Arctic Bay
Sewage Lagoon
Decommissioning

Prepared for:
Government of Nunavut
Community and Government Services
Project Management Division – Baffin Region

Trow Associates Inc.

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1.0 Introduction

Trow Associates Inc. (Trow) was retained by the Department of Community and Government Services (CGS), Government of Nunavut (GN), to undertake an Engineering Study to support the decommissioning of a sewage lagoon cell in the Hamlet of Arctic Bay, Nunavut (Hamlet). The decommissioning study was completed as a requirement of the Hamlet's Water Licence.

1.1 Background

Arctic Bay is located on the Borden Pennisula of Baffin Island, Nunavut. This northern community is connected by a 21 km road to the Nanisivik Airport. The present sewage lagoon, which services approximately 640 residents, is located approximately 2 km east of the community. It is a comprised of a single cell lagoon ice pack storage area and wetlands, as shown in Figure 1 (Appendix A). The sewage treatment system is bordered to the north by the Hamlet's solid waste disposal site and to the south by the road to Nanisivik. There are no facilities within the proximity of the old sewage lagoon system which may be impacted by the abandonment lagoon cell.

In 2002 and 2003 effluent tests carried out by Indian and Northern Affairs sited problems with the effluent quality from the facility. In addition, effluent samples taken in September 2004 did not comply with the requirements under the Hamlet's water licence.

1.2 Scope of Work

The purpose of the study is to assist in ensuring that the lagoon to be abandoned is closed in a manner that is aesthetically acceptable with minimal health and environmental impacts.

The components of the Hamlet's Water License that are addressed by this Plan include the following:

- Identify any sites in the vicinity of the lagoon that have been affected by waste spills;
- Identify if site remediation has occurred or if outstanding remediation activities are required;
- Identify the potential for leachate impact beyond the footprint of the lagoon;
- Establish surface and sub-surface drainage patterns and prepare a grading plan for the placement of cover material;
- Determine the thickness of sludge material;
- Assess the potential for hazardous materials to exist within the decommissioned sewage lagoon site; and,

- Recommend the type and source of cover materials.

1.3 Information Provided

As part of this program, the following studies have been completed by Trow:

- *Geotechnical Investigation, Sewage Lagoon, Hamlet of Arctic Bay, Nunavut, January 2008*

- *Environmental Assessment Screening, New Sewage Lagoon for the Hamlet of Arctic Bay, March 2008*.

2.0 Subsurface Investigation

2.1 Introduction

A subsurface investigation was completed within and adjacent to the sewage lagoon to determine if the lagoon sludge had adversely impacted the soil and groundwater underlying the lagoon or beyond the berms in a downgradient direction (i.e. towards Arctic Bay).

2.2 Methodology

The methodology for this component of the study included:

- Collection of soil (sludge) samples from the base of the sewage lagoon;
- Construct five boreholes hydraulically downgradient from the sewage lagoon;
- Submit two soil samples from the base of the sewage lagoon for detailed laboratory analysis;
- Collect and submit two groundwater samples downgradient of the sewage lagoon and one upgradient sample from the lagoon for detailed laboratory analysis; and,
- Interpret the analytical results and prepare a brief report.

2.3 Fieldwork

The drilling program was undertaken between August 25 and August 30, 2007 with a Hilti drill rig and was supervised by a representative of Trow on a full time basis.

Five boreholes were advanced in the vicinity of the sewage lagoon/ice field and the downgradient ponding berms/wetlands. Boreholes BH-1, BH-2 and BH-3 were drilled on the immediate downgradient side of the ice field berm. The other two boreholes were drilled further downgradient of the lagoon/ice field (Figure 1, Appendix A).

The boreholes were initially advanced by performing continuous standard penetration tests and retrieving the soil samples. However, the boreholes could only be advanced by this method in unfrozen soil to a depth of 0.6 m to 1.7 m until frost was encountered. The boreholes were then cased and advanced by core drilling techniques with the Hilti drill rig. Most of the boreholes were drilled by dry coring. Water was used in cases where the core barrel could not be advanced by dry coring. During core drilling, a careful record of colour of wash water, wash water return and any sudden drops of the drill rods was kept.

All soil samples were logged noting geological properties, moisture, colour, odour and any visual or olfactory indications of contamination. Borehole descriptions are presented in Appendix B: Borehole Logs.

At the completion of the drilling program, an insignificant amount of groundwater was present in the boreholes to permit sampling. Consequently, two additional larger boreholes (identified as *Downstream Lagoon* and *At Highway*) were advanced downgradient of the lagoon to allow for sample collection to assess potential leachate migration from the lagoon. A third borehole (*Upstream Lagoon*) was advanced to represent background conditions. Groundwater samples were collected from all three sampling locations.

In order to identify worst case conditions within the lagoon, composite sludge samples were collected from the base of the sewage lagoon (*Lagoon Base 1*) and the ice field (*Lagoon Base 2*).

In order to assess the impact that the sewage had on the base of the lagoon as well as leachate downgradient of the lagoon, the basal lagoon sludge samples and the groundwater samples were submitted for metals, organic/petroleum hydrocarbon (PHC) and volatile organic compound (VOC) analyses.

2.4 Field Observations

Boreholes BH-1 to BH-3 were drilled on top of the existing ice pack holding area. Based on information presented in the geotechnical report, the soil consists of fill placed for the construction of the berms. It is estimated that the fill extends to a depth of 1.2 m in BH-1 and BH-2 and the entire depth in BH-3 (1.7 m). The fill consists of sand and gravel to sandy gravel with some silty sand layers. Grain size analysis conducted on a soil sample from BH-1 indicates that fill consists of 7% clay, 15% silt, 30% sand and 58% gravel. The permeability of the fill was estimated as 2.5×10^{-5} cm/sec. No olfactory or visual indications of impact from the lagoon were detected in the soil samples.

The soil retrieved from BH-4 consisted of peaty topsoil (~0.30 m) overlying silty sand (~1.1 m) to a depth of 1.4 m beyond which was bedrock. A similar soil profile was observed in BH-5 which was drilled to a depth of 4.3 m. No olfactory or visual indications of lagoon impact were detected in either borehole.

3.0 Contaminant Assessment

3.1 Assessment Criteria

In terms of evaluating the analytical results obtained, the Government of Nunavut defaults to criteria established by the Canadian Council of Ministers of the Environment (CCME). For soil the CCME *Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health (updated September 2007)* was used to compare the metals and VOC analytical results. The CCME has also established the *Canada-Wide Standards (CWS) for Petroleum Hydrocarbons (PHC) in Soil (April 2001)*, which is the federal remedial standard for petroleum impacted soils. The CCME and CWS criteria are based on four land use categories: i) agricultural; ii) residential/parkland; iii) commercial; and iv) industrial. As this site is in an undeveloped area, distant from residential land, the most appropriate criteria for this site was considered to be industrial. The soil samples at the subject site varied between fine and coarse-grained materials and thus based on the field observations, the analytical results were compared to the coarse-grained criteria.

The groundwater in this area is not consumed, nor does it discharge to a water body that is used for consumption purposes (i.e., groundwater is considered non-potable). Considering that the CCME *Canadian Water Quality Guidelines* do not have criteria for non-potable groundwater settings, the groundwater analytical results were compared to the Table 3 criteria provided in Ontario Regulation 153/04 (O. Reg. 153/04) and the Ministry of Environment (MOE) document entitled *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act dated March 9, 2004 (Standards)*.

With respect to PHC in groundwater, the MOE Standard has not established a maximum acceptable generic criterion for non-potable groundwater settings. Rather, it is expected that the proponent either establish site-specific criteria by performing a comprehensive site-specific risk assessment or propose an alternate generic criterion that is currently being used by another province or jurisdiction. Therefore, for the purpose of quantitative comparison, Trow compared the analytical results for this site to the Atlantic Partners in Risk Based Corrective Action (RCBA) Implementation (PIRI) Tier I levels for PHC (non-potable groundwater scenario, coarse grained soils, commercial land use). The RBCA Modified TPH is defined as C_6 to C_{32} - BTEX. Using the four PHC fractions, the RBCA Modified TPH can be calculated as follows: $F_1+F_2+F_3$ or C_6 to C_{34}. It is noted that the F_1 fraction does not include the BTEX parameters.

3.2 Soil Results

Two worst-case soil samples (i.e., sludge) were collected from the base of the lagoons and submitted to Maxxam Analytics for the analysis of metals, VOCs, and Canada-Wide Standard petroleum hydrocarbons analysis.

The soil/sludge analytical results are summarized in Tables 1, 2 and 3 along with the applicable assessment criteria (Appendix C). Laboratory Certificates of Analysis are presented in Appendix D.

Based on the laboratory analytical results, exceedances of PHC F_3 were detected in both samples and copper was identified in sample *Lagoon Base 2*. It should be noted that other parameters typically indicative of petroleum hydrocarbon impact (i.e., BTEX, F_1 and F_2) were not detected at elevated concentrations and that the laboratory indicated that the hydrocarbon fraction results had an organic signature, which would be expected with sewage sludge.

3.3 Groundwater Results

Three groundwater samples were collected from various locations in the vicinity of the lagoon and submitted to Maxxam Analytics for the analysis of metals, VOCs, and petroleum hydrocarbons analysis.

The groundwater analytical results are summarized in Tables 4, 5 and 6 along with the applicable assessment criteria (Appendix C). Laboratory Certificates of Analysis are presented in Appendix D.

Based on the laboratory analytical results, copper was the only exceedance detected in the groundwater. The copper was detected in the sample identified as *Downstream Lagoon.* It should be noted that copper measured in the sample further downstream from the lagoon *(i.e., At Highway*) did not have elevated copper.

It should also be noted that there were no elevated concentrations of BTEX or F_1-F_4 in the groundwater downgradient of the lagoon, further suggesting that the F_3, F_4 concern detected in the sludge are organic in nature.

3.4 Summary of Analytical Results

Based on the laboratory analysis of the samples taken, the potential for future impact beyond the lagoon site is considered minimal.

4.0 Proposed Abandonment Plan

From the results from the soil and water sampling program, it is concluded that the risk of contamination is minimal. Based on the minimal risk of contamination, the proposed remediation plan for the lagoon cell is to fill the cell to cover the sludge, thereby encapsulating the sludge in frozen (permafrost) granular material. Final site cover serves several purposes: aesthetic improvements, reduce infiltration, site drainage, sludge stabilization through freezing.

4.1 Drainage Patterns

The natural drainage pattern in the area of the existing sewage lagoon and ice pack holding area is the surface drainage following from the northwest to the southeast. However, the access road to both the sewage lagoon and ice pack holding area is to the northwest of both facilities and provides a flow diversion from both sites. Therefore, minimal surface runoff should be experienced by either of the two facilities. The proposed remediation of filling the lagoons would be graded such that precipitation falling on the lagoons or ice pack area will drain to the south or southeast. Fill material will be placed to ensure a minimum of 2% slope across the surface of the remediated facilities.

4.2 Cover Material

The existing lagoon and ice pack area should be filled to the grades shown on Figure 2 and Figure 3. The proposed finished grade shall result in a minimum of 1.5 m cover of ground material being applied to the lagoon site. We propose that a 0.5 m layer of the insides of the existing berm be removed and deposited in the bottom of the lagoon as fill to remove any organic material from the upper region of the fill material. In addition, portions of the existing berms shall be removed and used as fill material by reducing the required material to rehabilitate the facilities.

The fill material shall be well graded material with a maximum aggregate size of 200 mm and shall be placed in layers with a maximum depth of 300 mm. The material should be spread in 300mm lifts by a bulldozer to obtain a final compaction rate of at least 80% standard Proctor. Based on the area and depth of the lagoon from the topographic survey completed by Trow Associates Inc. in July 2007, it is estimated that a total of 8,350 m^3 of compacted cover material will be required to decommission the sewage lagoon and ice pack holding area.

4.3 Capital Cost

The estimated cost for the abandonment of the Arctic Bay Sewage Lagoon and ice pack holding is $423,500.00, including a 10% contingency. A detail breakdown of the cost estimate is include in Appendix E.

5.0 Conclusions and Recommendations

Based on the discussions above, the results of the drilling and sampling program, the following conclusions and recommendations are drawn.

5.1 Conclusions

From the analytical results of the sludge and groundwater samples for metals, VOCs and hydrocarbons, the following can be concluded:

1) There are no sites within the vicinity of the lagoon identified to have been affected by waste spills;

2) The underlying sludge is not adversely impacted contaminants that would otherwise be expected to be present in sewage sludge and the potential for hazardous material to exist within the decommissioned lagoon cell is minimal;

3) The potential for future impact beyond the lagoon is minimal;

4) The proposed drainage pattern is design to promote surface drainage across the site from the west to the east;

5) The depth of sludge is estimated at approximately 0.1 metres from field observations during the sampling program; and,

6) The fill material should be a well-graded material, suitable to allow compaction, with a maximum size of 200 millimetres.

5.2 Recommendations

Base on the conclusions above and the results from the soil sampling and analysis, the following is recommended:

1) The sludge should be encapsulated with granular cover to promote stabilization through freezing;

2) The top of the cover material should be graded as per the proposed grading plan to minimize the potential of infiltration;

3) No long term monitoring is required, and

6.0 Closure

This report was prepared for the exclusive use of the Government of Nunavut. Any other party without the express written consent of Trow should not rely upon the contents of this report. Conclusions regarding the environmental conditions at this site are based solely on the extent of observations and the information referenced herein.

Trow has attempted to conduct the services reported herein in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality and under similar conditions as this project. No other representation, express or implied is included or intended in this document.

A subsurface investigation of this nature is based on a limited sampling of the site. The field observations, chemical analyses, and conclusions are based on information gathered at the specific test locations and can only be extrapolated to a limited area around the test holes. The reported information is believed to provide a reasonable representation of the general environmental conditions at the site at the time of the investigation. Should additional information become available concerning this site, such information should be provided to Trow so that our recommendations may be reviewed and modified as necessary.

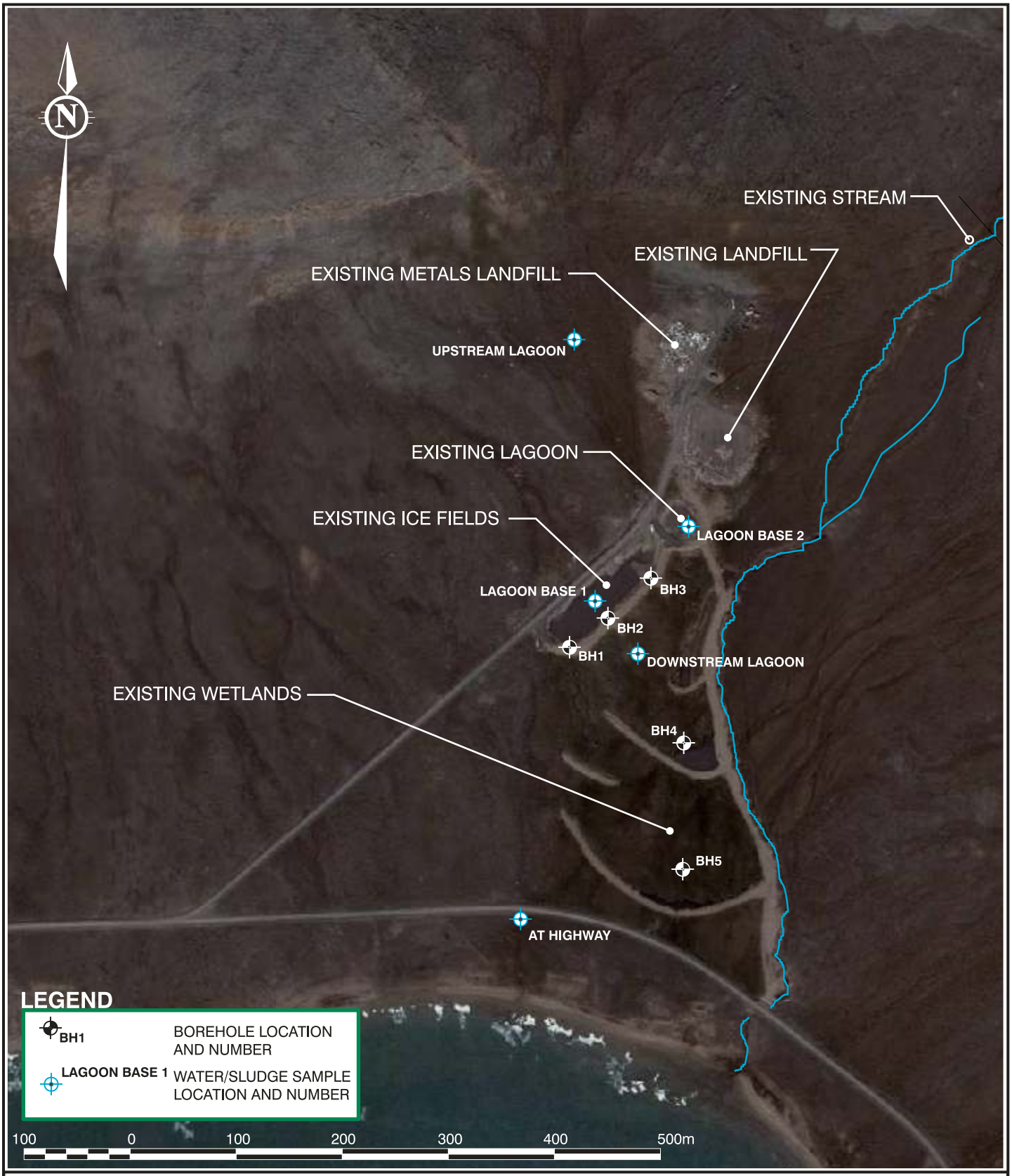
If you have any questions or comments concerning the above, please do not hesitate to contact either of the undersigned.

