g/g}$, respectively) at TP3 S1, collected from 0.4-0.5 mbgs by WESA in 2010. It should be noted that no nearby sample of comparable depth was reported in 2001, and that the depth sample NDS9-2 was not submitted for PHC F4 analysis.

Northwest side of subject building, below drain with sump, as characterized by soil samples G52 (0.15-0.2 mbgs) in 2010 and IQ-ND-06 (surface sample) in 1998:

- Chromium at G52 (85 $\mu\text{g/g}$) has slightly decreased to below the CCME guideline (87 $\mu\text{g/g}$) since sample IQ-ND-06 (91 $\mu\text{g/g}$) was collected;
- Copper at G52 (133 $\mu\text{g/g}$) was elevated compared to sample IQ-ND-06 (47 $\mu\text{g/g}$) and exceeded the CCME guideline (91 $\mu\text{g/g}$);

- Lead at G52 (499 $\mu\text{g/g}$) has decreased since sample IQ-ND-06 (994 $\mu\text{g/g}$) was collected, however it remains above the CCME guideline (260 $\mu\text{g/g}$);
- Zinc at G52 (769 $\mu\text{g/g}$) has decreased since sample IQ-ND-06 (1,430 $\mu\text{g/g}$) was collected, however it remains above the CCME guideline (360 $\mu\text{g/g}$); and
- PHC fractions F2 (19,100 $\mu\text{g/g}$) and F3 (4,370 $\mu\text{g/g}$) at G52 exceeded the CCME guidelines (260 $\mu\text{g/g}$ and 1,700 $\mu\text{g/g}$, respectively) in 2010; although IQ-ND-06 was not analyzed for these parameters in 1998, its concentration of TPH (9,273 $\mu\text{g/g}$) exceeded the applicable CCME guideline at that time.

South end of subject building, as characterized by soil samples TP8 S1 (0.2 mbgs) in 2010 and IQ-ND-05 (surface sample) in 1998):

- Zinc at TP8 S1 (36 $\mu\text{g/g}$) has decreased to below the CCME guideline (360 $\mu\text{g/g}$) since sample IQ-ND-05 (516 $\mu\text{g/g}$) was collected; and
- PHC F2 to F4 fractions were not detected above method detection limits when collected at TP8 S1; TPH concentrations at sample IQ-ND-05 (11,701 $\mu\text{g/g}$) exceeded the CCME guideline (2,500 $\mu\text{g/g}$) in 1998. While these two sets of results are not directly comparable, it does indicate that the hydrocarbon concentrations in the location sampled in 2010 were not as elevated as the hydrocarbon concentrations in the nearby location sampled in 1998.

Various locations across the site were chosen for soil sampling in 1998, 2001 and/or 2010, however were not located within close proximity of each other. These locations exhibited elevated concentrations of one or more of the following parameters: lead, zinc, PHC F2, PHC F3, ethylbenzene and/or TPH.

Surface water sample SW was collected from standing water underneath the west corner of the subject building in 2010; the closest comparable historical surface sample is nearby location NDW2, collected in 2001. In 2001, sample NDW2 exhibited elevated concentrations in excess of CCME guidelines for the following parameters: aluminum, arsenic, cadmium, copper, iron, lead, mercury and zinc. In 2010, sample SW did not exhibit detectable concentrations of any of these parameters, with the exception of low levels of zinc which were below the CCME guidelines (it should be noted that sample SW was not analyzed for mercury in 2010).

The analytical results of groundwater samples were not reported in the previous investigations at the site, so a comparison of historical to recent groundwater conditions cannot be made.

List of Acronyms

AST	above ground storage tank
BTEX	benzene, toluene, ethylbenzene, xylenes (total)
CCME	Canadian Councils of Ministers of the Environment
CGD	Combustible gas detector
CSQG	Canadian Soil Quality Guidelines
CWQG	Canadian Water Quality Guidelines
CWS	Canada-Wide Standards
DND	Department of National Defense
ESA	Environmental Site Assessment
GS	Grab sample
GW	Groundwater
IGQG	Interim Groundwater Quality Guidelines for Federal Contaminated Sites
L.E.L	Lower explosive limit
m.a.s.l.	metres above sea level
mbgs	metres below ground surface
MOE	Ministry of the Environment
MRL	Method reporting limit
PHC	Petroleum hydrocarbon
PCB	Polychlorinated biphenyl
ppm	Parts per million
PWGSC	Public works and Government Services Canada
SCS	Site Condition Standards
TP	Test pit
TPH	Total petroleum hydrocarbons
VOC	Volatile Organic Compound
WESA	WESA Inc.

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1.0 INTRODUCTION

WESA Inc. (WESA) was retained by First Air to perform a Phase II Environmental Site Assessment (ESA) of their maintenance hangar, also known as the nose hangar (herein referred to as the “subject building”) located at the Iqaluit Airport in Iqaluit, Nunavut (Figure 1). The objective of the Phase II ESA is to identify and quantify subsurface environmental impact associated with the subject building as a result of current and historical uses of the structure and of the surrounding properties. First Air occupied the subject building from approximately 2001 to 2010. The purpose of the Phase II ESA is to establish an environmental baseline for the subject building at the end of First Air’s occupancy in 2010. The site plan and locations that were investigated for the Phase II ESA are shown on Figure 2.

1.1 SITE DESCRIPTION

The subject property’s civic address is 1530 Ungalliqaat Crescent. The building number is T-235. It is located on the south side of Ungalliqaat Crescent, west of Federal Road at the northwest end of the Iqaluit Airport in Iqaluit, Nunavut (Figure 1). The total area of the site is approximately 0.81 hectares (2.0 acres); the hangar occupies approximately ¼ of this area.

The subject property is oriented along a northwest-southeast alignment and is bound by an asphalt apron and taxiway to the southeast and gravel on all other sides. The hangar is a steel clad building with a thick poured concrete foundation supported underneath by concrete pillars that extend into the permafrost. Regionally, the depth to the permafrost in the summer months may range from 1 m up to over 2 m (Throop, 2010). Concrete footings are located around the pillars at the ground surface building for additional support. Airspace is located between under the building between the foundation and the ground surface where water tends to accumulate. The maximum distance between the bottom of the concrete foundation and the top of the ground surface beneath the centre of the building is approximately two (2) meters. Along the southeast and northwest portions of the building, the ground surface is flush with the top of the concrete foundation.

The area of the maintenance hangar is approximately 900 m²; a partial second storey provides approximately 430 m² more floor area. An office trailer is attached to the northwest side of the hangar and measures approximately 50 m² (PWGSC, 1999). The ‘nose’ of the hangar is located along the northwest side of the main building and north of the office trailer. An electrical/mechanical room is attached to the north side of the nose portion of the building.

The electrical room contains two 1,100 L (approximate) above ground storage tanks (ASTs), referred to as ‘day tanks’, that contain heating fuel. Heating fuel used in northern communities is generally arctic diesel, a complex mixture of hydrocarbons. An outdoor 25,000 L AST containing heating fuel is located to the immediate west of the electrical room. An outdoor 1,000 L AST containing heating fuel is located to the immediate west of the office trailer. A site plan that shows the building and relevant site features is provided as Figure 2.

At the time of the site visit by WESA personnel (last week of August/first week of September, 2010), the majority of the hangar had standing water beneath it. Surface drainage is normally directed to a ditch located on the northeast side of the property. It was reported to WESA by First Air personnel that a large sewage spill occurred near the building so it is likely that a portion of the water beneath the building contained sewage. Based on the abundance of water beneath the building, a restriction to the drainage away from the subject building is inferred.

1.2 BACKGROUND INFORMATION AND PREVIOUS INVESTIGATIONS

The subject building was constructed sometime during the late 1950s to early 1960s and was initially used as an aircraft maintenance hangar by the United States and Canadian militaries. It was later subleased to Canadian Helicopters by the Department of National Defense (DND) in the early 1990s until approximately 1997-98. The building was vacant for a period of approximately three years until First Air relocated its maintenance operations there in August 2001 following a fire at its former maintenance facility on the other side of the taxiway (M.M. Dillon, 2001a).

Several environmental investigations have taken place at or near the subject building since the mid 1990s, including the following:

- an environmental baseline study (M.M. Dillon, 1995);
- a Phase I Environmental Property Transfer Assessment (PWGSC, 1999);
- an Environmental Assessment Screening Study (M.M. Dillon, 2001a);
- a brief letter report dated October 1, 2001 in response to a heating fuel spill that occurred outside the western part of the hangar on September 18, 2001 (M.M. Dillon, 2001b);
- a Phase II Environmental Site Investigation (M.M. Dillon, 2001c);
- an environmental investigation following a fire at the previous First Air maintenance hangar, which was the ‘twin’ of the subject building and was located nearby (WESA, 2002); and
- a Phase I ESA conducted by WESA in 2008 (WESA, 2008).

These studies identified several areas of actual and/or potential environmental concern at the subject building based on both historical information and more recent findings. Background research indicated that fuels and other chemicals have been stored and handled at and around the subject building since the 1950s or 1960s by a variety of military, governmental and commercial tenants. Figure 3 indicates a relative comparison of environmental media sampling locations from the various studies conducted at the site between 1998 and 2010.

Based on the long history of the structure and the areas of environmental concern that were identified by the previous studies, the key objective of the Phase II ESA herein was to characterize current subsurface environmental conditions at the subject property in comparison to current environmental standards in order to fulfill requirements necessary to surrender the lease.

Photographs documenting site conditions at the time of the Phase II ESA are included as Appendix A.

2.0 STUDY METHODOLOGY

Initially, previous ESA reports and information collected during the Phase I ESA were reviewed to develop a scope of work for the Phase II ESA. In addition, First Air personnel were contacted to determine what, if any, changes to the subject property had occurred since the WESA, 2008 Phase I ESA. The scope of work allotted some flexibility in the work program in the event of any unforeseen changes to site conditions since 2008. Of note, access to the east of the building was not possible for the investigation since this is the ‘air side’ and access was restricted. The Phase II ESA program consisted of the following tasks:

- Advancement of nine (9) test pits for soil sampling around the perimeter of the building in areas with known or potential subsurface impacts;
- Collection of four (4) grab soil samples from beneath the building in areas with known or potential subsurface impacts;
- Collection of two (2) shallow groundwater seepage samples from the soil test pits;
- Collection of one (1) surface water sample collected from the standing water beneath the subject building;
- Submission of 11 (plus 1 field duplicate) soil samples collected from the test pits and four (4) grab soil samples to a laboratory for analysis of various parameters;
- Submission of two (2) groundwater samples collected from test pits to a laboratory for analysis of various parameters;

- Submission of one (1) surface water sample collected beneath the building to a laboratory for analysis of various parameters; and
- Documentation of all investigation findings in a written report.

The sample locations were selected to investigate known and potential areas of environmental concern identified in the Phase I ESA (WESA, 2008) and in prior site investigations as listed in Section 1.1. The areas with known environmental impacts listed in the WESA Phase I ESA include the following:

- An area immediately west of the hangar where the release of 450L of Jet A fuel occurred during the transfer of fuel from one tank to another in October 2006.
- Areas with “previously detected heavy metal and hydrocarbon impacts to soils below and surrounding the building” (M.M. Dillon, 2001c);
- An area on the west side of the hangar and in the vicinity of the 25,000 L AST where a release of an unknown volume of heating fuel had occurred in September, 2001, as summarized in the M.M. Dillon letter report dated October 1, 2001. M.M. Dillon reported visible and olfactory evidence of contamination from samples collected from the excavation of impacted soils following the spill, though no samples were submitted for laboratory analysis. The report also noted visible evidence of potential older weathered impacts in the vicinity of the spill (former AST location) and staining on the ground surface in the vicinity of drums containing Jet fuel.
- High levels of petroleum hydrocarbons were found for soils beneath the floor drains and at the north side of the building in 1999 (PWGSC, 1999).

The areas of potential environmental concern based on the findings of the WESA Phase I ESA (WESA, 2008) include the following:

- Large amounts of fuel were historically stored without any secondary containment at the subject building by First Air and other parties in above ground storage tanks (ASTs). The majority of these tanks have been removed.
- Moderate amounts of oils, lubricants, grease, hydraulic fluid, paint and cleaning supplies are currently stored inside and outside the subject building without any secondary containment.
- Lead based paint has been identified on the exterior of the subject building; weathering of this paint could have resulted in lead impacts to soil near the subject building, particularly in areas that were not covered by asphalt or concrete, and;

- Heating fuel is currently stored at the subject building in a 25,000 L (estimated) AST west of the hangar, a 1,000 L AST west of the trailer office, and two 1,137 L ASTs inside the hangar. The two indoor ASTs have secondary containment.

The field investigation program is described in detail below.

2.1 TEST PITTING/SOIL SAMPLING PROGRAM

A total of nine test pits were advanced at the subject building on August 31, 2010 by Baffin Building Supply of Iqaluit (Figure 2). WESA provided supervision and direction during the test pitting program. First Air staff provided assistance by locating underground utilities at the subject building.

The test pit locations were selected to assess the soil and water quality in areas of current and historical fuel storage, as well as areas with previously noted exceedances of applicable soil criteria. Test pits TP1 through TP5 were advanced along the exterior of the northwest side of the subject building. Test pits TP6 and TP7 were advanced near the northeastern corner of the subject building and test pits TP8 and TP9 were advanced near the southwestern corner of the subject building. Test pits could not be advanced east of the subject building due to site access restrictions. Photographs of the test pit locations are included in Appendix A. The selection of each test pit location was based on the following rationale:

- TP1 was advanced immediately adjacent to the 1,000 L heating fuel AST west of the trailer office to determine soil quality with respect to PHCs, BTEX, and metals.
- TP2 was advanced in a low area immediately south of a previous floor drain in the nose section of the building to determine the soil quality with respect to PHCs, BTEX, metals, and PCBs.
- TP3 was advanced immediately adjacent to the 25,000 L heating fuel AST west of the nose hangar to determine soil quality with respect to PHCs, BTEX, metals, VOCs, and PCBs. A soil sample (NDS9-2) was collected from this location in 2001 (M.M. Dillon, 2001c) and had levels of PHCs in the F2 range above CCME criterion.
- TP4 and TP5 were advanced immediately north of the nose hangar to determine soil quality with respect to PHCs, BTEX, and metals. A soil sample (IQ-ND-02) was collected in the vicinity of these test pits in 1998 (PWGSC, 1999).
- TP6 and TP7 were advanced outside the northeast corner of the subject building in the vicinity of a former 4,500 L AST located just north of the hangar doors to determine soil quality with respect to PHCs, BTEX, and metals. These test pits are in the vicinity of several soil sample locations, including a soil sample (IQ-ND-01) collected in 1998 (PWGSC, 1999) with a TPH concentration above the CCME criterion.

- TP8 was advanced outside the southwest corner of the subject building to determine the soil quality with respect to PHCs, BTEX, metals and PCBs. This test pit is in the vicinity of a previous soil sample collected in 1998 (PWGSC, 1999) with elevated levels of zinc and TPH above CCME criteria.
- TP9 was advanced southwest of the subject building, down gradient with respect to surface water flow. This location is in the vicinity of soil samples collected in 1998 by (PWGSC, 1999) and 2001 (M.M. Dillon, 2001c).

Figure 2 provides an illustration of the area of standing water beneath the subject building. Due to the wet conditions of the soil in the vicinity of the subject building, test pits could not be advanced where standing water was located.

All test pits were excavated using a rubber tire backhoe operated by Baffin Building Systems of Iqaluit. The test pits were advanced to refusal at the permafrost layer or until the sides of the test pits were not sufficiently stable to prevent slumping. Permafrost depths varied from a minimum depth of 1.1 m below ground surface (mbgs) at TP2 to a maximum depth of 1.8 mbgs at TP1 and TP3. The soil profile of each test pit was logged based on visual examination of the soil conditions. Test pit logs are provided in Appendix B.

Soil samples were collected from the test pits and were transferred immediately to Ziploc™ bags and laboratory supplied sample jars. Combustible soil headspace vapour readings were measured for each bagged soil sample interval using a GasTechtor™ combustible gas detector (CGD) that was calibrated to a hexane standard prior to the test pitting, and was operated in methane elimination mode. Test pit logs, with corresponding soil descriptions and soil vapour headspace readings, are provided in Appendix B.

Grab soil samples were also collected from areas of concern beneath the hangar using clean stainless steel trowels. Sample GS1 was collected near a waste liquid storage area on the northwest side of the building, GS2 was collected from below the sealed floor drain outside of the electrical/mechanical room, GS3 was collected from below the sealed floor drain in the stores room and GS4 was collected from below the northeast corner of the building. The location of the grab samples can be found on Figure 2.

The soil sample that exhibited the highest headspace vapour reading from each of the 9 test pit locations (total of 9 soil samples) and all four (4) grab soil samples collected from beneath the building structure were submitted for laboratory analysis. Two additional soil samples were submitted from test pits TP2 and TP3 for analysis. In total, fifteen soil samples and one field blind duplicate sample (Dup #1) were submitted for laboratory analysis. Submitted samples were

placed in clean, labelled glass soil sample jars, and stored on ice in a cooler at approximately 4°C until they were delivered to Paracel Laboratories Ltd., of Ottawa, Ontario for analysis. All soil samples were analyzed for petroleum hydrocarbons (PHCs) (F1-F4 fractions), benzene, toluene, ethylbenzene, and xylenes (BTEX) and metals. Two soil samples (from TP2 and TP3) were selected for additional volatile organic compound (VOC) analysis and four soil samples (TP2 S1, TP2 S2, TP8 S1 and GS2) were selected for analysis for polychlorinated biphenyls (PCBs). One soil sample (TP9 S1) was analyzed for semi-volatile parameters associated with plane de-icing fluid.

2.2 SHALLOW GROUNDWATER AND SURFACE WATER SAMPLING PROGRAM

Shallow groundwater seeping into test pits was collected from test pits TP2 and TP5. For test pit TP2, water entered the test pit at a depth of 0.8 mbgs and permafrost was encountered at 1.10 mbgs. For test pit TP5, a significant portion of groundwater entered from the northern portion of the test pit, from an area with standing water on the ground surface. Eventually the test pit filled with water to a depth of 0.35 mbgs. A grab sample of the standing surface water (SW) below the hangar was collected from the southwest corner of the building.

All water samples were collected in clean laboratory bottles and were submitted for laboratory analysis of PHCs (F1 to F4), BTEX, and metals. Sample TP2 GW was also submitted for VOC and PCB analyses. Samples were stored in a cooler on ice at approximately 4°C until they were delivered to Paracel Laboratories Ltd. of Ottawa, Ontario for analysis.

3.0 REGULATORY GUIDELINES

The Government of Nunavut *Environmental Guideline for Contaminated Site Remediation* defines the commercial land use category as land on which the primary activity is the commercial buying, selling, or trading of goods or services (GN, 2010). This definition was used for the purpose of determining the land use at this site.

The Government of Nunavut *Environmental Guideline for Contaminated Site Remediation* applies to sites which are located on Commissioner's Land within Nunavut. Commissioner's Land includes lands that have been transferred by Order-in-Council to the Government of Nunavut. These guidelines are based on the Canadian Council of Ministers of the Environment (CCME) *Canadian Soil Quality Guidelines* and *Canada-Wide Standards for Petroleum Hydrocarbons in Soil* (CWS). The CCME assessment criteria, including the new *Interim Groundwater Quality Guidelines (IGQG) for Federal Contaminated Sites* (CCME, 2010), have been used for comparison to the analytical results of the Phase II ESA.

Analytical results for the surface water sample, were compared to the Canadian Water Quality Guidelines (CWQG) for the Protection of Aquatic Life (CCME, 2007)

Of note, at the time some of the previous site investigations were performed (PWGSC, 1999) the CCME criteria did not include values for PHCs in the F1 to F4 fractions. Therefore, previous investigations analyzed for total petroleum hydrocarbons (TPH) rather than PHCs. The Phase II ESA investigation presented herein analyzed soil and water samples for PHCs in the F1 to F4 fraction, rather than TPH, as the current CCME criteria only includes values for PHCs. Comparison between PHC and TPH concentrations are made herein, however, the laboratory procedures for analyses are different and, therefore, conclusions made regarding present and historic contamination are limited.

4.0 OBSERVATIONS AND RESULTS

The following sections describe the observations and results of the Phase II ESA investigation.

4.1 PHYSICAL SETTING

The Iqaluit Airport is located at an elevation of approximately 33 metres above sea level on the east end of Baffin Island at the western extremity of Frobisher Bay and is surrounded by rounded bedrock hills. The airport is located in a longitudinal valley between hills to the east and west. The valley floor appears to have been extensively graded and filled, especially in the vicinity of the subject building and the threshold of the runway. The fill thickness in the vicinity of the subject building appears to be on the order of 4 to 5 metres (WESA, 1994).

The subject building is located to the northwest of the passenger terminal at the Iqaluit Airport in Iqaluit, Nunavut (Figure 1). The site plan (Figure 2) shows the test pit and grab sample (soil and water) locations.

Carney Creek is a seasonal surface water body that originates to the northwest of the airport. One of its channels runs along the northeastern perimeter of the airport property and meets up with a second channel northwest of the airport terminal. The creek travels eastward for several hundred metres beyond this junction before bending and running southward toward Frobisher Bay. The nearest major surface water body to the subject building is Frobisher Bay, which is located approximately 1.5 km to the south (WESA, 2008).

4.2 SITE GEOLOGY AND HYDROGEOLOGY

The airport site is underlain by Precambrian bedrock at shallow depth. The topography is knobby and is predominantly bedrock controlled. Overburden is characterized as glacial tills intermixed with ice-contact glacio-fluvial materials. These materials thin on slopes west, east and north of the airport and would be expected to achieve a maximum thickness in the axis of the valley (WESA, 1994).

The soil encountered during the test pitting program consisted primarily of moist to saturated light brown sand and gravel fill (granitic in origin) to depth. Test pits located east of the subject building (TP1 to TP5) were typically deeper due to the presence of additional fill material to bring the grade up to a higher level. The surface fill material at these locations was underlain by fine to coarse grained sand with some gravel. The description of the material encountered during the test pit program can be found in Appendix B.

Based on the topography of the area around the subject building, the local groundwater flow is inferred to be to the south/southeast, toward Carney Creek and Frobisher Bay (WESA, 2008).

4.3 ANALYTICAL RESULTS – SOIL

Analytical results from the soil sampling program are summarized in Table 1 in comparison to the applicable guideline criteria. The laboratory reports of analysis are provided in Appendix C. The vapour headspace readings for soil samples collected from the test pits and grab samples are presented in Appendix B.

CGD Readings

The combustible vapour sample headspace readings ranged from a low of <25 ppm to a high of 5% LEL. The majority of samples had readings of <25 ppm. The two soil samples with the highest readings were TP2 (S1 = 150 ppm and S2 = 5% LEL), located in a topographic low spot between the trailer office and the nose portion of the building and TP3 (S1 = <25 ppm, S2 = <25 ppm, and S3 = 4% LEL), located immediately east of the 25,000 L outdoor AST. The only other samples with readings above <25 ppm were for GS1 (45 ppm), located beneath the waste liquid storage area and GS2 (60 ppm), located beneath the former floor drain in the nose portion of the subject building.

Petroleum Hydrocarbons and BTEX

As highlighted in Table 1, six (6) of the fifteen soil samples collected during the Phase II ESA exceeded the CCME CWS comparison guidelines for one or more fractions of PHCs. The sampling locations exhibiting exceedances included TP2 (located between the trailer office and the northern extension of the building), TP3 (located near the 25,000 L AST behind the electrical/mechanical room) and two of the grab samples (GS1, from below the waste liquid storage area outside the electrical/mechanical room and GS2, from below the former floor drain in the nose section of the building).

A summary of the PHC and BTEX soil exceedances noted during the 2010 Phase II ESA at the subject building is provided below:

- TP2 S1 (0.25 mbgs): PHC fraction F2 (both TP2 S1 and its duplicate Dup #1 exceeded);
- TP2 S2 (1.0 mbgs): PHC fractions F1 and F2, ethylbenzene;
- TP3 S1 (0.4-0.5 mbgs): PHC fractions F3 and F4;
- TP3 S3 (1.6-1.7 mbgs): PHC fraction F2, ethylbenzene;
- GS1 (0.15-0.2 mbgs): PHC fraction F2; and
- GS2 (0.15-0.2 mbgs): PHC fractions F2 and F3.

