PHASE I/II ENVIRONMENTAL SITE ASSESSMENT
ROBERTS BAY SILVER MINE
AND
IDA BAY SILVER DEPOSIT
NUNAVUT

Prepared for:

Indian and Northern Affairs Canada
Iqaluit, Nunavut

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Vancouver, BC

February 2004

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ENVIRONMENTAL SERVICES
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VANCOUVER, BC

FEBRUARY 2004

EXECUTIVE SUMMARY

Indian and Northern Affairs Canada retained Environmental Services, Public Works and Government Services Canada to conduct a combined Phase I / II environmental site assessment of the abandoned Roberts Bay Silver Mine, located in Nunavut. The assessment included the former Roberts Bay Silver Mine, including an exploration camp on the shore of Roberts Lake, and the Ida Bay Silver Deposit. The objectives of the project were to evaluate the environmental and human health safety concerns at the Roberts Bay Silver Mine and the Ida Bay Silver Deposit.

The site investigation was undertaken in August of 2003. The site work consisted of a visual inspection of the site, and a limited sampling program. Water, soil, waste rock, tailings and hazmat samples were collected for analysis. A brief description of each site and the significant environmental and safety concerns identified is provided below.

Roberts Bay Silver Mine
The Roberts Bay site consists of an Exploration Camp located on the shore of Roberts Lake, and the Mine Camp, Mill, and Garage / Adit, located approximately 1km north of Roberts Lake. There are no structures remaining at the site, however the metal framework of the Mill and Garage is still standing and the floors and half-walls of 7 tent-cabins at the Exploration Camp remain. There is a small tailings pond located adjacent to the Mill. Waste rock piles were found throughout the site. Non-hazardous debris (scrap metal and wood, mill equipment, burlap bags) was also identified throughout the site. Hazardous materials noted at the site include petroleum products, batteries, propane tanks and unknown chemicals stored in a Hazmat storage area south of the Mill. The adit at the site has been fenced off and is flooded. There is also a vertical shaft, which has been partially fenced.

Approximately 225m^3 of hydrocarbon contaminated soils were identified at the site. The contamination appears to be localized and not migrating. A hydrocarbon sheen was also identified on standing water in a muskeg area east of the mine camp. Water samples collected from this area had no detectable hydrocarbon concentrations.

A visual inspection of the tailings and waste rock at the site indicated that there were no indications of acid rock drainage occurring at the site. However, the analytical results showed that the waste rock at the fuel berm had an uncertain potential to generate acid rock drainage and the waste rock south of the Garage was likely to generate acid rock drainage.

Ida Bay Silver Deposit
The Ida Bay site is located approximately 7km north of the Roberts Bay Silver Mine. The site consists of one adit, three exploration trenches and a vent raise. The adit is in poor condition and flooded. The vent raise has been covered with plywood, which is in poor condition, and the exploration trenches are open. A small amount of non-hazardous debris (scrap wood and metal) was identified at the site.

Waste rock piles are located adjacent to the adit. Visual inspection found no indication that acid rock drainage was occurring, however, analysis of the waste rock identified that the waste rock had an uncertain potential to generate acid rock drainage.

Based on the findings at the site, it is recommended that the following investigative activities be undertaken:

- Additional investigation of the muskeg area where hydrocarbon sheens had been noted.
- Additional assessment of the acid rock drainage potential of the waste rock at the site
- Confirmation of contents of drums identified at the site and their disposal requirements

The estimated cost for these investigation activities is $70,000.

The physical hazards at the site are associated with the open adits, shafts and pits at the site and the non-hazardous debris. It is recommended that the non hazardous materials be collected and disposed of within the mine openings and capped with non-acid rock drainage generating waste rock. The estimated cost for these remedial activities is $984,000.

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APPENDICES

1.0 INTRODUCTION

Indian and Northern Affairs Canada retained Environmental Services, Public Works and Government Services Canada to conduct a combined Phase I / II environmental site assessment of the abandoned Roberts Bay Silver Mine, located in Nunavut. The assessment included an exploration camp on the shore of Roberts Lake, the former Roberts Bay Silver Mine and the Ida Bay Silver Deposit.

2.0 PROJECT OBJECTIVES

The objectives of the project were:

- to evaluate the environmental and human health safety concerns at the Roberts Bay Silver Mine,
- to evaluate the environmental and human health safety concerns at the Ida Bay Silver Deposit, and
- to classify the sites using the Canadian Council of Ministers of the Environment National Classification System for Contaminated Sites.

3.0 SITE ASSESSMENT METHODOLOGY

The following activities were conducted to complete the requirements for this environmental site assessment:

3.1 Background Review

A review of background information was conducted to determine the historical and current use of the site and to determine if any potential environmental liabilities were present. This review included aerial photos of the site, a review of existing files, and other available documents. In addition background information on the site and site activities was obtained through discussions with knowledgeable individuals, including Hugh Wilson, former DIAND Mine Inspector and Peter Avalak Sr., former Roberts Bay Silver Mine employee.

3.2 Contaminated Site Assessment

The contaminated site assessment was undertaken to evaluate the environmental condition of the site. It consisted of a visual inspection of the site to identify signs of contamination or impact. This inspection included documentation of hazardous and non-hazardous materials at the site, soil staining, and vegetation distress.

Sampling of surface water, soils, tailings / waste rock and hazardous materials at the site was also undertaken. Prior to any field work commencing, a health and safety plan for the project was prepared. Refer to Appendix A for a copy of the Health and Safety plan.

Soil Sampling

Test pits were excavated, using a shovel, to depths of 0.6m. Samples were collected at depth intervals selected on the basis of anticipated or apparent contamination. GPS coordinates of each sample location were recorded. The samples were collected using disposable nitrile gloves and decontaminated stainless steel sampling utensils. Field screening of the samples for hydrocarbons was conducted using a Thermal Gastech Innova portable gas monitor and Petroflag. Samples were placed into sterile 250ml jars with teflon lids, provided by Accutest Laboratories, a CAEAL certified laboratory. The jars were filled to the brim to minimize headspace. All sampling equipment was decontaminated with isopropyl alcohol prior to reuse.

Soil characteristics were recorded for each collected sample. This included soil composition, soil colour or discolouration, moisture, odour and other observations of significance. Soil samples were placed in a cooler and maintained at 4°C until delivery to the laboratory. Soil samples were analyzed for benzene, toluene, ethylbenzene and xylenes (BTEX), hydrocarbons (F1-F4), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyl (PCB), and metals and cyanide. The soil quality was compared to the Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines for the Protection of Environmental and Human Health (residential/parkland landuse).

Water Sampling

Grab samples were collected from the surface water at the site. A clean sample collection bottle was rinsed three times with water from the same sample stream prior to sample collection. Care was taken to prevent contamination of the sample by disturbed sediment, debris and other floating materials. The sample water collected with the collection bottle was then poured into sterile jars provided by Accutest Laboratories, a CAEAL certified laboratory. Sample jars were brim-filled to minimize head space. Preservatives (HNO_3) were added to water samples destined for metals analysis. The sealed jars were placed in a cooler and maintained at 4°C until delivery to the laboratory. GPS coordinates of each sample location were recorded.

The water samples were analyzed for BTEX, PCB, total petroleum hydrocarbons, metals and cyanide. The surface water quality was compared to the CCME Water Quality Guidelines for the Protection of Aquatic Life (freshwater).

Tailings / Waste Rock Sampling

Waste rock sample locations were selected following a reconnaissance tour of the site and after identifying the use and purpose of the waste rock piles and pads on the site. Rock samples were collected from surficial materials at a depth of 10 cm in order to obtain a fresh sample. Where practical, rock samples were taken from locations in proximity to surface water sample locations in order to facilitate comparison with water quality results.

Tailings samples from the Roberts Bay tailings pond were collected from shallow test pits dug with a hand shovel. The test pits were dug into the exposed tailings beach in order to visually assess for any oxidation interface layer and also allow for samples to be collected for acid base accounting and metals leaching analysis.

Samples were obtained using sterile plastic spatulas and retained into 8" x 11" 6mm single use plastic sample bags. A total of approximately 1 kg of material was collected from each sample location. Sample descriptions included colour, composition, estimate of moisture content, estimate of size fraction, presence of visible sulphides, presence of oxidation staining and level of consolidation. GPS coordinates of each sample location were recorded.

Samples were collected from surface waste rock, fill and tailings materials and submitted to ALS Environmental Laboratories in Vancouver for acid base accounting (ABA), water leachable metals and total metals analysis. As there are no environmental guidelines for tailings or waste rock with which to compare the sample analysis results, they were compared to the CCME Soil Quality Guidelines for the Protection of Environmental and Human Health (residential / parkland landuse). The results of metal leachability tests were compared to the CCME Water Quality Guidelines for the Protection of Aquatic Life (freshwater).

Hazardous Waste Sampling
Hazardous waste materials at the site were collected for characterization. Samples from barrels were collected using a drum thief. The collected samples were placed into 40ml amber bottles, with teflon lined lids. The bottles were filled to the brim to minimize headspace. The sealed bottles were then placed in a cooler and maintained at 4°C until delivery to the laboratory. GPS coordinates and descriptions of each sample location were recorded.

3.3 Physical Safety Assessment

A physical safety assessment was undertaken to evaluate the degree of physical risk left at the site. It consisted of a visual inspection of the site to assess and identify existing or potential physical safety risks to humans or wildlife at the site. The assessment included an examination of waste rock disposal areas with respect to their stability and mine openings with respect to their stability and accessibility

4.0 SITE DESCRIPTION

The Roberts Bay Silver Mine is located approximately 125 km southwest of the Hamlet of Cambridge Bay, in the Territory of Nunavut. Its latitude and longitude are 68° 10' 45" N and 106° 33' 29" W, respectively. The Ida Bay Silver Deposit is located approximately 7 km north of the Roberts Bay Silver Mine, along the shore of Melville Sound. Both of these sites are within the ORO claim region. Figure 1 provides a location map for the two areas.

Roberts Bay and Ida Bay Location Map

FIGURE 1

Public Works and Government Services Canada

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There is no airstrip or access road to either site. Access to the two sites is by rotary wing aircraft, fixed wing aircraft equipped with floats, or by boat.

4.1 Site History

The area was first staked by the Roberts Mining Company Ltd. in 1964. The silver deposit at Roberts Bay was subsequently discovered in 1965. The following year, a gold showing at Ida Point as well as a silver showing at Ida Bay were discovered and staked. Exploration of the Ida Bay and Roberts Bay silver showings was conducted by the Hope Bay Silver Syndicate from 1967 until 1972. Exploration activities included mapping, drilling, trenching, as well as air and ground geophysical surveys.

Mobilization of mining equipment to Ida Bay was initiated by Hope Bay Mines Ltd. (formerly Hope Bay Mining Co.) in 1973. Mining at Ida Bay included driving a 600 ft decline. Ore from this decline was transported to Roberts Bay for milling. It yielded over 10,000 ounces of high grade silver. That same year, a 400 ft decline excavated into the Roberts Bay deposit produced 10 tons of hand sorted ore grading 4,863 oz/ton. In 1974 Hope Bay Mines Ltd. entered into a joint venture with Van Silver Explorations Ltd. and Reako Explorations to upgrade the Roberts Bay mine. A small 50-75 ton/day mill was constructed at the Roberts Bay site and yielded a total of 74,500 ounces of silver until operations ceased in 1975.