Trow Associates Inc.

Steven Burden, P.Eng.
Senior Project Manger
Infrastructure Division

Chris Kimmerly, M.Sc.
Manager, Senior Environmental Scientist
Environmental Science & Engineering Services

Appendix A:
Figures



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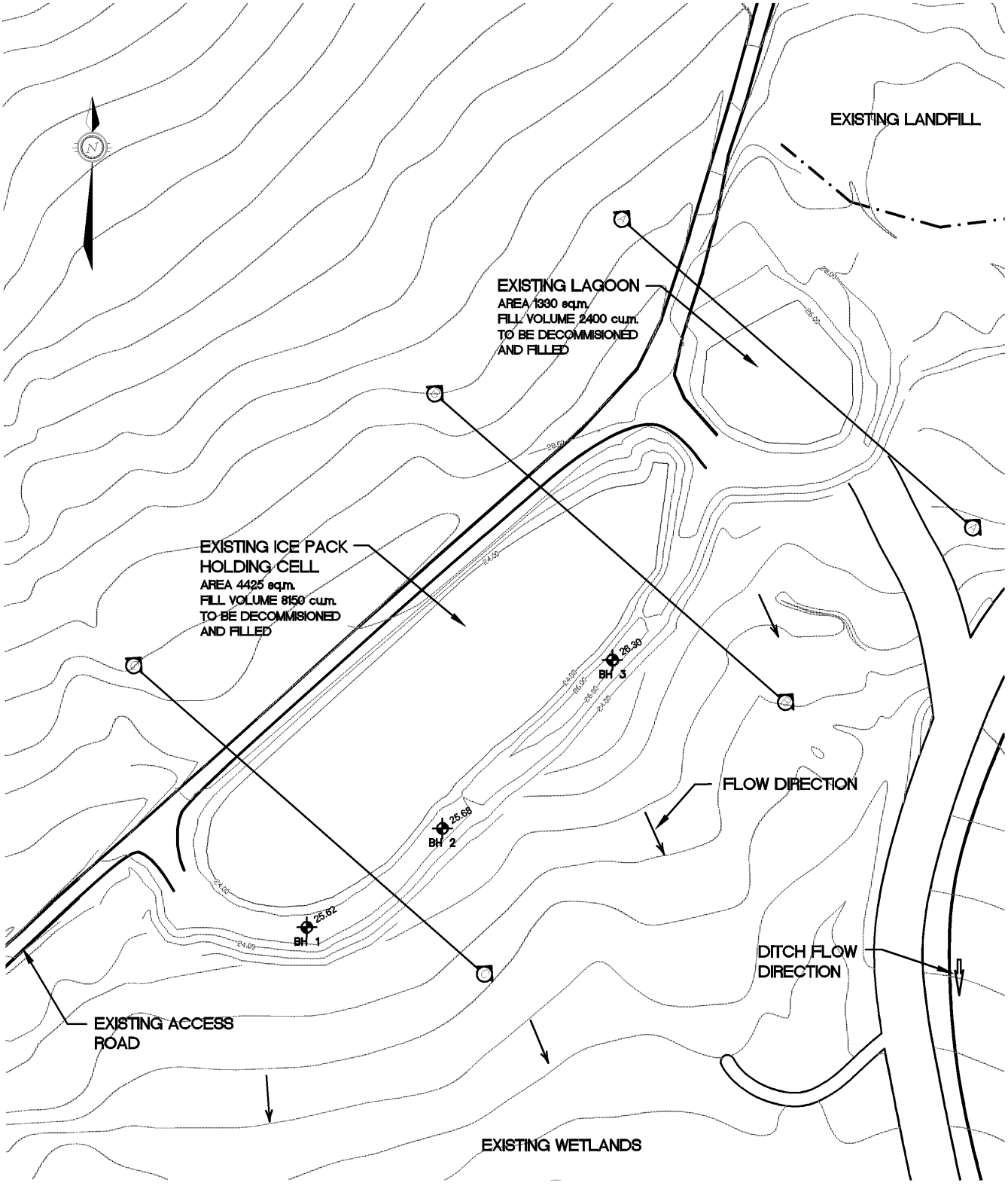
DRAWN: RG	TITLE: BOREHOLE LOCATION PLAN EXISTING SEWAGE LAGOON	FIG 1



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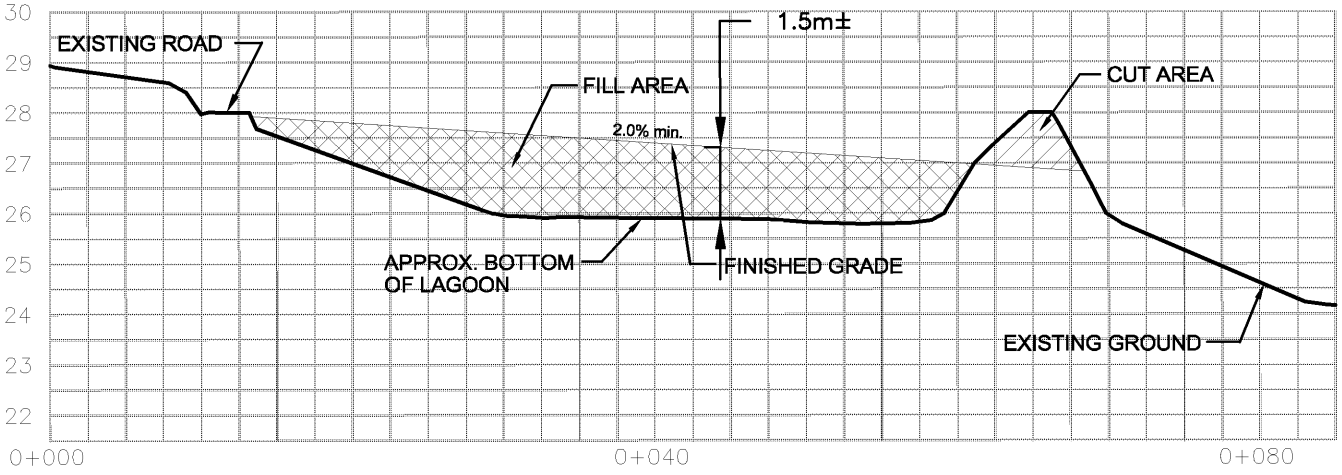
DRAWN: MEB	TITLE: SITE GRADING PLAN	FIG 2

SECTION A-A



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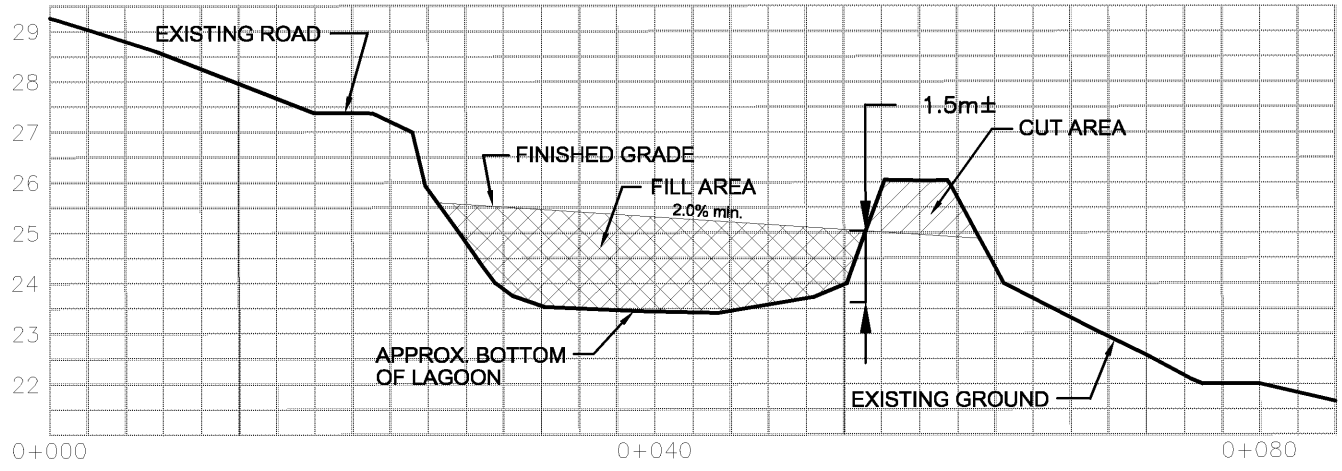

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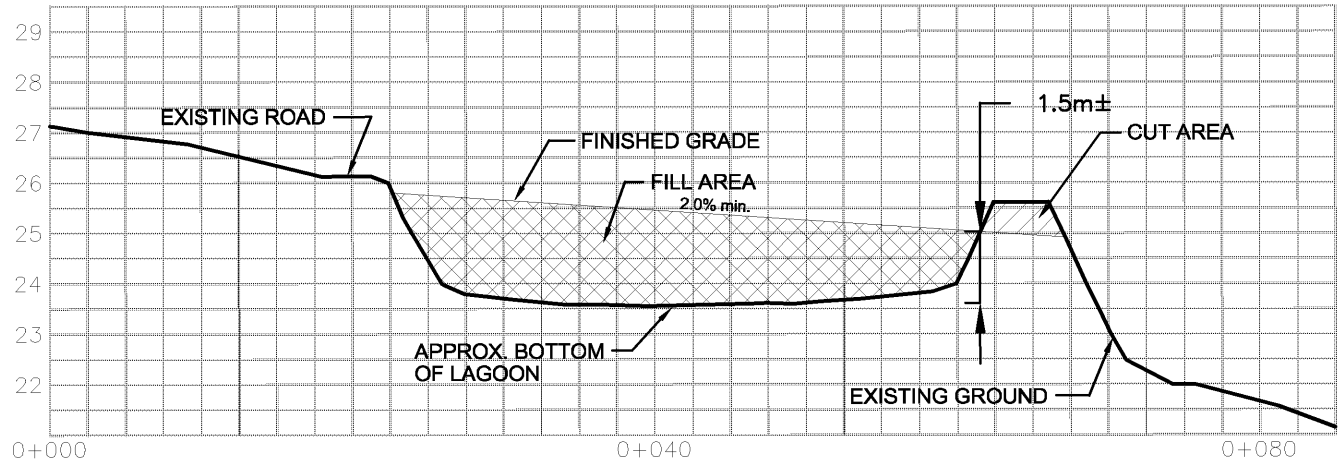

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DATE: 25/01/08	CLIENT: GOVERNMENT OF NUNAVUT		JOB NO. OTCD00019054A
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DRAWN: MEB			FIG 3

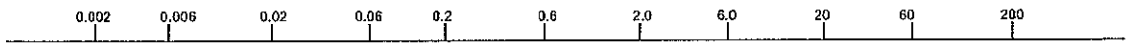
Appendix B:
Borehole Logs

Notes On Sample Descriptions

1. All sample descriptions included in this report follow the Canadian Foundations Engineering Manual soil classification system. This system follows the standard proposed by the International Society for Soil Mechanics and Foundation Engineering. Laboratory grain size analyses provided by Trow Associates Inc. also follow the same system. Different classification systems may be used by others; one such system is the Unified Soil Classification. Please note that, with the exception of those samples where a grain size analysis has been made, all samples are classified visually. Visual classification is not sufficiently accurate to provide exact grain sizing or precise differentiation between size classification systems.

ISSMFE SOIL CLASSIFICATION

CLAY	SILT			SAND			GRAVEL			COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE		



EQUIVALENT GRAIN DIAMETER IN MILLIMETRES

CLAY (PLASTIC) TO	FINE	MEDIUM	CRS.	FINE	COARSE
SILT (NONPLASTIC)	SAND			GRAVEL	

UNIFIED SOIL CLASSIFICATION

2. Fill: Where fill is designated on the borehole log it is defined as indicated by the sample recovered during the boring process. The reader is cautioned that fills are heterogeneous in nature and variable in density or degree of compaction. The borehole description may therefore not be applicable as a general description of site fill materials. All fills should be expected to contain obstruction such as wood, large concrete pieces or subsurface basements, floors, tanks, etc., none of these may have been encountered in the boreholes. Since boreholes cannot accurately define the contents of the fill, test pits are recommended to provide supplementary information. Despite the use of test pits, the heterogeneous nature of fill will leave some ambiguity as to the exact composition of the fill. Most fills contain pockets, seams, or layers of organically contaminated soil. This organic material can result in the generation of methane gas and/or significant ongoing and future settlements. Fill at this site may have been monitored for the presence of methane gas and, if so, the results are given on the borehole logs. The monitoring process does not indicate the volume of gas that can be potentially generated nor does it pinpoint the source of the gas. These readings are to advise of the presence of gas only, and a detailed study is recommended for sites where any explosive gas/methane is detected. Some fill material may be contaminated by toxic/hazardous waste that renders it unacceptable for deposition in any but designated land fill sites; unless specifically stated the fill on this site has not been tested for contaminants that may be considered toxic or hazardous. This testing and a potential hazard study can be undertaken if requested. In most residential/commercial areas undergoing reconstruction, buried oil tanks are common and are generally not detected in a conventional geotechnical site investigation.

3. Till: The term till on the borehole logs indicates that the material originates from a geological process associated with glaciation. Because of this geological process the till must be considered heterogeneous in composition and as such may contain pockets and/or seams of material such as sand, gravel, silt or clay. Till often contains cobbles (60 to 200 mm) or boulders (over 200 mm). Contractors may therefore encounter cobbles and boulders during excavation, even if they are not indicated by the borings. It should be appreciated that normal sampling equipment cannot differentiate the size or type of any obstruction. Because of the horizontal and vertical variability of till, the sample description may be applicable to a very limited zone; caution is therefore essential when dealing with sensitive excavations or dewatering programs in till materials.

Log of Borehole 1

Trow

Project No: OTGE00019054B

Project: Geotechnical Investigation - Existing Sewage lagoon

Location: Arctic Bay, Nunavut

Figure No. 2

Sheet No. 1 of 1

Date Drilled: 'August 25, 2007

Drill Type:

Datum: Geodetic

Logged by: _____ Checked by: _____

Split Spoon Sample	⊠	Combustible Vapour Reading	□
Auger Sample	◫	Natural Moisture Content	×
SPT (N) Value	○	Atterberg Limits	⊢—○
Dynamic Cone Test	——	Undrained Triaxial at % Strain at Failure	⊕
Shelby Tube	■	Shear Strength by Penetrometer Test	▲
Shear Strength by Vane Test	+ S		

GWL	SYMBOLE	SOIL/ROCK DESCRIPTION	Geodetic Elevation	Depth	Standard Penetration Test N Value / Shear Strength (kPa)	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Unit Weight kN/m³
		FILL Sandy gravel, fine to coarse, slightly cohesive, some silt, brown, moist to wet (loose to compact)	25.6 m	0	20 40 60 80 / 50 100 150 200 kPa	250 500 750 / 10 20 30		
					9 ○	×		
					10 ○			
				1				
			24.4					
		SILTY SAND Slightly cohesive, red brown, wet (very dense) Frozen below 1.6 m depth			160/275 mm ⊕			
			24.0					
		Refusal to split spoon sampler @ 1.65 m Depth						

LOG OF BOREHOLE BH1TO1-1.GPJ TROW OTTAWA.GDT 23/1/08

NOTES:
1. Borehole/Test Pit data requires interpretation by Trow before use by others
2. A 19 mm slotted standpipe was installed upon completion of drilling
3. Field work supervised by a Trow representative
4. See Notes on Sample Descriptions
5. This Figure is to read with Trow Associates Inc. report OTGE00019054B

WATER LEVEL RECORDS		
Elapsed Time	Water Level (m)	Hole Open To (m)

CORE DRILLING RECORD			
Run No.	Depth (m)	% Rec.	RQD %

Log of Borehole 2

Trow

Project No: OTGE00019054B

Project: Geotechnical Investigation - Existing Sewage lagoon

Location: Arctic Bay, Nunavut

Figure No. 3

Sheet No. 1 of 1

Date Drilled: 'August 25, 2007

Drill Type:

Datum: Geodetic

Logged by: _____ Checked by: _____

Split Spoon Sample ☒
Auger Sample ▮
SPT (N) Value ○
Dynamic Cone Test ——
Shelby Tube ▩
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits ⊢—○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOL	SOIL/ROCK DESCRIPTION	Geodetic Elevation	Depth	Standard Penetration Test N Value (20 40 60 80) / Shear Strength kPa (50 100 150 200)	Combustible Vapour Reading (ppm) (250 500 750) / Natural Moisture Content % Atterberg Limits (% Dry Weight) (10 20 30)	SAMPLES	Unit Weight kN/m³
		FILL Sand and gravel, silty, occassional cobbles, brown to red brown, moist to wet (loose to dense)	25.7 m	0	7	×		
				1	10	×		
			24.5					
		SANDY GRAVEL Silty, slightly cohesive, red brown, wet (dense) Frozen below 1.8 m depth			31			
			23.9					
		Refusal @ 1.8 m Depth						