A comparison of the soil exceedances noted during the 2010 Phase II ESA to those noted during previous studies is provided on Figure 4.

Metals

As highlighted in Table 1, only one (1) of the fifteen soil samples collected during the Phase II ESA exceeded the CCME CSQG comparison guidelines for metals. Grab sample GS2, collected from below the sealed floor drain in the nose portion of the building had exceedances of the standards for copper, lead and zinc.

A comparison of the soil exceedances noted during the 2010 Phase II ESA to those noted during previous studies is provided on Figure 4.

PCBs

None of the four soil samples that were analyzed for PCBs exhibited exceedances of the CCME CSQG comparison guideline. Of note, PCBs were detected above the laboratory method reporting limit (MRL) in both the shallow and deep samples collected from test pit TP2, as well as in soil grab sample GS2.

VOCs

Neither of the two screening soil samples that were analyzed for VOCs (TP2 S2 and TP3 S3) exhibited any exceedances of the CCME CSQG comparison criteria (BTEX parameters excluded).

Semi-Volatiles

The shallow soil sample collected from test pit TP9 had concentrations of ethylene glycol, diethylene glycol, and propylene glycol below the laboratory MRL.

For the soil sampling program, a blind duplicate sample (Dup #1) of TP2 S1 was submitted for metals, BTEX, and PHC F1-F4 analysis. A review of the blind duplicate results indicates excellent correlation and reproducibility of results for all parameters.

4.4 ANALYTICAL RESULTS – GROUNDWATER

Analytical results from the shallow groundwater seepage sampling program are summarized in Table 2 in comparison to the applicable comparison standards. The laboratory reports of analysis are provided in Appendix C. Of the two samples collected and submitted for analysis, TP2 GW was submitted for additional parameters (VOCs, PCBs, general inorganics) due to the high combustible vapour readings collected for the soil samples collected during advancement of the test pit.

Petroleum Hydrocarbons

As indicated in Table 2, the groundwater sample collected from test pit TP2 (TP2 GW) exhibited an exceedance of the CCME IGQG for fraction PHCs F2. The PHC F1 to F4 concentration for TP5 GW were all below the laboratory MRL.

A comparison of the groundwater and surface water exceedances noted during the 2010 Phase II ESA to those noted during previous studies is provided on Figure 5.

Metals

As indicated in Table 2, both groundwater samples collected during the Phase II ESA exhibited exceedances of the CCME IGQGs for metals. Sample TP2 GW exceeded the guidelines for aluminum, copper and iron, while sample TP5 GW exceeded the guideline for aluminum. Please note that the IGQG for aluminum depends on the pH of the groundwater sample. As pH

readings were not available for this sample, it was assumed that the pH was similar to that noted at TP2 GW (7.09).

Further to above it should be noted that the IGQGs were developed to assess concentrations of dissolved metals in groundwater, while the samples collected during the Phase II ESA were not field filtered and were therefore subjected to total metals analyses. Consequently, the laboratory

analytical results may be elevated relative to results for a filtered sample of the same water. In the case of iron and aluminum, for example, there is a potential that the results are elevated relative to an unfiltered sample since these metals are ubiquitous in soil. Despite the potential elevated concentrations of metals in the samples, it is still worthwhile to do a comparison to the IGQGs in order to provide an indication of the relative concentrations of metals in the shallow groundwater at the subject site.

BTEX and VOCs

For both TP2 GW and TP5 GW the BTEX concentrations were all below the laboratory MRL. For TP2 GW, the concentration of all VOC parameters were also below the laboratory MRL (VOC analysis not performed on TP5 GW). Therefore, the BTEX and VOC concentrations for the shallow groundwater seepage samples collected during the Phase II ESA were below their respective IGQGs.

PCBs

There is no IGQG standard for PCBs. However, it should be noted that PCBs were detected at a concentration of 0.75 µg/L in sample TP2 GW (only TP2 GW was analyzed for PCBs).

4.5 ANALYTICAL RESULTS – SURFACE WATER

Analytical results from the surface water sampling program are summarized in Table 3 in comparison to the selected guidelines. The laboratory reports of analysis are provided in Appendix C.

Analysis of the surface water sample, SW, collected from the standing water underneath the southwest corner of the subject building, had no exceedances of CCME CWQG guidelines for metals or BTEX. The concentrations of PHC fractions F1 through F4 were all below the MRL; no CCME CWQG standards are available for PHCs.

5.0 DISCUSSION

Petroleum Hydrocarbons and BTEX

Considering the historic storage and handling of various petroleum hydrocarbon products at the subject property and the documented spills that have occurred at and near the subject property, the primary contaminants of concern include PHC fractions F1 to F4 and BTEX parameters. A total of six (6) of the fifteen soil samples collected and submitted for analysis exceeded the CCME CWS comparison guidelines for one or more fractions of PHCs and ethylbenzene. The sampling locations exhibiting exceedances included test pits TP2 (located between the trailer office and the 'nose' portion of the building), test pit TP3 (located near the 25,000 L AST behind the electrical/mechanical room), grab sample GS1 (collected beneath the waste liquid storage area outside the electrical/mechanical room) and grab sample GS2 (located beneath the former floor drain in the 'nose' portion of the building). The location of the exceedances are illustrated on Figure 4 along with results from previous investigations conducted at the subject property. The locations of the exceedances are attributed to known onsite spills or areas where storage of petroleum hydrocarbon products is documented.

Test pit TP2 was advanced in a low-lying area between the nose portion of the building and the trailer office. Based on observations, any products that may have been released to the sealed floor drain in the nose portion of the subject building would likely migrate to this location. All the building floor drains were sealed off shortly after First Air took over occupancy in 2001. The surface soil sample, TP2 S1 (0.25 mbgs), had a PHC F2 concentration of 737 µg/g, in excess of the CCME criteria of 260 µg/g. The soil sample collected at depth from test pit TP2 S2 (1.0 mbgs), had concentrations of PHC F1 (416 µg/g), PHC F2 (5,210 µg/g), and ethylbenzene (1.2 µg/g) that exceeded their respective CCME criteria. A water sample, TP2 GW, collected from test pit TP2 had a PHC F2 concentration of 50,800 µg/L, in excess of the CCME criterion. No previous investigations that were available for review had samples collected from this site location. Therefore, no comments can be provided regarding potential changes or trends in soil and groundwater quality for this location.

Test pit TP3 was advanced immediately adjacent to the 25,000 L outdoor heating fuel AST. The near surface sample, TP3 S1 (0.4 to 0.5 mbgs), had a PHC F3 concentration of 2,040 µg/g and a PHC F4 concentration of 3,610 µg/g, in excess of their respective CCME criteria. The deeper soil sample collected from TP3, TP3 S3 (1.6 to 1.7 mbgs), had a PHC F2 concentration of 2,010 µg/g and a ethylbenzene concentration of 0.2 µg/g, in excess of their respective CCME criteria. The difference between the parameters detected for each soil sample location suggests migration of the lighter phase components to depth (PHC F2 and ethylbenzene) and/or the presence of more

than one petroleum hydrocarbon product at this location (lighter phase and heavier phase). A soil sample collected in 2001 (M.M. Dillon, 2001 c) in approximately the same location (NDS9) at a depth of 1.5 mbgs had a F2 PHC concentration of 1,300 µg/g, similar to soil sample TP3 S3. There are two documented spills in this area. A diesel heating fuel spill of unknown volume on September 18, 2001 (M.M. Dillon, 2001b) and a release of 450 L of Jet A fuel on October 27, 2006 (no documentation available). In both cases some remedial activities were said to have occurred, but no soil quality verification sample results from these activities were made available to WESA at the time of this report.

Grab soil sample G51 (0.15-0.2 mbgs) was collected from below the waste liquid storage area outside the electrical/mechanical room, immediately north of the nose hangar portion of the building. The detected PHC F2 concentration of 2,330 µg/g exceeds the CCME criteria of 260 µg/g. No other previous investigations reviewed as part of this Phase II ESA had samples collected in this location, therefore, making a comparison to previous results is not possible. The location of this soil sample is in the down gradient direction of test pit TP3 and, therefore, observed impacts at G51 may be attributed to the same source(s) discussed previously for TP3.

Grab soil sample G52 was collected from an area located directly beneath a sealed off floor drain in the nose hangar portion of the building. The PHC F2 concentration of 19,100 µg/g and PHC F3 concentration of 4,370 µg/g both exceeded the respective CCME criteria. A soil sample was collected from this location in 1998 (PWGSC, 1999) and had a TPH (total petroleum hydrocarbon – sum of total purgeable and total extractable hydrocarbons) concentration of 9,273 µg/g. The floor drain was reportedly sealed off in 2001, shortly after First Air took over occupancy of the subject building. Prior to this, any spills in this portion of the building that ended up in the floor drain would discharge directly to the environment. While the PHC concentrations from the 2010 soil sample appear high, it is difficult to compare current PHC levels to historical TPH results. Further, it is possible that in the three (3) years between the 1998 sample was collected and the floor drain was sealed in 2001 that additional petroleum hydrocarbon impacts entered the floor drain.

A soil sample (NDS13) was collected in 2001 (M.M. Dillon, 2001c) from beneath a floor drain in the southern portion of the main building and had PHC F2 and F3 exceedances of the CCME criteria, however, a sample could not be collected from this location in 2001 due to the presence of standing water.

In general, the 2010 sampling results indicate current petroleum hydrocarbon impacts to soil and groundwater are located along the western portion of the subject property. Historically, TPH concentrations in soil samples collected in 1998 (PWGSC, 1999), north of the subject building (IQ-ND-01) and south of the subject building (IQ-ND-04) indicated impacts above the CCME

criteria. Soil samples collected in the general vicinity of these locations by WESA in 2010 (e.g., TP6 S1, TP7 S1, and TP8 S1) had PHC concentrations below the laboratory MRL.

VOCs

A total of two (2) soil samples (TP2 S2 and TP3 S3) and one water sample (TP2 GW) were analyzed for a full suite of VOC parameters, including BTEX. For the two soil samples, benzene and toluene were below the laboratory MRL while xylenes and ethylbenzene were detected above the laboratory MRL. In the case of ethylbenzene, both soil samples exceeded the CCME criterion. With the exception of a detection of 1,3,5-trimethylbenzene above the laboratory MRL, all other VOC parameters were below their respective laboratory MRLs.

For groundwater sample TP2 GW, all VOC parameters, including BTEX, were below the respective laboratory MRLs.

With the exception of BTEX analyses, no historical laboratory results were available for VOC parameters. Therefore, no comment can be made regarding the soil and water quality at the subject property with respect to VOCs for 2010 relative to samples collected prior to the occupancy by First Air in 2001.

Metals

All fifteen soil samples collected during the Phase II ESA were analyzed for a full suite of metal parameters. Of these, only GS2, collected from beneath the former floor drain in the nose portion of the building, had any exceedances of CCME CSQG. The concentrations of copper (133 µg/g), lead (499 µg/g) and zinc (769 µg/g) all exceeded their respective criteria. A soil sample (IQ-ND-06) was collected in the same approximate location as GS2 in 1998 by (PWGSC, 1999). The concentrations of lead and zinc exceeded their respective criteria, however, copper did not. In addition, chromium exceeded the criteria for the 2001 sample. The results indicate that, with the exception of copper, metal exceedances in 2010 were also present in 2001 at this location.

Water samples TP2 GW, TP5 GW, and SW were all analyzed for a full suite of metal parameters. sample TP2 GW had concentrations of aluminum (572 µg/L), copper (25 µg/L), and iron (431 µg/L) that exceeded their respective CCME guidelines. Sample TP5 GW had an aluminum concentration of 105 µg/L, marginally exceeding the CCME criteria of 100 µg/L. All of the metal concentrations for SW were below the CCME criteria. Previous water samples NDW1 and NDW2 were collected in 2001 (M.M. Dillon, 2001c) from the surface water beneath the building. For both samples several parameters exceeded the CCME criteria including aluminum, arsenic,

iron, and zinc for NDW1 and aluminum, arsenic, cadmium, copper, iron, lead, mercury, and zinc for NDW2. WESA sample TP2 GW was in the vicinity of NDW1 and, in general, had higher metal concentrations. However, as discussed in Section 4.4, the water samples collected in 2010 by WESA were not filtered and, therefore, it is possible that the metal concentrations are elevated relative to a sample of the same water that was filtered. WESA surface water sample SW was collected in the general vicinity of NDW2 and by comparison, the magnitude of metal parameter detections for NDW2 was much higher.

PCBs

A total of four (4) soil samples were analyzed for PCBs (TP2 S1, TP2 S2, TP8 S1, and GS2) during the Phase II ESA investigation. With the exception of TP8 S1, all samples had PCB concentrations above the laboratory MRL. All of the results were below the CCME CSQG comparison guideline. The previous investigations conducted at the subject property made available for review by WESA did not analyze for PCBs and, therefore, no comment can be made regarding the concentration of PCBs in 2010 compared to those prior to the occupation of the building by First Air.

Semi-Volatiles

The shallow soil sample collected from test pit TP9 had concentrations of ethylene glycol, diethylene glycol, and propylene glycol below the laboratory MRL. The previous investigations conducted at the subject property made available for review by WESA did not analyze for semi-volatiles and, therefore, no comment can be made regarding the concentration of these parameters in 2010 compared to those prior to the occupation of the building by First Air.

Contaminant Migration

The active layer is defined as the portion of soil that freezes in the winter and thaws in the summer months above the permafrost. In Iqaluit, the thickness of this active layer varies depending on several factors. In a recent study conducted at a weather station in Iqaluit, the average thickness of the active layer was historically 1.4 m in the late 1980s and in the mid 2000s it averaged 2.3 m (Throop, 2010). The active layer of 1.1 to 1.8 m for test pits advanced in the vicinity of the subject building in August, 2010 is likely much less thick in the spring and fall months due to colder temperatures.

Contamination migration vertically is limited by the presence of permafrost. However, contamination migration horizontally within the active layer is possible during non-winter months. The presence of contaminants across the subject property suggests that the active layer is a likely pathway for contamination migration. In addition, the standing water present beneath the building in the summer months has likely acted as a pathway for contamination migration.

6.0 SUMMARY AND CONCLUSIONS

A Phase II ESA investigation was completed at the maintenance hangar (nose hangar) formerly occupied by First Air at the Iqaluit Airport in Nunavut. The investigation included a test pitting program, collection of grab soil samples, collection of groundwater samples seeping into test pits, collection of a water sample from the standing water in the vicinity of the subject building, and submission of soil and water samples for analysis of various parameters. The key objective of the Phase II ESA was to characterize subsurface environmental conditions at the subject property in light of current environmental standards and to establish baseline soil and groundwater conditions as of 2010. In addition, the results can be used to compare the current environmental conditions to those prior to the occupancy based on previous environmental investigations.

However, since WESA did not perform the investigations prior to the occupancy by First Air the results can only be used for illustrative purposes and any conclusions made between current conditions and previous conditions should be done with this in mind. In addition, comparison of current PHC concentrations to historical TPH concentrations should be made with caution as these parameters have different laboratory analysis methods associated with them.

The Government of Nunavut *Environmental Guideline for Contaminated Site Remediation* defines the commercial land use category as land on which the primary activity is the commercial buying, selling, or trading of goods or services (GN, 2010). WESA applied this definition for the purpose of determining the land use at this site. These guidelines are based on the Canadian Council of Ministers of the Environment (CCME) and the CCME assessment criteria have been applied to the analytical results of the Phase II ESA. The criteria used for comparison of analytical results can be found in the following documents:

- *Canadian Soil Quality Guidelines* (CCME, 2007);
- *Canada-Wide Standards for Petroleum Hydrocarbons in Soil* (CCME, 2008);
- *Groundwater Quality Guidelines for Federal Contaminated Sites* (CCME, 2010); and
- *Canadian Water Quality Guidelines* (CCME, 2007).

A summary of the exceedances of soil samples above the applicable CCME criteria noted during the 2010 Phase II ESA at the subject building is provided below:

- TP2 S1 (0.25 mbgs): PHC fraction F2 (both TP2 S1 and its duplicate Dup #1 exceeded);
- TP2 S2 (1.0 mbgs): PHC fractions F1 and F2, ethylbenzene;
- TP3 S1 (0.4-0.5 mbgs): PHC fractions F3 and F4;
- TP3 S3 (1.6-1.7 mbgs): PHC fraction F2, ethylbenzene;
- GS1 (0.15-0.2 mbgs): PHC fraction F2; and
- GS2 (0.15-0.2 mbgs): PHC fractions F2 and F3, copper, lead, and zinc.

A summary of the exceedances of water samples above the applicable CCME criteria noted during the 2010 Phase II ESA at the subject building is provided below:

- TP2 GW: PHC fraction F2, aluminum, copper, and iron; and
- TP5 GW: aluminum.

In conclusion, the soil at the subject site has been found to be impacted above applicable regulatory guidelines by petroleum hydrocarbons, ethylbenzene, copper, lead and zinc. Groundwater at the subject site has been found to be impacted above applicable regulatory guidelines by PHC fraction F2, aluminum, copper, and iron. The majority of the soil and water exceedances are associated with the PHC F2 fraction. The contamination at the subject property in 2010 relative to investigations conducted at the subject property in 1999 and 2001 indicate similar parameters are present at varying concentrations, as discussed as follows.

Wherever possible, attempts were made during the 2010 Phase II ESA to collect soil samples in the approximate vicinity of areas of concern identified during previous investigations. However, it should be noted that exact coordinates of the 1998 and 2001 sample locations were not available, so WESA used its professional judgment in selecting sampling locations in 2010. It should also be noted that this interpretation requires the comparison of historical TPH data (former CCME guideline analysis) to PHC fraction analyses required under the current CCME guideline. Consequently, interpretations of the 2010 results compared to the 1998 and/or 2001 results are for the purpose of characterizing relative levels of impact within the areas of concern, and is subject to the limitations noted herein.

Compared to the previous investigations conducted at the subject property in 1998 and 2001, concentrations of certain parameters of concern in areas of the subject property remain elevated above the CCME guidelines, as summarized below:

Northwest side of subject building, near large above ground storage tank (AST), as characterized by soil samples TP3 S3 (1.6-1.7 mbgs) in 2010 and NDS9-2 (1.5 mbgs) in 2001:

- PHC F2 fraction at TP3 S3 (2,010 µg/g) was elevated compared to sample NDS9-2 (1,300 µg/g) and remained above the CCME guideline (260 µg/g);
- Ethylbenzene at TP3 S3 (0.2 µg/g) was elevated compared to sample NDS9-2 (<0.1 µg/g) and exceeded the CCME guideline (0.082 µg/g); and
- PHC fractions F3 (2,040 µg/g) and F4 (3,610 µg/g) also exceeded the CCME guidelines (1,700 µg/g and 3,300 µg/g, respectively) at TP3 S1, collected from 0.4-0.5 mbgs by WESA in 2010. It should be noted that no nearby sample of comparable depth was reported in 2001, and that the depth sample NDS9-2 was not submitted for PHC F4 analysis.

Northwest side of subject building, below drain with sump, as characterized by soil samples G52 (0.15-0.2 mbgs) in 2010 and IQ-ND-06 (surface sample) in 1998:

- Chromium at G52 (85 µg/g) has slightly decreased to below the CCME guideline (87 µg/g) since sample IQ-ND-06 (91 µg/g) was collected;
- Copper at G52 (133 µg/g) was elevated compared to sample IQ-ND-06 (47 µg/g) and exceeded the CCME guideline (91 µg/g);
- Lead at G52 (499 µg/g) has decreased since sample IQ-ND-06 (994 µg/g) was collected, however it remains above the CCME guideline (260 µg/g);
- Zinc at G52 (769 µg/g) has decreased since sample IQ-ND-06 (1,430 µg/g) was collected, however it remains above the CCME guideline (360 µg/g); and
- PHC fractions F2 (19,100 µg/g) and F3 (4,370 µg/g) at G52 exceeded the CCME guidelines (260 µg/g and 1,700 µg/g, respectively) in 2010; although IQ-ND-06 was not analyzed for these parameters in 1998, its concentration of TPH (9,273 µg/g) exceeded the applicable CCME guideline at that time.

South end of subject building, as characterized by soil samples TP8 S1 (0.2 mbgs) in 2010 and IQ-ND-05 (surface sample) in 1998:

- Zinc at TP8 S1 (36 µg/g) has decreased to below the CCME guideline (360 µg/g) since sample IQ-ND-05 (516 µg/g) was collected; and
- PHC F2 to F4 fractions were not detected above method detection limits when collected at TP8 S1; TPH concentrations at sample IQ-ND-05 (11,701 µg/g) exceeded the CCME guideline (2,500 µg/g) in 1998. While these two sets of results are not directly comparable, it does indicate that the hydrocarbon concentrations in the location sampled in 2010 were not as elevated as the hydrocarbon concentrations in the nearby location sampled in 1998.

Various locations across the site were chosen for soil sampling in 1998, 2001 and/or 2010, however were not located within close proximity of each other. These locations exhibited elevated concentrations of one or more of the following parameters: lead, zinc, PHC F2, PHC F3, ethylbenzene and/or TPH.

Surface water sample *SW* was collected from standing water underneath the west corner of the subject building in 2010; the closest comparable historical surface sample is nearby location NDW2, collected in 2001. In 2001, sample NDW2 exhibited elevated concentrations in excess of CCME guidelines for the following parameters: aluminum, arsenic, cadmium, copper, iron, lead, mercury and zinc. In 2010, sample *SW* did not exhibit detectable concentrations of any of these parameters, with the exception of low levels of zinc which were below the CCME guidelines (it should be noted that sample *SW* was not analyzed for mercury in 2010).

The analytical results of groundwater samples were not reported in the previous investigations at the site, so a comparison of historical to recent groundwater conditions cannot be made.

Should further delineation of groundwater impacts related to metals be required in the future, analyses should include pH and CaCO₃.

7.0 CLOSURE

The observations and results obtained during this investigation are representative of the subsurface conditions encountered at test pit and grab sample locations only. No information presented in this report should be interpreted as being indicative of subsurface conditions elsewhere on the property. The statements made in this report are based solely on the information obtained to date as part of the above referenced investigation. WESA has used its professional judgment in analyzing this information and formulating its conclusions. No other warranty or representation, expressed or implied, as to the accuracy of the information or recommendations is included or intended in this report.

The information and opinions expressed in this report are prepared for the sole benefit of First Air. No other party may use or rely upon the report or any portion thereof without the express written consent of WESA. WESA will consent to any reasonable request by First Air to approve the use of the report by other parties as "Approved Users".

Respectfully submitted.