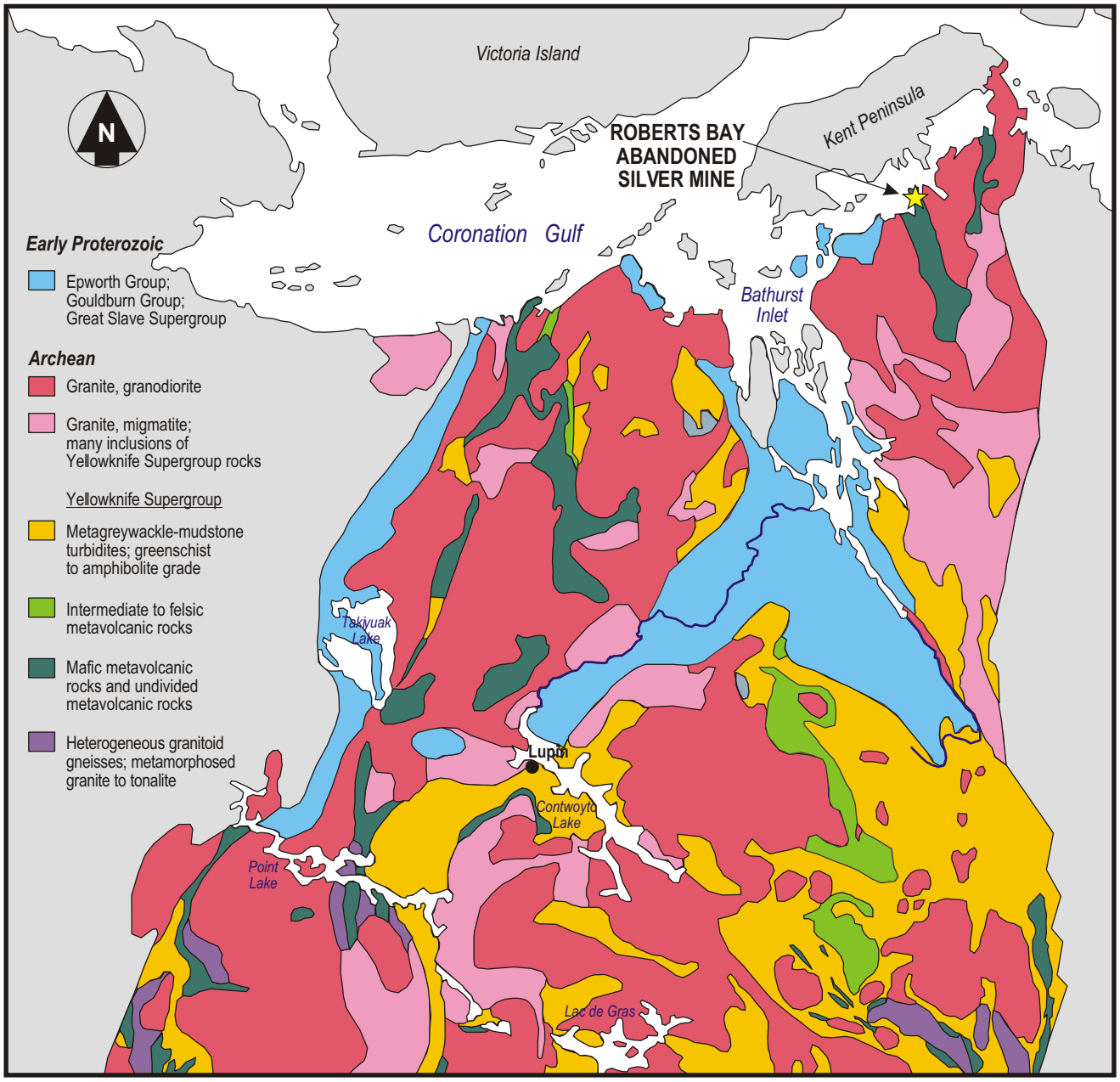
Further exploration continued at the leases throughout the 1980's and 1990's. In 1997 the Roberts Mining Lease was surrendered and the area covered by the lease was open for staking. In 1998 the ground was re-staked as the ORO 5 claim.

5.0 ECOREGION/ECOZONE CHARACTERISTICS

5.1 Site Geology

The Roberts Bay abandoned silver mine lies within the Hope Bay Volcanic Belt in the north of the Slave geological province. The rocks are Archean in age and are members of the Yellowknife Supergroup. The volcanic belt has a width of 13 km and a length of approximately 80 km extending from Ida Bay southwards. The belt is flanked on either side by pink and grey granite and granodiorite intrusives. The rocks in this belt are dominantly mafic to felsic lavas and tuffs, namely basalts and andesites that have undergone metamorphism to greenschist facies. Inclusions of granite, and granodiorite and quartz veins are common throughout the volcanic belt. Along the margins, at the contact of the volcanics with granite, there are both structural and metamorphic deformations. Figure 2 presents an illustration of the area geology

Scale
0 100 km



Simplified Geology of the Slave Geological Province

(modified from GSC Memoir 417, R. A. Frith, 1987)

FIGURE 2

Public Works and
Government Services Canada

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The Roberts Bay silver showing consists of epigenetic mineralization within a vein structure. The deposit is structurally controlled along a fault, and economic ore minerals included silver, copper, lead and zinc. Total production from the mine was reported to be greater then 10,000 ounces of silver from ore with grades as high as 4,863 oz/t.

5.2 Surface Hydrology

The Roberts Bay Silver Mine is located on basaltic outcrops approximately 60m above the elevation of Roberts Lake. Adjacent to the site are a series of low-lying marshes underlain with glacial till, all which is sloping to the south and draining towards Roberts Lake. There are a number of small lakes in the vicinity of the mine, which also drain towards Roberts Lake.

The Ida Bay Silver Deposit, is located adjacent to the shore of Melville Sound. Surface waters at the site drain to the east into Melville Sound.

5.3 Climate

The region is characterized as having a low arctic ecoclimate. Climate data is not collected at the site. The closest data collection point to the site is located in the Hamlet of Cambridge Bay. Due to its proximity to the Hamlet of Cambridge Bay, the climate at the Roberts Bay site and the Ida Bay site is assumed to be similar. Yearly temperatures at the site range from -33°C in February to 8.4°C in July, with a mean average temperature of –14.4°C. The annual precipitation is 138.8mm. This consists of 69.6mm of rainfall and 82.1cm of snowfall.

5.4 Vegetation

Vegetation at the site is typical of the region. It consists of lichens, sphagnum moss, sedge tussocks, least willow, blueberries and northern labrador tea.

5.5 Wildlife Resources

Wildlife typical of this region includes caribou, muskox, polar bear, moose, wolverine, hare, fox, and raptors. Wildlife observed at the site during the site visit included hare, arctic ground squirrel and wolverine.

5.6 Site Topography and Soils

The site is composed of exposed basalt ridges interspersed with low-lying marshes underlain with glacial deposits. The dominant soils in the region are Turbic and Static Cryosols developed on discontinuous, thin, sandy moraine and level alluvial deposits.

5.7 Permafrost

Permafrost in the region is continuous and deep, with a low ice content. At the site permafrost was identified at a depth of 0.6m.

6.0 PROJECT FINDINGS

The site was visited on August 19 and 20, 2003. The field team consisted of Giselle Cotta, P.Eng. and Dave Bynski, P.Eng. from PWGSC and Lara Woodhouse, P.Geol. from Rescan Environmental Services. In addition, Alan Kanayok of Cambridge Bay accompanied the crew as a bear monitor and Peter Avalak Sr, an elder from Cambridge Bay, who had worked at the mine during its operation, accompanied the field team to provide knowledge about the site and the historic operations.

Unfortunately, the site visit was cut short by the onset of poor weather. The field team was forced to depart the site in the early afternoon of the second day to avoid being weathered in at the site. This curtailed the collection of additional soil, water and hazmat samples from the site.

6.1 Contaminated Site Assessment

Roberts Bay Silver Mine
The Roberts Bay Silver Mine is located approximately 1 km north of Roberts Lake. A road leads from the lakeshore to the mine site following the crest of a basaltic ridge. The road was constructed using both esker and waste rock materials. The mine site itself is located atop a series of basaltic outcrops with mine waste rock used to level areas of the site for founding of infrastructure. The resulting waste rock pad varies in thickness from a thin veneer to upwards of 2 metres as dictated by local topography. The road that leads from Roberts Lake to the mine site continues northward through the site and ends abruptly (mid-construction) approximately 150 metres north of the site

The Roberts Bay site can be divided into four areas: the Exploration Camp, the Mine Camp, the Mill, and the Garage / Adit . A description of these areas is provided below. The layout of the Roberts Bay site is provided in Figure 3. The locations of the samples collected at the site are identified on Figure 4. Site photos are located in Appendix B.

> Exploration Camp. The exploration camp is located on the shore of Roberts Lake. It consists of 7 tent-cabin frames, an outhouse and shed. Racks of core, a small amount of wooden debris, 4 propane cylinders (3 empty, one with contents) and approximately 38 barrels were found at the site (17 empty, .21 full or partially full). East of the exploration camp, adjacent to the float plane docking area there is a pile of approximately 110 empty drums and one full drum of AvGas. Figure 5 provides a layout of the exploration camp.