NOTES:
1. Borehole/Test Pit data requires Interpretation by Trow before use by others
2. Borehole backfilled upon completion of drilling
3. Field work supervised by a Trow representative
4. See Notes on Sample Descriptions
5. This Figure is to read with Trow Associates Inc. report OTGE00019054B

WATER LEVEL RECORDS		
Elapsed Time	Water Level (m)	Hole Open To (m)

CORE DRILLING RECORD			
Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE BH1TO1-1.GPJ TROW OTTAWA.GDT 23/1/08

Log of Borehole 3

Trow

Project No: OTGE00019054B

Project: Geotechnical Investigation - Existing Sewage lagoon

Location: Arctic Bay, Nunavut

Figure No. 4

Sheet No. 1 of 1

Date Drilled: 'August 25, 2007

Drill Type:

Datum: Geodetic

Logged by: _____ Checked by: _____

Split Spoon Sample	⊠	Combustible Vapour Reading	□
Auger Sample	▯	Natural Moisture Content	×
SPT (N) Value	○	Atterberg Limits	⊢—○
Dynamic Cone Test	——	Undrained Triaxial at % Strain at Failure	⊕
Shelby Tube	■	Shear Strength by Penetrometer Test	▲
Shear Strength by Vane Test	+ S		

GWL	SYMBOL	SOIL/ROCK DESCRIPTION	Geodetic Elevation m	Depth m	Standard Penetration Test N Value (20 40 60 80) / Shear Strength kPa (50 100 150 200)	Combustible Vapour Reading (ppm) (250 500 750) / Natural Moisture Content % Atterberg Limits (% Dry Weight) (10 20 30)	SAMPLES	Unit Weight kN/m³
		FILL Sandy gravel, silty, fine to coarse, brown, moist to wet (loose to very dense)	26.3	0	9 ○	×		
					46 ○		141 ×	
				1				
		Ice lenses below 1.3 m depth			104 ⊕		139 ×	
			24.6					
		Refusal @ 1.68 m Depth						

NOTES:
1. Borehole/Test Pit data requires interpretation by Trow before use by others
2. A 19 mm slotted standpipe was installed upon completion of drilling
3. Field work supervised by a Trow representative
4. See Notes on Sample Descriptions
5. This Figure is to read with Trow Associates Inc. report OTGE00019054B

WATER LEVEL RECORDS		
Elapsed Time	Water Level (m)	Hole Open To (m)

CORE DRILLING RECORD			
Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE BH1TO1-1.GPJ TROW OTTAWA.GDT 23/1/08

Log of Borehole 4

Trow

Project No: OTGE00019054B

Project: Geotechnical Investigation - New Sewage Lagoon

Location: Arctic Bay, Nunavut

Figure No. 5

Sheet No. 1 of 1

Date Drilled: 'August 28, 2007

Drill Type:

Datum: Geodetic

Logged by: _____ Checked by: _____

Split Spoon Sample ☒
Auger Sample ◧
SPT (N) Value o
Dynamic Cone Test ——
Shelby Tube ■
Shear Strength by Vane Test +S

Combustible Vapour Reading □
Natural Moisture Content ×
Atterberg Limits |—○
Undrained Triaxial at % Strain at Failure ⊕
Shear Strength by Penetrometer Test ▲

GWL	SYMBOLE	SOIL/ROCK DESCRIPTION	Geodetic Elevation	Depth
		PEATY TOPSOIL ~300 mm	97.4 m	0
		SILTY SAND Trace clay, gravel and organics, brown (compact) Frozen below 1.4 m depth	97.1	
		GABBRO BEDROCK Grey to black, some inclined fractures, massive, medium to coarse grained	95.8	1
		Borehole Terminated @ 3.51 m Depth	93.9	2 3

Standard Penetration Test N Value: 20 40 60 80
Shear Strength: 50 100 150 200 kPa
Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30
SAMPLES
Unit Weight kN/m³

19
20
40/150 mm
44

NOTES:
1. Borehole/Test Pit data requires Interpretation by Trow before use by others
2. A 19 mm slotted standpipe was installed upon completion of drilling
3. Field work supervised by a Trow representative
4. See Notes on Sample Descriptions
5. This Figure is to read with Trow Associates Inc. report OTGE00019054B

WATER LEVEL RECORDS

Elapsed Time	Water Level (m)	Hole Open To (m)

CORE DRILLING RECORD

Run No.	Depth (m)	% Rec.	RQD %
1	1.63 - 2.39	93	57
2	2.39 - 2.69	92	83
3	2.69 - 3.51	97	80

LOG OF BOREHOLE NEWBH1TO1-1.GPJ TROW OTTAWA.GDT 26/11/07

Log of Borehole 5

Trow

Project No: OTGE00019054B

Project: Geotechnical Investigation - New Sewage Lagoon

Location: Arctic Bay, Nunavut

Figure No. 6

Sheet No. 1 of 1

Date Drilled: August 26, 2007

Drill Type:

Datum: Geodetic

Logged by: _____ Checked by: _____

Split Spoon Sample	⊠	Combustible Vapour Reading	□
Auger Sample	◧	Natural Moisture Content	×
SPT (N) Value	○	Atterberg Limits	⊢○
Dynamic Cone Test	——	Undrained Triaxial at % Strain at Failure	⊕
Shelby Tube	■	Shear Strength by Penetrometer Test	▲
Shear Strength by Vane Test	+ S		

GWL	Symbolic	SOIL/ROCK DESCRIPTION	Geodetic Elevation	Depth
		TOPSOIL Slightly cohesive, organics, trace gravel, reddish brown, wet (very loose)	96.9 m	0
		SAND AND GRAVEL Fine to coarse, some ice lenses, frozen, reddish brown 75 mm thick ice layer	96.4	
		SILTY SAND Some gravel, slightly cohesive, reddish brown, wet	95.7	1
		ICE Some silty sand and gravel ~ 80 to 90 percent ice content	95.3	
		SILTY SAND Some gravel, slightly cohesive, reddish brown, wet	94.8	2
		Borehole Terminated @ 4.27 m Depth	92.6	3 4

Standard Penetration Test N Value: 20 40 60 80

Shear Strength kPa: 50 100 150 200

Combustible Vapour Reading (ppm): 250 500 750

Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30

4/150 mm

15

36/125 mm

Samples: Run 1, Run 2, Run 3, Run 4, Run 5

Unit Weight kN/m³

NOTES:
1. Borehole/Test Pit data requires Interpretation by Trow before use by others
2. Borehole backfilled upon completion of drilling
3. Field work supervised by a Trow representative
4. See Notes on Sample Descriptions
5. This Figure is to read with Trow Associates Inc. report OTGE00019054B

WATER LEVEL RECORDS		
Elapsed Time	Water Level (m)	Hole Open To (m)

CORE DRILLING RECORD			
Run No.	Depth (m)	% Rec.	RQD %

LOG OF BOREHOLE NEWBH1TO1-1.GPJ TROW OTTAWA.GDT 26/11/07

Appendex C:
Analytical Summary Tables

Table 1: Arctic Bay Sewage Lagoon Decommissioning
Soil Analytical Results
Metal Parameters

Sample ID Units Sampling Date	Assessment Criteria[1] ug/g	LAGOON BASE 1 ug/g 03-September-2007	LAGOON BASE 2 ug/g 03-September-2007	LAGOON BASE 2 DUP 1 ug/g 03-September-2007
Antimony	40	5	0.8	0.8
Arsenic	12	2	3	3
Barium	2000	180	280	240
Beryllium	8	0.2	0.4	0.3
Cadmium	22	0.6	0.2	0.1
Chromium	87	22	17	16
Cobalt	300	5.2	8.3	7.9
Copper	91	160	56	53
Lead	600	16	13	11
Mercury	50	0.69	0.22	0.24
Molybdenum	40	2.3	1.2	1.2
Nickel	50	15	16	16
Selenium	2.9	2.8	0.5	0.7
Silver	40	1.7	0.9	0.6
Thallium	1	0.05	0.14	0.13
Vanadium	130	21	26	24
Zinc	360	240	76	73

Notes:

1. Criteria refers to Canadian Soil Quality Guidelines for the Protection of Environmental & Human Health (updated Sept. 2007) - Industrial Setting, coarse grained soils.

Values exceeds criteria

Data Entered - AM
Data Check - CK
Comparison Check - CK
Criteria Entered - AM
Criteria Check - CK

Table 2: Arctic Bay Sewage Lagoon Decommissioning
Soil Analytical Results
Petroleum Hydrocarbon/Organic Parameters

Sample ID Units Sampling Date	Assessment Criteria[1,2] ug/g	LAGOON BASE 1 ug/g 03-September-2007	LAGOON BASE 2 ug/g 03-September-2007
Benzene[1]	360 [1]	<0.02	<0.08
Toluene[1]	500 [1]	1.6	0.015
Ethylbenzene[1]	600 [1]	<0.02	<0.008
Xylenes[1]	700 [1]	<0.02	<0.008
F1 (C6-C10)	700 [2]	<100	<30
F2 (C10-C16)	2000 [2]	1300	710
F3 (C16-C34)	3500 [2]	29000	13000
F4 (C34-C50)	10000 [2]	6200	3700

Notes:
2007)

2. Criteria refers to CCME - Canadian Wide Standards for Petroleum Hydrocarbons (PHC) in Soil (Apr. 2001) - Table 13: Generic Levels for PHC in coarse-grained subsoil - Ecosoil Contact Pathway.
Values exceeds criteria

Data Entered - AM
Data Check - CK
Comparison Check - CK
Criteria Entered - AM
Criteria Check - CK

Table 3: Arctic Bay Sewage Lagoon Decommissioning
Soil Analytical Results
Volatile Organic Compounds

Sample ID Units Sampling Date	Assessment Criteria[1] ug/g	LAGOON BASE 1 ug/g 03-September-2007	LAGOON BASE 2 ug/g 03-September-2007
Acetone	nv	4	1.9
Benzene	360[2]	<0.02	<0.008
Bromodichloromethane	nv	<0.02	<0.008
Bromoform	nv	<0.02	<0.008
Bromomethane	nv	<0.03	<0.012
Carbon Tetrachloride	50	<0.02	<0.008
Chlorobenzene	10	<0.02	<0.008
Chloroform	50	<0.02	<0.008
Dibromochloromethane	nv	<0.02	<0.008
1,2-Dichlorobenzene	10	<0.02	<0.008
1,3-Dichlorobenzene	10	<0.02	<0.008
1,4-Dichlorobenzene	10	0.21	0.027
1,1-Dichloroethane	50	<0.02	<0.008
1,2-Dichloroethane	50	<0.02	<0.008
1,1-Dichloroethylene	50	<0.02	<0.008
Cis-1,2-Dichloroethylene	50	<0.02	<0.008
Trans-1,2-Dichloroethylene	50	<0.02	<0.008
1,2-Dichloropropane	50	<0.02	<0.008
Cis-1,3-Dichloropropylene	50	<0.02	<0.008
Trans-1,3-Dichloropropylene	50	<0.02	<0.008
Ethylbenzene	600	<0.02	<0.008
Ethylene Dibromide	nv	<0.02	<0.008
Methyl Ethyl Ketone	nv	1.6	1.5
Methylene Chloride	nv	<0.03	<0.012
Methyl Isobutyl Ketone	nv	<0.25	<0.1
Methyl-t-Butyl Ether	nv	<0.02	<0.008
Styrene	50	<0.02	<0.008
1,1,1,2-Tetrachloroethane	nv	<0.02	<0.008
1,1,2,2-Tetrachloroethane	50	<0.02	<0.008
Toluene	500[2]	1.6	0.015
Tetrachloroethylene	0.6	<0.02	<0.008
1,1,1-Trichloroethane	50	<0.02	<0.008
1,1,2-Trichloroethane	50	<0.02	<0.008
Trichloroethylene	0.01	<0.02	<0.008
Vinyl Chloride	nv	<0.02	<0.008
Total Xylenes	700	<0.02	<0.008

Notes:

1. Criteria refers to Canadian Soil Quality Guidelines for the Protection of Environmental & Human Health (updated Sept.

2. Benzene, toluene, ethylbenzene, xyles criteria based on soil quality guidelines for environmental health.

nv = no value

Values exceeds criteria

Data Entered - AM
Data Check - CK
Comparison Check - CK
Criteria Entered - AM
Criteria Check - CK

Table 4: Arctic Bay Sewage Lagoon Decommissioning
Groundwater Anayltical Results
Metal Parameters

Sample ID Units Sampling Date	Assessment Criteria[1] ug/L	UPSTREAM LAGOON ug/L 03-September-2007	DOWNSTREAM LAGOON ug/L 03-September-2007	AT HIGHWAY ug/L 03-September-2007
Antimony	16000	<0.5	1.2	<0.5
Arsenic	480	5	2	1
Barium	23000	81	28	20
Beryllium	53	<0.5	<0.5	<0.5
Boron	50000	50	120	91
Cadmium	11	0.3	0.2	<0.1
Chromium	2000	<5	<5	<5
Cobalt	100	31	3.4	0.9
Copper	23	5	86	6
Lead	32	0.9	3.4	<0.5
Molybdenum	73000	1	1	<1
Nickel	1600	30	10	7
Sodium	nv	14000	140000	84000
Selenium	50	<2	<2	<2
Silver	1.2	<0.1	0.4	<0.1
Thallium	400	<0.05	<0.05	<0.1
Vanadium	200	1	2	<1
Zinc	1100	46	95	8

Notes:

1. Criteria refers to Ministry of Environment "Soil, Ground Water and and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" March 9, 2004, Table 3: Non-Potable Groundwater Setting.

nv = no value

Values exceeds criteria

Data Entered - AM
Data Check - CK
Comparison Check - CK
Criteria Entered - AM
Criteria Check - CK

Table 5: Arctic Bay Sewage Lagoon Decommissioning
Groundwater Analytical Results
Petroleum Hydrocarbon/Organic Parameters

Sample ID Units Sampling Date	Assessment Criteria[1] ug/L	UPSTREAM LAGOON ug/L 03-September-2007	DOWNSTREAM LAGOON ug/L 03-September-2007	AT HIGHWAY ug/L 03-September-2007
Benzene[1]	1900 [1]	<0.1	<1	<0.1
Toluene[1]	5900 [1]	<0.2	<2	<0.2
Ethylbenzene[1]	2800 [1]	<0.1	<1	<0.1
Xylenes[1]	5600 [1]	<0.1	<1	<0.1
F1 (C6-C10)	nv	<100	<100	<100
F2 (C10-C16)	nv	<100	<100	<100
F3 (C16-C34)	nv	<100	1400	<100
F4 (C34-C50)	nv	<100	310	<100
Modified TPH=[(C_6-C_2)-BTEX]	20000 [2]	<100	1400	<100

Notes:

1. Criteria refers to Ministry of Environment "Soil, Ground Water and and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" March 9, 2004, Table 3: Non-potable Groundwater Setting.

2. Critera refers to Non-potable Groundwater Setting Atlantic Partners in Risk Based Corrective Action (PIRI)

nv = no value

Values exceeds criteria

Data Entered - AM
Data Check - CK
Comparison Check - CK
Criteria Entered - AM
Criteria Check - CK

Table 6: Arctic Bay Sewage Lagoon Decommissioning
Groundwater Analytical Results
Volatile Organic Compounds

Sample ID Units Sampling Date	Assessment Criteria[1] ug/L	UPSTREAM LAGOON ug/L 03-September-2007	DOWNSTREAM LAGOON ug/L 03-September-2007	AT HIGHWAY ug/L 03-September-2007
Acetone	3300	<10	120	<10
Benzene	1900	<0.1	<1	<0.1
Bromodichloromethane	50000	<0.1	<1	<0.1
Bromoform	840	<0.2	<2	<0.2
Bromomethane	3.7	<0.5	<5	<0.5
Carbon Tetrachloride	17	<0.1	<1	<0.1
Chlorobenzene	500	<0.1	<1	<0.1
Chloroform	430	<0.1	<1	<0.1
Dibromochloromethane	50000	<0.2	<2	<0.2
1,2-Dichlorobenzene	7600	<0.2	<2	<0.2
1,3-Dichlorobenzene	7600	<0.2	<2	<0.2
1,4-Dichlorobenzene	7600	<0.2	<2	<0.2
1,1-Dichloroethane	9000	<0.1	<1	<0.1
1,2-Dichloroethane	17	<0.1	<1	<0.1
1,1-Dichloroethylene	0.66	<0.1	<1	<0.1
Cis-1,2-Dichloroethylene	70	<0.1	<1	<0.1
Trans-1,2-Dichloroethylene	100	<0.1	<1	<0.1
1,2-Dichloropropane	9.3	<0.1	<1	<0.1
Cis-1,3-Dichloropropylene	3.8	<0.2	<2	<0.2
Trans-1,3-Dichloropropylene	3.8	<0.2	<2	<0.2
Ethylbenzene	28000	<0.1	<1	<0.1
Ethylene Dibromide	3.3	<0.2	<2	<0.2
Methyl Ethyl Ketone	50000	<5	<50	<5
Methylene Chloride	50000	<0.5	<5	<0.5
Methyl Isobutyl Ketone	50000	<5	<50	<5
Methyl-t-Butyl Ether	50000	<0.2	<2	<0.2
Styrene	940	<0.1	<1	<0.1
1,1,1,2-Tetrachloroethane	6.0	<0.1	<1	<0.1
1,1,2,2-Tetrachloroethane	22	<0.2	<2	<0.2
Toluene	5900	<0.2	<2	<0.2
Tetrachloroethylene	5.0	<0.1	<1	<0.1
1,1,1-Trichloroethane	200	<0.1	<1	<0.1
1,1,2-Trichloroethane	16000	<0.2	<2	<0.2
Trichloroethylene	50	<0.1	<1	<0.1
Vinyl Chloride	0.5	<0.2	<2	<0.2
Total Xylenes	5600	<0.1	<1	<0.1

Notes:

1. Criteria refers to Ministry of Environment "Soil, Ground Water and and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" March 9, 2004. Table 3: Non-potable Groundwater Condition.