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Table 1: Soil Analytical Results
 First Air Nose Dock Hangar Phase II ESA, Iqaluit 2010

Exceeds criteria
 MRL elevated above criteria threshold
 Duplicate samples

Parameter	Units	MRL	Regulation CCME Soil Quality Guidelines Commercial (Coarse)	Sample									
				TP1 S1	TP2 S1	Dup #1	TP2 S2	TP3 S1	TP3 S3	TP4 S1	TP5 S1	TP6 S1	TP7 S2
Sample Date (d/m/y)			SQCC	08/31/2010	08/31/2010	08/31/2010	08/31/2010	08/31/2010	08/31/2010	08/31/2010	08/31/2010	08/31/2010	08/31/2010
Physical Characteristics													
% Solids	% by Wt.	0.1		98.5	95.5	94	90.3	95.7	95.2	98.2	85	82.6	92.8
Metals													
Aluminum	ug/g dry	10		2460	3120	3510	3020	2860	2100	2340	2330	2810	3800
Antimony	ug/g dry	1	40 ug/g dry	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Arsenic	ug/g dry	1	12 ug/g dry	< 1	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	3
Barium	ug/g dry	10	2000 ug/g dry	15	19	22	27	18	< 10	< 10	12	19	27
Beryllium	ug/g dry	0.5	8 ug/g dry	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Boron	ug/g dry	5		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Cadmium	ug/g dry	0.5	22 ug/g dry	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Calcium	ug/g dry	200		17700	11900	12100	15100	8260	15200	15100	15000	14100	16800
Chromium	ug/g dry	5	87 ug/g dry	18	21	24	19	17	16	13	20	26	24
Chromium VI (hexavalent)	ug/g dry	0.4											
Cobalt	ug/g dry	1	300 ug/g dry	5	5	5	5	5	4	4	4	5	6
Copper	ug/g dry	5	91 ug/g dry	10	11	11	10	10	8	9	10	8	12
Iron	ug/g dry	200		22100	23700	26100	18500	19500	19700	16600	21500	18700	26500
Lead	ug/g dry	1	260 ug/g dry	3	5	5	3	3	2	2	4	2	5
Magnesium	ug/g dry	200		2610	2700	2840	2980	2570	2350	2740	2510	2770	3290
Manganese	ug/g dry	5		190	133	140	148	255	135	145	130	150	209
Mercury	ug/g dry	0.1	24 ug/g dry				< 0.1		< 0.1				
Molybdenum	ug/g dry	1	40 ug/g dry	< 1	3	< 1	1	1	< 1	< 1	< 1	< 1	< 1
Nickel	ug/g dry	5	50 ug/g dry	6	7	7	7	8	5	5	5	6	8
Potassium	ug/g dry	200		457	564	651	804	497	345	342	426	577	788
Selenium	ug/g dry	1	2.9 ug/g dry	< 1	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Silver	ug/g dry	0.3	40 ug/g dry	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Sodium	ug/g dry	200		< 200	< 200	< 200	234	< 200	< 200	< 200	< 200	214	238
Strontium	ug/g dry	10		22	19	18	25	13	19	19	20	20	26
Thallium	ug/g dry	1	1 ug/g dry	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Tin	ug/g dry	5	300 ug/g dry	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Titanium	ug/g dry	10		331	335	355	372	299	271	233	314	314	428
Uranium	ug/g dry	1	33 ug/g dry	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Vanadium	ug/g dry	10	130 ug/g dry	40	49	53	35	36	41	29	43	34	48
Zinc	ug/g dry	20	360 ug/g dry	23	29	30	27	27	< 20	21	20	23	33

Table 1: Soil Analytical Results
 First Air Nose Dock Hangar Phase II ESA, Iqaluit 2010

Exceeds criteria
 MRL elevated above criteria threshold
 Duplicate samples

Parameter	Units	MRL	Regulation CCME Soil Quality Guidelines Commercial (Coarse)	Sample									
				TP1 S1	TP2 S1	Dup #1	TP2 S2	TP3 S1	TP3 S3	TP4 S1	TP5 S1	TP6 S1	TP7 S2
Sample Date (d/m/y)			SQCc	08/31/2010	08/31/2010	08/31/2010	08/31/2010	08/31/2010	08/31/2010	08/31/2010	08/31/2010	08/31/2010	08/31/2010
Volatiles													
Benzene	ug/g dry	0.03	0.03 ug/g dry	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Ethylbenzene	ug/g dry	0.05	0.082 ug/g dry	< 0.05	< 0.05	< 0.05	1.2	< 0.05	0.2	< 0.05	< 0.05	< 0.05	< 0.05
Toluene	ug/g dry	0.05	0.37 ug/g dry	< 0.05	< 0.05	< 0.05	< 0.05	0.07	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
m/p-Xylene	ug/g dry	0.05		< 0.05	< 0.05	< 0.05	3.8	< 0.05	0.2	< 0.05	< 0.05	< 0.05	< 0.05
o-Xylene	ug/g dry	0.05		0.05	< 0.05	< 0.05	4.8	0.11	0.7	< 0.05	< 0.05	< 0.05	< 0.05
Xylenes, total	ug/g dry	0.1	11 ug/g dry	< 0.1	< 0.1	< 0.1	8.6	0.13	0.9	< 0.1	< 0.1	< 0.1	< 0.1
Bromodichloromethane	ug/g dry	0.02					< 0.02		< 0.02				
Bromoform	ug/g dry	0.04					< 0.04		< 0.04				
Bromomethane	ug/g dry	0.05					< 0.05		< 0.05				
Carbon Tetrachloride	ug/g dry	0.03	50 ug/g dry				< 0.03		< 0.03				
Chlorobenzene	ug/g dry	0.02	10 ug/g dry				< 0.02		< 0.02				
Chloroethane	ug/g dry	0.05	50 ug/g dry				< 0.05		< 0.05				
Chloroform	ug/g dry	0.03	50 ug/g dry				< 0.03		< 0.03				
Chloromethane	ug/g dry	0.2	50 ug/g dry				< 0.2		< 0.2				
Dibromochloromethane	ug/g dry	0.02					< 0.02		< 0.02				
1,2-Dibromoethane	ug/g dry	0.01					< 0.01		< 0.01				
1,2-Dichlorobenzene	ug/g dry	0.02	10 ug/g dry				< 0.02		< 0.02				
1,3-Dichlorobenzene	ug/g dry	0.05	10 ug/g dry				< 0.05		< 0.05				
1,4-Dichlorobenzene	ug/g dry	0.02	10 ug/g dry				< 0.02		< 0.02				
1,1-Dichloroethane	ug/g dry	0.03	50 ug/g dry				< 0.03		< 0.03				
1,2-Dichloroethane	ug/g dry	0.02	50 ug/g dry				< 0.02		< 0.02				
1,1-Dichloroethylene	ug/g dry	0.03	50 ug/g dry				< 0.03		< 0.03				
cis-1,2-Dichloroethylene	ug/g dry	0.02	50 ug/g dry				< 0.02		< 0.02				
trans-1,2-Dichloroethylene	ug/g dry	0.05	50 ug/g dry				< 0.05		< 0.05				
1,2-Dichloropropane	ug/g dry	0.03	50 ug/g dry				< 0.03		< 0.03				
cis-1,3-Dichloropropylene	ug/g dry	0.02	50 ug/g dry				< 0.02		< 0.02				
trans-1,3-Dichloropropylene	ug/g dry	0.02	50 ug/g dry				< 0.02		< 0.02				
Methylene Chloride	ug/g dry	0.2	50 ug/g dry				< 0.2		< 0.2				
Styrene	ug/g dry	0.02	50 ug/g dry				< 0.02		< 0.02				
1,1,1,2-Tetrachloroethane	ug/g dry	0.03	50 ug/g dry				< 0.03		< 0.03				
1,1,2,2-Tetrachloroethane	ug/g dry	0.03	50 ug/g dry				< 0.03		< 0.03				
Tetrachloroethylene	ug/g dry	0.02	0.5 ug/g dry				< 0.02		< 0.02				
1,1,1-Trichloroethane	ug/g dry	0.02	50 ug/g dry				< 0.02		< 0.02				
1,1,2-Trichloroethane	ug/g dry	0.03	50 ug/g dry				< 0.03		< 0.03				
Trichloroethylene	ug/g dry	0.03	0.01 ug/g dry				< 0.03		< 0.03				
Trichlorofluoromethane	ug/g dry	0.05					< 0.05		< 0.05				
1,3,5-Trimethylbenzene	ug/g dry	0.03					2.3		< 0.03				
Vinyl Chloride	ug/g dry	0.03					< 0.03		< 0.03				

Table 1: Soil Analytical Results
 First Air Nose Dock Hangar Phase II ESA, Iqaluit 2010

Exceeds criteria
 MRL elevated above criteria threshold
 Duplicate samples

Parameter	Units	MRL	Regulation CCME Soil Quality Guidelines Commercial (Coarse)	Sample									
				TP1 S1	TP2 S1	Dup #1	TP2 S2	TP3 S1	TP3 S3	TP4 S1	TP5 S1	TP6 S1	TP7 S2
Sample Date (d/m/y)			SQCc	08/31/2010	08/31/2010	08/31/2010	08/31/2010	08/31/2010	08/31/2010	08/31/2010	08/31/2010	08/31/2010	08/31/2010
Hydrocarbons													
F1 PHCs (C6-C10)	ug/g dry	10	240 ug/g dry	< 10	14	15	416	< 10	144	< 10	< 10	< 10	< 10
F2 PHCs (C10-C16)	ug/g dry	10	260 ug/g dry	< 10	737	970	5210	41	2010	< 10	< 10	< 10	< 10
F3 PHCs (C16-C34)	ug/g dry	10	1700 ug/g dry	< 10	84	81	219	2040	59	< 10	26	< 10	< 10
F4 PHCs (C34-C50)	ug/g dry	10	3300 ug/g dry	< 10	< 10	77	106	3610	< 10	< 10	< 10	< 10	< 10
Semi-Volatiles													
Ethylene glycol	ug/g dry	5	960 ug/g dry										
Diethylene glycol	ug/g dry	5											
Propylene glycol	ug/g dry	5											
PCBs													
PCBs, total	ug/g dry	0.05	33 ug/g dry		0.09		0.38						

Table 1: Soil Analytical Results
 First Air Nose Dock Hangar Phase II ESA, Iqaluit 2010

Exceeds criteria
 MRL elevated above criteria threshold
 Duplicate samples

Parameter	Units	MRL	Regulation CCME Soil Quality Guidelines Commercial (Coarse)	Sample					
				TP8 S1	TP9 S1	GS1	GS2	GS3	GS4
Sample Date (d/m/y)			SQCC	08/31/2010	08/31/2010	08/31/2010	08/31/2010	08/31/2010	08/31/2010
Physical Characteristics									
% Solids	% by Wt.	0.1		92.8	94.3	84.5	84.4	84.2	82.9
Metals									
Aluminum	ug/g dry	10		2710	3090	3250	4480	2830	3430
Antimony	ug/g dry	1	40 ug/g dry	< 1	< 1	< 1	3	< 1	< 1
Arsenic	ug/g dry	1	12 ug/g dry	1	< 1	< 1	1	< 1	1
Barium	ug/g dry	10	2000 ug/g dry	19	21	25	55	20	31
Beryllium	ug/g dry	0.5	8 ug/g dry	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Boron	ug/g dry	5		< 5	< 5	< 5	6.9	< 5	< 5
Cadmium	ug/g dry	0.5	22 ug/g dry	< 0.5	< 0.5	0.5	12.5	< 0.5	< 0.5
Calcium	ug/g dry	200		15500	17900	15200	8900	17700	17000
Chromium	ug/g dry	5	87 ug/g dry	24	23	25	85	25	20
Chromium VI (hexavalent)	ug/g dry	0.4					< 0.4		
Cobalt	ug/g dry	1	300 ug/g dry	5	5	6	7	6	5
Copper	ug/g dry	5	91 ug/g dry	12	12	17	133	13	16
Iron	ug/g dry	200		24800	24500	21100	23300	24600	19100
Lead	ug/g dry	1	260 ug/g dry	5	6	26	499	16	40
Magnesium	ug/g dry	200		2670	2980	2990	3490	2750	3200
Manganese	ug/g dry	5		150	159	196	165	179	177
Mercury	ug/g dry	0.1	24 ug/g dry				< 0.1		
Molybdenum	ug/g dry	1	40 ug/g dry	3	< 1	< 1	5	< 1	2
Nickel	ug/g dry	5	50 ug/g dry	7	8	9	14	7	8
Potassium	ug/g dry	200		499	631	705	854	590	726
Selenium	ug/g dry	1	2.9 ug/g dry	< 1	< 1	< 1	< 1	< 1	< 1
Silver	ug/g dry	0.3	40 ug/g dry	0.4	< 0.3	< 0.3	0.4	< 0.3	< 0.3
Sodium	ug/g dry	200		< 200	< 200	232	383	< 200	213
Strontium	ug/g dry	10		20	21	26	21	25	24
Thallium	ug/g dry	1	1 ug/g dry	< 1	< 1	< 1	< 1	< 1	< 1
Tin	ug/g dry	5	300 ug/g dry	< 5	< 5	< 5	5	< 5	< 5
Titanium	ug/g dry	10		351	345	315	351	324	339
Uranium	ug/g dry	1	33 ug/g dry	< 1	< 1	< 1	< 1	< 1	< 1
Vanadium	ug/g dry	10	130 ug/g dry	53	47	36	35	45	34
Zinc	ug/g dry	20	360 ug/g dry	36	44	172	769	97	225

Table 1: Soil Analytical Results
 First Air Nose Dock Hangar Phase II ESA, Iqaluit 2010

	Exceeds criteria
	MRL elevated above criteria threshold
	Duplicate samples

Parameter	Units	MRL	Regulation CCME Soil Quality Guidelines Commercial (Coarse)	Sample					
				TP8 S1	TP9 S1	GS1	GS2	GS3	GS4
Sample Date (d/m/y)			SQCc	08/31/2010	08/31/2010	08/31/2010	08/31/2010	08/31/2010	08/31/2010
Volatiles									
Benzene	ug/g dry	0.03	0.03 ug/g dry	< 0.03	< 0.03	< 0.03	< 0.3	< 0.03	< 0.03
Ethylbenzene	ug/g dry	0.05	0.082 ug/g dry	< 0.05	< 0.05	< 0.05	< 0.5	< 0.05	< 0.05
Toluene	ug/g dry	0.05	0.37 ug/g dry	< 0.05	< 0.05	< 0.05	< 0.5	< 0.05	< 0.05
m/p-Xylene	ug/g dry	0.05		< 0.05	< 0.05	< 0.05	< 0.5	< 0.05	< 0.05
o-Xylene	ug/g dry	0.05		< 0.05	< 0.05	0.09	< 0.5	< 0.05	< 0.05
Xylenes, total	ug/g dry	0.1	11 ug/g dry	< 0.1	< 0.1	< 0.1	< 1	< 0.1	< 0.1
Bromodichloromethane	ug/g dry	0.02							
Bromoform	ug/g dry	0.04							
Bromomethane	ug/g dry	0.05							
Carbon Tetrachloride	ug/g dry	0.03	50 ug/g dry						
Chlorobenzene	ug/g dry	0.02	10 ug/g dry						
Chloroethane	ug/g dry	0.05	50 ug/g dry						
Chloroform	ug/g dry	0.03	50 ug/g dry						
Chloromethane	ug/g dry	0.2	50 ug/g dry						
Dibromochloromethane	ug/g dry	0.02							
1,2-Dibromoethane	ug/g dry	0.01							
1,2-Dichlorobenzene	ug/g dry	0.02	10 ug/g dry						
1,3-Dichlorobenzene	ug/g dry	0.05	10 ug/g dry						
1,4-Dichlorobenzene	ug/g dry	0.02	10 ug/g dry						
1,1-Dichloroethane	ug/g dry	0.03	50 ug/g dry						
1,2-Dichloroethane	ug/g dry	0.02	50 ug/g dry						
1,1-Dichloroethylene	ug/g dry	0.03	50 ug/g dry						
cis-1,2-Dichloroethylene	ug/g dry	0.02	50 ug/g dry						
trans-1,2-Dichloroethylene	ug/g dry	0.05	50 ug/g dry						
1,2-Dichloropropane	ug/g dry	0.03	50 ug/g dry						
cis-1,3-Dichloropropylene	ug/g dry	0.02	50 ug/g dry						
trans-1,3-Dichloropropylene	ug/g dry	0.02	50 ug/g dry						
Methylene Chloride	ug/g dry	0.2	50 ug/g dry						
Styrene	ug/g dry	0.02	50 ug/g dry						
1,1,1,2-Tetrachloroethane	ug/g dry	0.03	50 ug/g dry						
1,1,2,2-Tetrachloroethane	ug/g dry	0.03	50 ug/g dry						
Tetrachloroethylene	ug/g dry	0.02	0.5 ug/g dry						
1,1,1-Trichloroethane	ug/g dry	0.02	50 ug/g dry						
1,1,2-Trichloroethane	ug/g dry	0.03	50 ug/g dry						
Trichloroethylene	ug/g dry	0.03	0.01 ug/g dry						
Trichlorofluoromethane	ug/g dry	0.05							
1,3,5-Trimethylbenzene	ug/g dry	0.03							
Vinyl Chloride	ug/g dry	0.03							

Table 1: Soil Analytical Results
 First Air Nose Dock Hangar Phase II ESA, Iqaluit 2010

	Exceeds criteria
	MRL elevated above criteria threshold
	Duplicate samples

Parameter	Units	MRL	Regulation CCME Soil Quality Guidelines Commercial (Coarse)	Sample					
				TP8 S1	TP9 S1	GS1	GS2	GS3	GS4
Sample Date (d/m/y)			SQCc	08/31/2010	08/31/2010	08/31/2010	08/31/2010	08/31/2010	08/31/2010
Hydrocarbons									
F1 PHCs (C6-C10)	ug/g dry	10	240 ug/g dry	< 10	< 10	< 10	231	< 10	< 10
F2 PHCs (C10-C16)	ug/g dry	10	260 ug/g dry	< 10	< 10	2330	19100	< 10	13
F3 PHCs (C16-C34)	ug/g dry	10	1700 ug/g dry	< 10	< 10	374	4370	< 10	174
F4 PHCs (C34-C50)	ug/g dry	10	3300 ug/g dry	< 10	< 10	270	2450	< 10	274
Semi-Volatiles									
Ethylene glycol	ug/g dry	5	960 ug/g dry		< 5				
Diethylene glycol	ug/g dry	5			< 5				
Propylene glycol	ug/g dry	5			< 5				
PCBs									
PCBs, total	ug/g dry	0.05	33 ug/g dry	< 0.05			19.6		

**Table 2: Shallow Groundwater Analytical Results
First Air Nose Dock Hangar Phase II ESA, Iqaluit 2010**

	Exceeds criteria
	MRL elevated above criteria threshold

Parameter	Units	MRL	Regulation	Sample	
			CCME Interim Groundwater	TP2 GW	TP5 GW
Sample Date (d/m/y)			CCME-GW	08/31/2010	08/31/2010
General Inorganics					
Alkalinity, total	mg/L	5		248	
Conductivity	uS/cm	5		489	
Hardness	mg/L			264	319
pH	pH Units	0.05		7.09	
Metals					
Aluminum	ug/L	10	100 ug/L ¹	572	105
Antimony	ug/L	1	1600 ug/L	< 1	< 1
Arsenic	ug/L	10	5 ug/L	< 10	< 10
Barium	ug/L	10	500 ug/L	16	< 10
Beryllium	ug/L	1	5.3 ug/L	< 1	< 1
Bismuth	ug/L	5		< 5	< 5
Boron	ug/L	50	5000 ug/L	98	199
Cadmium	ug/L	1	0.017 ug/L	< 1	< 1
Calcium	ug/L	200		96200	78000
Chromium	ug/L	50	8.9 ug/L	< 50	< 50
Cobalt	ug/L	5		< 5	< 5
Copper	ug/L	5	4 ug/L ²	25	< 5
Iron	ug/L	200	300 ug/L	431	< 200
Lead	ug/L	1	7 ug/L ³	4	3
Manganese	ug/L	50		126	65
Molybdenum	ug/L	5	73 ug/L	< 5	< 5
Nickel	ug/L	5	150 ug/L ⁴	< 5	< 5
Potassium	ug/L	200		3590	3340
Selenium	ug/L	5	1 ug/L	< 5	< 5
Silver	ug/L	1	0.1 ug/L	< 1	< 1
Sodium	ug/L	200		6190	23800
Strontium	ug/L	50		213	161
Thallium	ug/L	1	0.8 ug/L	< 1	< 1
Tin	ug/L	10		< 10	< 10
Titanium	ug/L	10	100 ug/L	17	< 10
Uranium	ug/L	5	300 ug/L	< 5	< 5
Vanadium	ug/L	10		< 10	< 10
Zinc	ug/L	20	10 ug/L	< 20	< 20

1. Aluminum guideline is 100 ug/L for pH ≥ 6.5
2. Copper guideline is 4 ug/L for hardness > 180 mg/L
3. Lead guideline is 7 ug/L for hardness > 180 mg/L
4. Nickel guideline is 150 ug/L for hardness > 180 mg/L

Table 2: Shallow Groundwater Analytical Results
First Air Nose Dock Hangar Phase II ESA, Iqaluit 2010

	Exceeds criteria
	MRL elevated above criteria threshold

Parameter	Units	MRL	Regulation	Sample	
			CCME Interim Groundwater	TP2 GW	TP5 GW
Sample Date (d/m/y)			CCME-GW	08/31/2010	08/31/2010
Volatiles					
Benzene	ug/L	0.5	200 ug/L	< 0.5	< 0.5
Ethylbenzene	ug/L	0.5	41000 ug/L	< 0.5	< 0.5
Toluene	ug/L	0.5	83 ug/L	< 0.5	< 0.5
m/p-Xylene	ug/L	0.5		< 0.5	< 0.5
o-Xylene	ug/L	0.5		< 0.5	< 0.5
Xylenes, total	ug/L	1	18000 ug/L	< 1.0	< 1.0
Bromodichloromethane	ug/L	0.4	67000 ug/L	< 0.4	
Bromoform	ug/L	0.5	840 ug/L	< 0.5	
Bromomethane	ug/L	0.7	2 ug/L	< 0.7	
Carbon Tetrachloride	ug/L	0.5	6.8 ug/L	< 0.5	
Chlorobenzene	ug/L	0.4	1.3 ug/L	< 0.4	
Chloroethane	ug/L	1		< 1.0	
Chloroform	ug/L	0.5	1.8 ug/L	< 0.5	
Chloromethane	ug/L	3		< 3	
Dibromochloromethane	ug/L	0.5	10000 ug/L	< 0.5	
1,2-Dibromoethane	ug/L	1		< 1.0	
1,2-Dichlorobenzene	ug/L	0.4	0.7 ug/L	< 0.4	
1,3-Dichlorobenzene	ug/L	0.4	42 ug/L	< 0.4	
1,4-Dichlorobenzene	ug/L	0.4	26 ug/L	< 0.4	
1,1-Dichloroethane	ug/L	0.5	9000 ug/L	< 0.5	
1,2-Dichloroethane	ug/L	0.5	100 ug/L	< 0.5	
1,1-Dichloroethylene	ug/L	0.5	490 ug/L	< 0.5	
cis-1,2-Dichloroethylene	ug/L	0.4	12000 ug/L	< 0.4	
trans-1,2-Dichloroethylene	ug/L	1	12000 ug/L	< 1.0	
1,2-Dichloroethylene, total	ug/L	1.4		< 1.4	
1,2-Dichloropropane	ug/L	0.5	9.3 ug/L	< 0.5	
cis-1,3-Dichloropropylene	ug/L	0.4		< 0.4	
trans-1,3-Dichloropropylene	ug/L	0.5		< 0.5	
1,3-Dichloropropene, total	ug/L	0.9	3.8 ug/L	< 0.9	
Methylene Chloride	ug/L	4	98 ug/L	< 4	
Styrene	ug/L	0.4	72 ug/L	< 0.4	
1,1,1,2-Tetrachloroethane	ug/L	0.5	6 ug/L	< 0.5	
1,1,2,2-Tetrachloroethane	ug/L	0.6	22 ug/L	< 0.6	
Tetrachloroethylene	ug/L	0.5	110 ug/L	< 0.5	
1,1,1-Trichloroethane	ug/L	0.4	4200 ug/L	< 0.4	
1,1,2-Trichloroethane	ug/L	0.6	9400 ug/L	< 0.6	
Trichloroethylene	ug/L	0.4	29 ug/L	< 0.4	
Trichlorofluoromethane	ug/L	1		< 1.0	
1,3,5-Trimethylbenzene	ug/L	0.5		< 0.5	
Vinyl Chloride	ug/L	0.4	13 ug/L	< 0.4	
Hydrocarbons					
F1 PHCs (C6-C10)	ug/L	200	9100 ug/L	525	< 200
F2 PHCs (C10-C16)	ug/L	100	1300 ug/L	50800	< 100
F3 PHCs (C16-C34)	ug/L	100		2340	< 100
F4 PHCs (C34-C50)	ug/L	100		< 100	< 100
PCBs					
PCBs, total	ug/L	0.05		0.75	

Table 3: Surface Water Analytical Results
First Air Nose Dock Hangar Phase II ESA, Iqaluit 2010