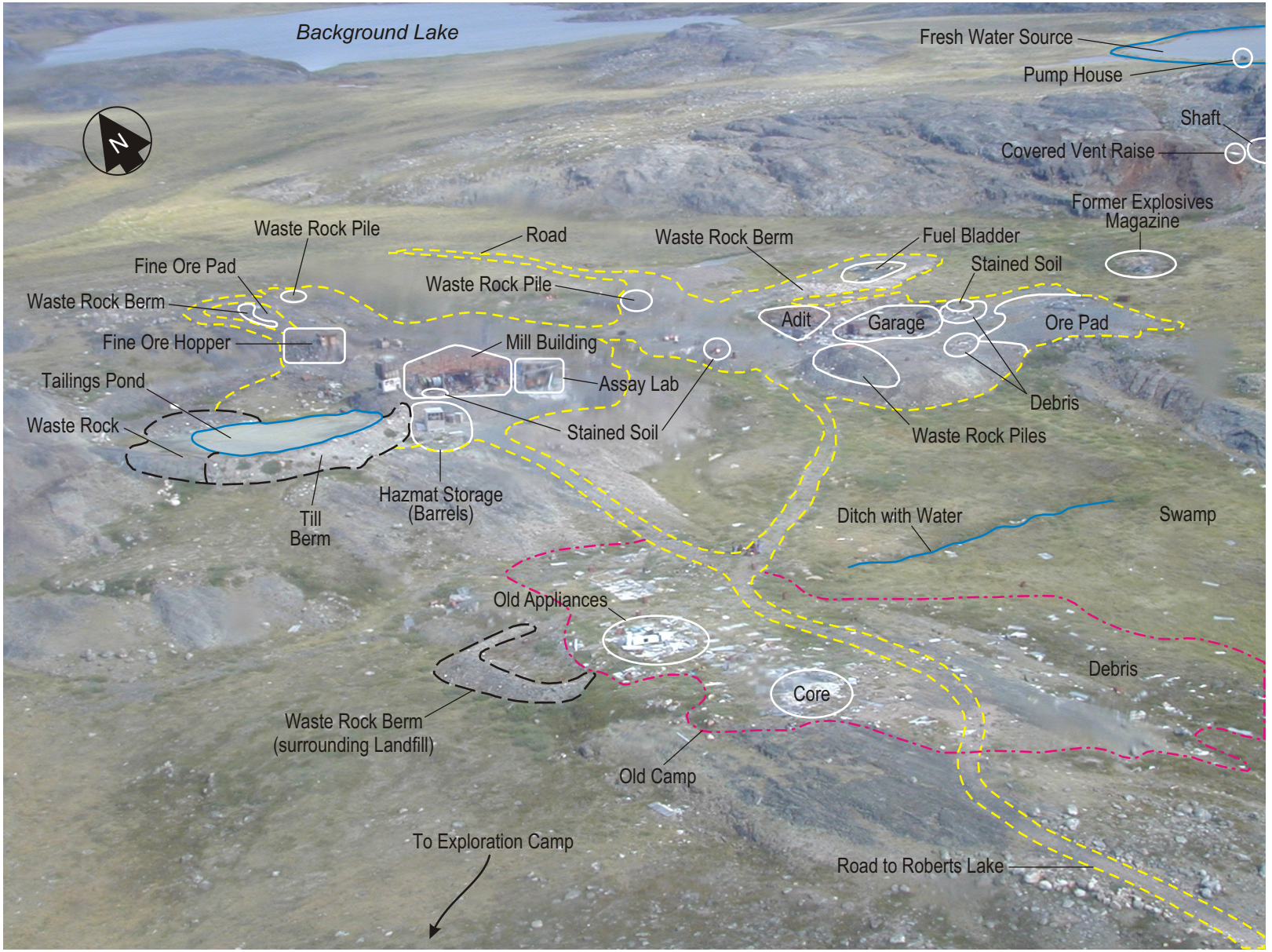

FIGURE 3

Public Works and Government Services Canada

Roberts Bay Silver Mine Photomap

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FIGURE 4

Public Works and Government Services Canada

Roberts Bay Abandoned Mine Site Sample Locations

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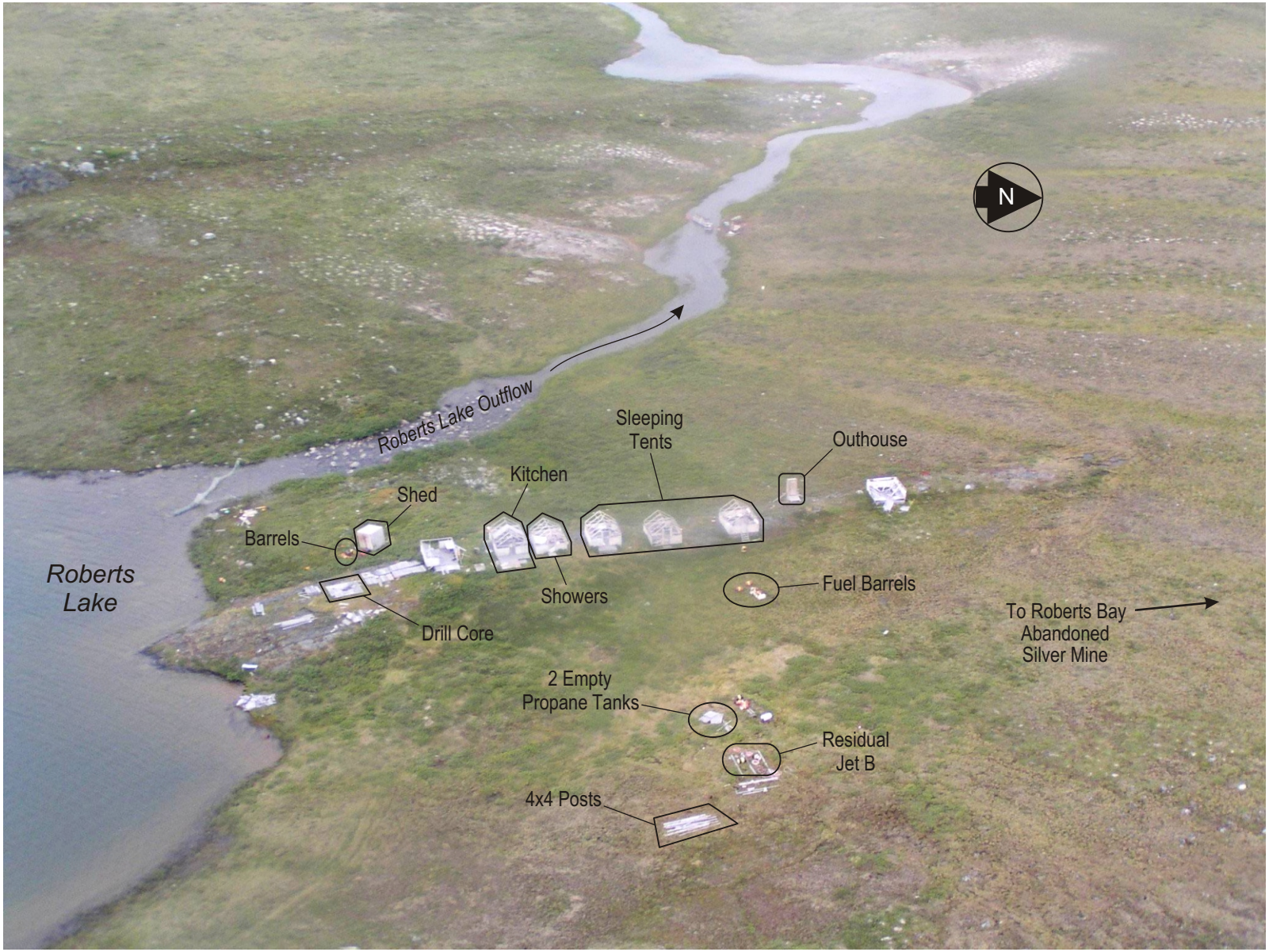

FIGURE 5

Public Works and Government Services Canada

Roberts Lake Exploration Camp Photomap

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Mine Camp Area. There are no structures remaining at the camp area. However there is a significant volume of non-hazardous debris strewn throughout this area. The debris consisted of wood, metal, burlap bags, and drill core. The only hazardous debris noted at the site were a few batteries. To the west of the camp buildings is a waste rock bermed area, which was the former land fill. Small amounts of metal debris were noted in the landfill. Soil samples were collected from the vicinity of the former kitchen and the landfill. A hydrocarbon sheen was noted in the swamp located in the valley east of the camp and south of the mill and garage. A water sample was collected from this area.

Mill Area. The mill area was located north of the camp area. It consisted of a small tailings pond, and the metal frames of the mill and the assay lab. The mill area was constructed on a rock fill pad. Mill equipment and generators were noted within the building frames. According to Peter Avalak Sr., a former mine employee, ore was crushed and concentrated at the site. It was then packaged into burlap bags for shipment to the south. A localized hydrocarbon soil stain was noted in the south west corner of the mill building and was sampled. A water sample and tailings samples were also collected from the tailings pond area.

Adit/ Garage Area. The adit / garage area was located east of the mill area, on a rock fill pad. It consisted of the metal frames of the garage and the mine entrance housing the adit, waste rock piles, and miscellaneous non-hazardous debris (scrap metal, wooden debris, engine parts, rubber hose). A fence was constructed around the mine entrance. The adit itself was boarded up and flooded. Localized soil stains were noted east of the garage. Soil samples were collected from the floor of the garage and a water sample was collected from ponded water east of the garage pad. The fuel storage area was located north of the adit. It consisted of two 15,000L rubber fuel bladders located within a bermed area. Hydrocarbon staining and odours were noted in this area. Soil samples were collected from in and around the bermed fuel area. A water sample was collected from ponded water immediately north of the fuel area. A background water sample was also collected from a small unnamed lake located approximately 850m north of the site.

Ida Bay Silver Deposit

The Ida Bay Silver Deposit is located approximately 7 km north of the Roberts Bay Silver Mine. Ore mined from the Ida Bay site was transported to the Roberts Bay site for crushing. Infrastructure at Ida Bay consists of a single adit, a 180 m decline, 3 waste rock piles, a covered vent raise and several exploration trenches. A small quantity of drill core is also present south of the adit. There was no trace of the previous camp, which had been located north of the adit, other than a small amount of metal debris (tin cans). There were also small amounts of non-hazardous debris located southwest of the adit. One waste rock and one water sample was collected from the site. The layout of the Ida Bay Site is provided in Figure 6. Site photos are located in Appendix B.

FIGURE 6

Public Works and Government Services Canada

Ida Bay Silver Deposit Photomap

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6.1.1 Analytical Results

Tables 1-4 summarize the analytical results for the water, soil and hazardous materials samples collected at the site. The laboratory certificates of analysis are located in Appendix C.

6.1.1.1 Water Quality

Roberts Bay Silver Mine
Based on the analytical results, the water quality at the site is fairly consistent with background. The water sample collected as background (RBSM-4) had concentrations of aluminum, cadmium, chromium, cyanide and silver above the CCME Water Quality Guidelines for the Protection of Aquatic Life (Freshwater). The other water samples collected from the site had similar exceedances. In addition, Sample RBSM-1, collected from the tailings pond had concentrations of arsenic, copper, iron, and lead which also exceeded the CCME criteria. Sample RBSM-2, collected from the standing water north of the Fuel Area had an iron concentration greater than the CCME criteria and Sample RBSM-3, collected from the adit had elevated copper and zinc concentrations. Sample RBSM-GAR-W-1, collected from standing water east of the Garage Area, had an elevated copper concentration. Sample RBSM-Val-1, collected from the muskeg valley east of the camp area had an iron concentration which exceeded the CCME criteria.

None of the water samples had BTEX or PCB concentrations which exceeded the CCME criteria. This included RSBM-Val-1, which was collected from the muskeg valley east of the camp because of a visible hydrocarbon sheen on the water surface. However, one water sample (RBSM-3) collected at the mine adit, had a total petroleum hydrocarbon concentration of 0.6mg/L.

Ida Bay Silver Deposit
One water sample was collected from the Ida Bay adit. This sample had concentrations of aluminum, cadmium, chromium, copper, cyanide and iron which exceeded the CCME Water Quality Guidelines for Aquatic Life (freshwater).

6.1.1.2 Soil Quality

Roberts Bay Silver Mine
Soil samples RBSM-TF-1 to RBSM-TF-8 were collected from the vicinity of the Fuel Area. The analytical results indicate that the soils from within the fuel berm area have F2 and F3 hydrocarbons concentrations which exceed the CCME Canada Wide Standards for Petroleum Hydrocarbons – fine grained surface soils. Testpitting in this area identified that permafrost is located at approximately 0.6m and that the hydrocarbon impacted soils do not extend past the berms. Therefore, it is estimated that 195 m^3 of soils have been impacted.

Soil samples were also collected from localized stained areas within the garage and mill. The analyses indicate that the stained soils had F2 and F3 hydrocarbons concentrations,

Table 1: Water Quality Results

Sample ID	RBSM-1	RBSM-2	RBSM-3	RBSM-4	RBSM-Gar-w-1	RBSM-Val-1	Ida-1	CCME
Location	Tailings Pond	Standing water north of Fuel Area	Roberts Bay Adit	Background Lake	Standing water east of Garage Area	Muskeg valley east of Camp Area	Ida Bay Adit	
Date Sampled	08/19/2003	08/19/2003	08/19/2003	08/19/2003	08/19/2003	08/19/2003	08/19/2003	**Water AQ Life[a]**
Hardness ($CaCO_3$)	168	855	277	57	--	--	256	**-**
Benzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.37**
Ethylbenzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.09**
Toluene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.002**
Xylenes	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	**-**
PCB	<0.1	<0.1	<0.1	<0.1	--	--	<0.1	**-**
TPH	<0.2	<0.2	0.6	<0.2	--	<0.2	<0.2	
Aluminum	**0.37**	**0.15**	**0.18**	**0.11**	**0.01**	**0.03**	**0.12**	**0.005[b] - 0.1**
Arsenic	**0.020**	0.002	0.002	<0.001	<0.001	<0.001	<0.001	**0.005**
Barium	0.05	0.08	0.05	<0.01	0.13	0.16	0.02	**-**
Beryllium	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**-**
Boron	<0.05	<0.05	<0.05	<0.05	0.50	0.49	<0.05	**-**
Cadmium	**<0.0005**	**<0.0001**	**0.0010**	**0.0008**	**0.0001**	**<0.0001**	**0.0003**	**0.000017**
Chromium	**0.005**	**0.007**	**0.004**	**0.003**	**0.007**	**0.004**	**0.003**	**-**
Cobalt	0.0005	0.0007	0.0004	<0.0002	<0.0002	<0.0002	0.0002	**-**
Copper	**0.011**	0.003	**0.012**	**0.002**	**0.003**	**0.002**	**0.008**	**0.002[b] - 0.004**
Cyanide (free)	**0.007**	**0.011**	**0.007**	**0.013**	--	--	**0.013**	**0.005**
Iron	**0.46**	**2.14**	0.30	0.08	0.04	**2.38**	0.10	**0.3**
Lead	**0.013**	<0.001	**0.001**	<0.001	<0.001	<0.001	0.002	**0.001[b] - 0.007**
Manganese	0.023	0.172	0.100	0.029	<0.005	0.023	0.028	**-**
Molybdenum	0.019	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**0.073**
Nickel	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0005	**0.025[b] - 0.150**
Silver	**0.0002**	<0.0001	<0.0001	**0.0002**	<0.0001	<0.0001	0.0001	**0.0001**
Strontium	0.065	0.640	0.232	0.051	0.065	0.046	0.123	**-**
Thallium	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.0008**
Titanium	<0.01	<0.01	<0.01	<0.01	0.02	0.02	<0.01	**-**
Vanadium	0.003	0.002	0.001	<0.001	0.003	0.001	<0.001	**-**
Zinc	<0.005	<0.005	**0.036**	<0.005	<0.005	<0.005	<0.005	**0.03**