Values exceeds criteria

Data Entered - AM
Data Check - CK
Comparison Check - CK
Criteria Entered - AM
Criteria Check - CK

Appendix D:
Laboratory Certificates of Analysis

Your Project #: OTEN00019054C
Site: ARCTIC BAY
Your C.O.C. #: 00515504

Attention: Chris Kimmerly
Trow Associates Inc
Ottawa
154 Colonnade Rd S
Nepean, ON
K2E 7J5

Report Date: 2007/09/24

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: A7A2428
Received: 2007/09/20, 09:44

Sample Matrix: Soil
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Petroleum Hydro. CCME F1 & BTEX in Soil	2	2007/09/20	2007/09/20	CAM SOP-00315	CCME CWS
Petroleum Hydrocarbons F2-F4 in Soil	2	2007/09/20	2007/09/20	CAM SOP-00316	CCME CWS
F4G (CCME Hydrocarbons Gravimetric)	2	2007/09/24	2007/09/24	CAM SOP-00316	CCME CWS
Mercury in Soil by CVAA	2	2007/09/21	2007/09/21	CAM SOP-00453	EPA 7470
Acid Extr. Metals (aqua regia) by ICPMS	2	2007/09/21	2007/09/21	CAM SOP-00447	EPA 6020
MOISTURE	2	N/A	2007/09/20	Ont SOP-0114	MOE HANDBOOK(1983)
Volatile Organic Compounds in Soil	2	N/A	2007/09/21	CAM SOP 0226	EPA 8260 modified

Sample Matrix: Water
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Petroleum Hydro. CCME F1 & BTEX in Water	3	N/A	2007/09/20	CAM SOP-00315	CCME CWS
Petroleum Hydrocarbons F2-F4 in Water	3	2007/09/20	2007/09/20	CAM SOP-00316	CCME Hydrocarbons
Lab Filtered Metals by ICPMS	1	2007/09/21	2007/09/21	CAM SOP-00447	EPA 6020
Total Metals Analysis by ICPMS	2	N/A	2007/09/21	CAM SOP-00447	EPA 6020
Volatile Organic Compounds in Water	3	N/A	2007/09/21	CAM SOP 0226	EPA 8260 modified

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key
Sam Lyons
24 Sep 2007 17:50:12 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

SAMANTHA LYONS, Project Manager
Email: samantha.lyons@maxxamanalytics.com
Phone# (613) 274-0573 Ext:5797

Your Project #: OTEN00019054C
Site: ARCTIC BAY
Your C.O.C. #: 00515504

Attention: Chris Kimmerly
Trow Associates Inc
Ottawa
154 Colonnade Rd S
Nepean, ON
K2E 7J5

Report Date: 2007/09/24

CERTIFICATE OF ANALYSIS

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. SCC and CAEAL have approved this reporting process and electronic report format.

For Service Group specific validation please refer to the Validation Signature Page

Total cover pages: 2

6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel: 905-817-5700 Toll free:800-563-6266 Fax: 905-817-5777

Maxxam Job #: A7A2428
Report Date: 2007/09/24

Trow Associates Inc
Client Project #: OTEN00019054C
Project name: ARCTIC BAY
Sampler Initials:

RESULTS OF ANALYSES OF SOIL

Maxxam ID		U76841	U76842		
Sampling Date		2007/09/03	2007/09/03		
COC Number		00515504	00515504		
	Units	**LAGOON BASE 1**	**LAGOON BASE 2**	**RDL**	**QC Batch**
INORGANICS					
Moisture	%	89	65	0.2	1365096

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel: 905-817-5700 Toll free:800-563-6266 Fax: 905-817-5777

Maxxam Job #: A7A2428
Report Date: 2007/09/24

Trow Associates Inc
Client Project #: OTEN00019054C
Project name: ARCTIC BAY
Sampler Initials:

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		U76841	U76842	U76842		
Sampling Date		2007/09/03	2007/09/03	2007/09/03		
COC Number		00515504	00515504	00515504		
	Units	**LAGOON BASE 1**	**LAGOON BASE 2**	**LAGOON BASE 2 Lab-Dup**	**RDL**	**QC Batch**
METALS						
Acid Extractable Aluminum (Al)	ug/g	10000	7500	7200	50	1365449
Acid Extractable Antimony (Sb)	ug/g	5.0	0.8	0.8	0.2	1365449
Acid Extractable Arsenic (As)	ug/g	2	3	3	1	1365449
Acid Extractable Barium (Ba)	ug/g	180	280	240	0.5	1365449
Acid Extractable Beryllium (Be)	ug/g	0.2	0.4	0.3	0.2	1365449
Acid Extractable Cadmium (Cd)	ug/g	0.6	0.2	0.1	0.1	1365449
Acid Extractable Calcium (Ca)	ug/g	8400	3600	3600	50	1365449
Acid Extractable Chromium (Cr)	ug/g	22	17	16	1	1365449
Acid Extractable Cobalt (Co)	ug/g	5.2	8.3	7.9	0.1	1365449
Acid Extractable Copper (Cu)	ug/g	160	56	53	0.5	1365449
Acid Extractable Iron (Fe)	ug/g	14000	18000	17000	50	1365449
Acid Extractable Lead (Pb)	ug/g	16	13	11	1	1365449
Acid Extractable Magnesium (Mg)	ug/g	2700	3900	3700	50	1365449
Acid Extractable Manganese (Mn)	ug/g	130	190	190	1	1365449
Acid Extractable Mercury (Hg)	ug/g	0.69	0.22	0.24	0.05	1365480
Acid Extractable Molybdenum (Mo)	ug/g	2.3	1.2	1.2	0.5	1365449
Acid Extractable Nickel (Ni)	ug/g	15	16	16	0.5	1365449
Acid Extractable Phosphorus (P)	ug/g	2000	540	540	50	1365449
Acid Extractable Potassium (K)	ug/g	820	1100	1100	200	1365449
Acid Extractable Selenium (Se)	ug/g	2.8	0.5	0.7	0.5	1365449
Acid Extractable Silver (Ag)	ug/g	1.7	0.9	0.6	0.2	1365449
Acid Extractable Sodium (Na)	ug/g	390	390	380	100	1365449
Acid Extractable Strontium (Sr)	ug/g	27	14	13	1	1365449
Acid Extractable Thallium (Tl)	ug/g	0.05	0.14	0.13	0.05	1365449
Acid Extractable Vanadium (V)	ug/g	21	26	24	5	1365449
Acid Extractable Zinc (Zn)	ug/g	240	76	73	5	1365449

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel: 905-817-5700 Toll free:800-563-6266 Fax: 905-817-5777

Maxxam Job #: A7A2428
Report Date: 2007/09/24

Trow Associates Inc
Client Project #: OTEN00019054C
Project name: ARCTIC BAY
Sampler Initials:

VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID		U76841		U76842		
Sampling Date		2007/09/03		2007/09/03		
COC Number		00515504		00515504		
	Units	**LAGOON BASE 1**	**RDL**	**LAGOON BASE 2**	**RDL**	**QC Batch**
VOLATILES						
Acetone (2-Propanone)	ug/g	4	1	1.9	0.4	1364987
Benzene	ug/g	<0.02	0.02	<0.008	0.008	1364987
Bromodichloromethane	ug/g	<0.02	0.02	<0.008	0.008	1364987
Bromoform	ug/g	<0.02	0.02	<0.008	0.008	1364987
Bromomethane	ug/g	<0.03	0.03	<0.012	0.012	1364987
Carbon Tetrachloride	ug/g	<0.02	0.02	<0.008	0.008	1364987
Chlorobenzene	ug/g	<0.02	0.02	<0.008	0.008	1364987
Chloroform	ug/g	<0.02	0.02	<0.008	0.008	1364987
Dibromochloromethane	ug/g	<0.02	0.02	<0.008	0.008	1364987
1,2-Dichlorobenzene	ug/g	<0.02	0.02	<0.008	0.008	1364987
1,3-Dichlorobenzene	ug/g	<0.02	0.02	<0.008	0.008	1364987
1,4-Dichlorobenzene	ug/g	0.21	0.02	0.027	0.008	1364987
1,1-Dichloroethane	ug/g	<0.02	0.02	<0.008	0.008	1364987
1,2-Dichloroethane	ug/g	<0.02	0.02	<0.008	0.008	1364987
1,1-Dichloroethylene	ug/g	<0.02	0.02	<0.008	0.008	1364987
cis-1,2-Dichloroethylene	ug/g	<0.02	0.02	<0.008	0.008	1364987
trans-1,2-Dichloroethylene	ug/g	<0.02	0.02	<0.008	0.008	1364987
1,2-Dichloropropane	ug/g	<0.02	0.02	<0.008	0.008	1364987
cis-1,3-Dichloropropene	ug/g	<0.02	0.02	<0.008	0.008	1364987
trans-1,3-Dichloropropene	ug/g	<0.02	0.02	<0.008	0.008	1364987
Ethylbenzene	ug/g	<0.02	0.02	<0.008	0.008	1364987
Ethylene Dibromide	ug/g	<0.02	0.02	<0.008	0.008	1364987
Methylene Chloride(Dichloromethane)	ug/g	<0.03	0.03	<0.012	0.012	1364987
Methyl Isobutyl Ketone	ug/g	<0.25	0.25	<0.1	0.1	1364987
Methyl Ethyl Ketone (2-Butanone)	ug/g	1.6	0.25	1.5	0.1	1364987
Methyl t-butyl ether (MTBE)	ug/g	<0.02	0.02	<0.008	0.008	1364987
Styrene	ug/g	<0.02	0.02	<0.008	0.008	1364987
1,1,1,2-Tetrachloroethane	ug/g	<0.02	0.02	<0.008	0.008	1364987
1,1,2,2-Tetrachloroethane	ug/g	<0.02	0.02	<0.008	0.008	1364987
Tetrachloroethylene	ug/g	<0.02	0.02	<0.008	0.008	1364987
Toluene	ug/g	1.6	0.02	0.015	0.008	1364987
1,1,1-Trichloroethane	ug/g	<0.02	0.02	<0.008	0.008	1364987
1,1,2-Trichloroethane	ug/g	<0.02	0.02	<0.008	0.008	1364987

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel: 905-817-5700 Toll free:800-563-6266 Fax: 905-817-5777

Maxxam Job #: A7A2428
Report Date: 2007/09/24

Trow Associates Inc
Client Project #: OTEN00019054C
Project name: ARCTIC BAY
Sampler Initials:

VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID		U76841		U76842		
Sampling Date		2007/09/03		2007/09/03		
COC Number		00515504		00515504		
	Units	**LAGOON BASE 1**	**RDL**	**LAGOON BASE 2**	**RDL**	**QC Batch**
Trichloroethylene	ug/g	<0.02	0.02	<0.008	0.008	1364987
Vinyl Chloride	ug/g	<0.02	0.02	<0.008	0.008	1364987
p+m-Xylene	ug/g	<0.02	0.02	<0.008	0.008	1364987
o-Xylene	ug/g	<0.02	0.02	<0.008	0.008	1364987
Xylene (Total)	ug/g	<0.02	0.02	<0.008	0.008	1364987
Surrogate Recovery (%)						
4-Bromofluorobenzene	%	79		81		1364987
D4-1,2-Dichloroethane	%	100		90		1364987
D8-Toluene	%	105		127		1364987

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: A7A2428
Report Date: 2007/09/24

Trow Associates Inc
Client Project #: OTEN00019054C
Project name: ARCTIC BAY
Sampler Initials:

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		U76841		U76842		
Sampling Date		2007/09/03		2007/09/03		
COC Number		00515504		00515504		
	Units	**LAGOON BASE 1**	**RDL**	**LAGOON BASE 2**	**RDL**	**QC Batch**
F1 PHC and BTEX						
F1 (C6-C10)	ug/g	<100	100	<30	30	1364867
F1 (C6-C10) - BTEX	ug/g	<100	100	<30	30	1364867
F2-F4 PHC						
F4G (Grav. Heavy Hydrocarbons)	ug/g	65000	100	28000	100	1366993
F2 (C10-C16 Hydrocarbons)	ug/g	1300	100	710	90	1365110
F3 (C16-C34 Hydrocarbons)	ug/g	29000	100	13000	90	1365110
F4 (C34-C50 Hydrocarbons)	ug/g	6200	100	3700	90	1365110
Reached Baseline at C50	ug/g	No		No		1365110
Surrogate Recovery (%)						
1,4-Difluorobenzene	%	101		102		1364867
4-Bromofluorobenzene	%	100		100		1364867
D10-Ethylbenzene	%	91		116		1364867
D4-1,2-Dichloroethane	%	103		100		1364867
o-Terphenyl	%	119		120		1365110

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel: 905-817-5700 Toll free:800-563-6266 Fax: 905-817-5777

Maxxam Job #: A7A2428
Report Date: 2007/09/24

Trow Associates Inc
Client Project #: OTEN00019054C
Project name: ARCTIC BAY
Sampler Initials:

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		U76838	U76839	U76840		
Sampling Date		2007/09/03 11:30	2007/09/03 11:30	2007/09/03 11:30		
COC Number		00515504	00515504	00515504		
	Units	**UPSTREAM LAGOON**	**DOWNSTREAM LAGOON**	**AT HIGHWAY**	**RDL**	**QC Batch**
METALS						
Dissolved Aluminum (Al)	ug/L			6	5	1365269
Total Aluminum (Al)	ug/L	330	770		5	1365285
Dissolved Antimony (Sb)	ug/L			<0.5	0.5	1365269
Total Antimony (Sb)	ug/L	<0.5	1.2		0.5	1365285
Dissolved Arsenic (As)	ug/L			1	1	1365269
Total Arsenic (As)	ug/L	5	2		1	1365285
Dissolved Barium (Ba)	ug/L			20	5	1365269
Total Barium (Ba)	ug/L	81	28		5	1365285
Dissolved Beryllium (Be)	ug/L			<0.5	0.5	1365269
Total Beryllium (Be)	ug/L	<0.5	<0.5		0.5	1365285
Dissolved Bismuth (Bi)	ug/L			<1	1	1365269
Total Bismuth (Bi)	ug/L	<1	<1		1	1365285
Dissolved Boron (B)	ug/L			91	10	1365269
Total Boron (B)	ug/L	50	120		10	1365285
Dissolved Cadmium (Cd)	ug/L			<0.1	0.1	1365269
Total Cadmium (Cd)	ug/L	0.3	0.2		0.1	1365285
Dissolved Calcium (Ca)	ug/L			34000	200	1365269
Total Calcium (Ca)	ug/L	44000	16000		200	1365285
Dissolved Chromium (Cr)	ug/L			<5	5	1365269
Total Chromium (Cr)	ug/L	<5	<5		5	1365285
Dissolved Cobalt (Co)	ug/L			0.9	0.5	1365269
Total Cobalt (Co)	ug/L	31	3.4		0.5	1365285
Dissolved Copper (Cu)	ug/L			6	1	1365269
Total Copper (Cu)	ug/L	5	86		1	1365285
Dissolved Iron (Fe)	ug/L			89	50	1365269
Total Iron (Fe)	ug/L	5600	1100		50	1365285
Dissolved Lead (Pb)	ug/L			<0.5	0.5	1365269
Total Lead (Pb)	ug/L	0.9	3.4		0.5	1365285
Dissolved Lithium (Li)	ug/L			<5	5	1365269
Total Lithium (Li)	ug/L	<5	<5		5	1365285
Dissolved Magnesium (Mg)	ug/L			23000	50	1365269
Total Magnesium (Mg)	ug/L	33000	11000		50	1365285

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: A7A2428
Report Date: 2007/09/24

Trow Associates Inc
Client Project #: OTEN00019054C
Project name: ARCTIC BAY
Sampler Initials:

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		U76838	U76839	U76840		
Sampling Date		2007/09/03 11:30	2007/09/03 11:30	2007/09/03 11:30		
COC Number		00515504	00515504	00515504		
	Units	**UPSTREAM LAGOON**	**DOWNSTREAM LAGOON**	**AT HIGHWAY**	**RDL**	**QC Batch**
Dissolved Manganese (Mn)	ug/L			5	2	1365269
Total Manganese (Mn)	ug/L	2600	230		2	1365285
Dissolved Molybdenum (Mo)	ug/L			<1	1	1365269
Total Molybdenum (Mo)	ug/L	1	1		1	1365285
Dissolved Nickel (Ni)	ug/L			7	1	1365269
Total Nickel (Ni)	ug/L	30	10		1	1365285
Dissolved Potassium (K)	ug/L			12000	200	1365269
Total Potassium (K)	ug/L	3900	38000		200	1365285
Dissolved Selenium (Se)	ug/L			<2	2	1365269
Total Selenium (Se)	ug/L	<2	<2		2	1365285
Dissolved Silicon (Si)	ug/L			3200	50	1365269
Total Silicon (Si)	ug/L	4700	7800		50	1365285
Dissolved Silver (Ag)	ug/L			<0.1	0.1	1365269
Total Silver (Ag)	ug/L	<0.1	0.4		0.1	1365285
Dissolved Sodium (Na)	ug/L			84000	100	1365269
Total Sodium (Na)	ug/L	14000	140000		100	1365285
Dissolved Strontium (Sr)	ug/L			55	1	1365269
Total Strontium (Sr)	ug/L	85	21		1	1365285
Dissolved Tellurium (Te)	ug/L			<1	1	1365269
Total Tellurium (Te)	ug/L	<1	<1		1	1365285
Dissolved Thallium (Tl)	ug/L			<0.1	0.1	1365269
Total Thallium (Tl)	ug/L	<0.05	<0.05		0.05	1365285
Dissolved Thorium (Th)	ug/L			<1	1	1365269
Total Thorium (Th)	ug/L	<1	<1		1	1365285
Dissolved Tin (Sn)	ug/L			<1	1	1365269
Total Tin (Sn)	ug/L	<1	2		1	1365285
Dissolved Titanium (Ti)	ug/L			<5	5	1365269
Total Titanium (Ti)	ug/L	12	7		5	1365285
Dissolved Tungsten (W)	ug/L			<1	1	1365269
Total Tungsten (W)	ug/L	<1	<1		1	1365285
Dissolved Uranium (U)	ug/L			<0.2	0.2	1365269
Total Uranium (U)	ug/L	<0.1	0.3		0.1	1365285
Dissolved Vanadium (V)	ug/L			<1	1	1365269

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: A7A2428
Report Date: 2007/09/24

Trow Associates Inc
Client Project #: OTEN00019054C
Project name: ARCTIC BAY
Sampler Initials:

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		U76838	U76839	U76840		
Sampling Date		2007/09/03 11:30	2007/09/03 11:30	2007/09/03 11:30		
COC Number		00515504	00515504	00515504		
	Units	**UPSTREAM LAGOON**	**DOWNSTREAM LAGOON**	**AT HIGHWAY**	**RDL**	**QC Batch**
Total Vanadium (V)	ug/L	1	2		1	1365285
Dissolved Zinc (Zn)	ug/L			8	5	1365269
Total Zinc (Zn)	ug/L	46	95		5	1365285
Dissolved Zirconium (Zr)	ug/L			<1	1	1365269
Total Zirconium (Zr)	ug/L	<1	<1		1	1365285
NUTRIENTS						
Dissolved Phosphorus (P)	ug/L			1000	50	1365269

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: A7A2428
Report Date: 2007/09/24

Trow Associates Inc
Client Project #: OTEN00019054C
Project name: ARCTIC BAY
Sampler Initials:

VOLATILE ORGANICS BY GC/MS (WATER)

Maxxam ID		U76838		U76839		
Sampling Date		2007/09/03 11:30		2007/09/03 11:30		
COC Number		00515504		00515504		
	Units	**UPSTREAM LAGOON**	**RDL**	**DOWNSTREAM LAGOON**	**RDL**	**QC Batch**
VOLATILES						
Acetone (2-Propanone)	ug/L	<10	10	120	100	1364921
Benzene	ug/L	<0.1	0.1	<1	1	1364921
Bromodichloromethane	ug/L	<0.1	0.1	<1	1	1364921
Bromoform	ug/L	<0.2	0.2	<2	2	1364921
Bromomethane	ug/L	<0.5	0.5	<5	5	1364921
Carbon Tetrachloride	ug/L	<0.1	0.1	<1	1	1364921
Chlorobenzene	ug/L	<0.1	0.1	<1	1	1364921
Chloroform	ug/L	<0.1	0.1	<1	1	1364921
Dibromochloromethane	ug/L	<0.2	0.2	<2	2	1364921
1,2-Dichlorobenzene	ug/L	<0.2	0.2	<2	2	1364921
1,3-Dichlorobenzene	ug/L	<0.2	0.2	<2	2	1364921
1,4-Dichlorobenzene	ug/L	<0.2	0.2	<2	2	1364921
1,1-Dichloroethane	ug/L	<0.1	0.1	<1	1	1364921
1,2-Dichloroethane	ug/L	<0.1	0.1	<1	1	1364921
1,1-Dichloroethylene	ug/L	<0.1	0.1	<1	1	1364921
cis-1,2-Dichloroethylene	ug/L	<0.1	0.1	<1	1	1364921
trans-1,2-Dichloroethylene	ug/L	<0.1	0.1	<1	1	1364921
1,2-Dichloropropane	ug/L	<0.1	0.1	<1	1	1364921
cis-1,3-Dichloropropene	ug/L	<0.2	0.2	<2	2	1364921
trans-1,3-Dichloropropene	ug/L	<0.2	0.2	<2	2	1364921
Ethylbenzene	ug/L	<0.1	0.1	<1	1	1364921
Ethylene Dibromide	ug/L	<0.2	0.2	<2	2	1364921
Methylene Chloride(Dichloromethane)	ug/L	<0.5	0.5	<5	5	1364921
Methyl Isobutyl Ketone	ug/L	<5	5	<50	50	1364921
Methyl Ethyl Ketone (2-Butanone)	ug/L	<5	5	<50	50	1364921
Methyl t-butyl ether (MTBE)	ug/L	<0.2	0.2	<2	2	1364921
Styrene	ug/L	<0.1	0.1	<1	1	1364921
1,1,1,2-Tetrachloroethane	ug/L	<0.1	0.1	<1	1	1364921
1,1,2,2-Tetrachloroethane	ug/L	<0.2	0.2	<2	2	1364921
Tetrachloroethylene	ug/L	<0.1	0.1	<1	1	1364921
Toluene	ug/L	<0.2	0.2	<2	2	1364921
1,1,1-Trichloroethane	ug/L	<0.1	0.1	<1	1	1364921

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: A7A2428
Report Date: 2007/09/24

Trow Associates Inc
Client Project #: OTEN00019054C
Project name: ARCTIC BAY
Sampler Initials:

VOLATILE ORGANICS BY GC/MS (WATER)

Maxxam ID		U76838		U76839		
Sampling Date		2007/09/03 11:30		2007/09/03 11:30		
COC Number		00515504		00515504		
	Units	**UPSTREAM LAGOON**	**RDL**	**DOWNSTREAM LAGOON**	**RDL**	**QC Batch**
1,1,2-Trichloroethane	ug/L	<0.2	0.2	<2	2	1364921
Trichloroethylene	ug/L	<0.1	0.1	<1	1	1364921
Vinyl Chloride	ug/L	<0.2	0.2	<2	2	1364921
p+m-Xylene	ug/L	<0.1	0.1	<1	1	1364921
o-Xylene	ug/L	<0.1	0.1	<1	1	1364921
Xylene (Total)	ug/L	<0.1	0.1	<1	1	1364921
Surrogate Recovery (%)						
4-Bromofluorobenzene	%	100		104		1364921
D4-1,2-Dichloroethane	%	94		93		1364921
D8-Toluene	%	99		100		1364921

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: A7A2428
Report Date: 2007/09/24

Trow Associates Inc
Client Project #: OTEN00019054C
Project name: ARCTIC BAY
Sampler Initials:

VOLATILE ORGANICS BY GC/MS (WATER)

Maxxam ID		U76840		
Sampling Date		2007/09/03 11:30		
COC Number		00515504		
	Units	**AT HIGHWAY**	**RDL**	**QC Batch**
VOLATILES				
Acetone (2-Propanone)	ug/L	<10	10	1364921
Benzene	ug/L	<0.1	0.1	1364921
Bromodichloromethane	ug/L	<0.1	0.1	1364921
Bromoform	ug/L	<0.2	0.2	1364921
Bromomethane	ug/L	<0.5	0.5	1364921
Carbon Tetrachloride	ug/L	<0.1	0.1	1364921
Chlorobenzene	ug/L	<0.1	0.1	1364921
Chloroform	ug/L	<0.1	0.1	1364921
Dibromochloromethane	ug/L	<0.2	0.2	1364921
1,2-Dichlorobenzene	ug/L	<0.2	0.2	1364921
1,3-Dichlorobenzene	ug/L	<0.2	0.2	1364921
1,4-Dichlorobenzene	ug/L	<0.2	0.2	1364921
1,1-Dichloroethane	ug/L	<0.1	0.1	1364921
1,2-Dichloroethane	ug/L	<0.1	0.1	1364921
1,1-Dichloroethylene	ug/L	<0.1	0.1	1364921
cis-1,2-Dichloroethylene	ug/L	<0.1	0.1	1364921
trans-1,2-Dichloroethylene	ug/L	<0.1	0.1	1364921
1,2-Dichloropropane	ug/L	<0.1	0.1	1364921
cis-1,3-Dichloropropene	ug/L	<0.2	0.2	1364921
trans-1,3-Dichloropropene	ug/L	<0.2	0.2	1364921
Ethylbenzene	ug/L	<0.1	0.1	1364921
Ethylene Dibromide	ug/L	<0.2	0.2	1364921
Methylene Chloride(Dichloromethane)	ug/L	<0.5	0.5	1364921
Methyl Isobutyl Ketone	ug/L	<5	5	1364921
Methyl Ethyl Ketone (2-Butanone)	ug/L	<5	5	1364921
Methyl t-butyl ether (MTBE)	ug/L	<0.2	0.2	1364921
Styrene	ug/L	<0.1	0.1	1364921
1,1,1,2-Tetrachloroethane	ug/L	<0.1	0.1	1364921
1,1,2,2-Tetrachloroethane	ug/L	<0.2	0.2	1364921
Tetrachloroethylene	ug/L	<0.1	0.1	1364921
Toluene	ug/L	<0.2	0.2	1364921
1,1,1-Trichloroethane	ug/L	<0.1	0.1	1364921
1,1,2-Trichloroethane	ug/L	<0.2	0.2	1364921

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: A7A2428
Report Date: 2007/09/24

Trow Associates Inc
Client Project #: OTEN00019054C
Project name: ARCTIC BAY
Sampler Initials:

VOLATILE ORGANICS BY GC/MS (WATER)

Maxxam ID		U76840		
Sampling Date		2007/09/03 11:30		
COC Number		00515504		
	Units	**AT HIGHWAY**	**RDL**	**QC Batch**
Trichloroethylene	ug/L	<0.1	0.1	1364921
Vinyl Chloride	ug/L	<0.2	0.2	1364921
p+m-Xylene	ug/L	<0.1	0.1	1364921
o-Xylene	ug/L	<0.1	0.1	1364921
Xylene (Total)	ug/L	<0.1	0.1	1364921
Surrogate Recovery (%)				
4-Bromofluorobenzene	%	103		1364921
D4-1,2-Dichloroethane	%	97		1364921
D8-Toluene	%	100		1364921

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel: 905-817-5700 Toll free:800-563-6266 Fax: 905-817-5777

Maxxam Job #: A7A2428
Report Date: 2007/09/24

Trow Associates Inc
Client Project #: OTEN00019054C
Project name: ARCTIC BAY
Sampler Initials:

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		U76838	U76839	U76840		
Sampling Date		2007/09/03 11:30	2007/09/03 11:30	2007/09/03 11:30		
COC Number		00515504	00515504	00515504		
	Units	**UPSTREAM LAGOON**	**DOWNSTREAM LAGOON**	**AT HIGHWAY**	**RDL**	**QC Batch**
F1 PHC and BTEX						
F1 (C6-C10)	ug/L	<100	<100	<100	100	1364914
F1 (C6-C10) - BTEX	ug/L	<100	<100	<100	100	1364914
F2-F4 PHC						
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	<100	100	1365076
F3 (C16-C34 Hydrocarbons)	ug/L	<100	1400	<100	100	1365076
F4 (C34-C50 Hydrocarbons)	ug/L	<100	310	<100	100	1365076
Reached Baseline at C50	ug/L	Yes	Yes	Yes		1365076
Surrogate Recovery (%)						
1,4-Difluorobenzene	%	98	96	101		1364914
4-Bromofluorobenzene	%	94	102	94		1364914
D10-Ethylbenzene	%	103	104	104		1364914
D4-1,2-Dichloroethane	%	108	107	112		1364914
o-Terphenyl	%	124	88	127		1365076

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Trow Associates Inc
Client Project #: OTEN00019054C
Project name: ARCTIC BAY
Sampler Initials:

Package 1	8.7°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

F1BTEX Analysis: The BTEX results used for the F1-BTEX calculation were obtained from Headspace-GC analysis.

VOC Analysis: DLs were adjusted for high moisture content.

Sample U76839-01: VOC Analysis: Due to foaming, the sample required dilution. The DLs were adjusted accordingly.

Sample U76841-01: BTEX/F1-F4 Analysis: The sample had a high percent of moisture. DLs were adjusted for the dry weight of sample.

Sample U76842-01: BTEX/F1-F4 Analysis: The sample had a high percent of moisture. DLs were adjusted for the dry weight of sample.

F2-F4 Analysis: Sample was diluted due to high concentration of target analytes. The DLs were adjusted accordingly.

Results relate only to the items tested.

6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel: 905-817-5700 Toll free:800-563-6266 Fax: 905-817-5777

Trow Associates Inc
Attention: Chris Kimmerly
Client Project #: OTEN00019054C
P.O. #:
Project name: ARCTIC BAY

Quality Assurance Report

Maxxam Job Number: TA7A2428

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
1364867 ABD	MATRIX SPIKE	1,4-Difluorobenzene	2007/09/20		101	%	60 - 140
		4-Bromofluorobenzene	2007/09/20		101	%	60 - 140
		D10-Ethylbenzene	2007/09/20		107	%	30 - 130
		D4-1,2-Dichloroethane	2007/09/20		103	%	60 - 140
		F1 (C6-C10)	2007/09/20		110	%	60 - 140
	Spiked Blank	1,4-Difluorobenzene	2007/09/20		101	%	60 - 140
		4-Bromofluorobenzene	2007/09/20		101	%	60 - 140
		D10-Ethylbenzene	2007/09/20		101	%	30 - 130
		D4-1,2-Dichloroethane	2007/09/20		105	%	60 - 140
		F1 (C6-C10)	2007/09/20		93	%	60 - 140
	Method Blank	1,4-Difluorobenzene	2007/09/20		103	%	60 - 140
		4-Bromofluorobenzene	2007/09/20		102	%	60 - 140
		D10-Ethylbenzene	2007/09/20		100	%	30 - 130
		D4-1,2-Dichloroethane	2007/09/20		105	%	60 - 140
		F1 (C6-C10)	2007/09/20	<10		ug/g	
		F1 (C6-C10) - BTEX	2007/09/20	<10		ug/g	
	RPD	F1 (C6-C10)	2007/09/20	NC		%	50
		F1 (C6-C10) - BTEX	2007/09/20	NC		%	50
1364914 GRU	MATRIX SPIKE	1,4-Difluorobenzene	2007/09/20		96	%	70 - 130
		4-Bromofluorobenzene	2007/09/20		103	%	70 - 130
		D10-Ethylbenzene	2007/09/20		78	%	70 - 130
		D4-1,2-Dichloroethane	2007/09/20		112	%	70 - 130
		F1 (C6-C10)	2007/09/20		83	%	70 - 130
	Spiked Blank	1,4-Difluorobenzene	2007/09/20		100	%	70 - 130
		4-Bromofluorobenzene	2007/09/20		103	%	70 - 130
		D10-Ethylbenzene	2007/09/20		81	%	70 - 130
		D4-1,2-Dichloroethane	2007/09/20		110	%	70 - 130
		F1 (C6-C10)	2007/09/20		89	%	70 - 130
	Method Blank	1,4-Difluorobenzene	2007/09/20		100	%	70 - 130
		4-Bromofluorobenzene	2007/09/20		92	%	70 - 130
		D10-Ethylbenzene	2007/09/20		87	%	70 - 130
		D4-1,2-Dichloroethane	2007/09/20		108	%	70 - 130
		F1 (C6-C10)	2007/09/20	<100		ug/L	
		F1 (C6-C10) - BTEX	2007/09/20	<100		ug/L	
	RPD	F1 (C6-C10)	2007/09/20	NC		%	40
		F1 (C6-C10) - BTEX	2007/09/20	NC		%	40
1364921 TPI	MATRIX SPIKE	4-Bromofluorobenzene	2007/09/21		104	%	70 - 130
		D4-1,2-Dichloroethane	2007/09/21		92	%	70 - 130
		D8-Toluene	2007/09/21		101	%	70 - 130
		Acetone (2-Propanone)	2007/09/21		102	%	60 - 140
		Benzene	2007/09/21		104	%	70 - 130
		Bromodichloromethane	2007/09/21		102	%	70 - 130
		Bromoform	2007/09/21		111	%	70 - 130
		Bromomethane	2007/09/21		110	%	60 - 140
		Carbon Tetrachloride	2007/09/21		106	%	70 - 130
		Chlorobenzene	2007/09/21		102	%	70 - 130
		Chloroform	2007/09/21		101	%	70 - 130
		Dibromochloromethane	2007/09/21		107	%	70 - 130
		1,2-Dichlorobenzene	2007/09/21		98	%	70 - 130
		1,3-Dichlorobenzene	2007/09/21		101	%	70 - 130
		1,4-Dichlorobenzene	2007/09/21		102	%	70 - 130
		1,1-Dichloroethane	2007/09/21		102	%	70 - 130
		1,2-Dichloroethane	2007/09/21		97	%	70 - 130
		1,1-Dichloroethylene	2007/09/21		104	%	70 - 130
		cis-1,2-Dichloroethylene	2007/09/21		106	%	70 - 130
		trans-1,2-Dichloroethylene	2007/09/21		105	%	70 - 130