Exceeds criteria
MRL elevated above criteria threshold

Parameter	Units	MRL	Regulation	Sample
			CCME Fresh Water Aquatic	SW
Sample Date (d/m/y)			CCME-FWA	08/31/2010
General Inorganics				
Alkalinity, total	mg/L	5		224
Conductivity	uS/cm	5		667
Hardness	mg/L	1		248
pH	pH Units	0.05		7.73
Metals				
Aluminum	ug/L	10	100 ug/L ¹	< 10
Antimony	ug/L	1		< 1
Arsenic	ug/L	10	5 ug/L	< 10
Barium	ug/L	10		< 10
Beryllium	ug/L	1		< 1
Bismuth	ug/L	5		< 5
Boron	ug/L	50		117
Cadmium	ug/L	1	0.017 ug/L	< 1
Calcium	ug/L	200		96400
Chromium	ug/L	50		< 50
Cobalt	ug/L	5		< 5
Copper	ug/L	5	4 ug/L ²	< 5
Iron	ug/L	200	300 ug/L	< 200
Lead	ug/L	1	7 ug/L ³	< 1
Manganese	ug/L	50		< 50
Molybdenum	ug/L	5	73 ug/L	< 5
Nickel	ug/L	5	150 ug/L ⁴	< 5
Potassium	ug/L	200		3970
Selenium	ug/L	5	1 ug/L	< 5
Silver	ug/L	1	0.1 ug/L	< 1
Sodium	ug/L	200		22900
Strontium	ug/L	50		228
Thallium	ug/L	1	0.8 ug/L	< 1
Tin	ug/L	10		< 10
Titanium	ug/L	10		< 10
Uranium	ug/L	5		< 5
Vanadium	ug/L	10		< 10
Zinc	ug/L	20	30 ug/L	26
Volatiles				
Benzene	ug/L	0.5	370 ug/L	< 0.5
Ethylbenzene	ug/L	0.5	90 ug/L	< 0.5
Toluene	ug/L	0.5	2 ug/L	< 0.5
m/p-Xylene	ug/L	0.5		< 0.5
o-Xylene	ug/L	0.5		< 0.5
Xylenes, total	ug/L	1		< 1.0
Hydrocarbons				
F1 PHCs (C6-C10)	ug/L	200		< 200
F2 PHCs (C10-C16)	ug/L	100		< 100
F3 PHCs (C16-C34)	ug/L	100		< 100
F4 PHCs (C34-C50)	ug/L	100		< 100

1. Aluminum guideline is 100 ug/L for pH ≥ 6.5
2. Copper guideline is 4 ug/L for hardness > 180 mg/L
3. Lead guideline is 7 ug/L for hardness > 180 mg/L
4. Nickel guideline is 150 ug/L for hardness > 180 mg/L

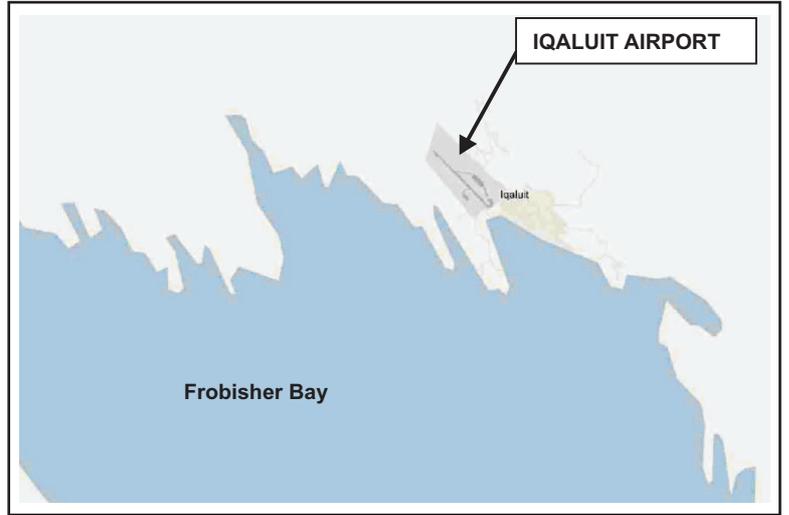
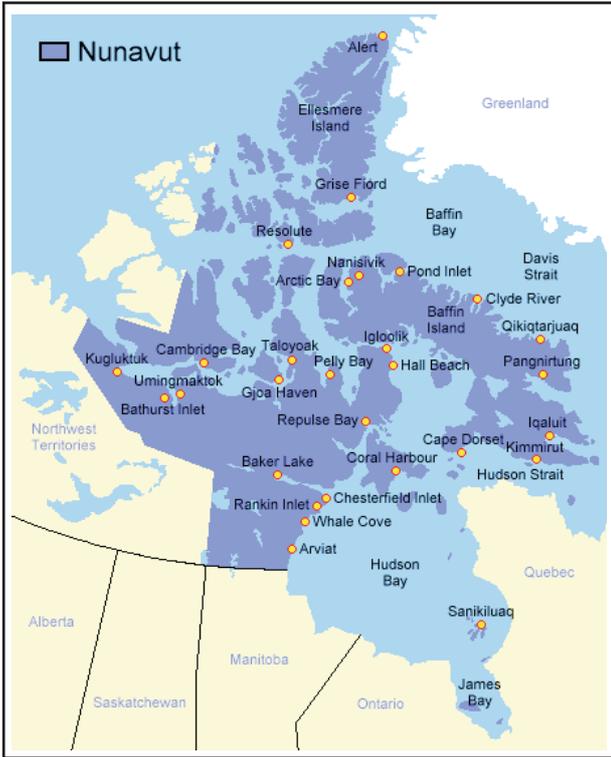
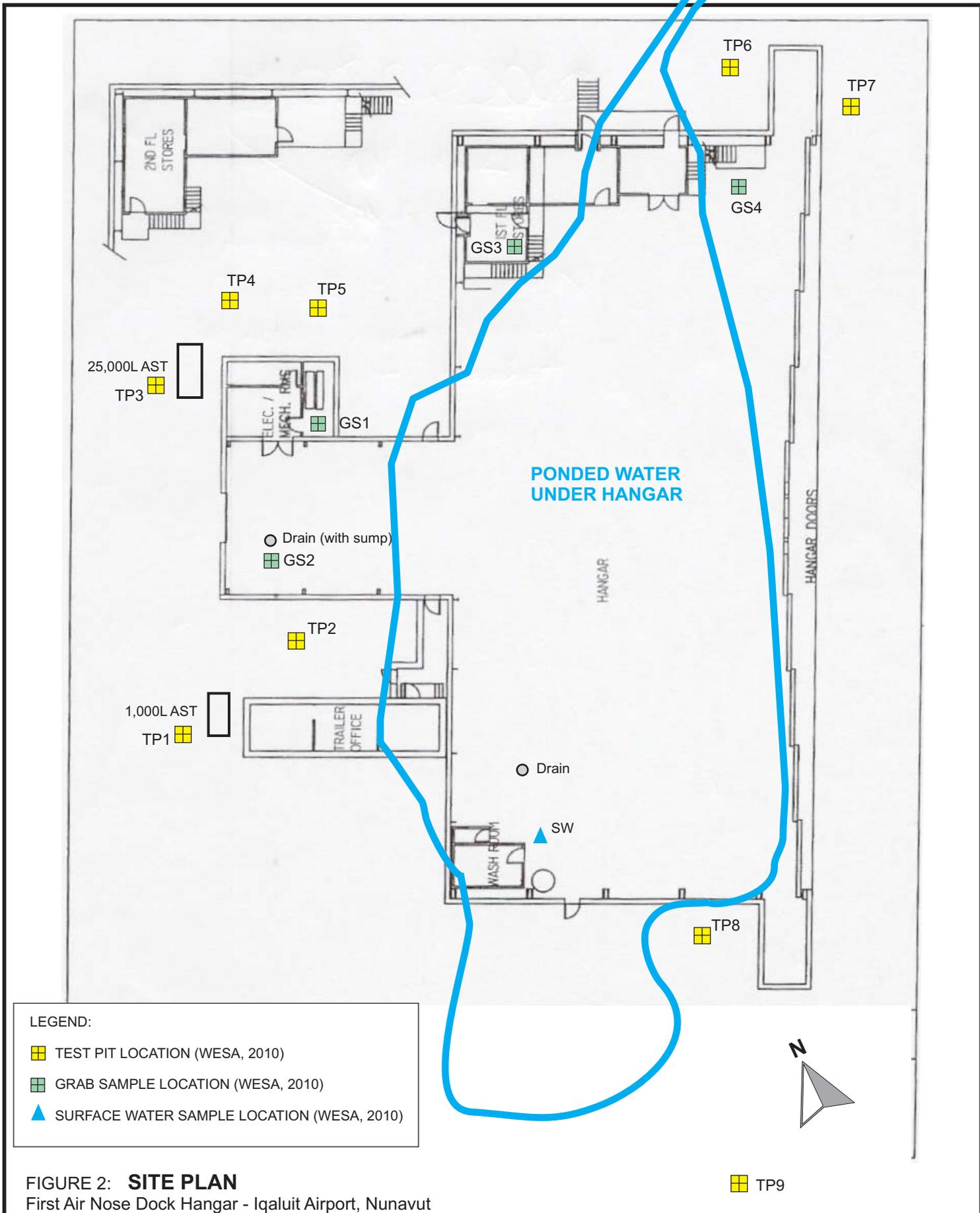


FIGURE 1: **SITE LOCATION MAP**

 **First Air Nose Dock Hangar - Iqaluit Airport, Nunavut**



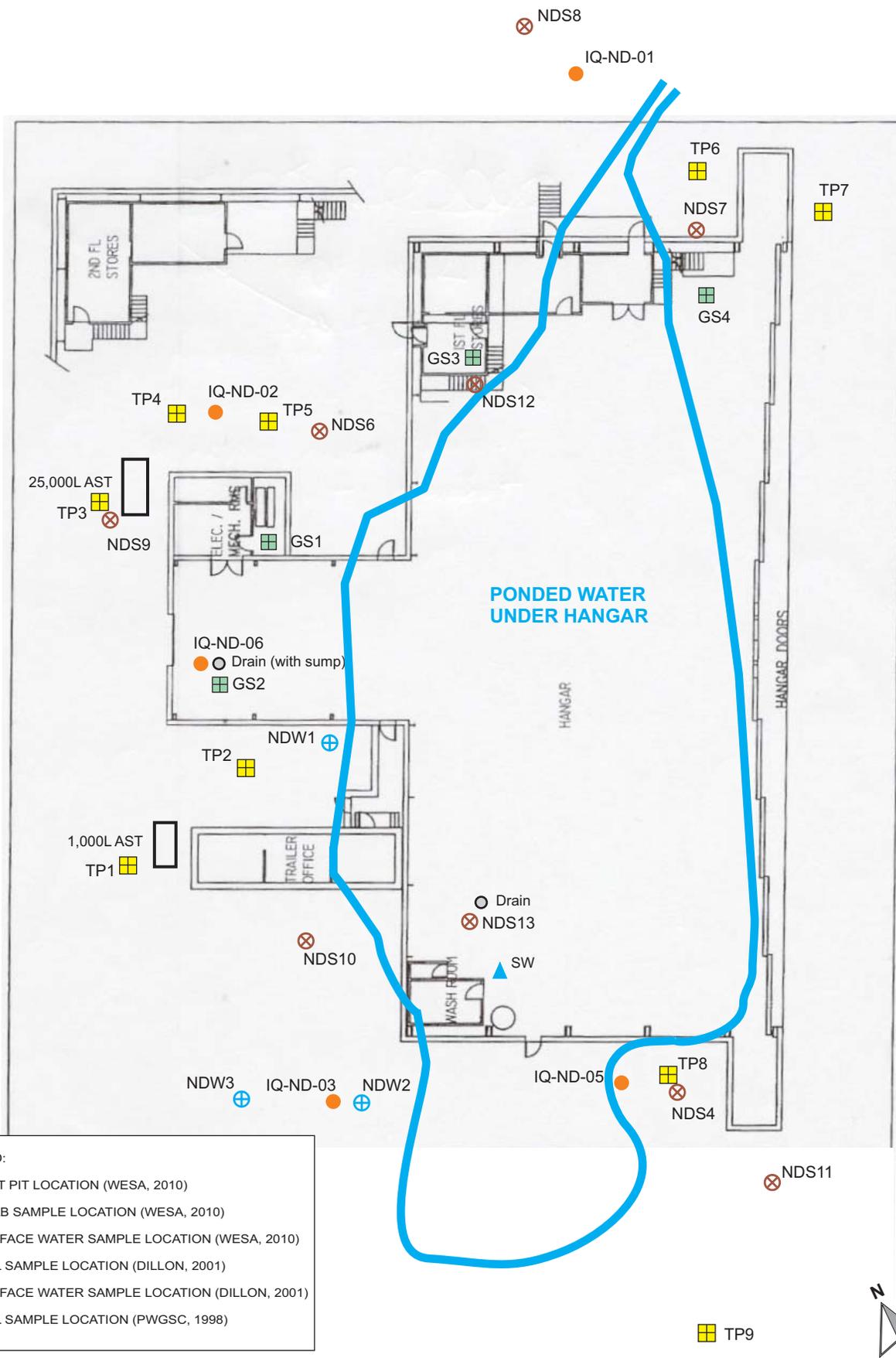


FIGURE 3: SAMPLING LOCATIONS
 First Air Nose Dock Hangar - Iqaluit Airport, Nunavut

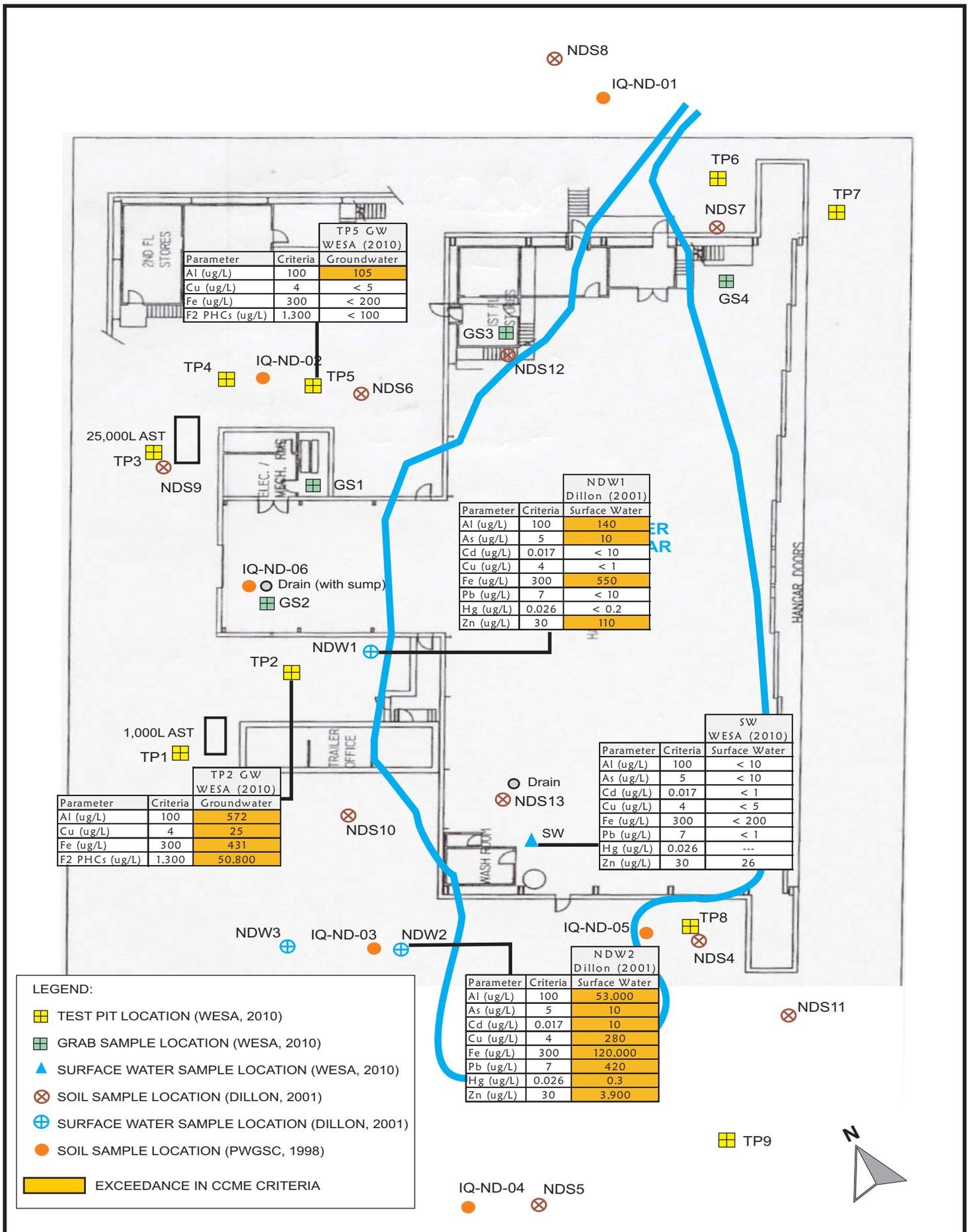


FIGURE 5: **WATER SAMPLE EXCEEDANCES**
 First Air Nose Dock Hangar - Iqaluit Airport, Nunavut

APPENDIX A
Site Photographs



LOCATION OF SEWAGE SPILL SPRING 2010,
SOUTH END OF HANGAR



PONDED WATER UNDER HANGAR,
VIEWING NORTH



VIEWING SOUTH, WEST SIDE OF HANGAR



SOUTH END OF MAINTENANCE HANGAR



SHALLOW DITCH FLOWING UNDER
HANGAR, VIEWING SOUTH

PHOTOGRAPHS - AUGUST 2010
FIRST AIR NOSE DOCK HANGAR - IQALUIT AIRPORT - NUNAVUT



TP1



TP2



TP3



TP4



TP5



TP6

PHOTOGRAPHS - TEST PIT LOCATIONS
FIRST AIR NOSE DOCK HANGAR - IQALUIT AIRPORT - NUNAVUT



TP7



TP8



TP9

PHOTOGRAPHS - TEST PIT LOCATIONS
FIRST AIR NOSE DOCK HANGAR - IQALUIT AIRPORT - NUNAVUT



GS1



GS2



GS3



GS4

**PHOTOGRAPHS - GRAB SAMPLE LOCATIONS
FIRST AIR NOSE DOCK HANGAR - IQALUIT AIRPORT - NUNAVUT**

APPENDIX B

Test Pit Logs

TEST PIT LOGS C-B8809-00
 First Air Nose Dock Hangar, Iqaluit Airport, Nunavut

31-Aug-2010

Test Pit Number	Depth in metres		DESCRIPTION	Sample # (depth m)	Headspace Reading ppm/%LEL
	Top	Bottom			
TP1	0.00	1.10	Light brown, moist to wet, granitic, sand and gravel fill.	*S1 (0.6-0.7)	<25 ppm
	1.10	1.80	Light brown, moist, stratified, medium to coarse grained	S2 (1.55)	<25 ppm
	1.04	1.88	sand with some gravel. Frost encountered 1.8m.		
TP2	0.00	0.30	Light brown, moist to wet, granitic, sand and gravel fill.	*S1 (0.25)	150 ppm
	0.30	1.10	Light brown, moist, fine to medium grained sand with some gravel. Strong odours encountered. Frost 1.10m. Water entering test pit 0.8m.	*S2 (1.0)	5% LEL
TP3	0.00	0.60	Light brown, moist to wet, granitic, gravelly sand fill. Oily film on pebble surface.	*S1 (0.4-0.5)	<25 ppm
	0.60	0.90	Light brown, moist, medium to coarse grained sand with some gravel.	S2 (0.8)	<25 ppm
	0.90	1.80	Light brown, moist, fine to medium coarse grained sand. Frost encountered 1.8m. Odour present.	*S3 (1.6-1.7)	4% LEL
TP4	0.00	0.50	Light brown, granitic, moist to wet, medium to coarse grained sand with some gravel.	*S1 (1.10)	<25 ppm
	0.50	1.60	Light brown, moist, fine to medium grained sand. Frost encountered 1.6m.	S2 (1.55)	<25 ppm
TP5	0.00	>1.0	Black stained overlying granitic, saturated sand and gravel. Shallow groundwater entering test pit from the north causing soil to collapse.	*S1 (0.3)	<25 ppm
TP6	0.00	1.10	Light brown, granitic, saturated, sand and gravel. Shallow groundwater entering test pit from the north causing soil to collapse.	*S1 (0.30) S2 (1.0)	<25 ppm <25 ppm
TP7	0.00	1.70	Light brown, moist to wet, granitic, gravelly sand fill.	S1 (0.50) *S2 (1.6)	<25 ppm <25 ppm
TP8	0.00	>1.0	Light brown, granitic, saturated sand and gravel to gravelly sand. Test pit location in low area beside standing water. Test pit walls collapse due to saturation.	*S1 (0.2)	<25 ppm
TP9	0.00	1.50	Light brown, granitic, wet to saturated, gravelly sand fill. Water entering 0.7m. Frost encountered 1.5m.	*S1 (0.5-0.6) S2 (1.4-1.5)	<25 ppm <25 ppm
Grab Samples GS1	0.00	0.20	Light brown, granitic, moist, sand with some gravel.	*(0.15-0.2)	45 ppm
GS2	0.00	0.20	Light brown, granitic, moist, sand with some gravel. Some gravel and traces of paper and metal fragments.	*(0.15-0.2)	60 ppm
GS3	0.00	0.15	Light brown, granitic, saturated sand and gravel to gravelly sand.	*(0.15)	<25 ppm
GS4	0.00	0.20	Light brown, granitic, moist, sand with some gravel.	*(0.15-0.2)	<25 ppm

*Samples submitted for laboratory analysis

APPENDIX C

Laboratory Reports of Chemical Analyses

Certificate of Analysis

WESA Inc. (Carp)

P.O. Box 430, 3108 Carp Rd.
Carp, ON K0A 1L0
Attn: Darryl Roberts

Phone: (613) 839-3053
Fax: (613) 839-5376

Client PO: First Air, Iqaluit
Project: C-B8809-00
Custody: 75095//94

Report Date: 10-Sep-2010
Order Date: 3-Sep-2010

Order #: 1036209

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Parcel ID	Client ID
1036209-01	TP1 S1
1036209-02	TP2 S1
1036209-03	TP2 S2
1036209-04	TP3 S1
1036209-05	TP3 S3
1036209-06	TP4 S1
1036209-07	TP5 S1
1036209-08	TP6 S1
1036209-09	TP7 S2
1036209-10	TP8 S1
1036209-11	TP9 S1
1036209-12	Dup 1 #1
1036209-13	GS1
1036209-14	GS2
1036209-15	GS3
1036209-16	GS4

Approved By:



Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

Any use of these results implies your agreement that our total liability in connection with this work, however arising shall be limited to the amount paid by you for this work, and that our employees or agents shall not under circumstances be liable to you in connection with this work

Certificate of Analysis

Report Date: 10-Sep-2010

Order Date: 3-Sep-2010

Client: **WESA Inc. (Carp)**

Client PO: First Air, Iqaluit

Project Description: C-B8809-00

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX	EPA 8260 - P&T GC-MS	3-Sep-10	10-Sep-10
CCME PHC F1	CWS Tier 1 - P&T GC-FID	3-Sep-10	10-Sep-10
CCME PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	8-Sep-10	9-Sep-10
Glycols	EPA 8015B - GC-FID	9-Sep-10	10-Sep-10
Mercury	EPA 7471A - CVAA, digestion	7-Sep-10	7-Sep-10
Metals	EPA 6020 - Digestion - ICP-MS	7-Sep-10	7-Sep-10
PCBs, total	SW846 8082A - GC-ECD	3-Sep-10	7-Sep-10
Solids, %	Gravimetric, calculation	7-Sep-10	7-Sep-10
VOCs	EPA 8260 - P&T GC-MS	3-Sep-10	10-Sep-10

Certificate of Analysis

Report Date: 10-Sep-2010

Order Date: 3-Sep-2010

 Client: **WESA Inc. (Carp)**

Client PO: First Air, Iqaluit

Project Description: C-B8809-00

	Client ID:	TP1 S1	TP2 S1	TP2 S2	TP3 S1
	Sample Date:	31-Aug-10	31-Aug-10	31-Aug-10	31-Aug-10
	Sample ID:	1036209-01	1036209-02	1036209-03	1036209-04
	MDL/Units	Soil	Soil	Soil	Soil

Physical Characteristics

% Solids	0.1 % by Wt.	98.5	95.5	90.3	95.7
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Metals