< = Less than the detection limit indicated.
Results are expressed as milligrams per litre except where noted.
Values in BOLD exceed the CCME Environment Quality Guidelines for Water: Aquatic Life, Freshwater
a : Canadian Council of Ministers of the Environment, Canadian Environmental Quality Guidelines for Water, Aquatic Life in Freshwater
b CCME values are dependant upon alkalinity, the lower end value has been used for this comparison

Table 2: Soil Quality Results – Fuel Area

Sample ID	RBSM-TF-1A	RBSM-TF-1C	RBSM-TF-2B	RBSM-TF-3A	RBSM-TF-3B	RBSM-TF-4B	RBSM-TF-5B	RBSM-TF-5D	RBSM-TF-6B	RBSM-TF-7A	RBSM-TF-7B	RBSM-TF-8A	RBSM-TF-8A	CCME
Location	Fuel Area	Fuel Area	Fuel Area	Fuel Area	Fuel Area	Fuel Area	Fuel Area	Fuel Area	Fuel Area	Fuel Area	Fuel Area	Fuel Area	Fuel Area	
Date Sampled	08/19/03	08/19/03	08/19/03	08/19/03	08/19/03	08/19/03	08/19/03	08/19/03	08/20/03	08/20/03	08/20/03	08/20/03	08/20/03	Soil Res/Park[a]
Benzene	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.5**
Ethylbenzene	<0.2	0.4	<0.2	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**1.2**
Toluene	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.8**
Xylenes	<0.6	5.7	<0.6	<0.3	<0.3	<0.3	**16.9**	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	**1**
F1 (C5-C10)	60	60	60	<20	<20	<20	80	60	<20	<20	<20	<20	<20	**260**
F2 (C10-C16)	**20,000**	**1,300**	**4,700**	290	710	<10	**11,000**	430	<10	20	30	<10	<10	**900**
F3 (C16-C34)	**8,600**	180	**1,600**	200	250	<10	**2,100**	80	60	30	60	<10	<10	**800**
F4 (C34-C50)	<10	<10	30	<10	<10	<10	40	<10	<10	<10	<10	<10	<10	**5600**
PCB	<0.1	--	--	--	--	--	--	--	--	--	--	--	--	**1.3**
Aluminum	6300	--	--	--	--	--	--	--	--	--	--	--	---	**-**
Arsenic	1.9	--	--	--	--	--	--	--	--	--	--	--	--	**12**
Barium	85	--	--	--	--	--	--	--	--	--	--	--	--	**500**
Beryllium	<1	--	--	--	--	--	--	--	--	--	--	--	--	**4**
Cadmium	0.6	--	--	--	--	--	--	--	--	--	--	--	--	**10**
Chromium	20	--	--	--	--	--	--	--	--	--	--	--	--	**64**
Cobalt	5	--	--	--	--	--	--	--	--	--	--	--	--	**50**
Copper	29	--	--	--	--	--	--	--	--	--	--	--	--	**63**
Cyanide (free)	<0.10	--	--	--	--	--	--	--	--	--	--	--	--	**0.9**
Iron	10,500	--	--	--	--	--	--	--	--	--	--	--	--	**-**
Lead	4	--	--	--	--	--	--	--	--	--	--	--	--	**140**
Manganese	245	--	--	--	--	--	--	--	--	--	--	--	--	**-**
Molybdenum	1	--	--	--	--	--	--	--	--	--	--	--	--	**10**
Nickel	13	--	--	--	--	--	--	--	--	--	--	--	--	**50**
Silver	<1	--	--	--	--	--	--	--	--	--	--	--	--	**20**
Strontium	52	--	--	--	--	--	--	--	--	--	--	--	--	**-**
Thallium	<1	--	--	--	--	--	--	--	--	--	--	--	--	**1**
Vanadium	25	--	--	--	--	--	--	--	--	--	--	--	--	**130**
Zinc	57	--	--	--	--	--	--	--	--	--	--	--	--	**200**

< = Less than the detection limit indicated.
Results are expressed as milligrams per dry kilogram except where noted.
a : Canadian Council of Ministers of the Environment, Canadian Environmental Quality Guidelines for Soil at Residential and Parkland Sites and CCME Canada Wide Standards for Petroleum Hydrocarbons in Soil – Fine Grained Surface Soils

Table 3: Soil Quality Results

Sample ID	RBSM-Mill-1	RBSM-GAR-1A	RBSM-Gar-1B	RBSM-Gar-2A	RBSM-Gar-2B	RBSM-Camp-1	RBSM-Landfill-1	CCME
Location	Mill	Garage	Garage	Garage	Garage	Camp Area	Landfill Area	
Date Sampled	08/20/03	0820/03	08/20/03	08/20/03	08/20/03	08/20/03	08/20/03	Soil Res/Park[a]
Benzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0..05	<0.05	**0.5**
Ethylbenzene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**1.2**
Toluene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.8**
Xylenes	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	**1**
F1 (C5-C10)	<20	<20	<20	<20	<20	--	--	**130**
F2 (C10-C16)	**740**	<10	**470**	30	70	**--**	--	**450**
F3 (C16-C34)	**1,600**	**1,800**	**2,500**	**5,300**	**4,400**	**--**	--	**400**
F4 (C34-C50)	50	**4,800**	740	490	410	--	--	**2800**
TPH	--	--	--	--	--	<20	<20	
PCB	<0.1	<0.1	<0.1	<0.1	<0.1	--	--	**1.3**
Aluminum	19,100	19,800	24,400	12,800	14,500	25,300	6000	**-**
Arsenic	**35.6**	**33.1**	**16.9**	6.1	10.1	**17.2**	2.8	**12**
Barium	33	138	152	455	406	119	56	**500**
Beryllium	<1	<1	<1	<1	<1	<1	<1	**4**
Cadmium	5.5	4.3	6.9	<0.5	<0.5	1.1	<0.5	**10**
Chromium	**104**	**101**	**136**	**106**	**74**	**166**	24	**64**
Cobalt	25	**60**	**81**	15	14	24	6	**50**
Copper	**108**	**152**	**426**	**84**	**112**	**90**	21	**63**
Cyanide (free)	<0.10	<0.1	<0.1	<0.10	<0.10	--	--	**0.9**
Iron	97,700	50,000	64,600	49,000	57,600	58,400	14,700	**-**
Lead	**156**	**420**	110	28	42	74	**7**	**140**
Manganese	1,030	820	932	1,120	1,200	1,220	197	**-**
Molybdenum	2	4	5	**11**	10	**11**	2	**10**
Nickel	**76**	**94**	**105**	**51**	35	**89**	16	**50**
Silver	**35**	**117**	**50**	2	2	**63**	3	**20**
Strontium	32	19	17	20	20	22	13	**-**
Thallium	<1	<1	<1	<1	<1	<1	<1	**1**
Vanadium	78	83	69	33	33	93	28	**130**
Zinc	172	**329**	142	74	120	138	42	**200**

< = Less than the detection limit indicated.

Results are expressed as milligrams per dry kilogram except where noted.

a : Canadian Council of Ministers of the Environment, Canadian Environmental Quality Guidelines for Soil at Residential and Parkland Sites and CCME Canada Wide Standards for Petroleum Hydrocarbons in Soil – Coarse Grained Surface Soils

which exceed the CCME Canada Wide Standards for Petroleum Hydrocarbons – coarse surface soils. In addition, one of the surficial garage samples (RBSM-Gar-1A) also had an F4 concentration that exceeded the CCME Canada Wide Standards for Petroleum Hydrocarbons – coarse surface soils. The soil samples collected from these areas also had arsenic, chromium, cobalt, copper, lead, nickel silver and zinc concentrations greater than the CCME Soil Quality Guidelines for the Protection of Environmental and Human Health – residential / parkland landuse. Due to site time constraints imposed by the weather, full delineation of these stained areas could not be completed. However, based on visual observations, they appear to be localized. It is estimated that 30 m^3 of soils have been impacted.

No hydrocarbon impacts were noted in the samples collected from the camp site (RBSM-Camp-1 and RBSM-Landfill-1). However sample RBSM-Camp-1 had arsenic, chromium, copper, molybdenum, nickel and silver concentrations greater than the CCME Soil Quality Guidelines.

The elevated metal concentrations in the site soils are similar to the metal concentrations found in the waste rock, which was used at the site as fill material.

Ida Bay Silver Deposit
No soil samples were collected from the Ida Bay site.

6.1.1.3 Hazardous Materials Characterization

Roberts Bay Silver Mine
Hazardous materials identified at the Roberts Bay site included hydrocarbon products, batteries and a transformer. Samples of waste oil/grease (RBSM-Gar-Product-1) and the contents of a partially filled barrel (RBSM-Gar-Product-2) were collected from the Garage Area. Analyses confirmed that these materials did not contain PCB. RBSM-Gar-Product-1 was characterized as a heavy oil / grease which did not contain PCBs. RBSM-Gar-Product-2 was characterized as a oily water mixture. Although it was observed during collection to be yellow in colour, it had no detectable hydrocarbons or PCBs.

A sample of a clear odourless liquid stored at the hazardous materials storage area, south of the Mill (RBSM-Mill-Haz-1) was characterized as a light hydraulic oil, free of PCBs.

Ida Bay Silver Deposit
No hazardous materials were identified at the Ida Bay site.

Table 4: Hazardous Materials

Sample ID	RBSM-Mill-Haz-1	RBSM-GAR-Product-1	RBSM-Gar-Product-2
	Clear liquid from Hazmat storage	Grease from Garage area	Drum contents from Garage Area
Location	Area		
Date Sampled	08/20/03	0820/03	08/20/03
TPH	210	--	<8
PCB	<1	<2 ug/g	<1
Aluminum	14.4	--	--
Arsenic	<0.5	--	--
Barium	<0.05	--	--
Beryllium	1.6	--	--
Cadmium	<0.005	--	--
Chromium	0.08	--	--
Cobalt	<0.01	--	--
Copper	<0.05	--	--
Iron	12.1	--	--
Lead	<0.05	--	--
Manganese	<0.2	--	--
Molybdenum	<0.2	--	--
Nickel	<0.2	--	--
Silicon	<5	--	--
Silver	<0.005	--	--
Strontium	0.32	--	--
Thallium	<0.05	--	--
Titanium	0.7	--	--
Vanadium	<0.05	--	--
Zinc	0.5	--	--

< = Less than the detection limit indicated.
Results are expressed as milligrams per litre except where noted.