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Client Project #: OTEN00019054C
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Quality Assurance Report (Continued)

Maxxam Job Number: TA7A2428

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
1364921 TPI	MATRIX SPIKE	1,2-Dichloropropane	2007/09/21		104	%	70 - 130
		cis-1,3-Dichloropropene	2007/09/21		108	%	70 - 130
		trans-1,3-Dichloropropene	2007/09/21		107	%	70 - 130
		Ethylbenzene	2007/09/21		104	%	70 - 130
		Ethylene Dibromide	2007/09/21		104	%	70 - 130
		Methylene Chloride(Dichloromethane)	2007/09/21		104	%	70 - 130
		Methyl Isobutyl Ketone	2007/09/21		98	%	60 - 140
		Methyl Ethyl Ketone (2-Butanone)	2007/09/21		107	%	60 - 140
		Methyl t-butyl ether (MTBE)	2007/09/21		104	%	70 - 130
		Styrene	2007/09/21		109	%	70 - 130
		1,1,1,2-Tetrachloroethane	2007/09/21		106	%	70 - 130
		1,1,2,2-Tetrachloroethane	2007/09/21		102	%	70 - 130
		Tetrachloroethylene	2007/09/21		105	%	70 - 130
		Toluene	2007/09/21		103	%	70 - 130
		1,1,1-Trichloroethane	2007/09/21		103	%	70 - 130
		1,1,2-Trichloroethane	2007/09/21		100	%	70 - 130
		Trichloroethylene	2007/09/21		106	%	70 - 130
		Vinyl Chloride	2007/09/21		101	%	70 - 130
		p+m-Xylene	2007/09/21		105	%	70 - 130
		o-Xylene	2007/09/21		106	%	70 - 130
	Spiked Blank	4-Bromofluorobenzene	2007/09/21		104	%	70 - 130
		D4-1,2-Dichloroethane	2007/09/21		92	%	70 - 130
		D8-Toluene	2007/09/21		100	%	70 - 130
		Acetone (2-Propanone)	2007/09/21		103	%	60 - 140
		Benzene	2007/09/21		103	%	70 - 130
		Bromodichloromethane	2007/09/21		102	%	70 - 130
		Bromoform	2007/09/21		107	%	70 - 130
		Bromomethane	2007/09/21		98	%	60 - 140
		Carbon Tetrachloride	2007/09/21		103	%	70 - 130
		Chlorobenzene	2007/09/21		102	%	70 - 130
		Chloroform	2007/09/21		101	%	70 - 130
		Dibromochloromethane	2007/09/21		105	%	70 - 130
		1,2-Dichlorobenzene	2007/09/21		98	%	70 - 130
		1,3-Dichlorobenzene	2007/09/21		101	%	70 - 130
		1,4-Dichlorobenzene	2007/09/21		102	%	70 - 130
		1,1-Dichloroethane	2007/09/21		102	%	70 - 130
		1,2-Dichloroethane	2007/09/21		98	%	70 - 130
		1,1-Dichloroethylene	2007/09/21		103	%	70 - 130
		cis-1,2-Dichloroethylene	2007/09/21		105	%	70 - 130
		trans-1,2-Dichloroethylene	2007/09/21		104	%	70 - 130
		1,2-Dichloropropane	2007/09/21		105	%	70 - 130
		cis-1,3-Dichloropropene	2007/09/21		107	%	70 - 130
		trans-1,3-Dichloropropene	2007/09/21		105	%	70 - 130
		Ethylbenzene	2007/09/21		104	%	70 - 130
		Ethylene Dibromide	2007/09/21		104	%	70 - 130
		Methylene Chloride(Dichloromethane)	2007/09/21		105	%	70 - 130
		Methyl Isobutyl Ketone	2007/09/21		99	%	60 - 140
		Methyl Ethyl Ketone (2-Butanone)	2007/09/21		104	%	60 - 140
		Methyl t-butyl ether (MTBE)	2007/09/21		104	%	70 - 130
		Styrene	2007/09/21		109	%	70 - 130
		1,1,1,2-Tetrachloroethane	2007/09/21		104	%	70 - 130
		1,1,2,2-Tetrachloroethane	2007/09/21		101	%	70 - 130
		Tetrachloroethylene	2007/09/21		105	%	70 - 130
		Toluene	2007/09/21		103	%	70 - 130
		1,1,1-Trichloroethane	2007/09/21		102	%	70 - 130
		1,1,2-Trichloroethane	2007/09/21		100	%	70 - 130

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Quality Assurance Report (Continued)

Maxxam Job Number: TA7A2428

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
1364921 TPI	Spiked Blank	Trichloroethylene	2007/09/21		106	%	70 - 130
		Vinyl Chloride	2007/09/21		100	%	70 - 130
		p+m-Xylene	2007/09/21		106	%	70 - 130
		o-Xylene	2007/09/21		106	%	70 - 130
	Method Blank	4-Bromofluorobenzene	2007/09/21		102	%	70 - 130
		D4-1,2-Dichloroethane	2007/09/21		92	%	70 - 130
		D8-Toluene	2007/09/21		100	%	70 - 130
		Acetone (2-Propanone)	2007/09/21	<10		ug/L	
		Benzene	2007/09/21	<0.1		ug/L	
		Bromodichloromethane	2007/09/21	<0.1		ug/L	
		Bromoform	2007/09/21	<0.2		ug/L	
		Bromomethane	2007/09/21	<0.5		ug/L	
		Carbon Tetrachloride	2007/09/21	<0.1		ug/L	
		Chlorobenzene	2007/09/21	<0.1		ug/L	
		Chloroform	2007/09/21	<0.1		ug/L	
		Dibromochloromethane	2007/09/21	<0.2		ug/L	
		1,2-Dichlorobenzene	2007/09/21	<0.2		ug/L	
		1,3-Dichlorobenzene	2007/09/21	<0.2		ug/L	
		1,4-Dichlorobenzene	2007/09/21	<0.2		ug/L	
		1,1-Dichloroethane	2007/09/21	<0.1		ug/L	
		1,2-Dichloroethane	2007/09/21	<0.1		ug/L	
		1,1-Dichloroethylene	2007/09/21	<0.1		ug/L	
		cis-1,2-Dichloroethylene	2007/09/21	<0.1		ug/L	
		trans-1,2-Dichloroethylene	2007/09/21	<0.1		ug/L	
		1,2-Dichloropropane	2007/09/21	<0.1		ug/L	
		cis-1,3-Dichloropropene	2007/09/21	<0.2		ug/L	
		trans-1,3-Dichloropropene	2007/09/21	<0.2		ug/L	
		Ethylbenzene	2007/09/21	<0.1		ug/L	
		Ethylene Dibromide	2007/09/21	<0.2		ug/L	
		Methylene Chloride(Dichloromethane)	2007/09/21	<0.5		ug/L	
		Methyl Isobutyl Ketone	2007/09/21	<5		ug/L	
		Methyl Ethyl Ketone (2-Butanone)	2007/09/21	<5		ug/L	
		Methyl t-butyl ether (MTBE)	2007/09/21	<0.2		ug/L	
		Styrene	2007/09/21	<0.1		ug/L	
		1,1,1,2-Tetrachloroethane	2007/09/21	<0.1		ug/L	
		1,1,2,2-Tetrachloroethane	2007/09/21	<0.2		ug/L	
		Tetrachloroethylene	2007/09/21	<0.1		ug/L	
		Toluene	2007/09/21	<0.2		ug/L	
		1,1,1-Trichloroethane	2007/09/21	<0.1		ug/L	
		1,1,2-Trichloroethane	2007/09/21	<0.2		ug/L	
		Trichloroethylene	2007/09/21	<0.1		ug/L	
		Vinyl Chloride	2007/09/21	<0.2		ug/L	
		p+m-Xylene	2007/09/21	<0.1		ug/L	
		o-Xylene	2007/09/21	<0.1		ug/L	
		Xylene (Total)	2007/09/21	<0.1		ug/L	
	RPD	Chlorobenzene	2007/09/21	NC		%	40
		Toluene	2007/09/21	NC		%	40
1364987 RZH	MATRIX SPIKE	4-Bromofluorobenzene	2007/09/21		98	%	60 - 140
		D4-1,2-Dichloroethane	2007/09/21		105	%	60 - 140
		D8-Toluene	2007/09/21		105	%	60 - 140
		Acetone (2-Propanone)	2007/09/21		152	%	24 - 171
		Benzene	2007/09/21		77	%	39 - 137
		Bromodichloromethane	2007/09/21		91	%	45 - 131
		Bromoform	2007/09/21		98	%	44 - 131
		Bromomethane	2007/09/21		87	%	20 - 146
		Carbon Tetrachloride	2007/09/21		87	%	40 - 139

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Maxxam Job Number: TA7A2428

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
1364987 RZH	MATRIX SPIKE	Chlorobenzene	2007/09/21		102	%	45 - 140
		Chloroform	2007/09/21		88	%	48 - 128
		Dibromochloromethane	2007/09/21		100	%	52 - 135
		1,2-Dichlorobenzene	2007/09/21		117	%	39 - 145
		1,3-Dichlorobenzene	2007/09/21		124	%	38 - 158
		1,4-Dichlorobenzene	2007/09/21		124	%	35 - 159
		1,1-Dichloroethane	2007/09/21		84	%	48 - 131
		1,2-Dichloroethane	2007/09/21		87	%	43 - 123
		1,1-Dichloroethylene	2007/09/21		88	%	50 - 134
		cis-1,2-Dichloroethylene	2007/09/21		84	%	45 - 136
		trans-1,2-Dichloroethylene	2007/09/21		85	%	45 - 138
		1,2-Dichloropropane	2007/09/21		81	%	51 - 130
		cis-1,3-Dichloropropene	2007/09/21		96	%	39 - 143
		trans-1,3-Dichloropropene	2007/09/21		94	%	33 - 135
		Ethylbenzene	2007/09/21		97	%	46 - 150
		Ethylene Dibromide	2007/09/21		97	%	48 - 136
		Methylene Chloride(Dichloromethane)	2007/09/21		76	%	47 - 124
		Methyl Isobutyl Ketone	2007/09/21		101	%	48 - 133
		Methyl Ethyl Ketone (2-Butanone)	2007/09/21		128	%	39 - 160
		Methyl t-butyl ether (MTBE)	2007/09/21		83	%	37 - 150
		Styrene	2007/09/21		114	%	27 - 148
		1,1,1,2-Tetrachloroethane	2007/09/21		101	%	51 - 140
		1,1,2,2-Tetrachloroethane	2007/09/21		102	%	46 - 128
		Tetrachloroethylene	2007/09/21		96	%	45 - 154
		Toluene	2007/09/21		48	%	30 - 158
		1,1,1-Trichloroethane	2007/09/21		86	%	44 - 136
		1,1,2-Trichloroethane	2007/09/21		96	%	56 - 135
		Trichloroethylene	2007/09/21		90	%	39 - 146
		Vinyl Chloride	2007/09/21		78	%	34 - 136
		p+m-Xylene	2007/09/21		73	%	29 - 161
		o-Xylene	2007/09/21		95	%	45 - 150
	Spiked Blank	4-Bromofluorobenzene	2007/09/21		98	%	60 - 140
		D4-1,2-Dichloroethane	2007/09/21		100	%	60 - 140
		D8-Toluene	2007/09/21		98	%	60 - 140
		Acetone (2-Propanone)	2007/09/21		96	%	60 - 140
		Benzene	2007/09/21		97	%	60 - 140
		Bromodichloromethane	2007/09/21		101	%	60 - 140
		Bromoform	2007/09/21		109	%	60 - 140
		Bromomethane	2007/09/21		100	%	60 - 140
		Carbon Tetrachloride	2007/09/21		94	%	60 - 140
		Chlorobenzene	2007/09/21		102	%	60 - 140
		Chloroform	2007/09/21		96	%	60 - 140
		Dibromochloromethane	2007/09/21		107	%	60 - 140
		1,2-Dichlorobenzene	2007/09/21		118	%	60 - 140
		1,3-Dichlorobenzene	2007/09/21		120	%	60 - 140
		1,4-Dichlorobenzene	2007/09/21		121	%	60 - 140
		1,1-Dichloroethane	2007/09/21		93	%	60 - 140
		1,2-Dichloroethane	2007/09/21		94	%	60 - 140
		1,1-Dichloroethylene	2007/09/21		88	%	60 - 140
		cis-1,2-Dichloroethylene	2007/09/21		91	%	60 - 140
		trans-1,2-Dichloroethylene	2007/09/21		90	%	60 - 140
		1,2-Dichloropropane	2007/09/21		90	%	60 - 140
		cis-1,3-Dichloropropene	2007/09/21		104	%	60 - 140
		trans-1,3-Dichloropropene	2007/09/21		107	%	60 - 140
		Ethylbenzene	2007/09/21		103	%	60 - 140
		Ethylene Dibromide	2007/09/21		100	%	60 - 140

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Quality Assurance Report (Continued)

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QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
1364987 RZH	Spiked Blank	Methylene Chloride(Dichloromethane)	2007/09/21		82	%	60 - 140
		Methyl Isobutyl Ketone	2007/09/21		104	%	60 - 140
		Methyl Ethyl Ketone (2-Butanone)	2007/09/21		99	%	60 - 140
		Methyl t-butyl ether (MTBE)	2007/09/21		92	%	60 - 140
		Styrene	2007/09/21		114	%	60 - 140
		1,1,1,2-Tetrachloroethane	2007/09/21		104	%	60 - 140
		1,1,2,2-Tetrachloroethane	2007/09/21		106	%	60 - 140
		Tetrachloroethylene	2007/09/21		93	%	60 - 140
		Toluene	2007/09/21		97	%	60 - 140
		1,1,1-Trichloroethane	2007/09/21		95	%	60 - 140
		1,1,2-Trichloroethane	2007/09/21		97	%	60 - 140
		Trichloroethylene	2007/09/21		97	%	60 - 140
		Vinyl Chloride	2007/09/21		86	%	60 - 140
		p+m-Xylene	2007/09/21		109	%	60 - 140
		o-Xylene	2007/09/21		103	%	60 - 140
	Method Blank	4-Bromofluorobenzene	2007/09/21		89	%	60 - 140
		D4-1,2-Dichloroethane	2007/09/21		102	%	60 - 140
		D8-Toluene	2007/09/21		102	%	60 - 140
		Acetone (2-Propanone)	2007/09/21	<0.1		ug/g	
		Benzene	2007/09/21	<0.002		ug/g	
		Bromodichloromethane	2007/09/21	<0.002		ug/g	
		Bromoform	2007/09/21	<0.002		ug/g	
		Bromomethane	2007/09/21	<0.003		ug/g	
		Carbon Tetrachloride	2007/09/21	<0.002		ug/g	
		Chlorobenzene	2007/09/21	<0.002		ug/g	
		Chloroform	2007/09/21	<0.002		ug/g	
		Dibromochloromethane	2007/09/21	<0.002		ug/g	
		1,2-Dichlorobenzene	2007/09/21	<0.002		ug/g	
		1,3-Dichlorobenzene	2007/09/21	<0.002		ug/g	
		1,4-Dichlorobenzene	2007/09/21	<0.002		ug/g	
		1,1-Dichloroethane	2007/09/21	<0.002		ug/g	
		1,2-Dichloroethane	2007/09/21	<0.002		ug/g	
		1,1-Dichloroethylene	2007/09/21	<0.002		ug/g	
		cis-1,2-Dichloroethylene	2007/09/21	<0.002		ug/g	
		trans-1,2-Dichloroethylene	2007/09/21	<0.002		ug/g	
		1,2-Dichloropropane	2007/09/21	<0.002		ug/g	
		cis-1,3-Dichloropropene	2007/09/21	<0.002		ug/g	
		trans-1,3-Dichloropropene	2007/09/21	<0.002		ug/g	
		Ethylbenzene	2007/09/21	<0.002		ug/g	
		Ethylene Dibromide	2007/09/21	<0.002		ug/g	
		Methylene Chloride(Dichloromethane)	2007/09/21	<0.003		ug/g	
		Methyl Isobutyl Ketone	2007/09/21	<0.025		ug/g	
		Methyl Ethyl Ketone (2-Butanone)	2007/09/21	<0.025		ug/g	
		Methyl t-butyl ether (MTBE)	2007/09/21	<0.002		ug/g	
		Styrene	2007/09/21	<0.002		ug/g	
		1,1,1,2-Tetrachloroethane	2007/09/21	<0.002		ug/g	
		1,1,2,2-Tetrachloroethane	2007/09/21	<0.002		ug/g	
		Tetrachloroethylene	2007/09/21	<0.002		ug/g	
		Toluene	2007/09/21	<0.002		ug/g	
		1,1,1-Trichloroethane	2007/09/21	<0.002		ug/g	
		1,1,2-Trichloroethane	2007/09/21	<0.002		ug/g	
		Trichloroethylene	2007/09/21	<0.002		ug/g	
		Vinyl Chloride	2007/09/21	<0.002		ug/g	
		p+m-Xylene	2007/09/21	<0.002		ug/g	
		o-Xylene	2007/09/21	<0.002		ug/g	
		Xylene (Total)	2007/09/21	<0.002		ug/g	