Aluminum	10 ug/g dry	2460	3120	3020	2860
Antimony	1 ug/g dry	<1	<1	<1	<1
Arsenic	1 ug/g dry	<1	1	<1	<1
Barium	10 ug/g dry	15	19	27	18
Beryllium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Boron	5.0 ug/g dry	<5.0	<5.0	<5.0	<5.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Calcium	200 ug/g dry	17700	11900	15100	8260
Chromium	5 ug/g dry	18	21	19	17
Cobalt	1 ug/g dry	5	5	5	5
Copper	5 ug/g dry	10	11	10	10
Iron	200 ug/g dry	22100	23700	18500	19500
Lead	1 ug/g dry	3	5	3	3
Magnesium	200 ug/g dry	2610	2700	2980	2570
Manganese	5 ug/g dry	190	133	148	255
Mercury	0.1 ug/g dry	-	-	<0.1	-
Molybdenum	1 ug/g dry	<1	3	1	1
Nickel	5 ug/g dry	6	7	7	8
Potassium	200 ug/g dry	457	564	804	497
Selenium	1 ug/g dry	<1	1	<1	<1
Silver	0.3 ug/g dry	<0.3	<0.3	<0.3	<0.3
Sodium	200 ug/g dry	<200	<200	234	<200
Strontium	10 ug/g dry	22	19	25	13
Thallium	1 ug/g dry	<1	<1	<1	<1
Tin	5 ug/g dry	<5	<5	<5	<5
Titanium	10 ug/g dry	331	335	372	299
Uranium	1 ug/g dry	<1	<1	<1	<1
Vanadium	10 ug/g dry	40	49	35	36
Zinc	20 ug/g dry	23	29	27	27

Volatiles

Benzene	0.03 ug/g dry	-	-	<0.03 [3]	-
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Certificate of Analysis

Report Date: 10-Sep-2010

Order Date: 3-Sep-2010

 Client: **WESA Inc. (Carp)**

Client PO: First Air, Iqaluit

Project Description: C-B8809-00

	Client ID:	TP1 S1	TP2 S1	TP2 S2	TP3 S1
	Sample Date:	31-Aug-10	31-Aug-10	31-Aug-10	31-Aug-10
	Sample ID:	1036209-01	1036209-02	1036209-03	1036209-04
	MDL/Units	Soil	Soil	Soil	Soil
Bromodichloromethane	0.02 ug/g dry	-	-	<0.02 [3]	-
Bromoform	0.04 ug/g dry	-	-	<0.04 [3]	-
Bromomethane	0.05 ug/g dry	-	-	<0.05 [3]	-
Carbon Tetrachloride	0.03 ug/g dry	-	-	<0.03 [3]	-
Chlorobenzene	0.02 ug/g dry	-	-	<0.02 [3]	-
Chloroethane	0.05 ug/g dry	-	-	<0.05 [3]	-
Chloroform	0.03 ug/g dry	-	-	<0.03 [3]	-
Chloromethane	0.2 ug/g dry	-	-	<0.2 [3]	-
Dibromochloromethane	0.02 ug/g dry	-	-	<0.02 [3]	-
1,2-Dibromoethane	0.01 ug/g dry	-	-	<0.01 [3]	-
1,2-Dichlorobenzene	0.02 ug/g dry	-	-	<0.02 [3]	-
1,3-Dichlorobenzene	0.05 ug/g dry	-	-	<0.05 [3]	-
1,4-Dichlorobenzene	0.02 ug/g dry	-	-	<0.02 [3]	-
1,1-Dichloroethane	0.03 ug/g dry	-	-	<0.03 [3]	-
1,2-Dichloroethane	0.02 ug/g dry	-	-	<0.02 [3]	-
1,1-Dichloroethylene	0.03 ug/g dry	-	-	<0.03 [3]	-
cis-1,2-Dichloroethylene	0.02 ug/g dry	-	-	<0.02 [3]	-
trans-1,2-Dichloroethylene	0.05 ug/g dry	-	-	<0.05 [3]	-
1,2-Dichloroethylene, total	0.07 ug/g dry	-	-	<0.07 [3]	-
1,2-Dichloropropane	0.03 ug/g dry	-	-	<0.03 [3]	-
cis-1,3-Dichloropropylene	0.02 ug/g dry	-	-	<0.02 [3]	-
trans-1,3-Dichloropropylene	0.02 ug/g dry	-	-	<0.02 [3]	-
1,3-Dichloropropene, total	0.04 ug/g dry	-	-	<0.04 [3]	-
Ethylbenzene	0.05 ug/g dry	-	-	1.2 [3]	-
Methylene Chloride	0.2 ug/g dry	-	-	<0.2 [3]	-
Styrene	0.02 ug/g dry	-	-	<0.02 [3]	-
1,1,1,2-Tetrachloroethane	0.03 ug/g dry	-	-	<0.03 [3]	-
1,1,2,2-Tetrachloroethane	0.03 ug/g dry	-	-	<0.03 [3]	-
Tetrachloroethylene	0.02 ug/g dry	-	-	<0.02 [3]	-
Toluene	0.05 ug/g dry	-	-	<0.05 [3]	-
1,1,1-Trichloroethane	0.02 ug/g dry	-	-	<0.02 [3]	-
1,1,2-Trichloroethane	0.03 ug/g dry	-	-	<0.03 [3]	-
Trichloroethylene	0.03 ug/g dry	-	-	<0.03 [3]	-

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 5415 Morning Glory Cr.
 Niagara Falls, ON L2J 0A3

SARNIA
 123 Christina St. N.
 Sarnia, ON N7T 5T7

Certificate of Analysis

Report Date: 10-Sep-2010

Order Date: 3-Sep-2010

 Client: **WESA Inc. (Carp)**

Client PO: First Air, Iqaluit

Project Description: C-B8809-00

	Client ID: Sample Date: Sample ID:	TP1 S1	TP2 S1	TP2 S2	TP3 S1
		31-Aug-10 1036209-01 Soil	31-Aug-10 1036209-02 Soil	31-Aug-10 1036209-03 Soil	31-Aug-10 1036209-04 Soil
	MDL/Units				
Trichlorofluoromethane	0.05 ug/g dry	-	-	<0.05 [3]	-
1,3,5-Trimethylbenzene	0.03 ug/g dry	-	-	2.3 [3]	-
Vinyl chloride	0.03 ug/g dry	-	-	<0.03 [3]	-
m,p-Xylenes	0.05 ug/g dry	-	-	3.8 [3]	-
o-Xylene	0.05 ug/g dry	-	-	4.8 [3]	-
Xylenes, total	0.1 ug/g dry	-	-	8.6 [3]	-
4-Bromofluorobenzene	Surrogate	-	-	102% [3]	-
Dibromofluoromethane	Surrogate	-	-	92.3% [3]	-
Toluene-d8	Surrogate	-	-	104% [3]	-
Benzene	0.03 ug/g dry	<0.03	<0.03	-	<0.03
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	-	<0.05
Toluene	0.05 ug/g dry	<0.05	<0.05	-	0.07
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	-	<0.05
o-Xylene	0.05 ug/g dry	0.05	<0.05	-	0.11
Xylenes, total	0.10 ug/g dry	<0.10	<0.10	-	0.13
Toluene-d8	Surrogate	100%	99.3%	-	103%

Hydrocarbons

F1 PHCs (C6-C10)	10 ug/g dry	<10	14	416	<10
F2 PHCs (C10-C16)	10 ug/g dry	<10	737	5210	41
F3 PHCs (C16-C34)	10 ug/g dry	<10	84	219	2040
F4 PHCs (C34-C50)	10 ug/g dry	<10	<10	106	3610

Certificate of Analysis

Report Date: 10-Sep-2010

Order Date: 3-Sep-2010

 Client: **WESA Inc. (Carp)**

Client PO: First Air, Iqaluit

Project Description: C-B8809-00

	Client ID:	TP3 S3	TP4 S1	TP5 S1	TP6 S1
	Sample Date:	31-Aug-10	31-Aug-10	31-Aug-10	31-Aug-10
	Sample ID:	1036209-05	1036209-06	1036209-07	1036209-08
	MDL/Units	Soil	Soil	Soil	Soil

Physical Characteristics

% Solids	0.1 % by Wt.	95.2	98.2	85.0	82.6
----------	--------------	------	------	------	------

Metals

Aluminum	10 ug/g dry	2100	2340	2330	2810
Antimony	1 ug/g dry	<1	<1	<1	<1
Arsenic	1 ug/g dry	<1	<1	<1	<1
Barium	10 ug/g dry	<10	<10	12	19
Beryllium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Boron	5.0 ug/g dry	<5.0	<5.0	<5.0	<5.0
Cadmium	0.5 ug/g dry	<0.5	<0.5	<0.5	<0.5
Calcium	200 ug/g dry	15200	15100	15000	14100
Chromium	5 ug/g dry	16	13	20	26
Cobalt	1 ug/g dry	4	4	4	5
Copper	5 ug/g dry	8	9	10	8
Iron	200 ug/g dry	19700	16600	21500	18700
Lead	1 ug/g dry	2	2	4	2
Magnesium	200 ug/g dry	2350	2740	2510	2770
Manganese	5 ug/g dry	135	145	130	150
Mercury	0.1 ug/g dry	<0.1	-	-	-
Molybdenum	1 ug/g dry	<1	<1	<1	<1
Nickel	5 ug/g dry	5	5	5	6
Potassium	200 ug/g dry	345	342	426	577
Selenium	1 ug/g dry	<1	<1	<1	<1
Silver	0.3 ug/g dry	<0.3	<0.3	<0.3	<0.3
Sodium	200 ug/g dry	<200	<200	<200	214
Strontium	10 ug/g dry	19	19	20	20
Thallium	1 ug/g dry	<1	<1	<1	<1
Tin	5 ug/g dry	<5	<5	<5	<5
Titanium	10 ug/g dry	271	233	314	314
Uranium	1 ug/g dry	<1	<1	<1	<1
Vanadium	10 ug/g dry	41	29	43	34
Zinc	20 ug/g dry	<20	21	20	23

Volatiles

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 Niagara Falls, ON L2J 0A3

SARNIA
 123 Christina St. N.
 Sarnia, ON N7T 5T7

Certificate of Analysis

Report Date: 10-Sep-2010

Order Date: 3-Sep-2010

 Client: **WESA Inc. (Carp)**

Client PO: First Air, Iqaluit

Project Description: C-B8809-00

	Client ID:	TP3 S3	TP4 S1	TP5 S1	TP6 S1
	Sample Date:	31-Aug-10	31-Aug-10	31-Aug-10	31-Aug-10
	Sample ID:	1036209-05	1036209-06	1036209-07	1036209-08
	MDL/Units	Soil	Soil	Soil	Soil
Benzene	0.03 ug/g dry	<0.03 [3]	-	-	-
Bromodichloromethane	0.02 ug/g dry	<0.02 [3]	-	-	-
Bromoform	0.04 ug/g dry	<0.04 [3]	-	-	-
Bromomethane	0.05 ug/g dry	<0.05 [3]	-	-	-
Carbon Tetrachloride	0.03 ug/g dry	<0.03 [3]	-	-	-
Chlorobenzene	0.02 ug/g dry	<0.02 [3]	-	-	-
Chloroethane	0.05 ug/g dry	<0.05 [3]	-	-	-
Chloroform	0.03 ug/g dry	<0.03 [3]	-	-	-
Chloromethane	0.2 ug/g dry	<0.2 [3]	-	-	-
Dibromochloromethane	0.02 ug/g dry	<0.02 [3]	-	-	-
1,2-Dibromoethane	0.01 ug/g dry	<0.01 [3]	-	-	-
1,2-Dichlorobenzene	0.02 ug/g dry	<0.02 [3]	-	-	-
1,3-Dichlorobenzene	0.05 ug/g dry	<0.05 [3]	-	-	-
1,4-Dichlorobenzene	0.02 ug/g dry	<0.02 [3]	-	-	-
1,1-Dichloroethane	0.03 ug/g dry	<0.03 [3]	-	-	-
1,2-Dichloroethane	0.02 ug/g dry	<0.02 [3]	-	-	-
1,1-Dichloroethylene	0.03 ug/g dry	<0.03 [3]	-	-	-
cis-1,2-Dichloroethylene	0.02 ug/g dry	<0.02 [3]	-	-	-
trans-1,2-Dichloroethylene	0.05 ug/g dry	<0.05 [3]	-	-	-
1,2-Dichloroethylene, total	0.07 ug/g dry	<0.07 [3]	-	-	-
1,2-Dichloropropane	0.03 ug/g dry	<0.03 [3]	-	-	-
cis-1,3-Dichloropropylene	0.02 ug/g dry	<0.02 [3]	-	-	-
trans-1,3-Dichloropropylene	0.02 ug/g dry	<0.02 [3]	-	-	-
1,3-Dichloropropene, total	0.04 ug/g dry	<0.04 [3]	-	-	-
Ethylbenzene	0.05 ug/g dry	0.2 [3]	-	-	-
Methylene Chloride	0.2 ug/g dry	<0.2 [3]	-	-	-
Styrene	0.02 ug/g dry	<0.02 [3]	-	-	-
1,1,1,2-Tetrachloroethane	0.03 ug/g dry	<0.03 [3]	-	-	-
1,1,2,2-Tetrachloroethane	0.03 ug/g dry	<0.03 [3]	-	-	-
Tetrachloroethylene	0.02 ug/g dry	<0.02 [3]	-	-	-
Toluene	0.05 ug/g dry	<0.05 [3]	-	-	-
1,1,1-Trichloroethane	0.02 ug/g dry	<0.02 [3]	-	-	-

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Certificate of Analysis

Report Date: 10-Sep-2010

Order Date: 3-Sep-2010

 Client: **WESA Inc. (Carp)**

Client PO: First Air, Iqaluit

Project Description: C-B8809-00

	Client ID:	TP3 S3	TP4 S1	TP5 S1	TP6 S1
	Sample Date:	31-Aug-10	31-Aug-10	31-Aug-10	31-Aug-10
	Sample ID:	1036209-05	1036209-06	1036209-07	1036209-08
	MDL/Units	Soil	Soil	Soil	Soil
1,1,2-Trichloroethane	0.03 ug/g dry	<0.03 [3]	-	-	-
Trichloroethylene	0.03 ug/g dry	<0.03 [3]	-	-	-
Trichlorofluoromethane	0.05 ug/g dry	<0.05 [3]	-	-	-
1,3,5-Trimethylbenzene	0.03 ug/g dry	<0.03 [3]	-	-	-
Vinyl chloride	0.03 ug/g dry	<0.03 [3]	-	-	-
m,p-Xylenes	0.05 ug/g dry	0.2 [3]	-	-	-
o-Xylene	0.05 ug/g dry	0.7 [3]	-	-	-
Xylenes, total	0.1 ug/g dry	0.9 [3]	-	-	-
4-Bromofluorobenzene	Surrogate	108% [3]	-	-	-
Dibromofluoromethane	Surrogate	91.1% [3]	-	-	-
Toluene-d8	Surrogate	99.4% [3]	-	-	-
Benzene	0.03 ug/g dry	-	<0.03	<0.03	<0.03
Ethylbenzene	0.05 ug/g dry	-	<0.05	<0.05	<0.05
Toluene	0.05 ug/g dry	-	<0.05	<0.05	<0.05
m,p-Xylenes	0.05 ug/g dry	-	<0.05	<0.05	<0.05
o-Xylene	0.05 ug/g dry	-	<0.05	<0.05	<0.05
Xylenes, total	0.10 ug/g dry	-	<0.10	<0.10	<0.10
Toluene-d8	Surrogate	-	98.7%	99.5%	100%
Hydrocarbons					
F1 PHCs (C6-C10)	10 ug/g dry	144	<10	<10	<10
F2 PHCs (C10-C16)	10 ug/g dry	2010	<10	<10	<10
F3 PHCs (C16-C34)	10 ug/g dry	59	<10	26	<10
F4 PHCs (C34-C50)	10 ug/g dry	<10	<10	<10	<10
PCBs					
PCBs, total	0.05 ug/g dry	-	-	-	-
Decachlorobiphenyl	Surrogate	-	-	-	-

Certificate of Analysis

Report Date: 10-Sep-2010

Order Date: 3-Sep-2010

 Client: **WESA Inc. (Carp)**

Client PO: First Air, Iqaluit

Project Description: C-B8809-00

	Client ID:	TP7 S2	TP8 S1	TP9 S1	Dup 1 #1
	Sample Date:	31-Aug-10	31-Aug-10	31-Aug-10	31-Aug-10
	Sample ID:	1036209-09	1036209-10	1036209-11	1036209-12
	MDL/Units	Soil	Soil	Soil	Soil

Physical Characteristics

% Solids	0.1 % by Wt.	92.8	92.8	94.3	94.0
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Metals

Aluminum	10 ug/g dry	3800	-	3090	3510
Antimony	1 ug/g dry	<1	-	<1	<1
Arsenic	1 ug/g dry	3	-	<1	<1
Barium	10 ug/g dry	27	-	21	22
Beryllium	0.5 ug/g dry	<0.5	-	<0.5	<0.5
Boron	5.0 ug/g dry	<5.0	-	<5.0	<5.0
Cadmium	0.5 ug/g dry	<0.5	-	<0.5	<0.5
Calcium	200 ug/g dry	16800	-	17900	12100
Chromium	5 ug/g dry	24	-	23	24
Cobalt	1 ug/g dry	6	-	5	5
Copper	5 ug/g dry	12	-	12	11
Iron	200 ug/g dry	26500	-	24500	26100
Lead	1 ug/g dry	5	-	6	5
Magnesium	200 ug/g dry	3290	-	2980	2840
Manganese	5 ug/g dry	209	-	159	140
Molybdenum	1 ug/g dry	<1	-	<1	<1
Nickel	5 ug/g dry	8	-	8	7
Potassium	200 ug/g dry	788	-	631	651
Selenium	1 ug/g dry	<1	-	<1	<1
Silver	0.3 ug/g dry	<0.3	-	<0.3	<0.3
Sodium	200 ug/g dry	238	-	<200	<200
Strontium	10 ug/g dry	26	-	21	18
Thallium	1 ug/g dry	<1	-	<1	<1
Tin	5 ug/g dry	<5	-	<5	<5
Titanium	10 ug/g dry	428	-	345	355
Uranium	1 ug/g dry	<1	-	<1	<1
Vanadium	10 ug/g dry	48	-	47	53
Zinc	20 ug/g dry	33	-	44	30

Volatiles

Benzene	0.03 ug/g dry	<0.03	<0.03	<0.03	<0.03
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Certificate of Analysis

Report Date: 10-Sep-2010

Order Date: 3-Sep-2010

 Client: **WESA Inc. (Carp)**

Client PO: First Air, Iqaluit

Project Description: C-B8809-00

	Client ID: Sample Date: Sample ID:	TP7 S2 31-Aug-10 1036209-09 Soil	TP8 S1 31-Aug-10 1036209-10 Soil	TP9 S1 31-Aug-10 1036209-11 Soil	Dup 1 #1 31-Aug-10 1036209-12 Soil
	MDL/Units				
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
o-Xylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Xylenes, total	0.10 ug/g dry	<0.10	<0.10	<0.10	<0.10
Toluene-d8	Surrogate	99.5%	100%	98.9%	99.7%

Hydrocarbons

F1 PHCs (C6-C10)	10 ug/g dry	<10	<10	<10	15
F2 PHCs (C10-C16)	10 ug/g dry	<10	<10	<10	970
F3 PHCs (C16-C34)	10 ug/g dry	<10	<10	<10	81
F4 PHCs (C34-C50)	10 ug/g dry	<10	<10	<10	77

Semi-Volatiles

Ethylene glycol	5 ug/g dry	-	-	<5	-
Diethylene glycol	5 ug/g dry	-	-	<5	-
Propylene glycol	5 ug/g dry	-	-	<5	-

PCBs

PCBs, total	0.05 ug/g dry	-	<0.05	-	-
Decachlorobiphenyl	Surrogate	-	134%	-	-

Certificate of Analysis

Report Date: 10-Sep-2010

Order Date: 3-Sep-2010

 Client: **WESA Inc. (Carp)**

Client PO: First Air, Iqaluit

Project Description: C-B8809-00

	Client ID:	GS1	GS2	GS3	GS4
	Sample Date:	31-Aug-10	31-Aug-10	31-Aug-10	31-Aug-10
	Sample ID:	1036209-13	1036209-14	1036209-15	1036209-16
	MDL/Units	Soil	Soil	Soil	Soil

Physical Characteristics

% Solids	0.1 % by Wt.	84.5	84.4	84.2	82.9
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Metals

	MDL/Units	GS1	GS2	GS3	GS4
Aluminum	10 ug/g dry	3250	4480	2830	-
Antimony	1 ug/g dry	<1	3	<1	-
Arsenic	1 ug/g dry	<1	1	<1	-
Barium	10 ug/g dry	25	55	20	-
Beryllium	0.5 ug/g dry	<0.5	<0.5	<0.5	-
Boron	5.0 ug/g dry	<5.0	6.9	<5.0	-
Cadmium	0.5 ug/g dry	0.5	12.5	<0.5	-
Calcium	200 ug/g dry	15200	8900	17700	-
Chromium	5 ug/g dry	25	85	25	-
Cobalt	1 ug/g dry	6	7	6	-
Copper	5 ug/g dry	17	133	13	-
Iron	200 ug/g dry	21100	23300	24600	-
Lead	1 ug/g dry	26	499	16	-
Magnesium	200 ug/g dry	2990	3490	2750	-
Manganese	5 ug/g dry	196	165	179	-
Mercury	0.1 ug/g dry	-	<0.1	-	-
Molybdenum	1 ug/g dry	<1	5	<1	-
Nickel	5 ug/g dry	9	14	7	-
Potassium	200 ug/g dry	705	854	590	-
Selenium	1 ug/g dry	<1	<1	<1	-
Silver	0.3 ug/g dry	<0.3	0.4	<0.3	-
Sodium	200 ug/g dry	232	383	<200	-
Strontium	10 ug/g dry	26	21	25	-
Thallium	1 ug/g dry	<1	<1	<1	-
Tin	5 ug/g dry	<5	5	<5	-
Titanium	10 ug/g dry	315	351	324	-
Uranium	1 ug/g dry	<1	<1	<1	-
Vanadium	10 ug/g dry	36	35	45	-
Zinc	20 ug/g dry	172	769	97	-

Volatiles

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Certificate of Analysis

Report Date: 10-Sep-2010

Order Date: 3-Sep-2010

 Client: **WESA Inc. (Carp)**

Client PO: First Air, Iqaluit

Project Description: C-B8809-00

	MDL/Units	Client ID:	GS1	GS2	GS3	GS4
		Sample Date:	31-Aug-10	31-Aug-10	31-Aug-10	31-Aug-10
		Sample ID:	1036209-13	1036209-14	1036209-15	1036209-16
			Soil	Soil	Soil	Soil
Benzene	0.03 ug/g dry		<0.03	<0.30 [1]	<0.03	<0.03
Ethylbenzene	0.05 ug/g dry		<0.05	<0.50 [1]	<0.05	<0.05
Toluene	0.05 ug/g dry		<0.05	<0.50 [1]	<0.05	<0.05
m,p-Xylenes	0.05 ug/g dry		<0.05	<0.50 [1]	<0.05	<0.05
o-Xylene	0.05 ug/g dry		0.09	<0.50 [1]	<0.05	<0.05
Xylenes, total	0.10 ug/g dry		<0.10	<1.00 [1]	<0.10	<0.10
Toluene-d8	Surrogate		99.8%	103% [1]	98.7%	99.6%

Hydrocarbons

F1 PHCs (C6-C10)	10 ug/g dry	<10	231	<10	<10
F2 PHCs (C10-C16)	10 ug/g dry	2330	19100	<10	13
F3 PHCs (C16-C34)	10 ug/g dry	374	4370	<10	174
F4 PHCs (C34-C50)	10 ug/g dry	270	2450	<10	274