6.1.2 Waste Rock / Tailings

Acid Rock Drainage Potential

The overall balance between the Maximum Potential Acidity (MPA)of a material and the Neutralization Potential (NP) of a material is determined through dividing the MPA into the NP. The resulting dimensionless value is known as the Net Potential Ratio (NPR). The NPR provides a valuable indication of the overall *potential* for a sample to generate net acidity. Theoretically, rock with equal masses of sulphide (MPA) and neutralizing (NP) minerals should ultimately generate net neutral drainage when exposed to weathering processes. The resulting NPR for this condition is unity and is rarely observed in the natural environment as neutralizing minerals are usually not completely exhausted when counteracting the production of acid. INAC management guidelines therefore set a NPR of >3.0 as the point at which there would be an unlikely potential for a sample to generate net acidity. For tailings, an NP/AP ratio of 1.2:1 is generally accepted to define non-acid generating rock (INAC, 1998). Table 5 summarizes the guidelines stipulated by the INAC Acid Rock Drainage Guidelines.

Table 5
Guidelines for Interpretation of Waste Rock ABA Results (INAC, 1998)

NPR	Acid Generating Potential
NPR >3.0	Unlikely to generate net acidity
1.0 = NPR = 3.0	Uncertain acid generating potential
NPR < 1.0	Likely potential to generate acid

Roberts Bay Silver Mine

Waste Rock
Seven discrete waste rock piles were observed at the site, as well as numerous berms and rock pads constructed from waste rock materials. Rock pad material covers the majority of the site beneath the mill, adit and machine shop area, as well as the area to the north of the mill. A record of waste rock sample descriptions can be found in Appendix D.

The waste rock is comprised of black fine grained mafic volcanics with occasional quartz veinlettes and stringers. There is 1–2 % visible sulphides locally concentrated upon fracture surfaces and within quartz. There is also trace amounts of oxidation staining on the waste rock, localized around the sulphides. The waste rock is irregular in shape, consisting of blasted rock fragments which were estimated to range in size from less than 0.01 m to 0.5 m.

In addition to the waste rock piles, there are four berms constructed out of waste rock materials at the Roberts Bay site; one surrounds the camp landfill, another encircles the tailings pond, a third on the crush rock ore pad and finally one surrounding the former fuel bladder storage location. Waste rock material used in the construction of the berms are similar in composition with the exception of the materials surrounding the fuel bladder. Berm materials from the landfill, tailings pond and ore pad are a mix of basalt, gabbro, and granites. Materials vary in grain size and were visually estimated at 50% gravel with 20% cobble and 10% boulder-sized materials. Finer grained materials were exposed when the surface of each berm was dug into. The berm materials did not exhibit rust or oxidation staining and contain the occasional quartz vein with trace to 1% visible sulphides.

The materials which make up the berm around the fuel bladder are also a mixture of basalt, gabbro and granites with the addition of 40 to 50% quartz and 3 to 5% visible sulphides with rust and oxidation staining occurring in greater frequency .

Tailings Pond
There is one tailings pond located west of the mill building at the Roberts Bay site. The tailings pond is estimated to be 30 m in diameter with approximately 60% of the tailings solids submerged below the surface of the water line at the time of the site inspection. Algae and grasses were observed to be growing at the northeast margin of the tailings.

Judging from the tailings deposition pattern observed within the impoundment, it would appear that the tailings were discharged into the pond at several locations around the perimeter of the impoundment thereby limiting infiltration of tailings porewater into the upstream side of the impoundment berm. The tailings impoundment berm is constructed of glacial till but is not sufficiently armoured with crushed rock to limit long-term erosion. There were no design documents available for the tailings containment berm and it is unclear what level of quality control procedures were implemented during construction.

The tailings themselves are greenish grey in colour and comprised of silt and sand sized particles. The exposed tailings are on a 2 to 5% slope and fairly evenly distributed with no desiccation cracks or erosional features noted. No rusty oxidation staining was observed on the surface of the tailings however, approximately 10 to 15% of the exposed tailings is covered with a brittle white precipitate (possibly gypsum) creating a speckled appearance in these areas.

The tailings were generally soft and penetrable with a hand shovel. The first test pit was dug approximately 2 metres up-slope from the tailings water surface. The tailings located in the first test pit were well consolidated and drained allowing the pit to be dug fairly easily into the material without sloughing of tailings back into the pit. The top 10 cm of the first pit was brownish-green in colour, below which the materials became greener in colour. The second test pit was dug very close to the free water surface and was completely saturated with residual tailings water. The second test pit could only be dug to a depth of 0.25 metres before the surrounding materials would sink back into the hole and water would infiltrate . There were no sulphides or rusty oxidation staining visible within the tailings materials. A record of tailings sample descriptions can be found in Appendix D.

Ida Bay Silver Deposit

Waste Rock Piles

A total of three waste rock piles were identified at Ida Bay each located in close proximity to the adit. The smallest of the three piles is located immediately north of the adit and extends from land into the ocean. The second pile is located west of the adit while a third large elongated pile is located to the west of the second pile. A description of the waste rock sample collected at the site can be found in Appendix D.

The composition of the waste rock from all of the piles was essentially the same; black fine-grained basalt with trace to an estimated 1% pyrite coating on fracture surfaces and rare quartz veinlettes and stringers with sulphides on their selvages. Within the basalt are 5% inclusions of pink syenitic granite as pods and stringers less than 10 cm wide. There was no visible oxidation staining.

6.1.2.1 Waste Rock / Tailings Analytical Results

The ARD potential of waste rock and tailings samples collected at the site was determined through a number of analytical tests. The results from ABA analysis of tailings and waste rock samples are presented in Table 6.

A review of the NPR values indicated that the majority of the samples have a low potential to generate net acidity (*i.e.*, NPR > 3.0). NPR values of greater than 8 were determined in samples 1, 2, 3, 4, 5 and 10 indicating an extremely low potential to generate net acidity under weathering conditions. The below surface tailings samples had particularly high NPR values of 42.2 and 39.0 for Samples 2 and 3 respectively. Sample 7 is also unlikely to generate net acidity with an NPR value of 4.86. The NPR value for sample 6, collected from the berm around the fuel area was 1.12 indicating an uncertain potential to generate net acidity. Sample 9, collected from the waste rock pile south of the Garage, indicated a likely potential to generate net acidity with an NPR value of 0.6.

In addition to ABA analysis, the 9 grab samples (waste rock and tailings) collected from the Roberts Bay site and 1 waste rock grab sample collected from the Ida Bay site were also analyzed for water leachable metals and total metals content.

The results of leachable metals testing are presented in Table 7. The results have been compared to CCME Water Quality Guidelines for the Protection of Aquatic Life (freshwater). The comparison is conservative in that the leaching tests conducted in the laboratory give worst-case results as the test does not simulate dilution that will likely to occur in the environment prior to reaching aquatic biota. For aluminium, copper, lead and nickel, the CCME guidelines provide a range of values that are dependent upon the alkalinity of the water. In the absence of aquatic alkalinity data, the lower end CCME guideline values (*i.e.*, aluminum, copper, lead and nickel) have been used for evaluation purposes.

A total of four metals leached to concentrations exceeding their respective CCME guideline value (aluminum, arsenic, selenium and copper). The concentration of aluminum in all but Sample 6 (Fuel Berm Waste Rock) exceeded the CCME guidelines, with values ranging from 0.186 mg/L to 0.761 mg/L. Leachate concentrations of arsenic exceeded the guideline for all samples with the exception of Samples 4 and 7. Exceedence values ranged from 0.0052 mg/L (Sample 6 – Fuel Berm Waste Rock) to 0.746 mg/L (Sample 2 – Roberts Bay tailings). Analysis of the tailings leachate indicated the highest concentration of leachable arsenic was associated with Roberts Bay tailings. Extractable selenium exceeded the guideline (0.001 mg/L) in Samples 6 and 9 with values of 0.002 mg/L and 0.003 mg/L respectively. Copper was slightly elevated over the guideline in Samples 1, 2, 3, 4, and 6.

The results of total metals testing are presented in Table 8. The results have been compared to CCME Soil Quality Guidelines for the Protection of Environmental and Human Health (Residential/Parkland). The comparison is conservative in that the

Table 6
Results of Acid Base Accounting

Sample ID	Location	Fizz Rating ( )	Paste pH ( )	Total Sulphur (%)	Sulphate Sulphur (%)	Sulphide Sulphur (%)	MPA (kg $CaCO_3$/ t sample)	Bulk NP (kg $CaCO_3$/ t sample)	NPR ( )	Carbonate NP (kg $CaCO_3$/ t sample)
1	Tailings Surface	1	7.2	0.16	0.12	0.12	5.0	41	8.2	53
2	Tailings Below Surface	1	8.2	0.05	0.03	0.04	1.6	66	42.24	64
3	Tailings Below Water	1	7.4	0.05	0.03	0.04	1.6	61	39.04	44
4	Waste Rock Pad near Adit	1	8.0	0.10	0.01	0.08	3.1	81	25.92	80
5	Waste Rock from Crushed Ore Pad	3	8.4	0.49	0.01	0.37	15.3	150	9.8	100
6	Waste Rock From Fuel Bladder Berm	1	7.3	1.43	<0.01	**1.18**	44.7	50	**1.12**	50
7	Waste Rock from Coarse Ore Pad	1	8.4	0.25	0.14	0.17	7.8	38	4.86	35
8	Waste Rock at Ida Bay	1	8.1	0.60	0.02	**0.44**	18.8	21	**1.12**	10
9	Waste Rock Piles South of Machine Shop	1	8.2	1.17	<0.01	**0.95**	36.6	22	**0.6**	14
10	Waste Rock from Road	1	8.3	0.15	0.01	0.12	4.7	67	14.29	65

Note: Bolded NPR values indicate an uncertain or likely potential to generate net acidity over the long term.

Table 7
Roberts Lake Waste Rock Analysis Extractable Metals

Sample ID	**Sample 1**	**Sample 2**	**Sample 3**	**Sample 4**	**Sample 5**	**Sample 6**	**Sample 7**	**Sample 8**	**Sample 9**	**Sample 10**	**CCME**
Location	Tailings Surface	Tailings Below Surface	Tailings Below Water	Waste Rock Pad near Adit	Waste Rock from Crushed Ore Pad	Waste Rock From Fuel Bladder Berm	Waste Rock from Coarse Ore Pad	Waste Rock at Ida Bay	Waste Rock Piles West of Garage	Waste Rock from Road	
Date Sampled	08/19/2003	08/19/2003	08/19/2003	08/19/2003	08/19/2003	08/19/2003	08/19/2003	08/19/2003	08/20/2003	08/20/2003	**Water AQ Life[a]**
Aluminum	**0.186**	**0.333**	**0.31**	**0.628**	**0.319**	0.032	**0.48**	**0.51**	**0.387**	**0.761**	**0.005[b] - 0.1**
Antimony	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**-**
Arsenic	**0.554**	**0.746**	**0.655**	0.0027	**0.0932**	**0.0052**	0.0007	**0.0072**	**0.0094**	**0.0054**	**0.005**
Barium	0.06	0.09	0.1	0.07	0.11	0.05	0.38	0.01	<0.01	0.27	**-**
Beryllium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**-**
Bismuth	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**-**
Cadmium	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	**0.000017**
Calcium	17.5	12.2	12.5	9.53	14.3	13.4	6.45	9.13	9.29	8.02	**-**
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**-**
Cobalt	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**-**
Copper	**0.004**	**0.0021**	**0.0031**	**0.003**	0.0013	**0.0042**	0.0006	0.0012	0.0009	0.0007	**0.002[b] - 0.004**
Iron	0.05	0.05	0.06	<0.03	<0.03	<0.03	<0.03	0.04	<0.03	<0.03	**0.3**
Lead	0.0016	0.0007	0.0011	0.0004	0.0001	<0.0001	0.0003	0.0006	0.0002	<0.0001	**0.001[b] - 0.007**
Magnesium	3.8	2.3	2.4	1.8	2.7	4.2	1.4	1.9	3.5	1	**-**
Manganese	<0.005	<0.005	<0.005	<0.005	<0.005	0.011	<0.005	<0.005	<0.005	<0.005	**-**
Mercury	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**-**
Molybdenum	<0.03	<0.03	<0.03	<0.03	<0.03	0.04	<0.03	<0.03	<0.03	<0.03	**0.073**
Nickel	0.0014	0.0041	0.005	<0.0005	0.0009	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	**0.025[b] - 0.150**
Phosphorus	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	**-**
Potassium	3	3	<2	<2	<2	<2	3	3	<2	2	**-**
Selenium	<0.001	<0.001	<0.001	<0.001	<0.001	**0.002**	<0.001	0.001	**0.003**	<0.001	**0.001**
Silver	<0.0001	0.0002	0.0002	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	0.0008	**0.0001**
Sodium	5	2	2	<2	2	6	5	6	4	4	**-**
Strontium	0.037	0.034	0.039	0.022	0.034	0.173	0.15	0.016	0.016	0.046	**-**
Thallium	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	**0.0008**
Tin	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	**-**
Titanium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**-**
Vanadium	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	**-**
Zinc	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**0.03**