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Client Project #: OTEN00019054C
P.O. #:
Project name: ARCTIC BAY

Quality Assurance Report (Continued)

Maxxam Job Number: TA7A2428

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
1364987 RZH	RPD	Benzene	2007/09/21	NC		%	50
		Ethylbenzene	2007/09/21	NC		%	50
		Toluene	2007/09/21	9.4		%	50
		p+m-Xylene	2007/09/21	11.6		%	50
		o-Xylene	2007/09/21	NC		%	50
		Xylene (Total)	2007/09/21	11.6		%	50
1365076 BLZ	MATRIX SPIKE	o-Terphenyl	2007/09/20		109	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2007/09/20		121	%	60 - 130
		F3 (C16-C34 Hydrocarbons)	2007/09/20		121	%	60 - 130
		F4 (C34-C50 Hydrocarbons)	2007/09/20		121	%	60 - 130
	Spiked Blank	o-Terphenyl	2007/09/20		116	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2007/09/20		119	%	60 - 130
		F3 (C16-C34 Hydrocarbons)	2007/09/20		119	%	60 - 130
		F4 (C34-C50 Hydrocarbons)	2007/09/20		119	%	60 - 130
	Method Blank	o-Terphenyl	2007/09/20		100	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2007/09/20	<100		ug/L	
		F3 (C16-C34 Hydrocarbons)	2007/09/20	<100		ug/L	
		F4 (C34-C50 Hydrocarbons)	2007/09/20	<100		ug/L	
	RPD	F2 (C10-C16 Hydrocarbons)	2007/09/20	NC		%	50
1365096 VPA	RPD	Moisture	2007/09/20	2.8		%	50
1365110 JXI	MATRIX SPIKE	o-Terphenyl	2007/09/20		102	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2007/09/20		107	%	60 - 130
		F3 (C16-C34 Hydrocarbons)	2007/09/20		107	%	60 - 130
		F4 (C34-C50 Hydrocarbons)	2007/09/20		107	%	60 - 130
	Spiked Blank	o-Terphenyl	2007/09/20		98	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2007/09/20		87	%	60 - 130
		F3 (C16-C34 Hydrocarbons)	2007/09/20		87	%	60 - 130
		F4 (C34-C50 Hydrocarbons)	2007/09/20		87	%	60 - 130
	Method Blank	o-Terphenyl	2007/09/20		89	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2007/09/20	<10		ug/g	
		F3 (C16-C34 Hydrocarbons)	2007/09/20	<10		ug/g	
		F4 (C34-C50 Hydrocarbons)	2007/09/20	<10		ug/g	
	RPD	F2 (C10-C16 Hydrocarbons)	2007/09/20	NC		%	50
		F3 (C16-C34 Hydrocarbons)	2007/09/20	10.8		%	50
		F4 (C34-C50 Hydrocarbons)	2007/09/20	NC		%	50
1365269 JBW	MATRIX SPIKE	Dissolved Aluminum (Al)	2007/09/21		97	%	80 - 120
		Dissolved Antimony (Sb)	2007/09/21		110	%	80 - 120
		Dissolved Arsenic (As)	2007/09/21		104	%	80 - 120
		Dissolved Barium (Ba)	2007/09/21		97	%	80 - 120
		Dissolved Beryllium (Be)	2007/09/21		99	%	75 - 125
		Dissolved Bismuth (Bi)	2007/09/21		95	%	75 - 125
		Dissolved Boron (B)	2007/09/21		102	%	75 - 125
		Dissolved Cadmium (Cd)	2007/09/21		103	%	80 - 120
		Dissolved Calcium (Ca)	2007/09/21		NC (1)	%	75 - 125
		Dissolved Chromium (Cr)	2007/09/21		100	%	80 - 120
		Dissolved Cobalt (Co)	2007/09/21		100	%	80 - 120
		Dissolved Copper (Cu)	2007/09/21		96	%	80 - 120
		Dissolved Iron (Fe)	2007/09/21		100	%	80 - 120
		Dissolved Lead (Pb)	2007/09/21		94	%	80 - 120
		Dissolved Lithium (Li)	2007/09/21		93	%	75 - 125
		Dissolved Magnesium (Mg)	2007/09/21		93	%	80 - 120
		Dissolved Manganese (Mn)	2007/09/21		99	%	80 - 120
		Dissolved Molybdenum (Mo)	2007/09/21		108	%	80 - 120
		Dissolved Nickel (Ni)	2007/09/21		96	%	80 - 120
		Dissolved Potassium (K)	2007/09/21		103	%	75 - 125
		Dissolved Selenium (Se)	2007/09/21		103	%	80 - 120

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Client Project #: OTEN00019054C
P.O. #:
Project name: ARCTIC BAY

Quality Assurance Report (Continued)

Maxxam Job Number: TA7A2428

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
1365269 JBW	MATRIX SPIKE	Dissolved Silicon (Si)	2007/09/21		103	%	75 - 125
		Dissolved Silver (Ag)	2007/09/21		99	%	80 - 120
		Dissolved Sodium (Na)	2007/09/21		101	%	75 - 125
		Dissolved Strontium (Sr)	2007/09/21		98	%	80 - 120
		Dissolved Tellurium (Te)	2007/09/21		107	%	75 - 125
		Dissolved Thallium (Tl)	2007/09/21		94	%	75 - 125
		Dissolved Thorium (Th)	2007/09/21		98	%	75 - 125
		Dissolved Tin (Sn)	2007/09/21		109	%	80 - 120
		Dissolved Titanium (Ti)	2007/09/21		106	%	75 - 125
		Dissolved Tungsten (W)	2007/09/21		103	%	75 - 125
		Dissolved Uranium (U)	2007/09/21		97	%	80 - 120
		Dissolved Vanadium (V)	2007/09/21		102	%	80 - 120
		Dissolved Zinc (Zn)	2007/09/21		98	%	80 - 120
		Dissolved Zirconium (Zr)	2007/09/21		109	%	75 - 125
		Dissolved Phosphorus (P)	2007/09/21		104	%	75 - 125
	Spiked Blank	Dissolved Aluminum (Al)	2007/09/21		99	%	85 - 115
		Dissolved Antimony (Sb)	2007/09/21		101	%	85 - 115
		Dissolved Arsenic (As)	2007/09/21		100	%	85 - 115
		Dissolved Barium (Ba)	2007/09/21		96	%	85 - 115
		Dissolved Beryllium (Be)	2007/09/21		101	%	85 - 115
		Dissolved Bismuth (Bi)	2007/09/21		96	%	85 - 115
		Dissolved Boron (B)	2007/09/21		97	%	85 - 115
		Dissolved Cadmium (Cd)	2007/09/21		103	%	85 - 115
		Dissolved Calcium (Ca)	2007/09/21		101	%	85 - 115
		Dissolved Chromium (Cr)	2007/09/21		101	%	85 - 115
		Dissolved Cobalt (Co)	2007/09/21		101	%	85 - 115
		Dissolved Copper (Cu)	2007/09/21		98	%	85 - 115
		Dissolved Iron (Fe)	2007/09/21		98	%	85 - 115
		Dissolved Lead (Pb)	2007/09/21		94	%	85 - 115
		Dissolved Lithium (Li)	2007/09/21		93	%	85 - 115
		Dissolved Magnesium (Mg)	2007/09/21		104	%	85 - 115
		Dissolved Manganese (Mn)	2007/09/21		100	%	85 - 115
		Dissolved Molybdenum (Mo)	2007/09/21		101	%	85 - 115
		Dissolved Nickel (Ni)	2007/09/21		98	%	85 - 115
		Dissolved Potassium (K)	2007/09/21		100	%	85 - 115
		Dissolved Selenium (Se)	2007/09/21		100	%	85 - 115
		Dissolved Silicon (Si)	2007/09/21		103	%	85 - 115
		Dissolved Silver (Ag)	2007/09/21		100	%	85 - 115
		Dissolved Sodium (Na)	2007/09/21		104	%	85 - 115
		Dissolved Strontium (Sr)	2007/09/21		102	%	85 - 115
		Dissolved Tellurium (Te)	2007/09/21		99	%	85 - 115
		Dissolved Thallium (Tl)	2007/09/21		94	%	85 - 115
		Dissolved Thorium (Th)	2007/09/21		97	%	85 - 115
		Dissolved Tin (Sn)	2007/09/21		100	%	85 - 115
		Dissolved Titanium (Ti)	2007/09/21		100	%	85 - 115
		Dissolved Tungsten (W)	2007/09/21		96	%	85 - 115
		Dissolved Uranium (U)	2007/09/21		96	%	85 - 115
		Dissolved Vanadium (V)	2007/09/21		101	%	85 - 115
		Dissolved Zinc (Zn)	2007/09/21		99	%	85 - 115
		Dissolved Zirconium (Zr)	2007/09/21		101	%	85 - 115
		Dissolved Phosphorus (P)	2007/09/21		95	%	85 - 115
	Method Blank	Dissolved Aluminum (Al)	2007/09/21	<5		ug/L	
		Dissolved Antimony (Sb)	2007/09/21	<0.5		ug/L	
		Dissolved Arsenic (As)	2007/09/21	<1		ug/L	
		Dissolved Barium (Ba)	2007/09/21	<5		ug/L	
		Dissolved Beryllium (Be)	2007/09/21	<0.5		ug/L	

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Client Project #: OTEN00019054C
P.O. #:
Project name: ARCTIC BAY

Quality Assurance Report (Continued)

Maxxam Job Number: TA7A2428

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
1365269 JBW	Method Blank	Dissolved Bismuth (Bi)	2007/09/21	<1		ug/L	
		Dissolved Boron (B)	2007/09/21	<10		ug/L	
		Dissolved Cadmium (Cd)	2007/09/21	<0.1		ug/L	
		Dissolved Calcium (Ca)	2007/09/21	<200		ug/L	
		Dissolved Chromium (Cr)	2007/09/21	<5		ug/L	
		Dissolved Cobalt (Co)	2007/09/21	<0.5		ug/L	
		Dissolved Copper (Cu)	2007/09/21	<1		ug/L	
		Dissolved Iron (Fe)	2007/09/21	<50		ug/L	
		Dissolved Lead (Pb)	2007/09/21	<0.5		ug/L	
		Dissolved Lithium (Li)	2007/09/21	<5		ug/L	
		Dissolved Magnesium (Mg)	2007/09/21	<50		ug/L	
		Dissolved Manganese (Mn)	2007/09/21	<2		ug/L	
		Dissolved Molybdenum (Mo)	2007/09/21	<1		ug/L	
		Dissolved Nickel (Ni)	2007/09/21	<1		ug/L	
		Dissolved Potassium (K)	2007/09/21	<200		ug/L	
		Dissolved Selenium (Se)	2007/09/21	<2		ug/L	
		Dissolved Silicon (Si)	2007/09/21	<50		ug/L	
		Dissolved Silver (Ag)	2007/09/21	<0.1		ug/L	
		Dissolved Sodium (Na)	2007/09/21	<100		ug/L	
		Dissolved Strontium (Sr)	2007/09/21	<1		ug/L	
		Dissolved Tellurium (Te)	2007/09/21	<1		ug/L	
		Dissolved Thallium (Tl)	2007/09/21	<0.1		ug/L	
		Dissolved Thorium (Th)	2007/09/21	<1		ug/L	
		Dissolved Tin (Sn)	2007/09/21	<1		ug/L	
		Dissolved Titanium (Ti)	2007/09/21	<5		ug/L	
		Dissolved Tungsten (W)	2007/09/21	<1		ug/L	
		Dissolved Uranium (U)	2007/09/21	<0.2		ug/L	
		Dissolved Vanadium (V)	2007/09/21	<1		ug/L	
		Dissolved Zinc (Zn)	2007/09/21	<5		ug/L	
		Dissolved Zirconium (Zr)	2007/09/21	<1		ug/L	
		Dissolved Phosphorus (P)	2007/09/21	<50		ug/L	
	RPD	Dissolved Cobalt (Co)	2007/09/21	NC		%	25
1365285 MIL	MATRIX SPIKE	Total Aluminum (Al)	2007/09/21		99	%	80 - 120
		Total Antimony (Sb)	2007/09/21		104	%	80 - 120
		Total Arsenic (As)	2007/09/21		106	%	80 - 120
		Total Barium (Ba)	2007/09/21		101	%	80 - 120
		Total Beryllium (Be)	2007/09/21		104	%	75 - 125
		Total Bismuth (Bi)	2007/09/21		99	%	75 - 125
		Total Boron (B)	2007/09/21		102	%	75 - 125
		Total Cadmium (Cd)	2007/09/21		105	%	80 - 120
		Total Calcium (Ca)	2007/09/21		97	%	75 - 125
		Total Chromium (Cr)	2007/09/21		98	%	80 - 120
		Total Cobalt (Co)	2007/09/21		99	%	80 - 120
		Total Copper (Cu)	2007/09/21		96	%	80 - 120
		Total Iron (Fe)	2007/09/21		107	%	80 - 120
		Total Lead (Pb)	2007/09/21		99	%	80 - 120
		Total Lithium (Li)	2007/09/21		99	%	75 - 125
		Total Magnesium (Mg)	2007/09/21		104	%	80 - 120
		Total Manganese (Mn)	2007/09/21		100	%	80 - 120
		Total Molybdenum (Mo)	2007/09/21		101	%	80 - 120
		Total Nickel (Ni)	2007/09/21		98	%	80 - 120
		Total Potassium (K)	2007/09/21		108	%	75 - 125
		Total Selenium (Se)	2007/09/21		98	%	75 - 125
		Total Silicon (Si)	2007/09/21		101	%	75 - 125
		Total Silver (Ag)	2007/09/21		93	%	80 - 120
		Total Sodium (Na)	2007/09/21		104	%	75 - 125

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Quality Assurance Report (Continued)