PCBs

PCBs, total	0.05 ug/g dry	-	19.6	-	-
Decachlorobiphenyl	Surrogate	-	82.0%	-	-

Certificate of Analysis

Report Date: 10-Sep-2010

Order Date: 3-Sep-2010

 Client: **WESA Inc. (Carp)**

Client PO: First Air, Iqaluit

Project Description: C-B8809-00

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	10	ug/g						
F2 PHCs (C10-C16)	ND	10	ug/g						
F3 PHCs (C16-C34)	ND	10	ug/g						
F4 PHCs (C34-C50)	ND	10	ug/g						
Metals									
Aluminum	ND	10	ug/g						
Antimony	ND	1	ug/g						
Arsenic	ND	1	ug/g						
Barium	ND	10	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Calcium	ND	200	ug/g						
Chromium	ND	5	ug/g						
Cobalt	ND	1	ug/g						
Copper	ND	5	ug/g						
Iron	ND	200	ug/g						
Lead	ND	1	ug/g						
Magnesium	ND	200	ug/g						
Mercury	ND	0.1	ug/g						
Manganese	ND	5	ug/g						
Molybdenum	ND	1	ug/g						
Nickel	ND	5	ug/g						
Potassium	ND	200	ug/g						
Selenium	ND	1	ug/g						
Silver	ND	0.3	ug/g						
Sodium	ND	200	ug/g						
Strontium	ND	10	ug/g						
Thallium	ND	1	ug/g						
Tin	ND	5	ug/g						
Titanium	ND	10	ug/g						
Uranium	ND	1	ug/g						
Vanadium	ND	10	ug/g						
Zinc	ND	20	ug/g						
PCBs									
PCBs, total	ND	0.05	ug/g						
Surrogate: Decachlorobiphenyl	0.106		ug/g		106	43-142			
Semi-Volatiles									
Ethylene glycol	ND	5	ug/g						
Diethylene glycol	ND	5	ug/g						
Propylene glycol	ND	5	ug/g						
Volatiles									
Benzene	ND	0.03	ug/g						
Bromodichloromethane	ND	0.02	ug/g						
Bromoform	ND	0.04	ug/g						
Bromomethane	ND	0.05	ug/g						
Carbon Tetrachloride	ND	0.03	ug/g						
Chlorobenzene	ND	0.02	ug/g						
Chloroethane	ND	0.05	ug/g						
Chloroform	ND	0.03	ug/g						
Chloromethane	ND	0.2	ug/g						
Dibromochloromethane	ND	0.02	ug/g						

Certificate of Analysis

Report Date: 10-Sep-2010

Order Date: 3-Sep-2010

Client: **WESA Inc. (Carp)**

Client PO: First Air, Iqaluit

Project Description: C-B8809-00

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
1,2-Dibromoethane	ND	0.01	ug/g						
1,2-Dichlorobenzene	ND	0.02	ug/g						
1,3-Dichlorobenzene	ND	0.05	ug/g						
1,4-Dichlorobenzene	ND	0.02	ug/g						
1,1-Dichloroethane	ND	0.03	ug/g						
1,2-Dichloroethane	ND	0.02	ug/g						
1,1-Dichloroethylene	ND	0.03	ug/g						
cis-1,2-Dichloroethylene	ND	0.02	ug/g						
trans-1,2-Dichloroethylene	ND	0.05	ug/g						
1,2-Dichloroethylene, total	ND	0.07	ug/g						
1,2-Dichloropropane	ND	0.03	ug/g						
cis-1,3-Dichloropropylene	ND	0.02	ug/g						
trans-1,3-Dichloropropylene	ND	0.02	ug/g						
1,3-Dichloropropene, total	ND	0.04	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Methylene Chloride	ND	0.2	ug/g						
Styrene	ND	0.02	ug/g						
1,1,1,2-Tetrachloroethane	ND	0.03	ug/g						
1,1,2,2-Tetrachloroethane	ND	0.03	ug/g						
Tetrachloroethylene	ND	0.02	ug/g						
Toluene	ND	0.05	ug/g						
1,1,1-Trichloroethane	ND	0.02	ug/g						
1,1,2-Trichloroethane	ND	0.03	ug/g						
Trichloroethylene	ND	0.03	ug/g						
Trichlorofluoromethane	ND	0.05	ug/g						
1,3,5-Trimethylbenzene	ND	0.03	ug/g						
Vinyl chloride	ND	0.03	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.1	ug/g						
Surrogate: 4-Bromofluorobenzene	8.23		ug/g		103	83-134			
Surrogate: Dibromofluoromethane	7.58		ug/g		94.8	78-124			
Surrogate: Toluene-d8	8.00		ug/g		99.9	76-118			
Benzene	ND	0.03	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.10	ug/g						
Surrogate: Toluene-d8	8.00		ug/g		99.9	76-118			

Certificate of Analysis

Report Date: 10-Sep-2010

Order Date: 3-Sep-2010

Client: **WESA Inc. (Carp)**

Client PO: First Air, Iqaluit

Project Description: C-B8809-00

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	10	ug/g dry	ND				32	
F2 PHCs (C10-C16)	16	10	ug/g dry	13			19.5	50	
F3 PHCs (C16-C34)	139	10	ug/g dry	174			22.6	50	
F4 PHCs (C34-C50)	221	10	ug/g dry	274			21.1	50	
Metals									
Aluminum	4720	10	ug/g dry	5060			7.0	27	
Antimony	1.7	1	ug/g dry	1.8			6.9	26	
Arsenic	4.8	1	ug/g dry	5.0			3.8	35	
Barium	249	10	ug/g dry	260			4.3	34	
Beryllium	0.56	0.5	ug/g dry	0.67			17.1	25	
Boron	ND	5.0	ug/g dry	ND				33	
Cadmium	0.96	0.5	ug/g dry	1.05			8.7	33	
Calcium	7860	200	ug/g dry	8260			5.1	30	
Chromium	33.5	5	ug/g dry	34.9			4.1	32	
Cobalt	7.2	1	ug/g dry	7.4			2.9	32	
Copper	90.5	5	ug/g dry	92.1			1.7	32	
Iron	15000	200	ug/g dry	15700			4.9	32	
Lead	2250	1	ug/g dry	2360			4.6	44	
Magnesium	2380	200	ug/g dry	2540			6.6	30	
Mercury	0.249	0.1	ug/g dry	0.198			22.7	35	
Manganese	504	5	ug/g dry	526			4.3	29	
Molybdenum	ND	1	ug/g dry	ND				29	
Nickel	13.7	5	ug/g dry	14.0			1.9	29	
Potassium	670	200	ug/g dry	680			1.5	28	
Selenium	ND	1	ug/g dry	ND				28	
Silver	ND	0.3	ug/g dry	ND				28	
Sodium	ND	200	ug/g dry	ND				27	
Strontium	20.3	10	ug/g dry	21.2			4.4	27	
Thallium	ND	1	ug/g dry	ND				27	
Tin	16.5	5	ug/g dry	17.9			7.9	27	
Titanium	364	10	ug/g dry	375			3.0	27	
Uranium	1.3	1	ug/g dry	1.4			5.1	27	
Vanadium	44.3	10	ug/g dry	46.1			3.8	27	
Zinc	1400	20	ug/g dry	1470			4.9	27	
PCBs									
PCBs, total	ND	0.05	ug/g dry	ND				35	
Surrogate: Decachlorobiphenyl	0.123		ug/g dry	ND	114	43-142			
Physical Characteristics									
% Solids	100	0.1	% by Wt.	92.8			7.5	25	
Semi-Volatiles									
Ethylene glycol	ND	5	ug/g dry	ND				50	
Diethylene glycol	ND	5	ug/g dry	ND				50	
Propylene glycol	ND	5	ug/g dry	ND				50	
Volatiles									
Benzene	ND	0.03	ug/g dry	ND				50	
Bromodichloromethane	ND	0.02	ug/g dry	ND				50	
Bromoform	ND	0.04	ug/g dry	ND				50	
Bromomethane	ND	0.05	ug/g dry	ND				50	
Carbon Tetrachloride	ND	0.03	ug/g dry	ND				50	
Chlorobenzene	ND	0.02	ug/g dry	ND				50	

Certificate of Analysis

Report Date: 10-Sep-2010

Order Date: 3-Sep-2010

Client: **WESA Inc. (Carp)**

Client PO: First Air, Iqaluit

Project Description: C-B8809-00

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Chloroethane	ND	0.05	ug/g dry	ND				50	
Chloroform	ND	0.03	ug/g dry	ND				32	
Chloromethane	ND	0.2	ug/g dry	ND				50	
Dibromochloromethane	ND	0.02	ug/g dry	ND				50	
1,2-Dibromoethane	ND	0.01	ug/g dry	ND				50	
1,2-Dichlorobenzene	ND	0.02	ug/g dry	ND				50	
1,3-Dichlorobenzene	ND	0.05	ug/g dry	ND				50	
1,4-Dichlorobenzene	ND	0.02	ug/g dry	ND				50	
1,1-Dichloroethane	ND	0.03	ug/g dry	ND				27	
1,2-Dichloroethane	ND	0.02	ug/g dry	ND				50	
1,1-Dichloroethylene	ND	0.03	ug/g dry	ND				50	
cis-1,2-Dichloroethylene	ND	0.02	ug/g dry	ND				33	
trans-1,2-Dichloroethylene	ND	0.05	ug/g dry	ND				50	
1,2-Dichloropropane	ND	0.03	ug/g dry	ND				50	
cis-1,3-Dichloropropylene	ND	0.02	ug/g dry	ND				50	
trans-1,3-Dichloropropylene	ND	0.02	ug/g dry	ND				50	
Ethylbenzene	ND	0.05	ug/g dry	ND				34	
Methylene Chloride	ND	0.2	ug/g dry	ND				50	
Styrene	ND	0.02	ug/g dry	ND				50	
1,1,1,2-Tetrachloroethane	ND	0.03	ug/g dry	ND				50	
1,1,1,2-Tetrachloroethane	ND	0.03	ug/g dry	ND				50	
Tetrachloroethylene	ND	0.02	ug/g dry	ND				32	
Toluene	ND	0.05	ug/g dry	ND				32	
1,1,1-Trichloroethane	ND	0.02	ug/g dry	ND				50	
1,1,2-Trichloroethane	ND	0.03	ug/g dry	ND				50	
Trichloroethylene	ND	0.03	ug/g dry	ND				31	
Trichlorofluoromethane	ND	0.05	ug/g dry	ND				50	
1,3,5-Trimethylbenzene	ND	0.03	ug/g dry	ND				43	
Vinyl chloride	ND	0.03	ug/g dry	ND				50	
m,p-Xylenes	ND	0.05	ug/g dry	ND				35	
o-Xylene	ND	0.05	ug/g dry	ND				50	
Surrogate: 4-Bromofluorobenzene	8.86		ug/g dry	ND	104	83-134			
Surrogate: Dibromofluoromethane	8.22		ug/g dry	ND	96.2	78-124			
Surrogate: Toluene-d8	8.55		ug/g dry	ND	100	76-118			
Benzene	ND	0.03	ug/g dry	ND				50	
Ethylbenzene	ND	0.05	ug/g dry	ND				34	
Toluene	ND	0.05	ug/g dry	ND				32	
m,p-Xylenes	ND	0.05	ug/g dry	ND				35	
o-Xylene	ND	0.05	ug/g dry	ND				50	
Surrogate: Toluene-d8	8.55		ug/g dry	ND	100	76-118			

Certificate of Analysis

Report Date: 10-Sep-2010

Order Date: 3-Sep-2010

Client: **WESA Inc. (Carp)**

Client PO: First Air, Iqaluit

Project Description: C-B8809-00

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	99	10	ug/g	ND	99.4	80-120			
F2 PHCs (C10-C16)	63	10	ug/g	ND	78.1	61-129			
F3 PHCs (C16-C34)	179	10	ug/g	ND	89.4	61-129			
F4 PHCs (C34-C50)	110	10	ug/g	ND	91.7	61-129			
Metals									
Aluminum	42.2		ug/L	ND	84.4	80-120			
Antimony	50.0		ug/L	ND	99.9	80-120			
Arsenic	42.1		ug/L	ND	84.2	80-120			
Barium	49.9		ug/L	ND	99.8	80-120			
Beryllium	45.0		ug/L	ND	90.0	80-120			
Boron	41.8		ug/L	ND	83.7	80-120			
Cadmium	43.0		ug/L	ND	86.0	80-120			
Calcium	1030		ug/L	ND	103	80-120			
Chromium	52.7		ug/L	ND	105	80-120			
Cobalt	52.1		ug/L	ND	104	80-120			
Copper	52.9		ug/L	ND	106	80-120			
Iron	1130		ug/L	ND	113	80-120			
Lead	53.5		ug/L	ND	107	80-120			
Magnesium	887		ug/L	ND	88.7	80-120			
Mercury	1.88	0.1	ug/g	0.198	112	72-128			
Manganese	52.5		ug/L	ND	105	80-120			
Molybdenum	38.5		ug/L	ND	77.1	80-120			QS-01
Nickel	52.0		ug/L	ND	104	80-120			
Potassium	890		ug/L	ND	89.0	80-120			
Selenium	44.6		ug/L	ND	89.1	80-120			
Silver	41.4		ug/L	ND	82.9	80-120			
Sodium	866		ug/L	ND	86.6	80-120			
Strontium	40.8		ug/L	ND	81.6	80-120			
Thallium	60.1		ug/L	ND	120	80-120			
Tin	41.3		ug/L	ND	82.5	80-120			
Titanium	49.2		ug/L	ND	98.5	80-120			
Uranium	60.1		ug/L	ND	120	80-120			
Vanadium	50.6		ug/L	ND	101	80-120			
Zinc	40.1		ug/L	ND	80.1	80-120			
PCBs									
PCBs, total	0.476	0.05	ug/g	ND	119	58-147			
Surrogate: Decachlorobiphenyl	0.130		ug/g		130	43-142			
Semi-Volatiles									
Ethylene glycol	27	5	ug/g	ND	108	0-200			
Diethylene glycol	26	5	ug/g	ND	104	0-200			
Propylene glycol	29	5	ug/g	ND	116	0-200			
Volatiles									
Benzene	0.691	0.03	ug/g	ND	74.0	55-141			
Ethylbenzene	2.15	0.05	ug/g	ND	97.0	61-139			
Toluene	8.93	0.05	ug/g	ND	82.7	54-136			
m,p-Xylenes	6.20	0.05	ug/g	ND	92.1	61-139			
o-Xylene	2.72	0.05	ug/g	ND	101	60-142			
Surrogate: Toluene-d8	7.89		ug/g		98.6	76-118			

Certificate of Analysis

Report Date: 10-Sep-2010

Order Date: 3-Sep-2010

Client: **WESA Inc. (Carp)**

Client PO: First Air, Iqaluit

Project Description: C-B8809-00

Sample and QC Qualifiers Notes

- 1- GEN07 :Elevated detection limit because of dilution required due to high target analyte concentration.
- 2- QS-01 : Spike Level is less than the reporting MDL, however, recovery was acceptable.
- 3- VOC02 :Not able to complete VOC-low level analysis due to elevated hydrocarbon background. VOC-high level analysis completed in its place.

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.

Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

Reg. Drinking Water

Client Name: WESA	Project Ref: Frost Air, Egaluit	Waterworks Name:	Page <u>1</u> of <u>2</u>
Contact Name: D. Roberts A. Street	Quote #	Waterworks Number:	Sample Taken by:
Address: 3100 Camp Rd K0A1L0	PO # C-88809-00	Address:	Print Name: Brian Andress
Telephone: 613-839-3053	E-mail Address: d.roberts@wesa.ca	After hours Contact:	Signature: <i>[Signature]</i>
	Fax:	Public Health Unit:	TAT: [] 1-day [] 2-day [x] Reg.

Matrix Types: S-Soil/Sed. GW-Ground Water SW-Surface Water SS-Storm/Sanitary Sewer DW-Drinking Water RDW-Regulated Drinking Water P- Paint A-Air O-Other

Samples submitted under: (Indicate **ONLY** one)
 O. Reg 153 (511) Table ___ O. Reg 170/03 O. Reg 318/08 Private well
 CCME O. Reg 243/07 O. Reg 319/08 Other: _____
 Type of DW Sample: R = Raw; T = Treated; D = Distribution
 Location Types: S = Surface Water; G = Ground Water

Paracel Order Number		Matrix	Air Volume	Type of Sample	# of Containers	Sample Taken		Free / Combined Chlorine Residual mg/L	Required Analyses							
Sample ID / Location Name						Date	Time		PHC FI-F4	BREX	ICP Metals	VOC	PCB	Glycol	Hg	
1	TP1 S1	S			1	Aug 3/10	a.m.		✓	✓						
2	TP2 S1	S			1				✓	✓						
3	TP2 S2	S			1				✓	✓	✓			✓		
4	TP3 S1	S			1				✓	✓						
5	TP3 S3	S			1				✓	✓	✓			✓		
6	TP4 S1	S			1				✓	✓						
7	TP5 S1	S			1				✓	✓						
8	TP6 S1	S			1				✓	✓						
9	TP7 S2	S			1				✓	✓						
10	TP8 S1	S			1				✓			✓				

Comments: _____
 Preservation Verification: pH _____ Temperature _____
 Verified by: _____

Relinquished By (Print & Sign): *J.K.*

Received By Driver/Depot:		Lab Use Only:	
Date/Time: 11:15 SEP 3/10	Received at Lab: <i>[Signature]</i>	Verified By: <i>[Signature]</i>	Date/Time: Sept. 3/10

1:52pm 1:59pm

Client Name: WESA	Project Ref: First Air, Iqaluit	Waterworks Name:	Page 2 of 2
Contact Name: D. Roberts A. Street	Quote #	Waterworks Number:	Sample Taken by:
Address: 3108 Cap Rd. K0A 1L0	PO # C-38809-00	Address:	Print Name: Brian
Telephone: 613-839-3053	E-mail Address: astreet@wesa.ca	After hours Contact:	Signature: <i>[Signature]</i>
	Fax:	Public Health Unit:	TAT: [] 1-day [] 2-day [x] Reg.

Matrix Types: S-Soil/Sed. GW-Ground Water SW-Surface Water SS-Storm/Sanitary Sewer DW-Drinking Water RDW-Regulated Drinking Water P-Paint A-Air O-Other

Samples submitted under: (Indicate ONLY one)
 O. Reg 153 (511) Table O. Reg 170/03 O. Reg 318/08 Private well
 CCME O. Reg 243/07 O. Reg 319/08 Other: _____

Type of DW Sample: R = Raw; T = Treated; D = Distribution
 Location Types: S = Surface Water; G = Ground Water

Required Analyses

Paracel Order Number		Matrix	Air Volume	Type of Sample	# of Containers	Sample Taken		Free / Combined Chlorine Residual mg/L	PHC FI-F4	BTEX	metals ICP	VOC	PCB	Glycol	H ₂ S	PH, Cond, Alk
Sample ID / Location Name						Date	Time									
1	TP9 S1	S			1	Aug 31/10	a.m.		✓	✓				✓		
2	Dupl. #1	S			1		a.m.		✓	✓						
3	GS1	S			1		pm		✓	✓						
4	GS2	S			1		pm		✓	✓		✓		✓		
5	GS3	S			1		pm		✓	✓						
6	GS4	S			1		pm		✓							
7	TP2 GW	GW			5		pm		✓	✓	✓	✓				✓
8	TP5 GW	GW			3		pm		✓	✓						
9	SW	SW			4		pm		✓	✓						✓
10																

Comments: for analysis of metal in GW & SW please decant from 500ml amber - (metals bottles were not included in prepared coolers)

Preservation Verification: pH _____ Temperature _____
 Verified by: _____

Relinquished By (Print & Sign):	Lab Use Only:		
	Received By Driver/Depot:	Received at Lab:	Verified By:
Date/Time:	Date/Time: 11/5 SEP 3/10	Date/Time: Sept. 3/10	Date/Time: Sept 3/10

J.K. 1:52pm 1:59pm

Certificate of Analysis

WESA Inc. (Carp)

P.O. Box 430, 3108 Carp Rd.

Carp, ON K0A 1L0

Attn: Darryl Roberts

Phone: (613) 839-3053

Fax: (613) 839-5376

Client PO: First Air, Ialuit

Project: C-B8809-00

Custody: 75095/94

Report Date: 10-Sep-2010

Order Date: 3-Sep-2010

Order #: 1036222

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1036222-01	TP2 GW
1036222-02	TP5 GW
1036222-03	SW

Approved By:



Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 10-Sep-2010

Client: **WESA Inc. (Carp)**

Order Date: 3-Sep-2010

Client PO: First Air, Ialuit

Project Description: C-B8809-00

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Alkalinity, total	EPA 310.1 - Titration	7-Sep-10	7-Sep-10
BTEX	EPA 624 - P&T GC-MS	7-Sep-10	10-Sep-10
CCME PHC F1	CWS Tier 1 - P&T GC-FID	7-Sep-10	7-Sep-10
CCME PHC F1 to F4 + BTEX	[CALC]	4-Sep-10	4-Sep-10
CCME PHC F1 to F4 + VOC	[CALC]	4-Sep-10	4-Sep-10
CCME PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	4-Sep-10	4-Sep-10
Conductivity	EPA 120.1 - probe	7-Sep-10	7-Sep-10
Metals	EPA 200.8 - ICP-MS	8-Sep-10	8-Sep-10
PCBs, total	EPA 608 - GC-ECD	10-Sep-10	10-Sep-10
pH	EPA 150.1 - pH probe	7-Sep-10	7-Sep-10
VOCs	EPA 624 - P&T GC-MS	7-Sep-10	10-Sep-10

Certificate of Analysis

Report Date: 10-Sep-2010

Client: WESA Inc. (Carp)

Order Date: 3-Sep-2010

Client PO: First Air, Ialuit

Project Description: C-B8809-00

Client ID:	TP2 GW	TP5 GW	SW	-
Sample Date:	31-Aug-10	31-Aug-10	31-Aug-10	-
Sample ID:	1036222-01	1036222-02	1036222-03	-
MDL/Units	Water	Water	Water	-

General Inorganics

Alkalinity, total	5 mg/L	248	-	224	-
Conductivity	5 uS/cm	489	-	667	-
pH	0.05 pH Units	7.09	-	7.73	-

Metals

Aluminum	10 ug/L	572	105	<10	-
Antimony	1 ug/L	<1	<1	<1	-
Arsenic	10 ug/L	<10	<10	<10	-
Barium	10 ug/L	16	<10	<10	-
Beryllium	1 ug/L	<1	<1	<1	-
Bismuth	5 ug/L	<5	<5	<5	-
Boron	50 ug/L	98	199	117	-
Cadmium	1 ug/L	<1	<1	<1	-
Calcium	200 ug/L	96200	78000	96400	-
Chromium	50 ug/L	<50	<50	<50	-
Cobalt	5 ug/L	<5	<5	<5	-
Copper	5 ug/L	25	<5	<5	-
Iron	200 ug/L	431	<200	<200	-
Lead	1 ug/L	4	3	<1	-
Magnesium	200 ug/L	5750	12800	19000	-
Manganese	50 ug/L	126	65	<50	-
Molybdenum	5 ug/L	<5	<5	<5	-
Nickel	5 ug/L	<5	<5	<5	-
Potassium	200 ug/L	3590	3340	3970	-
Selenium	5 ug/L	<5	<5	<5	-
Silver	1 ug/L	<1	<1	<1	-
Sodium	200 ug/L	6190	23800	22900	-
Strontium	50 ug/L	213	161	228	-
Thallium	1 ug/L	<1	<1	<1	-
Tin	10 ug/L	<10	<10	<10	-
Titanium	10 ug/L	17	<10	<10	-
Uranium	5 ug/L	<5	<5	<5	-
Vanadium	10 ug/L	<10	<10	<10	-
Zinc	20 ug/L	<20	<20	26	-

Certificate of Analysis

Report Date: 10-Sep-2010

Client: WESA Inc. (Carp)

Order Date: 3-Sep-2010

Client PO: First Air, Ialuit

Project Description: C-B8809-00

Client ID:	TP2 GW	TP5 GW	SW	-
Sample Date:	31-Aug-10	31-Aug-10	31-Aug-10	-
Sample ID:	1036222-01	1036222-02	1036222-03	-
MDL/Units	Water	Water	Water	-