< = Less than the detection limit indicated.
Results are expressed as milligrams per litre except where noted.
Values in BOLD exceed the CCME Environment Quality Guidelines for Water: Aquatic Life, Freshwater
a : Canadian Council of Ministers of the Environment, Canadian Environmental Quality Guidelines for Water, Aquatic Life in Freshwater
b CCME values are dependant upon alkalinity, the lower end value has been used for this comparison

Table 8
Roberts Lake Waste Rock Analysis Total Metals

Sample ID	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Sample 7	Sample 8	Sample 9	Sample 10	CCME
Location	Tailings Surface	Tailings Below Surface	Tailings Below Water	Waste Rock Pad near Adit	Waste Rock from Crushed Ore Pad	Waste Rock From Fuel Bladder Berm	Waste Rock from Coarse Ore Pad	Waste Rock at Ida Bay	Waste Rock Piles West of Garage	Waste Rock from Road	
Date Sampled	08/19/2003	08/19/2003	08/19/2003	08/19/2003	08/19/2003	08/19/2003	08/19/2003	08/19/2003	08/20/2003	08/20/2003	Soil Res/Park[a]
Aluminum	35300	33000	30900	26500	22800	269	24800	18300	21100	25900	-
Antimony	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	**20**
Arsenic	<100	<100	<100	<100	264	<100	<100	<100	<100	<100	**12**
Barium	**1530**	**940**	**1070**	72	134	3	**501**	14	11	197	**500**
Beryllium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**4**
Bismuth	<20	<20	<20	<20	<20	<20	<20	<20	40	<20	-
Cadmium	<2	<2	<2	<2	<2	<2	<2	3	<2	<2	**10**
Calcium	38100	37000	37400	29900	65200	13300	28400	16400	6170	29300	-
Chromium	**118**	**80**	**78**	41	47	9	61	7	24	25	**64**
Cobalt	24	24	24	17	39	15	22	21	45	17	**50**
Copper	**86**	53	51	59	**87**	**1790**	**104**	**64**	**866**	**75**	**63**
Iron	44300	42000	40300	39700	45300	15000	37600	46900	40100	54700	-
Lead	**304**	87	90	<50	**269**	<50	64	**263**	<50	<50	**140**
Lithium	54	52	49	52	45	<2	35	13	55	45	-
Magnesium	25800	22900	22500	26700	22400	7000	19500	11800	22900	15200	-
Manganese	1110	901	892	950	2320	450	652	541	488	818	-
Molybdenum	<4	<4	<4	<4	<4	<4	<4	<4	6	<4	**10**
Nickel	**94**	**172**	**169**	32	**229**	8	40	10	15	19	**50**
Phosphorus	361	526	529	353	410	<50	299	652	361	924	-
Potassium	1540	1300	1180	652	557	<200	479	550	571	521	-
Selenium	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	**1**
Silver	<2	10	8	5	**21**	6	<2	3	<2	<2	**20**
Strontium	102	77.3	75	20.9	35.8	5.2	55.5	6.3	4.2	56.7	-
Thallium	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	**1**
Tin	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	**50**
Titanium	1750	1320	1400	325	592	4	1350	854	153	896	-
Vanadium	**152**	128	121	66	103	3	101	109	21	55	**130**
Zinc	**282**	89	91	53	139	5	68	**1050**	48	87	**200**

< = Less than the detection limit indicated.
Results are expressed as milligrams per dry kilogram except where noted.
a : Canadian Council of Ministers of the Environment, Canadian Environmental Quality Guidelines for Soil at Residential and Parkland Sites.

guidelines are intended for soils and the materials collected at the Roberts Bay and Ida Bay sites are waste rock and tailings.

Review of the analytical results indicated that the sample collected from the surface layer of the tailings pond (Sample 1), exceeded the CCME guideline values for barium, chromium, copper, lead and zinc. Each of the below surface tailings samples exceeded the guideline values for barium, chromium and nickel. Sample 5 exceeded the guideline values for arsenic, copper, lead, nickel and silver. Waste rock sample 6 exceeded the copper guideline by a factor of 28 while Sample 7 exceeded the guideline values for both barium and copper. Finally, Sample 9 and 10 each exceeded the guideline value for copper.

Ida Bay Silver Deposit
Sample 8, the one waste rock sample collected from the Ida Bay site had an NPR of 1.12, indicating an uncertain potential to generate net acidity. The sample was collected from waste rock north of the portal.

With respect to leachable metals testing, a total of four metals leached to concentrations exceeding their respective CCME guideline value (aluminum, arsenic, selenium and copper) in Sample 8.

With respect to total metals testing, Sample 8 exceeded the guideline values for copper, lead, and zinc.

6.1.2.2 WASTE ROCK VOLUME

Roberts Bay Silver Mine
The volumes of material contained within the waste rock piles and berms have been estimated based upon dimensions measured in the field, however it should be noted that the berms are irregular in shape and their heights are approximations only, as detailed topography is unknown. Estimated volumes of waste rock materials are found in Table 9.

Table 9
Waste Rock Locations and Volumes at Roberts Bay Site

Waste Rock Location	Pile Dimensions			Estimated Volume (m^3)	Comments
	Length	Width	Height		
Tailings Pond Berm	Section of 32 m diameter ring			32.4	
Ore pad Berm NW of Mill	20 m	1 m	1 m	20.0	Curved shape
Berm around Fuel Bladder	30m x 20m sq	2.5 m	0.5	90.0	Ring around the Fuel Bladder
Berm around camp landfill	30 m	1 m	1 - 2 m (variable)	48.0	Horseshoe shape
5 Waste Rock Piles South of Adit	Cones with diameter of 5 m and height of 2 m			65.5	
Waste Rock Pile North of Adit	20 m	5 m	3 m	150.0	
Waste Rock Pile North of Ore Pad	15 m	4 m	2.5 m	75.0	
		Total Volume		480.9	(Estimate)

Ida Bay Silver Deposit

The waste rock pile north of the portal extends into the marine environment and would be partially covered by seawater at high tide. The volume of waste rock deposited into the ocean at this location is unknown. Volumes of exposed waste rock material were estimated based on the pile dimensions measured on site. These volume estimates are presented in Table 10.

Table 10
Estimated Waste Rock Volumes at Ida Bay

Waste Rock Location	Pile Dimensions			Estimated Volume (m^3)	Comments
	Length	Width	Height		
North of Adit	20	10	1.0	200	
Conical pile west of adit	Diameter of ~20 m, height 2.5 m			260	
Elongated pile west of adit	53 m	9 - 16 m	0.5-1.5	600	
		Total Volume		1,060	(Estimate)

6.1.3 Non-Hazardous Waste Material

Non-hazardous waste materials were noted at both the Roberts Bay and Ida Bay sites. The materials consisted of wood and metal debris, tin cans, empty drums, and abandoned equipment. Table 11 lists the debris identified at the site and provides the volume of debris.

Table 11: Non-Hazardous Waste Materials at Roberts Bay Silver Mine

Location	Waste Material	Volume
Exploration Camp		
	66 empty drums	7 m^3
	wood debris (cabins)	20 m^3
	metal debris	1 m^3
	overturned core and core racks	4 m^3
Mine Camp		
	20 empty barrels	2 m^3
	wood debris	25 m^3
	metal debris	15 m^3
	burlap sacks	4 m^3
	overturned core and core racks	6 m^3
Mill Area		
	26 empty drums	3 m^3
	wood debris	20 m^3
	metal debris	80 m^3
	burlap sacks	2 m^3

Location	Waste Material	Volume
Adit / Garage Area		
	60 empty barrels	6 m^3
	wood debris	43 m^3
	metal debris	58 m^3
	10 tires	2.5 m^3
	cables and rubber hoses	4.0 m^3
	cement mix	1 m^3
	shredded canvas and tarps	1.5 m^3
Volume of Non-hazardous Waste at Roberts Bay		**305 m^3**
Ida Bay Site		
	3 empty barrels	0.3 m^3
	wood debris	5 m^3
	metal debris	2 m^3
	overturned core and core racks	1 m^3
Volume of Non-hazardous Waste at Ida Bay		**8.3 m^3**

6.1.4 Hazardous Materials

The hazardous materials identified at the Roberts Bay site are listed in Table 12. No hazardous materials were identified at the Ida Bay site.

Table 12: Hazardous Waste Materials

Location	Waste Material
Exploration Camp	
	15 drums of gasoline, Jet B, motor oil
	4 empty propane cylinders
Mine Camp	
	2 lead acid batteries
Mill Area	
	9 drums with unknown content
	1 drum of lead acid batteries
	2- 20L drums with unknown content
	3 – 8L pails with unknown contents
Adit / Garage Area	
	1- 20L pail waste oil
	1-8L pail waste grease
	1 compressed gas cylinder
	1 oil filled transformer (suspect PCB)
	6 drums with unknown contents
	3 compressed gas cylinders

6.2 Physical Safety Assessment

At the cessation of mining at the sites, supporting mine infrastructure was abandoned. A general surface reconnaissance of each site was completed in order to identify mine-related site features (*i.e.* tailings ponds, waste rock piles, mine workings) and to identify any potential stability concerns that could impact human/animal safety. Exposed mine workings such as adits, shafts and vent raises were assessed for ground stability issues, access and potential safety hazards. Waste rock piles and tailings ponds were assessed for slope stability and retaining structure integrity. The condition of the remaining infrastructure at each site and the potential hazards are discussed below.

Robert Bay Silver Mine

- Adit. The main adit has been covered over with a wooden framework and plywood against which a layer of waste rock has been placed. The adit itself is surrounded by a chain-link fence that has been installed over a pre-existing framework. The fence is in relatively good condition preventing accidental access to the portal area. At the time of the site reconnaissance visit, there was a body of standing water observed at the entrance to the adit indicating that the adit itself is fully flooded.

- Vertical Shaft. The shaft is located on the side of a basaltic ridge and is accessible by climbing up the ridge. The shaft is still open although it appears as though the walls have partially caved-in. A chain-link fence has been installed on the collar of the shaft but only surrounds 2/3 of the perimeter. The uphill side remains open allowing access to the shaft opening at any time. There are serious stability problems with the collar surrounding the shaft as evidenced by the open fractures and caving of bedrock.

- Vent Raise. A vent raise is located 10 metres north of the shaft. It has been sealed with concrete and there were no signs of subsidence noted during inspection.