Maxxam Job Number: TA7A2428

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
1365285 MIL	MATRIX SPIKE	Total Strontium (Sr)	2007/09/21		91	%	80 - 120
		Total Tellurium (Te)	2007/09/21		100	%	75 - 125
		Total Thallium (Tl)	2007/09/21		100	%	80 - 120
		Total Thorium (Th)	2007/09/21		102	%	75 - 125
		Total Tin (Sn)	2007/09/21		102	%	75 - 125
		Total Titanium (Ti)	2007/09/21		105	%	75 - 125
		Total Tungsten (W)	2007/09/21		99	%	75 - 125
		Total Uranium (U)	2007/09/21		101	%	80 - 120
		Total Vanadium (V)	2007/09/21		101	%	80 - 120
		Total Zinc (Zn)	2007/09/21		99	%	80 - 120
		Total Zirconium (Zr)	2007/09/21		102	%	75 - 125
	Spiked Blank	Total Aluminum (Al)	2007/09/21		98	%	80 - 120
		Total Antimony (Sb)	2007/09/21		104	%	82 - 120
		Total Arsenic (As)	2007/09/21		106	%	86 - 119
		Total Barium (Ba)	2007/09/21		101	%	83 - 115
		Total Beryllium (Be)	2007/09/21		104	%	85 - 132
		Total Bismuth (Bi)	2007/09/21		100	%	78 - 120
		Total Boron (B)	2007/09/21		104	%	78 - 133
		Total Cadmium (Cd)	2007/09/21		102	%	85 - 116
		Total Calcium (Ca)	2007/09/21		107	%	75 - 125
		Total Chromium (Cr)	2007/09/21		99	%	80 - 120
		Total Cobalt (Co)	2007/09/21		100	%	82 - 117
		Total Copper (Cu)	2007/09/21		99	%	80 - 117
		Total Iron (Fe)	2007/09/21		107	%	80 - 120
		Total Lead (Pb)	2007/09/21		100	%	80 - 120
		Total Lithium (Li)	2007/09/21		98	%	86 - 131
		Total Magnesium (Mg)	2007/09/21		108	%	80 - 120
		Total Manganese (Mn)	2007/09/21		100	%	80 - 120
		Total Molybdenum (Mo)	2007/09/21		100	%	82 - 117
		Total Nickel (Ni)	2007/09/21		99	%	81 - 117
		Total Potassium (K)	2007/09/21		107	%	75 - 125
		Total Selenium (Se)	2007/09/21		99	%	82 - 118
		Total Silicon (Si)	2007/09/21		105	%	67 - 140
		Total Silver (Ag)	2007/09/21		92	%	80 - 120
		Total Sodium (Na)	2007/09/21		108	%	75 - 125
		Total Strontium (Sr)	2007/09/21		99	%	83 - 120
		Total Tellurium (Te)	2007/09/21		101	%	80 - 116
		Total Thallium (Tl)	2007/09/21		100	%	80 - 129
		Total Thorium (Th)	2007/09/21		101	%	80 - 125
		Total Tin (Sn)	2007/09/21		103	%	83 - 119
		Total Titanium (Ti)	2007/09/21		107	%	60 - 125
		Total Tungsten (W)	2007/09/21		100	%	81 - 123
		Total Uranium (U)	2007/09/21		100	%	82 - 120
		Total Vanadium (V)	2007/09/21		100	%	82 - 118
		Total Zinc (Zn)	2007/09/21		99	%	80 - 120
		Total Zirconium (Zr)	2007/09/21		102	%	84 - 118
	Method Blank	Total Aluminum (Al)	2007/09/21	<5		ug/L	
		Total Antimony (Sb)	2007/09/21	<0.5		ug/L	
		Total Arsenic (As)	2007/09/21	<1		ug/L	
		Total Barium (Ba)	2007/09/21	<5		ug/L	
		Total Beryllium (Be)	2007/09/21	<0.5		ug/L	
		Total Bismuth (Bi)	2007/09/21	<1		ug/L	
		Total Boron (B)	2007/09/21	<10		ug/L	
		Total Cadmium (Cd)	2007/09/21	<0.1		ug/L	
		Total Calcium (Ca)	2007/09/21	<200		ug/L	
		Total Chromium (Cr)	2007/09/21	<5		ug/L	

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Quality Assurance Report (Continued)

Maxxam Job Number: TA7A2428

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
1365285 MIL	Method Blank	Total Cobalt (Co)	2007/09/21	<0.5		ug/L	
		Total Copper (Cu)	2007/09/21	<1		ug/L	
		Total Iron (Fe)	2007/09/21	<50		ug/L	
		Total Lead (Pb)	2007/09/21	<0.5		ug/L	
		Total Lithium (Li)	2007/09/21	<5		ug/L	
		Total Magnesium (Mg)	2007/09/21	<50		ug/L	
		Total Manganese (Mn)	2007/09/21	<2		ug/L	
		Total Molybdenum (Mo)	2007/09/21	<1		ug/L	
		Total Nickel (Ni)	2007/09/21	<1		ug/L	
		Total Potassium (K)	2007/09/21	<200		ug/L	
		Total Selenium (Se)	2007/09/21	<2		ug/L	
		Total Silicon (Si)	2007/09/21	<50		ug/L	
		Total Silver (Ag)	2007/09/21	<0.1		ug/L	
		Total Sodium (Na)	2007/09/21	<100		ug/L	
		Total Strontium (Sr)	2007/09/21	<1		ug/L	
		Total Tellurium (Te)	2007/09/21	<1		ug/L	
		Total Thallium (Tl)	2007/09/21	<0.05		ug/L	
		Total Thorium (Th)	2007/09/21	<1		ug/L	
		Total Tin (Sn)	2007/09/21	<1		ug/L	
		Total Titanium (Ti)	2007/09/21	<5		ug/L	
		Total Tungsten (W)	2007/09/21	<1		ug/L	
		Total Uranium (U)	2007/09/21	<0.1		ug/L	
		Total Vanadium (V)	2007/09/21	<1		ug/L	
		Total Zinc (Zn)	2007/09/21	<5		ug/L	
		Total Zirconium (Zr)	2007/09/21	<1		ug/L	
	RPD	Total Aluminum (Al)	2007/09/21	15.1		%	25
		Total Antimony (Sb)	2007/09/21	NC		%	25
		Total Arsenic (As)	2007/09/21	NC		%	25
		Total Barium (Ba)	2007/09/21	1		%	25
		Total Beryllium (Be)	2007/09/21	NC		%	25
		Total Bismuth (Bi)	2007/09/21	NC		%	25
		Total Boron (B)	2007/09/21	NC		%	25
		Total Cadmium (Cd)	2007/09/21	NC		%	25
		Total Calcium (Ca)	2007/09/21	1.4		%	25
		Total Chromium (Cr)	2007/09/21	NC		%	25
		Total Cobalt (Co)	2007/09/21	NC		%	25
		Total Copper (Cu)	2007/09/21	NC		%	25
		Total Iron (Fe)	2007/09/21	NC		%	25
		Total Lead (Pb)	2007/09/21	NC		%	25
		Total Lithium (Li)	2007/09/21	NC		%	25
		Total Magnesium (Mg)	2007/09/21	0.2		%	25
		Total Manganese (Mn)	2007/09/21	NC		%	25
		Total Molybdenum (Mo)	2007/09/21	NC		%	25
		Total Nickel (Ni)	2007/09/21	NC		%	25
		Total Potassium (K)	2007/09/21	1.3		%	25
		Total Selenium (Se)	2007/09/21	NC		%	25
		Total Silicon (Si)	2007/09/21	0.9		%	25
		Total Silver (Ag)	2007/09/21	NC		%	25
		Total Sodium (Na)	2007/09/21	0.2		%	25
		Total Strontium (Sr)	2007/09/21	1.4		%	25
		Total Tellurium (Te)	2007/09/21	NC		%	25
		Total Thallium (Tl)	2007/09/21	NC		%	25
		Total Thorium (Th)	2007/09/21	NC		%	25
		Total Tin (Sn)	2007/09/21	NC		%	25
		Total Titanium (Ti)	2007/09/21	NC		%	25
		Total Tungsten (W)	2007/09/21	NC		%	25

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Trow Associates Inc
Attention: Chris Kimmerly
Client Project #: OTEN00019054C
P.O. #:
Project name: ARCTIC BAY

Quality Assurance Report (Continued)

Maxxam Job Number: TA7A2428

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
1365285 MIL	RPD	Total Uranium (U)	2007/09/21	2.9		%	25
		Total Vanadium (V)	2007/09/21	NC		%	25
		Total Zinc (Zn)	2007/09/21	NC		%	25
		Total Zirconium (Zr)	2007/09/21	NC		%	25
1365449 JBW	MATRIX SPIKE						
	[U76842-02]	Acid Extractable Aluminum (Al)	2007/09/21		NC (1)	%	75 - 125
		Acid Extractable Antimony (Sb)	2007/09/21		95	%	75 - 125
		Acid Extractable Arsenic (As)	2007/09/21		99	%	75 - 125
		Acid Extractable Barium (Ba)	2007/09/21		NC (1)	%	75 - 125
		Acid Extractable Beryllium (Be)	2007/09/21		103	%	75 - 125
		Acid Extractable Cadmium (Cd)	2007/09/21		100	%	75 - 125
		Acid Extractable Calcium (Ca)	2007/09/21		NC (1)	%	75 - 125
		Acid Extractable Chromium (Cr)	2007/09/21		106	%	75 - 125
		Acid Extractable Cobalt (Co)	2007/09/21		104	%	75 - 125
		Acid Extractable Copper (Cu)	2007/09/21		99	%	75 - 125
		Acid Extractable Iron (Fe)	2007/09/21		NC (1)	%	75 - 125
		Acid Extractable Lead (Pb)	2007/09/21		98	%	75 - 125
		Acid Extractable Magnesium (Mg)	2007/09/21		NC (1)	%	75 - 125
		Acid Extractable Manganese (Mn)	2007/09/21		NC (1)	%	75 - 125
		Acid Extractable Molybdenum (Mo)	2007/09/21		96	%	75 - 125
		Acid Extractable Nickel (Ni)	2007/09/21		102	%	75 - 125
		Acid Extractable Phosphorus (P)	2007/09/21		NC (1)	%	80 - 120
		Acid Extractable Potassium (K)	2007/09/21		NC (1)	%	75 - 125
		Acid Extractable Selenium (Se)	2007/09/21		99	%	75 - 125
		Acid Extractable Silver (Ag)	2007/09/21		100	%	75 - 125
		Acid Extractable Sodium (Na)	2007/09/21		112	%	75 - 125
		Acid Extractable Strontium (Sr)	2007/09/21		110	%	75 - 125
		Acid Extractable Thallium (Tl)	2007/09/21		99	%	75 - 125
		Acid Extractable Vanadium (V)	2007/09/21		110	%	75 - 125
		Acid Extractable Zinc (Zn)	2007/09/21		98	%	75 - 125
	QC STANDARD	Acid Extractable Aluminum (Al)	2007/09/21		96	%	75 - 125
		Acid Extractable Antimony (Sb)	2007/09/21		109	%	75 - 125
		Acid Extractable Arsenic (As)	2007/09/21		93	%	75 - 125
		Acid Extractable Barium (Ba)	2007/09/21		98	%	75 - 125
		Acid Extractable Beryllium (Be)	2007/09/21		104	%	75 - 125
		Acid Extractable Cadmium (Cd)	2007/09/21		93	%	75 - 125
		Acid Extractable Calcium (Ca)	2007/09/21		97	%	75 - 125
		Acid Extractable Chromium (Cr)	2007/09/21		93	%	75 - 125
		Acid Extractable Cobalt (Co)	2007/09/21		93	%	75 - 125
		Acid Extractable Copper (Cu)	2007/09/21		89	%	75 - 125
		Acid Extractable Iron (Fe)	2007/09/21		96	%	75 - 125
		Acid Extractable Lead (Pb)	2007/09/21		94	%	75 - 125
		Acid Extractable Magnesium (Mg)	2007/09/21		99	%	75 - 125
		Acid Extractable Manganese (Mn)	2007/09/21		97	%	75 - 125
		Acid Extractable Molybdenum (Mo)	2007/09/21		86	%	75 - 125
		Acid Extractable Nickel (Ni)	2007/09/21		86	%	75 - 125
		Acid Extractable Phosphorus (P)	2007/09/21		95	%	75 - 125
		Acid Extractable Potassium (K)	2007/09/21		98	%	75 - 125
		Acid Extractable Selenium (Se)	2007/09/21		119	%	50 - 150
		Acid Extractable Silver (Ag)	2007/09/21		96	%	75 - 125
		Acid Extractable Sodium (Na)	2007/09/21		109	%	75 - 125
		Acid Extractable Strontium (Sr)	2007/09/21		100	%	75 - 125
		Acid Extractable Thallium (Tl)	2007/09/21		82	%	75 - 125
		Acid Extractable Vanadium (V)	2007/09/21		101	%	75 - 125
		Acid Extractable Zinc (Zn)	2007/09/21		91	%	75 - 125
	Method Blank	Acid Extractable Aluminum (Al)	2007/09/21	<50		ug/g	

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Client Project #: OTEN00019054C
P.O. #:
Project name: ARCTIC BAY

Quality Assurance Report (Continued)

Maxxam Job Number: TA7A2428

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
1365449 JBW	Method Blank	Acid Extractable Antimony (Sb)	2007/09/21	<0.2		ug/g	
		Acid Extractable Arsenic (As)	2007/09/21	<1		ug/g	
		Acid Extractable Barium (Ba)	2007/09/21	<0.5		ug/g	
		Acid Extractable Beryllium (Be)	2007/09/21	<0.2		ug/g	
		Acid Extractable Cadmium (Cd)	2007/09/21	<0.1		ug/g	
		Acid Extractable Calcium (Ca)	2007/09/21	<50		ug/g	
		Acid Extractable Chromium (Cr)	2007/09/21	<1		ug/g	
		Acid Extractable Cobalt (Co)	2007/09/21	<0.1		ug/g	
		Acid Extractable Copper (Cu)	2007/09/21	<0.5		ug/g	
		Acid Extractable Iron (Fe)	2007/09/21	<50		ug/g	
		Acid Extractable Lead (Pb)	2007/09/21	<1		ug/g	
		Acid Extractable Magnesium (Mg)	2007/09/21	<50		ug/g	
		Acid Extractable Manganese (Mn)	2007/09/21	<1		ug/g	
		Acid Extractable Molybdenum (Mo)	2007/09/21	<0.5		ug/g	
		Acid Extractable Nickel (Ni)	2007/09/21	<0.5		ug/g	
		Acid Extractable Phosphorus (P)	2007/09/21	<50		ug/g	
		Acid Extractable Potassium (K)	2007/09/21	<200		ug/g	
		Acid Extractable Selenium (Se)	2007/09/21	<0.5		ug/g	
		Acid Extractable Silver (Ag)	2007/09/21	<0.2		ug/g	
		Acid Extractable Sodium (Na)	2007/09/21	<100		ug/g	
		Acid Extractable Strontium (Sr)	2007/09/21	<1		ug/g	
		Acid Extractable Thallium (Tl)	2007/09/21	<0.05		ug/g	
		Acid Extractable Vanadium (V)	2007/09/21	<5		ug/g	
		Acid Extractable Zinc (Zn)	2007/09/21	<5		ug/g	
	RPD [U76842-02]	Acid Extractable Aluminum (Al)	2007/09/21	4.0		%	35
		Acid Extractable Antimony (Sb)	2007/09/21	NC		%	35
		Acid Extractable Arsenic (As)	2007/09/21	NC		%	35
		Acid Extractable Barium (Ba)	2007/09/21	13.5		%	35
		Acid Extractable Beryllium (Be)	2007/09/21	NC		%	35
		Acid Extractable Cadmium (Cd)	2007/09/21	NC		%	35
		Acid Extractable Calcium (Ca)	2007/09/21	1.3		%	35
		Acid Extractable Chromium (Cr)	2007/09/21	4.7		%	35
		Acid Extractable Cobalt (Co)	2007/09/21	4.0		%	35
		Acid Extractable Copper (Cu)	2007/09/21	4.5		%	35
		Acid Extractable Iron (Fe)	2007/09/21	3.6		%	35
		Acid Extractable Lead (Pb)	2007/09/21	10.7		%	35
		Acid Extractable Magnesium (Mg)	2007/09/21	4.4		%	35
		Acid Extractable Manganese (Mn)	2007/09/21	2.1		%	35
		Acid Extractable Molybdenum (Mo)	2007/09/21	NC		%	35
		Acid Extractable Nickel (Ni)	2007/09/21	3.9		%	35
		Acid Extractable Phosphorus (P)	2007/09/21	0.6		%	35
		Acid Extractable Potassium (K)	2007/09/21	3.7		%	35
		Acid Extractable Selenium (Se)	2007/09/21	NC		%	35
		Acid Extractable Silver (Ag)	2007/09/21	NC		%	35
		Acid Extractable Sodium (Na)	2007/09/21	NC		%	35
		Acid Extractable Strontium (Sr)	2007/09/21	5.4		%	35
		Acid Extractable Thallium (Tl)	2007/09/21	NC		%	35
		Acid Extractable Vanadium (V)	2007/09/21	NC		%	35
		Acid Extractable Zinc (Zn)	2007/09/21	4.0		%	35
1365480 MC	MATRIX SPIKE [U76842-02]	Acid Extractable Mercury (Hg)	2007/09/21		75	%	75 - 125
	QC STANDARD	Acid Extractable Mercury (Hg)	2007/09/21		101	%	75 - 125
	Method Blank	Acid Extractable Mercury (Hg)	2007/09/21	<0.05		ug/g	
	RPD [U76842-02]	Acid Extractable Mercury (Hg)	2007/09/21	NC		%	35
1366993 DAN	MATRIX SPIKE	F4G (Grav. Heavy Hydrocarbons)	2007/09/24		94	%	65 - 135
	Spiked Blank	F4G (Grav. Heavy Hydrocarbons)	2007/09/24		91	%	65 - 135

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Appendix E:
Cost Estimate

Item	Description	Unit	Quantity	Unit Price	Amount
1	Mobilization & Demobilization	L.S.	1	$ 25,000.00	$ 25,000.00
2	Excavate top of berm around lagoon and deposit material into lagoon	m^3	375	$ 20.00	$ 7,500.00
3	Excavate top of berm around ice pack area and deposit material into ice pack area	m^3	925	$ 20.00	$ 18,500.00
4	Supply, place and spread general fill in 300mm lifts in the lagoon	m^3	1750	$ 40.00	$ 70,000.00
5	Supply, place and spread general fill in 300mm lifts in the ice pack area	m^3	6600	$ 40.00	$ 264,000.00
				Subtotal	**$ 385,000.00**
				10% Contingency	**$ 38,500.00**
				Total	**$ 423,500.00**