Volatiles

Compound	MDL/Units	TP2 GW	TP5 GW	SW	-
Benzene	0.5 ug/L	<0.5	-	-	-
Bromodichloromethane	0.4 ug/L	<0.4	-	-	-
Bromoform	0.5 ug/L	<0.5	-	-	-
Bromomethane	0.7 ug/L	<0.7	-	-	-
Carbon Tetrachloride	0.5 ug/L	<0.5	-	-	-
Chlorobenzene	0.4 ug/L	<0.4	-	-	-
Chloroethane	1.0 ug/L	<1.0	-	-	-
Chloroform	0.5 ug/L	<0.5	-	-	-
Chloromethane	3.0 ug/L	<3.0	-	-	-
Dibromochloromethane	0.5 ug/L	<0.5	-	-	-
1,2-Dibromoethane	1.0 ug/L	<1.0	-	-	-
1,2-Dichlorobenzene	0.4 ug/L	<0.4	-	-	-
1,3-Dichlorobenzene	0.4 ug/L	<0.4	-	-	-
1,4-Dichlorobenzene	0.4 ug/L	<0.4	-	-	-
1,1-Dichloroethane	0.5 ug/L	<0.5	-	-	-
1,2-Dichloroethane	0.5 ug/L	<0.5	-	-	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	-	-	-
cis-1,2-Dichloroethylene	0.4 ug/L	<0.4	-	-	-
trans-1,2-Dichloroethylene	1.0 ug/L	<1.0	-	-	-
1,2-Dichloroethylene, total	1.4 ug/L	<1.4	-	-	-
1,2-Dichloropropane	0.5 ug/L	<0.5	-	-	-
cis-1,3-Dichloropropylene	0.4 ug/L	<0.4	-	-	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	-	-	-
1,3-Dichloropropene, total	0.9 ug/L	<0.9	-	-	-
Ethylbenzene	0.5 ug/L	<0.5	-	-	-
Methylene Chloride	4.0 ug/L	<4.0	-	-	-
Styrene	0.4 ug/L	<0.4	-	-	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	-	-	-
1,1,2,2-Tetrachloroethane	0.6 ug/L	<0.6	-	-	-
Tetrachloroethylene	0.5 ug/L	<0.5	-	-	-
Toluene	0.5 ug/L	<0.5	-	-	-
1,1,1-Trichloroethane	0.4 ug/L	<0.4	-	-	-
1,1,2-Trichloroethane	0.6 ug/L	<0.6	-	-	-
Trichloroethylene	0.4 ug/L	<0.4	-	-	-

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 5415 Morning Glory Cr.
 Niagara Falls, ON L2J 0A3

SARNIA
 123 Christina St. N.
 Sarnia, ON N7T 5T7

Certificate of Analysis

Report Date: 10-Sep-2010

Client: WESA Inc. (Carp)

Order Date: 3-Sep-2010

Client PO: First Air, Ialuit

Project Description: C-B8809-00

	Client ID:	TP2 GW	TP5 GW	SW	
	Sample Date:	31-Aug-10	31-Aug-10	31-Aug-10	-
	Sample ID:	1036222-01	1036222-02	1036222-03	-
	MDL/Units	Water	Water	Water	-
Trichlorofluoromethane	1.0 ug/L	<1.0	-	-	-
1,3,5-Trimethylbenzene	0.5 ug/L	<0.5	-	-	-
Vinyl chloride	0.4 ug/L	<0.4	-	-	-
m,p-Xylenes	0.5 ug/L	<0.5	-	-	-
o-Xylene	0.5 ug/L	<0.5	-	-	-
Xylenes, total	1.0 ug/L	<1.0	-	-	-
4-Bromofluorobenzene	Surrogate	116%	-	-	-
Dibromofluoromethane	Surrogate	91.9%	-	-	-
Toluene-d8	Surrogate	92.4%	-	-	-
Benzene	0.5 ug/L	-	<0.5	<0.5	-
Ethylbenzene	0.5 ug/L	-	<0.5	<0.5	-
Toluene	0.5 ug/L	-	<0.5	<0.5	-
m,p-Xylenes	0.5 ug/L	-	<0.5	<0.5	-
o-Xylene	0.5 ug/L	-	<0.5	<0.5	-
Xylenes, total	1.0 ug/L	-	<1.0	<1.0	-
Toluene-d8	Surrogate	-	92.2%	91.4%	-

Hydrocarbons

F1 PHCs (C6-C10)	200 ug/L	525	<200	<200	-
F2 PHCs (C10-C16)	100 ug/L	50800	<100	<100	-
F3 PHCs (C16-C34)	100 ug/L	2340	<100	<100	-
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	-
F1 + F2 PHCs	300 ug/L	-	<300	<300	-
F1 + F2 PHCs	300 ug/L	51300	-	-	-
F3 + F4 PHCs	200 ug/L	-	<200	<200	-
F3 + F4 PHCs	200 ug/L	2340	-	-	-

PCBs

PCBs, total	0.05 ug/L	0.75	-	-	-
Decachlorobiphenyl	Surrogate	69.1%	-	-	-

Certificate of Analysis

Report Date: 10-Sep-2010

Client: **WESA Inc. (Carp)**

Order Date: 3-Sep-2010

Client PO: First Air, Ialuit

Project Description: C-B8809-00

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Alkalinity, total	ND	5	mg/L						
Conductivity	ND	5	uS/cm						
Hydrocarbons									
F1 PHCs (C6-C10)	ND	200	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Metals									
Aluminum	ND	10	ug/L						
Antimony	ND	1	ug/L						
Arsenic	ND	10	ug/L						
Barium	ND	10	ug/L						
Beryllium	ND	1	ug/L						
Bismuth	ND	5	ug/L						
Boron	ND	50	ug/L						
Cadmium	ND	1	ug/L						
Calcium	ND	200	ug/L						
Chromium	ND	50	ug/L						
Cobalt	ND	5	ug/L						
Copper	ND	5	ug/L						
Iron	ND	200	ug/L						
Lead	ND	1	ug/L						
Magnesium	ND	200	ug/L						
Manganese	ND	50	ug/L						
Molybdenum	ND	5	ug/L						
Nickel	ND	5	ug/L						
Potassium	ND	200	ug/L						
Selenium	ND	5	ug/L						
Silver	ND	1	ug/L						
Sodium	ND	200	ug/L						
Strontium	ND	50	ug/L						
Thallium	ND	1	ug/L						
Tin	ND	10	ug/L						
Titanium	ND	10	ug/L						
Uranium	ND	5	ug/L						
Vanadium	ND	10	ug/L						
Zinc	ND	20	ug/L						
PCBs									
PCBs, total	ND	0.05	ug/L						
Surrogate: Decachlorobiphenyl	0.465		ug/L		92.9	26-147			
Volatiles									
Benzene	ND	0.5	ug/L						
Bromodichloromethane	ND	0.4	ug/L						
Bromoform	ND	0.5	ug/L						
Bromomethane	ND	0.7	ug/L						
Carbon Tetrachloride	ND	0.5	ug/L						
Chlorobenzene	ND	0.4	ug/L						
Chloroethane	ND	1.0	ug/L						
Chloroform	ND	0.5	ug/L						
Chloromethane	ND	3.0	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
1,2-Dibromoethane	ND	1.0	ug/L						
1,2-Dichlorobenzene	ND	0.4	ug/L						
1,3-Dichlorobenzene	ND	0.4	ug/L						
1,4-Dichlorobenzene	ND	0.4	ug/L						
1,1-Dichloroethane	ND	0.5	ug/L						

Certificate of Analysis

Report Date: 10-Sep-2010

Client: **WESA Inc. (Carp)**

Order Date: 3-Sep-2010

Client PO: First Air, Ialuit

Project Description: C-B8809-00

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
1,2-Dichloroethane	ND	0.5	ug/L						
1,1-Dichloroethylene	ND	0.5	ug/L						
cis-1,2-Dichloroethylene	ND	0.4	ug/L						
trans-1,2-Dichloroethylene	ND	1.0	ug/L						
1,2-Dichloroethylene, total	ND	1.4	ug/L						
1,2-Dichloropropane	ND	0.5	ug/L						
cis-1,3-Dichloropropylene	ND	0.4	ug/L						
trans-1,3-Dichloropropylene	ND	0.5	ug/L						
1,3-Dichloropropene, total	ND	0.9	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Methylene Chloride	ND	4.0	ug/L						
Styrene	ND	0.4	ug/L						
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L						
1,1,2,2-Tetrachloroethane	ND	0.6	ug/L						
Tetrachloroethylene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
1,1,1-Trichloroethane	ND	0.4	ug/L						
1,1,2-Trichloroethane	ND	0.6	ug/L						
Trichloroethylene	ND	0.4	ug/L						
Trichlorofluoromethane	ND	1.0	ug/L						
1,3,5-Trimethylbenzene	ND	0.5	ug/L						
Vinyl chloride	ND	0.4	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	1.0	ug/L						
Surrogate: 4-Bromofluorobenzene	93.5		ug/L		117	83-134			
Surrogate: Dibromofluoromethane	77.4		ug/L		96.8	78-124			
Surrogate: Toluene-d8	74.2		ug/L		92.8	76-118			
Benzene	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	1.0	ug/L						
Surrogate: Toluene-d8	74.2		ug/L		92.8	76-118			

Certificate of Analysis

Report Date: 10-Sep-2010

Client: **WESA Inc. (Carp)**

Order Date: 3-Sep-2010

Client PO: First Air, Ialuit

Project Description: C-B8809-00

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Alkalinity, total	249	5	mg/L	249			0.0	14	
Conductivity	496	5	uS/cm	489			1.4	11	
pH	7.78	0.05	pH Units	7.79			0.1	10	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	200	ug/L	ND				32	
F2 PHCs (C10-C16)	ND	100	ug/L	ND				50	
F3 PHCs (C16-C34)	ND	100	ug/L	ND				50	
F4 PHCs (C34-C50)	ND	100	ug/L	ND				50	
Metals									
Aluminum	ND	10	ug/L	ND				27	
Antimony	ND	1	ug/L	ND				26	
Arsenic	ND	10	ug/L	ND				29	
Barium	272	10	ug/L	277			1.8	34	
Beryllium	ND	1	ug/L	ND				25	
Bismuth	ND	5	ug/L	ND				25	
Boron	306	50	ug/L	339			10.2	33	
Cadmium	ND	1	ug/L	ND				33	
Calcium	80400	200	ug/L	82700			2.8	30	
Chromium	ND	50	ug/L	ND				32	
Cobalt	ND	5	ug/L	ND				32	
Copper	ND	5	ug/L	ND				32	
Iron	568	200	ug/L	588			3.4	32	
Lead	ND	1	ug/L	ND				32	
Magnesium	31900	200	ug/L	33500			5.0	30	
Manganese	212	50	ug/L	217			2.5	29	
Molybdenum	ND	5	ug/L	ND				29	
Nickel	ND	5	ug/L	ND				29	
Potassium	11600	200	ug/L	11800			1.9	28	
Selenium	13.1	5	ug/L	13.4			2.3	28	
Silver	ND	1	ug/L	ND				28	
Sodium	158000	200	ug/L	165000			4.5	27	
Strontium	4370	50	ug/L	4450			1.7	27	
Thallium	ND	1	ug/L	ND				27	
Tin	ND	10	ug/L	ND				27	
Titanium	ND	10	ug/L	ND				28	
Uranium	ND	5	ug/L	ND				27	
Vanadium	ND	10	ug/L	ND				27	
Zinc	ND	20	ug/L	ND				27	
Volatiles									
Benzene	ND	0.5	ug/L	ND				20	
Bromodichloromethane	ND	0.4	ug/L	ND				25	
Bromoform	ND	0.5	ug/L	ND				25	
Bromomethane	ND	0.7	ug/L	ND				25	
Carbon Tetrachloride	ND	0.5	ug/L	ND				25	
Chlorobenzene	ND	0.4	ug/L	ND				25	
Chloroethane	ND	1.0	ug/L	ND				25	
Chloroform	ND	0.5	ug/L	ND				19	
Chloromethane	ND	3.0	ug/L	ND				25	
Dibromochloromethane	ND	0.5	ug/L	ND				25	
1,2-Dibromoethane	ND	1.0	ug/L	ND				25	
1,2-Dichlorobenzene	ND	0.4	ug/L	ND				25	
1,3-Dichlorobenzene	ND	0.4	ug/L	ND				25	
1,4-Dichlorobenzene	ND	0.4	ug/L	ND				25	
1,1-Dichloroethane	ND	0.5	ug/L	ND				21	
1,2-Dichloroethane	ND	0.5	ug/L	ND				25	

Certificate of Analysis

Report Date: 10-Sep-2010

Client: **WESA Inc. (Carp)**

Order Date: 3-Sep-2010

Client PO: First Air, Ialuit

Project Description: C-B8809-00

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
1,1-Dichloroethylene	ND	0.5	ug/L	ND				21	
cis-1,2-Dichloroethylene	ND	0.4	ug/L	ND				20	
trans-1,2-Dichloroethylene	ND	1.0	ug/L	ND				25	
1,2-Dichloropropane	ND	0.5	ug/L	ND				25	
cis-1,3-Dichloropropylene	ND	0.4	ug/L	ND				25	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND				25	
Ethylbenzene	ND	0.5	ug/L	ND				35	
Methylene Chloride	ND	4.0	ug/L	ND				25	
Styrene	ND	0.4	ug/L	ND				25	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND				25	
1,1,1,2,2-Tetrachloroethane	ND	0.6	ug/L	ND				25	
Tetrachloroethylene	ND	0.5	ug/L	ND				31	
Toluene	ND	0.5	ug/L	ND				30	
1,1,1-Trichloroethane	ND	0.4	ug/L	ND				25	
1,1,2-Trichloroethane	ND	0.6	ug/L	ND				25	
Trichloroethylene	ND	0.4	ug/L	ND				30	
Trichlorofluoromethane	ND	1.0	ug/L	ND				25	
1,3,5-Trimethylbenzene	ND	0.5	ug/L	ND				20	
Vinyl chloride	ND	0.4	ug/L	ND				25	
m,p-Xylenes	ND	0.5	ug/L	ND				34	
o-Xylene	ND	0.5	ug/L	ND				32	
Surrogate: 4-Bromofluorobenzene	93.0		ug/L	ND	116	83-134			
Surrogate: Dibromofluoromethane	73.2		ug/L	ND	91.4	78-124			
Surrogate: Toluene-d8	75.5		ug/L	ND	94.4	76-118			
Benzene	ND	0.5	ug/L	ND				20	
Ethylbenzene	ND	0.5	ug/L	ND				35	
Toluene	ND	0.5	ug/L	ND				30	
m,p-Xylenes	ND	0.5	ug/L	ND				34	
o-Xylene	ND	0.5	ug/L	ND				32	
Surrogate: Toluene-d8	75.5		ug/L	ND	94.4	76-118			

Certificate of Analysis

Report Date: 10-Sep-2010

Client: **WESA Inc. (Carp)**

Order Date: 3-Sep-2010

Client PO: First Air, Ialuit

Project Description: C-B8809-00

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1500	200	ug/L	ND	75.2	68-117			
F2 PHCs (C10-C16)	1690	100	ug/L	ND	105	61-129			
F3 PHCs (C16-C34)	4200	100	ug/L	ND	105	61-129			
F4 PHCs (C34-C50)	3080	100	ug/L	ND	128	61-129			
Metals									
Aluminum	44.3		ug/L	ND	88.7	74-130			
Antimony	55.0		ug/L	ND	110	78-126			
Arsenic	47.4		ug/L	ND	94.8	83-119			
Barium	48.9		ug/L	ND	97.8	83-116			
Beryllium	45.8		ug/L	ND	91.6	72-132			
Bismuth	33.8		ug/L	ND	67.7	75-118			QS-02
Boron	45.3		ug/L	ND	90.7	71-128			
Cadmium	48.5		ug/L	ND	97.1	78-119			
Calcium	1060		ug/L	ND	106	64-127			
Chromium	48.9		ug/L	ND	97.7	80-124			
Cobalt	48.9		ug/L	ND	97.8	78-125			
Copper	48.9		ug/L	ND	97.7	75-123			
Iron	1120		ug/L	ND	112	66-119			
Lead	48.7		ug/L	ND	97.4	77-126			
Magnesium	930		ug/L	ND	93.0	75-131			
Manganese	48.6		ug/L	ND	97.3	79-123			
Molybdenum	46.4		ug/L	ND	92.8	82-119			
Nickel	48.9		ug/L	ND	97.8	78-119			
Potassium	929		ug/L	ND	92.9	70-129			
Selenium	49.3		ug/L	ND	98.6	81-125			
Silver	48.7		ug/L	ND	97.3	70-128			
Sodium	910		ug/L	ND	91.0	68-132			
Strontium	46.5		ug/L	ND	92.9	88-114			
Thallium	59.2		ug/L	ND	118	82-127			
Tin	49.2		ug/L	ND	98.5	75-123			
Titanium	48.7		ug/L	ND	97.5	84-118			
Uranium	59.0		ug/L	ND	118	70-131			
Vanadium	48.5		ug/L	ND	97.1	82-123			
Zinc	46.6		ug/L	ND	93.3	80-120			
PCBs									
PCBs, total	1.03	0.05	ug/L	ND	103	54-137			
Surrogate: Decachlorobiphenyl	0.512		ug/L		102	26-147			
Volatiles									
Benzene	29.0	0.5	ug/L	ND	72.6	55-141			
Bromodichloromethane	24.4	0.4	ug/L	ND	61.0	52-139			
Bromoform	31.0	0.5	ug/L	ND	77.6	52-170			
Bromomethane	29.4	0.7	ug/L	ND	73.4	32-138			
Carbon Tetrachloride	28.1	0.5	ug/L	ND	70.3	49-149			
Chlorobenzene	28.2	0.4	ug/L	ND	70.5	64-137			
Chloroethane	29.5	1.0	ug/L	ND	73.8	39-152			
Chloroform	27.0	0.5	ug/L	ND	67.6	58-138			
Chloromethane	27.0	3.0	ug/L	ND	67.4	24-163			
Dibromochloromethane	30.1	0.5	ug/L	ND	75.2	61-153			
1,2-Dibromoethane	29.0	1.0	ug/L	ND	72.5	61-145			
1,2-Dichlorobenzene	35.0	0.4	ug/L	ND	87.4	60-150			
1,3-Dichlorobenzene	33.7	0.4	ug/L	ND	84.2	62-149			
1,4-Dichlorobenzene	36.7	0.4	ug/L	ND	91.8	63-132			

Certificate of Analysis

Report Date: 10-Sep-2010

Client: **WESA Inc. (Carp)**

Order Date: 3-Sep-2010

Client PO: First Air. Ialuit

Project Description: C-B8809-00

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
1,1-Dichloroethane	25.9	0.5	ug/L	ND	64.8	51-156			
1,2-Dichloroethane	28.3	0.5	ug/L	ND	70.7	50-140			
1,1-Dichloroethylene	26.0	0.5	ug/L	ND	65.0	43-153			
cis-1,2-Dichloroethylene	29.6	0.4	ug/L	ND	73.9	58-145			
trans-1,2-Dichloroethylene	26.8	1.0	ug/L	ND	67.0	51-145			
1,2-Dichloropropane	31.5	0.5	ug/L	ND	78.7	56-136			
cis-1,3-Dichloropropylene	29.1	0.4	ug/L	ND	72.7	54-141			
trans-1,3-Dichloropropylene	32.0	0.5	ug/L	ND	79.9	61-140			
Ethylbenzene	28.4	0.5	ug/L	ND	70.9	61-139			
Methylene Chloride	28.8	4.0	ug/L	ND	72.0	58-149			
Styrene	29.1	0.4	ug/L	ND	72.8	63-143			
1,1,1,2-Tetrachloroethane	31.1	0.5	ug/L	ND	77.8	61-148			
1,1,2,2-Tetrachloroethane	23.0	0.6	ug/L	ND	57.5	50-157			
Tetrachloroethylene	27.1	0.5	ug/L	ND	67.7	51-145			
Toluene	33.5	0.5	ug/L	ND	83.7	54-136			
1,1,1-Trichloroethane	27.3	0.4	ug/L	ND	68.2	55-140			
1,1,2-Trichloroethane	27.2	0.6	ug/L	ND	68.0	63-144			
Trichloroethylene	39.3	0.4	ug/L	ND	98.2	52-135			
Trichlorofluoromethane	28.2	1.0	ug/L	ND	70.4	37-155			
1,3,5-Trimethylbenzene	37.6	0.5	ug/L	ND	94.0	61-151			
Vinyl chloride	27.6	0.4	ug/L	ND	69.0	31-159			
m,p-Xylenes	56.8	0.5	ug/L	ND	71.0	61-139			
o-Xylene	28.9	0.5	ug/L	ND	72.4	60-142			
Surrogate: 4-Bromofluorobenzene	77.0		ug/L		96.2	83-134			
Surrogate: Dibromofluoromethane	76.9		ug/L		96.1	78-124			
Surrogate: Toluene-d8	74.5		ug/L		93.2	76-118			
Benzene	29.0	0.5	ug/L	ND	72.6	55-141			
Ethylbenzene	28.4	0.5	ug/L	ND	70.9	61-139			
Toluene	33.5	0.5	ug/L	ND	83.7	54-136			
m,p-Xylenes	56.8	0.5	ug/L	ND	71.0	61-139			
o-Xylene	28.9	0.5	ug/L	ND	72.4	60-142			
Surrogate: Toluene-d8	74.5		ug/L		93.2	76-118			

Certificate of Analysis

Report Date: 10-Sep-2010

Client: WESA Inc. (Carp)

Order Date: 3-Sep-2010

Client PO: First Air, Ialuit

Project Description: C-B8809-00

Sample and QC Qualifiers Notes

- 1- A-01 : Sub-sampled from 500ml amber bottle for metals.
- 2- QS-02 : Spike level outside of control limits. Analysis batch accepted based on other QC included in the batch.

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.



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Chain of Custody
(lab use only)
Nº 75094

Client Name: WESA	Project Ref: First Air, Iqahuit	Waterworks Name:	Page 2 of 2
Contact Name: D. Roberts A. Street	Quote #	Waterworks Number:	Sample Taken by:
Address: 3108 Cap Rd. K0A 1L0	PO # C-88809-00	Address:	Print Name: Brian Andress
	E-mail Address: astreet@wesa.ca	After hours Contact:	Signature: <i>[Signature]</i>
Telephone: 613-839-3053	Fax:	Public Health Unit:	TAT: [] 1-day [] 2-day [] Reg.

Matrix Types: S-Soil/Sed. GW-Ground Water SW-Surface Water SS-Storm/Sanitary Sewer DW-Drinking Water RDW-Regulated Drinking Water P-Paint A-Air O-Other

Samples submitted under: (Indicate ONLY one)		Type of DW Sample: R = Raw; T = Treated; D = Distribution		Required Analyses												
<input type="checkbox"/> O. Reg 153 (511) Table <input type="checkbox"/> O. Reg 170/03 <input type="checkbox"/> O. Reg 318/08 <input type="checkbox"/> Private well <input checked="" type="checkbox"/> CCME <input type="checkbox"/> O. Reg 243/07 <input type="checkbox"/> O. Reg 319/08 <input type="checkbox"/> Other:		Location Types: S = Surface Water; G = Ground Water														
Parcel Order Number	Sample ID / Location Name	Matrix	Air Volume	Type of Sample	# of Containers	Sample Taken		Free / Combined Chlorine Residual mg/L	PHC, FI, F4	BTEX	metals ICP	VOC	PCB	Glycol	H ₂ S	PH, Cond, Alk
						Date	Time									
1036209-soil																
1036222-H2O																
1	TP9 S1	S			1	Aug 31/10	a.m.		✓	✓				✓		
2	Dupl. #1	S			1		a.m.		✓	✓						
3	GS1	S			1		pm		✓	✓						
4	GS2	S			1		pm		✓	✓		✓		✓		
5	GS3	S			1		pm		✓	✓						
6	GS4	S			1		pm		✓							
7	TP2 GW	GW			5		pm		✓	✓	✓	✓			✓	
8	TP5 GW	GW			3		pm		✓	✓						
9	SW	SW			4		pm		✓	✓					✓	
10																

Comments: for analysis of metal in GW & SW please decant from 500ml amber - (metals bottles were not included in prepared coolers)

Preservation Verification: pH _____ Temperature _____
Verified by: _____

Relinquished By (Print & Sign):	Lab Use Only:		
	Received By Driver/Depot:	Received at Lab:	Verified By:
Date/Time:	Date/Time: 11/15 SEP 3/10	Date/Time: Sept. 3/10	Date/Time: Sept 3/10

J.K. 1:52pm 1:59pm

Certificate of Analysis

WESA Inc. (Carp)

P.O. Box 430, 3108 Carp Rd.
Carp, ON K0A 1L0
Attn: Alison Street

Phone: (613) 839-3053
Fax: (613) 839-5376

Client PO: C-B8809-00
Project: First Air, Iqaluit
Custody: 75094

Report Date: 20-Sep-2010
Order Date: 16-Sep-2010

Revised Report **Order #: 1039018**

This Certificate of Analysis contains analytical data applicable to the following samples submitted:

Parcel ID	Client ID
1039018-01	TP2 GW
1039018-02	SW
1039018-03	TP5 GW

Approved By:



Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

Any use of these results implies your agreement that our total liability in connection with this work, however arising shall be limited to the amount paid by you for this work, and that our employees or agents shall not under circumstances be liable to you in connection with this work

Certificate of Analysis

Report Date: 20-Sep-2010

Order Date: 16-Sep-2010

Client: **WESA Inc. (Carp)**

Client PO: C-B8809-00

Project Description: First Air, Iqaluit

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Hardness	Hardness	20-Sep-10	20-Sep-10

Sample Data Revisions

None

Work Order Revisions/Comments:

Revision 1 - This report includes revised sample data.