- Waste Rock Piles and Berms. The seven waste rock piles identified at the site had uniform side slopes consolidated and stable enough that the piles could be climbed without material being significantly displaced. They did not display evidence of instability. The rock berms at the site were all generally long, low-lying structures. No instability issues associated with the berms were noted.

- Site Debris. Non-hazardous debris was identified throughout the site. Concentrations of debris were noted in the mine camp area, the mill area and the adit/garage area. This debris is a physical hazard, which could injure humans or wildlife utilizing the site.

Ida Bay Silver Deposit

- Adit. The adit is located approximately 15 m from the ocean shoreline and is fully flooded. There is no physical barrier to the adit entrance with the exception of the water preventing access. In addition, there are no warning signs in the immediate

vicinity of the adit. Timber supports are in place however it was not possible to evaluate their condition.

- Vent Raise. There is what appeared to be a boarded over raise (assumed to be a vent raise) located south of the adit. The raise is covered with plywood (approximately 1 x 1 metre) and it can be seen through a hole in the plywood to be filled with water. The integrity of the plywood is unknown and for safety reasons should be considered unsound until it can be proven otherwise. There are no identifying markers at the raise and no barriers preventing persons or animals from walking over the cover.

- Waste Rock. Three waste rock piles identified at the Ida Bay site were well consolidated with stable slopes. No instability issues were identified.

- Exploration Trenches. Three exploration trenches were identified within the basaltic ridges south of the adit. The trenches were excavated using blast and muck techniques and are approximately 1.2 m wide, 2 m long and 1.2 m deep and are full of water. The exposed rock is basalt containing approximately 10% small quartz veinlets. There was no oxidation staining visible. There were no warning signs or identification markers noted around any of the trenches.

6.3 Quality Assurance / Quality Control

Quality assurance and quality control measures were implemented throughout the project to ensure that the project results provided were accurate and representative of the site. The quality assurance measures used for this project included the use of a CAEAL certified laboratory for analysis; appropriate sample preservation, as outlined by the CAEAL laboratory; and the completion of chain of custody forms. In addition, quality control measures were implemented to ensure that results reported by the laboratory were reliable. These measures included the analysis of a field blank as well as laboratory blanks and duplicates.

A field blank water sample was submitted to Accutest Laboratories for analysis. Accutest Laboratories also conducted lab blanks and duplicates for 10% of the samples. The analytical results for all of the blanks were below the detection limit, as would be expected. The duplicate samples analyzed by Accutest Laboratories had a percent recovery, which ranged from 80-119%, which is in the acceptable range identified by Accutest Laboratories. The only exceptions were the spike recoveries for the PCB in soil, which was 41%. Accutest has reported that the spike recovery acceptable range for PCBs in soil is undetermined.

ALS Environmental Laboratories conducted the tailings and waste rock analyses. Their QA/QC program also included analysis of a duplicate to ensure accuracy in their measurements. The quality control duplicate had a percent recovery of 89-99%.

7.0 CCME NATIONAL CONTAMINATED SITES CLASSIFICATION SYSTEM

The Roberts Bay site and the Ida Bay site were classified together using the 2003 updated CCME National Classification System for Contaminated Sites. The updated system was developed by Environment Canada, to clarify and standardize the interpretation of the original system. Based on this classification system, the sites scored 85 out of 100. This means that the sites would be considered a Class 1. Please refer to Appendix E for details of the evaluation.

8.0 CONCLUSIONS

The environmental site assessment and safety assessment was conducted in August 2003 at the Roberts Bay and Ida Bay properties was intended as a preliminary assessment. The objectives stated in the introduction were met during the 2003 field program and the following provides a discussion of the results along with our recommendations.

8.1 Roberts Bay Silver Mine

The Roberts Bay site has been in a state of abandonment for nearly 30 years and has residual infrastructure and waste materials scattered about the site. Some limited closure activities have been historically carried out at the site but numerous physical and environmental hazards are present. These hazards are discussed below.

8.1.1 Environmental Hazards

Water Quality

The composition of the water samples collected at the site is consistent with the background water quality of the site. No BTEX or PCB concentrations were noted in any of the water samples. No TPH concentrations were noted in any of the water samples, with the exception of RBSM-3, collected from the adit, which had a TPH concentration of 0.6mg/L.

Contaminated Soils

Hydrocarbon contaminated soils (F2 and F3) were identified at the Roberts Bay site, in the vicinity of the Mill, the Garage and around the bermed Fuel Area. The volume of impacted soils was estimated to be 225 m^3 .

Elevated metals concentrations (arsenic, chromium, copper, nickel and silver) were identified in most of the soil samples collected from the Roberts Bay site. The elevated metal concentrations in the site soils are similar to the metal concentrations found in the waste rock, which was used at the site as fill material.

Waste Rock / Tailings
There was no evidence of on-going acid rock drainage (*i.e.*, surficial oxidation staining) in the tailings or waste rock. Review of acid base accounting and metals testwork however has determined that there is a potential for the waste rock southwest of the Garage and the waste rock in the Fuel Area berm to generate net acidity and a possible concomitant release of metals. As there was no standing water at either of these waste rock sample locations, it was not possible to compare drainage water quality to the ABA static predictions and thereby confirm whether acid generation is indeed a problem.

The results of leachable metals analysis of the tailings and waste rock indicated that arsenic leaching may be a potential problem. However, unless acid rock drainage is facilitating the release of arsenic and/or other potentially problematic metals, it is unlikely that leaching of metals is an on-going problem at Roberts Bay given the length of time these materials have been in their present location and condition. Aluminum, copper and selenium concentrations were also elevated compared to the CCME freshwater standard

The total metals content of the waste rock samples was compared to the CCME Soil Quality Guidelines for the Protection of Environmental and Human Health - Residential/Parkland sites. While the waste rock at the site does not constitute a "soil", the comparison was intended to help evaluate the results and provide a reference for any future sampling that may be conducted. As one would expect for a site where chalcopyrite ($CuFeS_2$) is present, the analysis indicated that the majority of the waste rock on site is elevated in concentrations of copper. Additional metals that were elevated in certain waste rock samples included arsenic, barium, copper, lead, nickel, silver and zinc.

Petroleum Hydrocarbons
The storage of petroleum hydrocarbons at the site poses a significant environmental risk. Fifteen 205L drums of Jet "B", motor oil, and gasoline, one 8L pail of grease and one 20L pail of waste oil were identified at the site. The drums and pails were in fair to poor condition.

Hazardous Waste
Hazardous materials identified at the site include propane cylinders, lead acid batteries, unknown chemicals and one possible PCB containing transformer. These materials pose an environmental risk to humans and animals visiting the site.

8.1.2 Physical Hazards

Mine Related Site Features
The adit has been boarded over and has a chain link fence around it, however the measures implemented to date are not sufficient for the long-term. The shaft has also been partially closed off but is still fully accessible from the upstream side by persons or wildlife. The shaft itself is structurally unsound as evidenced by the collapse of the collar onto the wooded support beams. There were no concerns noted as a result of inspection

of the capped vent raise as the area appeared to be stable with no signs of subsidence or cracking of the concrete cap.

Non-hazardous Waste
In addition to the safety hazards associated with the adit and shaft, the site is littered with a large quantity of waste materials such as scrap metal, wooden debris, and old mining/milling equipment. Approximately 305 m^3 of non-hazardous debris is scattered throughout the site.

8.2 Ida Bay Silver Deposit

The Ida Bay property also remains in a state of abandonment. Closure activities have been historically carried out at the site. The former camp at the site has been completely removed and the road connecting the Ida Bay site to the Roberts Bay site has been reclaimed. However, physical and environmental hazards remain at the site. These hazards are discussed below.

8.2.1 Environmental Hazards

Water Quality
The composition of the water sample collected at the site is consistent with the background water quality of the site. No BTEX , TPH or PCB concentrations were noted in the water samples.

Contaminated Soils
No contaminated soils were identified at the site.

Waste Rock
There was no evidence of on-going acid rock drainage (*i.e.*, surficial oxidation staining) in the waste rock. Review of acid base accounting and metals testwork however has determined that there is an uncertain potential for the waste rock in the foreshore waste rock pile to generate net acidity and a possible concomitant release of metals. As there was no standing water at this waste rock sample location, it was not possible to compare drainage water quality to the ABA static predictions and thereby confirm whether acid generation is indeed a problem.

Water leachable arsenic from the waste rock at this site was elevated slightly above the CCME aquatic life guideline of 0.005 mg/L.

Petroleum Hydrocarbons
No stored petroleum product was identified at the site.

Hazardous Waste
No hazardous materials were identified at the site.

8.2.2 Physical Hazards

Mine Related Site Features
With the exception of being filled with water, the adit at Ida Bay has not been closed off and remains fully open. The timbers bracing the back of the adit entrance are old and have exceeded their normal service lifespan.

In addition there are three exploration pits, which are uncovered and filled with water. A vent raise has been covered by plywood, which appears to be in poor condition.

Non-hazardous Waste
There is a small amount of non-hazardous mine waste scattered to the south of the adit. The waste materials consisted of scrap metal and wooden debris. Approximately 8.3 m^3 was identified at the site.

9.0 RECOMMENDATIONS

Based on the findings of the current investigation, the following recommendations are provided for consideration.

9.1 Environmental Hazards

Water Quality
No hydrocarbon impacts were noted in the muskeg area east of the camp, however only one sample was collected. Additional sampling of the water in this area is recommended to confirm that the observed sheen does not denote an impact to the environment.

Contaminated Soils
The identified hydrocarbon impacted soils appear to be localized and have not impacted surrounding water courses. No further action is recommended at this time.

Waste Rock / Tailings
Assessment of waste rock samples from both Roberts Bay and Ida Bay determined that certain samples have the potential to generate net acidity under weathering conditions. Metals leaching testwork determined that elevated levels of arsenic could potentially be leaching from tailings (Roberts Bay) and certain waste rock piles (Roberts Bay and Ida Bay). Assessment of area drainage water quality paired with additional waste rock and tailings sampling is required to confirm whether any acid rock drainage and/or metals leaching is occurring at either of these sites.

It is unknown what types of quality control methods, if any, were implemented during the construction of the tailings impoundment. A more detailed assessment of the tailings geochemistry and area hydrology is required. Additional analytical testwork to evaluate the mobility of arsenic and other metals should be undertaken to determine the fate of these parameters and any associated impacts on the receiving aquatic environment. As

part of a more detailed geochemical investigation, the installation of water quality monitoring wells should be considered to aid in evaluating whether arsenic or other metals of concern are actively migrating from the tailings into the active layer groundwater. Investigation of both the groundwater hydrology and quality downstream of the tailings will help to define what types of closure options are most appropriate for the tailings impoundment.

Petroleum Hydrocarbons
Due to weather constraints during this year's field work, the contents of a representative number of drums could not be collected. Additional investigation of the drums on site is required to identify contents and determine whether the contents can be incinerated at site or require off-site disposal

Hazardous Waste
Due to weather constraints during this year's field work, the contents of drums stored in the hazardous waste storage area south of the Mill were not identified. Sampling and characterization of these materials to determine disposal requirements is recommended.

9.2 Physical Hazards

Mine Related Site Features
The adits at the two sites should be backfilled as a more permanent closure method. This involves the clearing away of loose debris and capping of the opening with concrete followed by a layer of non-acid generating waste rock.

Similarly, the exploration pits should be backfilled.

Closure of the shaft and vent raises will likely require the use of blasting techniques to clear the opening and allow for proper capping to proceed. Waste rock, which has been identified as non- acid rock drainage generating, can be used as capping material.

Non-hazardous Waste
There are a few pieces of heavy machinery at the Mill, which cannot be easily moved due to their size and weight. However, the remaining non-hazardous waste at the site should be collected and disposed of in the mine adits, exploration pits, or vent raises. The debris should then be capped with cover material available at the site. Waste rock, which has been identified as non acid rock drainage generating, can be used as cover material.