Other Report Notes:

n/a: not applicable

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

Certificate of Analysis

Report Date: 20-Sep-2010

Order Date: 16-Sep-2010

 Client: **WESA Inc. (Carp)**

Client PO: C-B8809-00

Project Description: First Air, Iqaluit

Sample Results

Hardness				Matrix: Water
				Sample Date: 31-Aug-10
Paracel ID	Client ID	Units	MDL	Result
1039018-01	TP2 GW	mg/L	1	264
1039018-02	SW	mg/L	1	319
1039018-03	TP5 GW	mg/L	1	248



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Chain of Custody
(lab use only)

Nº 75094

Client Name: <u>WESA</u>	Project Ref: <u>First Av. Iqaluit</u>	Waterworks Name:	Page <u>2</u> of <u>2</u>
Contact Name: <u>D. Roberts</u>	Quote #	Waterworks Number:	Sample Taken by: <u>Brian</u>
Address: <u>510B Capital - K0A 1L0</u>	PO # <u>C-38809-00</u>	Address:	Print Name: <u>Address</u>
E-mail Address: <u>astreet@wesa.ca</u>	E-mail Address:	After hours Contact:	Signature: <u>[Signature]</u>
Telephone: <u>613-839-3053</u>	Fax:	Public Health Unit:	TAT: [] 1-day [] 2-day [] Reg.

Matrix Types: S-Soil/Sed. GW-Ground Water SW-Surface Water SS-Storm/Sanitary Sewer DW-Drinking Water RDW-Regulated Drinking Water P-Paint A-Air O-Other

Samples submitted under: (Indicate ONLY one)
 O. Reg. 153 (511) Table O. Reg. 170/03 O. Reg. 318/08 Private well
 CCME O. Reg. 243/07 O. Reg. 319/08 Other:

Type of DW Sample: R = Raw; T = Treated; D = Distribution
 Location Types: S = Surface Water. G = Ground Water

Required Analyses

Sample ID / Location Name		Matrix	Air Volume	Type of Sample	# of Containers	Sample Taken		Free / Combined Chlorine Residual (mg/L)	PHC FI-F4	BTEX	metals (ICP)	VOC	PCB	Glycol	HS	PH, Cond, Alk	hardness
						Date	Time										
1	TP9 S1	S			1	Aug 31/10	a.m.		✓	✓				✓			
2	Dupl. #1	S			1		a.m.		✓	✓							
3	GS1	S			1		p.m.		✓	✓							
4	GS2	S			1		p.m.		✓	✓			✓		✓		
5	GS3	S			1		p.m.		✓	✓							
6	GS4	S			1		p.m.		✓	✓							
7	TP2 GW	GW			5		p.m.		✓	✓	✓	✓					⊗ revised
8	TP5 GW	GW			3		p.m.		✓	✓							⊗ sept 20/10
9	SW	SW			4		p.m.		✓	✓							
10																	

Comments: for analysis of metal in GW & SW please decant from 500ml amber. (metals bottles were not included in prepared estovers)

Preservation Verification: pH _____ Temperature _____
 Verified by: _____

Relinquished By (Print & Sign): _____

Received By: [Signature] Date/Time: 11:15 SEP 3/10

Received at Lab: [Signature] Date/Time: Sept 21/10

Verified By: [Signature] Date/Time: Sept 3/10

J.K. 1:52pm 1:59pm

Chain of Custody Rev 2.0, January 2010

WO #1039018
 S. Col
 Sept 20/10
 11:42am

Certificate of Analysis

WESA Inc. (Carp)

P.O. Box 430, 3108 Carp Rd.

Carp, ON K0A 1L0

Attn: Alison Street

Phone: (613) 839-3053

Fax: (613) 839-5376

Client PO: C-B8809-00

Project: First Air, Iqaluit

Custody: 75095/94

Report Date: 23-Sep-2010

Order Date: 20-Sep-2010

Order #: 1039044

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1039044-01	TP8 S1
1039044-02	GS2
1039044-03	GS4

Approved By:



Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Client: **WESA Inc. (Carp)**

Client PO: C-B8809-00

Report Date: 23-Sep-2010

Order Date: 20-Sep-2010

Project Description: First Air, Iqaluit

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Chromium, hexavalent	MOE E3056 - Extraction, colourimetric	22-Sep-10	22-Sep-10
Metals	EPA 6020 - Digestion - ICP-MS	22-Sep-10	22-Sep-10
Solids, %	Gravimetric, calculation	22-Sep-10	22-Sep-10

Certificate of Analysis

Report Date: 23-Sep-2010

Client: WESA Inc. (Carp)

Order Date: 20-Sep-2010

Client PO: C-B8809-00

Project Description: First Air, Iqaluit

Client ID:	TP8 S1	GS2	GS4	-
Sample Date:	31-Aug-10	31-Aug-10	31-Aug-10	-
Sample ID:	1039044-01	1039044-02	1039044-03	-
MDL/Units	Soil	Soil	Soil	-

Physical Characteristics

% Solids	0.1 % by Wt.	92.1	77.1	87.6	-
----------	--------------	------	------	------	---

Metals

Aluminum	10 ug/g dry	2710	-	3430	-
Antimony	1 ug/g dry	<1	-	<1	-
Arsenic	1 ug/g dry	1	-	1	-
Barium	10 ug/g dry	19	-	31	-
Beryllium	0.5 ug/g dry	<0.5	-	<0.5	-
Boron	5.0 ug/g dry	<5.0	-	<5.0	-
Cadmium	0.5 ug/g dry	<0.5	-	<0.5	-
Calcium	200 ug/g dry	15500	-	17000	-
Chromium	5 ug/g dry	24	-	20	-
Chromium (VI)	0.4 ug/g dry	-	<0.4	-	-
Cobalt	1 ug/g dry	5	-	5	-
Copper	5 ug/g dry	12	-	16	-
Iron	200 ug/g dry	24800	-	19100	-
Lead	1 ug/g dry	5	-	40	-
Magnesium	200 ug/g dry	2670	-	3200	-
Manganese	5 ug/g dry	150	-	177	-
Molybdenum	1 ug/g dry	3	-	2	-
Nickel	5 ug/g dry	7	-	8	-
Potassium	200 ug/g dry	499	-	726	-
Selenium	1 ug/g dry	<1	-	<1	-
Silver	0.3 ug/g dry	0.4	-	<0.3	-
Sodium	200 ug/g dry	<200	-	213	-
Strontium	10 ug/g dry	20	-	24	-
Thallium	1 ug/g dry	<1	-	<1	-
Tin	5 ug/g dry	<5	-	<5	-
Titanium	10 ug/g dry	351	-	339	-
Uranium	1 ug/g dry	<1	-	<1	-
Vanadium	10 ug/g dry	53	-	34	-
Zinc	20 ug/g dry	36	-	225	-

Certificate of Analysis

Report Date: 23-Sep-2010

Client: WESA Inc. (Carp)

Order Date: 20-Sep-2010

Client PO: C-B8809-00

Project Description: First Air, Iqaluit

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Aluminum	ND	10	ug/g						
Antimony	ND	1	ug/g						
Arsenic	ND	1	ug/g						
Barium	ND	10	ug/g						
Beryllium	ND	0.5	ug/g						
Boron	ND	5.0	ug/g						
Cadmium	ND	0.5	ug/g						
Calcium	ND	200	ug/g						
Chromium (VI)	ND	0.4	ug/g						
Chromium	ND	5	ug/g						
Cobalt	ND	1	ug/g						
Copper	ND	5	ug/g						
Iron	ND	200	ug/g						
Lead	ND	1	ug/g						
Magnesium	ND	200	ug/g						
Manganese	ND	5	ug/g						
Molybdenum	ND	1	ug/g						
Nickel	ND	5	ug/g						
Potassium	ND	200	ug/g						
Selenium	ND	1	ug/g						
Silver	ND	0.3	ug/g						
Sodium	ND	200	ug/g						
Strontium	ND	10	ug/g						
Thallium	ND	1	ug/g						
Tin	ND	5	ug/g						
Titanium	ND	10	ug/g						
Uranium	ND	1	ug/g						
Vanadium	ND	10	ug/g						
Zinc	ND	20	ug/g						

Certificate of Analysis

Report Date: 23-Sep-2010

Client: WESA Inc. (Carp)

Order Date: 20-Sep-2010

Client PO: C-B8809-00

Project Description: First Air, Iqaluit

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Aluminum	2210	10	ug/g dry	2150			2.5	27	
Antimony	ND	1	ug/g dry	ND				26	
Arsenic	ND	1	ug/g dry	ND				35	
Barium	10.0	10	ug/g dry	ND				34	QR-01
Beryllium	ND	0.5	ug/g dry	ND				25	
Boron	ND	5.0	ug/g dry	ND				33	
Cadmium	ND	0.5	ug/g dry	ND				33	
Calcium	54200	200	ug/g dry	52600			3.0	30	
Chromium (VI)	ND	0.4	ug/g dry	ND				35	
Chromium	5.6	5	ug/g dry	5.4			4.9	32	
Cobalt	2.1	1	ug/g dry	2.0			3.5	32	
Copper	ND	5	ug/g dry	ND				32	
Iron	7200	200	ug/g dry	7070			1.7	32	
Lead	2.8	1	ug/g dry	2.7			1.9	44	
Magnesium	3810	200	ug/g dry	3690			3.2	30	
Manganese	175	5	ug/g dry	170			2.8	29	
Molybdenum	ND	1	ug/g dry	1.3				29	QR-01
Nickel	ND	5	ug/g dry	ND				29	
Potassium	469	200	ug/g dry	469			0.1	28	
Selenium	ND	1	ug/g dry	ND				28	
Silver	ND	0.3	ug/g dry	ND				28	
Sodium	603	200	ug/g dry	583			3.4	27	
Strontium	87.4	10	ug/g dry	84.5			3.4	27	
Thallium	ND	1	ug/g dry	ND				27	
Tin	ND	5	ug/g dry	ND				27	
Titanium	257	10	ug/g dry	254			0.8	27	
Uranium	ND	1	ug/g dry	ND				27	
Vanadium	12.5	10	ug/g dry	12.1			3.3	27	
Zinc	ND	20	ug/g dry	ND				27	
Physical Characteristics									
% Solids	100	0.1	% by Wt.	79.9			22.3	25	

Certificate of Analysis

Report Date: 23-Sep-2010

Client: WESA Inc. (Carp)

Order Date: 20-Sep-2010

Client PO: C-B8809-00

Project Description: First Air, Iqaluit

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Metals									
Aluminum	42.3		ug/L	ND	84.6	80-120			
Antimony	57.5		ug/L	ND	115	80-120			
Arsenic	50.3		ug/L	ND	101	80-120			
Barium	49.6		ug/L	ND	99.2	80-120			
Beryllium	50.0		ug/L	ND	100	80-120			
Boron	40.7		ug/L	ND	81.4	80-120			
Cadmium	49.0		ug/L	ND	98.0	80-120			
Calcium	1070		ug/L	ND	107	80-120			
Chromium (VI)	5.2	0.4	ug/g	ND	105	89-123			
Chromium	48.4		ug/L	ND	96.9	80-120			
Cobalt	46.3		ug/L	ND	92.7	80-120			
Copper	48.0		ug/L	ND	96.1	80-120			
Iron	1050		ug/L	ND	105	80-120			
Lead	50.5		ug/L	ND	101	80-120			
Magnesium	919		ug/L	ND	91.9	80-120			
Manganese	47.0		ug/L	ND	94.0	80-120			
Molybdenum	48.4		ug/L	ND	96.7	80-120			
Nickel	46.9		ug/L	ND	93.9	80-120			
Potassium	901		ug/L	ND	90.1	80-120			
Selenium	49.7		ug/L	ND	99.4	80-120			
Silver	46.9		ug/L	ND	93.8	80-120			
Sodium	936		ug/L	ND	93.6	80-120			
Strontium	48.2		ug/L	ND	96.3	80-120			
Thallium	48.1		ug/L	ND	96.2	80-120			
Tin	47.7		ug/L	ND	95.3	80-120			
Titanium	48.6		ug/L	ND	97.2	80-120			
Uranium	43.5		ug/L	ND	87.1	80-120			
Vanadium	47.1		ug/L	ND	94.1	80-120			
Zinc	47.1		ug/L	ND	94.3	80-120			

Certificate of Analysis

Client: WESA Inc. (Carp)

Client PO: C-B8809-00

Project Description: First Air, Iqaluit

Report Date: 23-Sep-2010

Order Date: 20-Sep-2010

Sample and QC Qualifiers Notes

1- QR-01 : Duplicate RPD is high, however, the sample result is less than 10x the MDL.

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.

Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.



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800-749-1947
f: 613-731-9064
e: paracel@paracellabs.com

Chain of Custody
(lab use only)
Nº 75095

Client Name: WESA	Project Ref: First Air, Iqaluit	Reg. Drinking Water	Waterworks Name:	Page 1 of 3
Contact Name: D. Roberts A. Street	Quote #	Waterworks Number:	Sample Taken by:	
Address: 5100 Camp Rd KOA1LO	PO # C-88809-00	Address:	Print Name: E. Roberts	
Telephone: 613-839-3053	E-mail Address: droberts@wesa.ca	After hours Contact:	Signature: [Signature]	
	Fax:	Public Health Unit:	TAT: [11-day] [12-day] [Reg.]	

Matrix Types: S-Soil/Sed. GW-Ground Water SW-Surface Water SS-Storm/Sanitary Sewer DW-Drinking Water RDW-Regulated Drinking Water P- Paint A-Air O-Other
 Samples submitted under: (Indicate ONLY one)
 O. Reg 153 (511) Table 1 O. Reg 170/03 O. Reg 318/08 Private well
 CCME O. Reg 243/07 O. Reg 319/08 Other
 Type of DW Sample: R = Raw; T = Treated; D = Distribution
 Location Types: S = Surface Water; G = Ground Water

Sample ID / Location Name	Matrix	Air Volume	Type of Sample	# of Containers	Sample Taken		Free / Combined Chlorine Residual mg/L	Required Analyses									
					Date	Time		PH	F ⁻	FA	BEY	1CT methods	VOC	PCB	Allycol	Hg	CrVI
1 TP1 S1	S			1	Aug 31/10	2:00		✓	✓	✓							
2 TP2 S1	S			1				✓	✓	✓							
3 TP2 S2	S			1				✓	✓	✓	✓						
4 TP3 S1	S			1				✓	✓	✓	✓						
5 TP3 S3	S			1				✓	✓	✓	✓						
6 TP4 S1	S			1				✓	✓	✓	✓						
7 TP5 S1	S			1				✓	✓	✓	✓						
8 TP6 S1	S			1				✓	✓	✓	✓						
9 TP7 S2	S			1				✓	✓	✓	✓						
10 TP8 S1	S			1				✓	✓	✓	✓						

Revised Sept. 20/10

Comments:	JK	Preservation Verified by: [Signature]	Temperature Verified by: [Signature]
Relinquished By (Print & Sign):	[Signature]	Received at Lab: [Signature]	Verified By: [Signature]
Date/Time:	11:15 Sept 10	Date/Time:	Sept 3/10 1:52pm
		Date/Time:	Sept 3/10 1:59pm

ChainOfCustody Rev 2.0, January 2010

WD# 1039044
 of Col
 Sept. 20/10
 4:42pm



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Chain of Custody
(In-house only)

Nº 75094

Client Name: WESA	Project Ref: First Air, Iqaluit	Waterworks Name:	Page 2 of 2
Contact Name: D. Roberts	Quote #:	Waterworks Number:	Sample Taken by:
Address: A. Street	PJ # C-88809-00	Address:	Print Name: Brian Andros
Address: 3103 Cap Tnd. K0A 1L0	E-mail Address: ast@wesa.ca	After Hours Contact:	Signature: <i>[Signature]</i>
Telephone: 613-839-3053	Fax:	Public Health Unit:	TAT: [] 1-day [] 2-day [] Reg.

Matrix Types: S-Soil/Sed. GW-Ground Water SW-Surface Water SS-Storm/Sanitary Sewer DW-Drinking Water RDW-Regulated Drinking Water P- Paint A-Air O-Other

Samples submitted under: (Indicate ONLY one)		Type of DW Sample: R = Raw, T = Treated, D = Distribution		Required Analyses													
<input type="checkbox"/> O. Reg 153 (511) Table <input type="checkbox"/> O. Reg 170/03 <input type="checkbox"/> O. Reg 318/08 <input checked="" type="checkbox"/> CCME <input type="checkbox"/> O. Reg 243/07 <input type="checkbox"/> O. Reg 319/08 <input type="checkbox"/> Other:		<input type="checkbox"/> Private well Location Types: S = Surface Water, G = Ground Water		Date		Time		Free / Combined Chlorine Residual mg/L	PHC F1-F4	BTEX	metals ICP	VOC	PCB	Glycol	H ₂	PH, Cond, Alk	CRVI
Sample ID / Location Name	Matrix	Air Volume	Type of Sample	# of Containers	Sample Taken		Free / Combined Chlorine Residual mg/L	PHC F1-F4	BTEX	metals ICP	VOC	PCB	Glycol	H ₂	PH, Cond, Alk	CRVI	
					Date	Time											
1036209-Soil																	
1036222-H2O																	
1 TP4 S1	S			1	Aug 31/10	2:00			✓	✓			✓				
Dupl #1	S			1		2:00			✓	✓			✓				
G51	S			1		pm			✓	✓							
G52	S			1		pm			✓	✓							
G53	S			1		pm			✓	✓							
G54	S			1		pm			✓	✓							
TP2 GW	GW			5		pm			✓	✓	✓	✓					
TP5 GW	GW			3		pm			✓	✓							
SW	SW			4		pm			✓	✓							

Comments: for analysis of metal in GW & SW please decant from 500ml amber (metals bottles were not included in prepared coolers)

Reinquished By (Print & Sign): _____

Received By Driver/Depot: _____ Date/Time: 11:45 SEP 3/10

Received at Lab: _____ Date/Time: Sept 3/10 1:52pm

Verified By: _____ Date/Time: Sept 3/10 1:59pm

ChainOfCustody Rev 2.0, January 2010

Revised
Sept 2010

WO# 1039044
J.K.
Sept 2010
4:42pm

Certificate of Analysis

WESA Inc. (Carp)

P.O. Box 430, 3108 Carp Rd.

Carp, ON K0A 1L0

Attn: Alison Street

Phone: (613) 839-3053

Fax: (613) 839-5376

Client PO: C-B8809-00

Project: First Air, Iqaluit

Custody: 75095

Report Date: 23-Sep-2010

Order Date: 21-Sep-2010

Order #: 1039067

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1039067-01	TP2 S1
1039067-02	TP2 S2

Approved By:



Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Client: **WESA Inc. (Carp)**

Client PO: C-B8809-00

Report Date: 23-Sep-2010

Order Date: 21-Sep-2010

Project Description: First Air, Iqaluit

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
PCBs, total	SW846 8082A - GC-ECD	23-Sep-10	23-Sep-10
Solids, %	Gravimetric, calculation	22-Sep-10	22-Sep-10

Certificate of Analysis

Report Date: 23-Sep-2010

Client: WESA Inc. (Carp)

Order Date: 21-Sep-2010

Client PO: C-B8809-00

Project Description: First Air, Iqaluit

Client ID:	TP2 S1	TP2 S2	-	-
Sample Date:	31-Aug-10	31-Aug-10	-	-
Sample ID:	1039067-01	1039067-02	-	-
MDL/Units	Soil	Soil	-	-

Physical Characteristics

% Solids	0.1 % by Wt.	94.2	87.4	-	-
----------	--------------	------	------	---	---

PCBs

PCBs, total	0.05 ug/g dry	0.09 [1]	0.38 [1]	-	-
Decachlorobiphenyl	Surrogate	132% [1]	108% [1]	-	-

Certificate of Analysis

Report Date: 23-Sep-2010

Client: WESA Inc. (Carp)

Order Date: 21-Sep-2010

Client PO: C-B8809-00

Project Description: First Air, Iqaluit

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
PCBs									
PCBs, total	ND	0.05	ug/g						
Surrogate: Decachlorobiphenyl	0.125		ug/g		125	43-142			

Certificate of Analysis

Report Date: 23-Sep-2010

Client: WESA Inc. (Carp)

Order Date: 21-Sep-2010

Client PO: C-B8809-00

Project Description: First Air, Iqaluit

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	---------------	------	------------	-----	-----------	-------

Physical Characteristics

% Solids	100	0.1	% by Wt.	79.9			22.3	25	
----------	-----	-----	----------	------	--	--	------	----	--

Certificate of Analysis

Report Date: 23-Sep-2010

Client: WESA Inc. (Carp)

Order Date: 21-Sep-2010

Client PO: C-B8809-00

Project Description: First Air, Iqaluit

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
PCBs									
PCBs, total	0.493	0.05	ug/g	ND	123	58-147			
Surrogate: Decachlorobiphenyl	0.115		ug/g		115	43-142			

Certificate of Analysis

Client: WESA Inc. (Carp)

Client PO: C-B8809-00

Project Description: First Air, Iqaluit

Report Date: 23-Sep-2010

Order Date: 21-Sep-2010

Sample and QC Qualifiers Notes

1- H-01 : Holding time had been exceeded upon sample receipt.

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.

Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.



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Chain of Custody
(lab use only)
No. 75095

Client Name: WESA	Project Ref: First Air, Igualit	Reg. Drinking Water	Waterworks Name:	Page 1 of 2
Contact Name: D. Roberts A. Street	Quote #	Waterworks Number:	Sample Taken by:	
Address: 5100 Camp Rd KOA1LD	PO # C-88809-00	Address:	Print Name: B. A. Roberts	
Telephone: 613-839-3053	E-mail Address: d.roberts@wesa.ca	After hours Contact:	Signature: <i>[Signature]</i>	
	Fax:	Public Health Unit:	TAT: <input type="checkbox"/> 1-day <input type="checkbox"/> 2-day <input checked="" type="checkbox"/> Reg.	

Matrix Types: S-Soil/Sed. GW-Ground Water SW-Surface Water SS-Storm/Sanitary Sewer DW-Drinking Water RDW-Regulated Drinking Water P-Paint A-Air O-Other

Samples submitted under: (Indicate ONLY one)
 O. Reg 153 (511) Table O. Reg 170/03 O. Reg 318/08 Private well
 CCME O. Reg 243/07 O. Reg 319/08 Other

Sample ID / Location Name	Matrix	Air Volume	Type of Sample	# of Containers	Sample Taken		Free / Combined Chlorine Residual mg/L	Required Analyses									
					Date	Time		PHC F-FA	BTEX	137 radionuclides	VOC	PCB	Allycol	Hg	PCBS		
1036209-soil																	
1	TP1 S1	S		1		Aug 31/10	2:00										
2	TP2 S1	S		1													
3	TP2 S2	S		1													
4	TP3 S1	S		1													
5	TP3 S3	S		1													
6	TP4 S1	S		1													
7	TP5 S1	S		1													
8	TP6 S1	S		1													
9	TP7 S2	S		1													
10	TP8 S1	S		1													

Comments: _____ Preservation Verification: pH _____ Temperature _____
Verified by: _____

Relinquished By (Print & Sign): <i>J.K.</i>	Received By Driver/Depot: _____	Received at Lab: _____	Verified By: _____
Date/Time: _____	Date/Time: <i>11:05 Sep 10</i>	Date/Time: <i>Sept 3/10</i>	Date/Time: <i>Sept 3/10</i>

ChainOfCustody Rev 2.0, January 2010

WO# 1039067.
[Signature]
 Sept 21/10
 12:30pm

Revised Sept 21/10