9.3 Cost Estimate to Implement Recommendations

The estimated cost to implement the recommendations for further investigation and remediation at the site outlined in Sections 9.1 and 9.2 is $1,054,000. This includes additional acid rock drainage assessment work, collection and off-site disposal of hazardous materials from the site and collection and disposal of non-hazardous materials at the site into a mine opening and capping with non-acid rock drainage producing waste rock. The cost for capping or removal of any confirmed acid rock drainage generating

waste rock has not been included as the volume of such material is not currently known. A breakdown of the preliminary cost estimate is located in Appendix F.

10.0 REFERENCES

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APPENDIX A:

HEALTH AND SAFETY PLAN

APPENDIX B:

SITE PHOTOS

Roberts Bay Silver Mine

Photo 1. Roberts Bay site looking west.

Photo 2. Roberts Bay Camp Area

Photo 3. Typical debris at Roberts Bay Mine Camp Area

Photo 4. Landfill at Roberts Bay Mine Camp Area

Photo 5. Mill building and assay lab.

Photo 6. Mill building

Photo 7. Localized soil staining in Mill building

Photo 8. Fine ore hopper and tailings pond.

Photo 9. Coarse ore hopper.

Photo 10. Waste rock berm at fine ore pad.

Photo 11. Hazardous material storage area south of Mill

Photo 12. Assay lab with burlap bags in foreground

Photo 13. Adit, machine shop, and waste rock pad.

Photo 14. Debris west of Garage. Adit in background

Photo 15. Boarded up adit.

Photo 16. Garage

Photo 17. Transformer in Garage

Photo 18. Debris east of Garage

Photo 19. Debris east of Garage

Photo 20. Localized stained soils east of Garage

Photo 21. Drums between Garage and Mill Area

Photo 22. Drums in Garage Area overlooking muskeg valley where hydrocarbon sheen observed

Photo 23. Fuel bladder bermed area

Photo 24. Compressed gas cylinders north of Mill Area

Photo 25. Cone crusher and waste rock pile.

Photo 26. Mine shaft on east side.

Photo 27. Mine shaft and concrete covered ventilation raise.

Photo 28. Camp water supply lake, with pumphouse.

Ida Bay Silver Deposit

Photo 29. Ida Bay Silver Deposit

Photo 30. Waste rock piles.

Photo 31. Flooded adit.

Photo 32. Former Ida Bay Camp Site

Photo 33. Debris around former Camp Area

Photo 34. Partially covered vent raise

Photo 35. Debris south of adit

Photo 36. Spilled drill core on site.

APPENDIX C:

LABORATORY RESULTS

Client: PWGSC - Edmonton
Suite 1000-9700 Jasper Avenue
Edmonton, AB
T5J 4E2
Attention: Giselle Cotta

Report Number: 2317583
Date: 2003-02-12
Date Submitted: 2003-10-27

Project: RBSM

P.O. Number:
Matrix: Water

			LAB ID:	280378					GUIDELINE		
			Sample Date:	2003-08-19							
			Sample ID:	Idael	Date	Blank	QC STD Recovery %	QC STD Recovery Range	Guidelines for Canadian Drinking Water Quality - 2003		
PARAMETER	UNITS	MDL							TYPE	LIMIT	UNITS
Hardness as CaCO3	mg/L	1	256								
Calcium	mg/L	1	45	03-10-27	<1	92	92-108				
Magnesium	mg/L	1	35	03-10-27	<1	102	92-108				

MDL = Method Detection Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL: _____
Ewan McRobbie
Inorganic Lab Supervisor

ACCUTEST LABORATORIES LTD

REPORT OF ANALYSIS

Client: PWGSC - Edmonton
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T5J 4E2
Attention: Giselle Cotta

Report Number: 2317583
Date: 2003-02-12
Date Submitted: 2003-10-27

Project: RBSM

P.O. Number:
Matrix: Water

			LAB ID:	280373	280374	280375	280376	280377	GUIDELINE		
			Sample Date:	2003-08-19	2003-08-19	2003-08-19	2003-08-19	2003-08-19			
			Sample ID:	Field Blank	RBSM-1	RBSM-2	RBSM-3	RBSM-4	Guidelines for Canadian Drinking Water Quality - 2003		
PARAMETER	UNITS	MDL							TYPE	LIMIT	UNITS
Hardness as CaCO3	mg/L	1		<1	168	855	277	57			
Calcium	mg/L	1		<1	44	207	68	13			
Magnesium	mg/L	1		<1	14	82	26	6			

MDL = Method Detection Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment: This is an amendment and supercedes all previous copies of this report. QC has been added.

APPROVAL: _____
Ewan McRobbie
Inorganic Lab Supervisor

Client: PWGSC - Edmonton
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T5J 4E2
Attention: Giselle Cotta

Report Number: 2313140
Date: 2004-02-12
Date Submitted: 2003-08-25

Project: RBSM

P.O. Number:
Matrix: Soil

			LAB ID:	267955	267959				GUIDELINE		
			Sample Date:	2003-08-19	2003-08-19						
			Sample ID:	RBSM-TF-8B	RBSM-TF-6B	Blank	Standard Recovery %	Duplicate			
PARAMETER	UNITS	MDL							TYPE	LIMIT	UNITS
BTEX											
Benzene	ug/g	0.05		<0.05	<0.05	<0.05	97	<0.05			
Ethylbenzene	ug/g	0.1		<0.1	<0.1	<0.1	107	<0.1			
Toluene	ug/g	0.1		<0.1	<0.1	<0.1	99	<0.1			
m/p-xylene	ug/g	0.2		<0.2	<0.2	<0.2	106	<0.2			
o-xylene	ug/g	0.1		<0.1	<0.1	<0.1	106	<0.1			
BTEX SURROGATES											
Toluene-d8	%			97	97	96	97	95			
CCME Total Petroleum Hydrocarbons											
F1 (C5-C10)	ug/g	20		<20	<20	<20	93				
F2 (C10-C16)	ug/g	10		<10	<10						
F3 (C16-C34)	ug/g	10		<10	60						
F4 (C34-C50)	ug/g	10		<10	<10						
F2-F4 (C10-C50)	ug/g	10				<10	119				

MDL = Method Detection Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment: This is an amendment and supercedes all previous copies of this report.

APPROVAL: _____
Mina Nasirai
Organic Lab Supervisor

ACCUTEST LABORATORIES LTD

REPORT OF ANALYSIS

Client: PWGSC - Edmonton
Suite 1000-9700 Jasper Avenue
Edmonton, AB
T5J 4E2
Attention: Giselle Cotta

Report Number: 2313140
Date: 2004-02-12
Date Submitted: 2003-08-25

Project: RBSM

P.O. Number:
Matrix: Soil

			LAB ID:	267950	267951	267952	267953	267954	GUIDELINE		
			Sample Date:	2003-08-19	2003-08-19	2003-08-19	2003-08-19	2003-08-19			
			Sample ID:	RBSM-TF-4B	RBSM-TF-5D	RBSM-TF-7A	RBSM-TF-7B	RBSM-TF-8A			
PARAMETER	UNITS	MDL							TYPE	LIMIT	UNITS
BTEX											
Benzene	ug/g	0.05		<0.05	<0.05	<0.05	<0.05	<0.05			
Ethylbenzene	ug/g	0.1		<0.1	<0.1	<0.1	<0.1	<0.1			
Toluene	ug/g	0.1		<0.1	<0.1	<0.1	<0.1	<0.1			
m/p-xylene	ug/g	0.2		<0.2	<0.2	<0.2	<0.2	<0.2			
o-xylene	ug/g	0.1		<0.1	0.1	<0.1	<0.1	<0.1			
BTEX SURROGATES											
Toluene-d8	%			99	98	98	97	98			
CCME Total Petroleum Hydrocarbons											
F1 (C5-C10)	ug/g	20		<20	60	<20	<20	<20			
F2 (C10-C16)	ug/g	10		<10	430	20	30	<10			
F3 (C16-C34)	ug/g	10		<10	80	30	60	<10			
F4 (C34-C50)	ug/g	10		<10	<10	<10	<10	<10			

MDL = Method Detection Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment: This is an amendment and supercedes all previous copies of this report.

APPROVAL: _____
Mina Nasirai
Organic Lab Supervisor

Client: PWGSC - Edmonton
Suite 1000-9700 Jasper Avenue
Edmonton, AB
T5J 4E2
Attention: Giselle Cotta

Report Number: 2313139
Date: 2004-02-13
Date Submitted: 2003-08-25

Project: RBSM

P.O. Number:
Matrix: Soil

			LAB ID:	267945	267946	267947			GUIDELINE		
			Sample Date:	2003-08-20	2003-08-20	2003-08-20					
			Sample ID:	Blank	Standard Recovery %	Duplicate					
PARAMETER	UNITS	MDL							TYPE	LIMIT	UNITS
BTEX											
Benzene	ug/g	0.1		<0.05	106	<0.05					
Ethylbenzene	ug/g	0.2		<0.1	101	<0.1					
Toluene	ug/g	0.2		<0.1	100	<0.1					
m/p-xylene	ug/g	0.4		<0.2	96	<0.2					
o-xylene	ug/g	0.2		<0.1	104	<0.1					
BTEX SURROGATES											
Toluene-d8	%			97	98	99					
Total Petroleum Hydrocarbons											
GRO (<C10)	ug/g	20		<20	92						
DRO (C10-C24)	ug/g	20		<20	80						
GRO + DRO	ug/g	20									
CCME Total Petroleum Hydrocarbons											
F1 (C5-C10)	ug/g	20		<20	98						
F2-F4 (C10-C50)	ug/g	10		<10	98						

MDL = Method Detection Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment: QC was added to this report. February 13, 2004.

APPROVAL: _____
Mina Nasirai
Organic Lab Supervisor

Client: PWGSC - Edmonton
Suite 1000-9700 Jasper Avenue
Edmonton, AB
T5J 4E2
Attention: Giselle Cotta

Report Number: 2313139
Date: 2004-02-13
Date Submitted: 2003-08-25

Project: RBSM

P.O. Number:
Matrix: Soil

			LAB ID:	267945	267946	267947			GUIDELINE		
			Sample Date:	2003-08-20	2003-08-20	2003-08-20					
			Sample ID:	RBSM-Gar-1B	RBSM-Gar-2A	RBSM-Gar-2B					
PARAMETER	UNITS	MDL							TYPE	LIMIT	UNITS
BTEX											
Benzene	ug/g	0.1		<0.05	<0.05	<0.05					
Ethylbenzene	ug/g	0.2		<0.1	<0.1	<0.1					
Toluene	ug/g	0.2		<0.1	<0.1	<0.1					
m/p-xylene	ug/g	0.4		<0.2	<0.2	<0.2					
o-xylene	ug/g	0.2		<0.1	<0.1	<0.1					
BTEX SURROGATES											
Toluene-d8	%			99	97	99					
Total Petroleum Hydrocarbons											
GRO (<C10)	ug/g	20									
DRO (C10-C24)	ug/g	20									
GRO + DRO	ug/g	20									
CCME Total Petroleum Hydrocarbons											
F1 (C5-C10)	ug/g	20		<20	<20	<20					
F2 (C10-C16)	ug/g	10		470	30	70					
F3 (C16-C34)	ug/g	10		2500	5300	4400					
F4 (C34-C50)	ug/g	10		740	490	410					

MDL = Method Detection Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment: QC was added to this report. February 13, 2004.

APPROVAL: _____
Mina Nasirai
Organic Lab Supervisor

REPORT OF ANALYSIS

Client: PWGSC - Edmonton
Suite 1000-9700 Jasper Avenue
Edmonton, AB
T5J 4E2
Attention: Giselle Cotta

Report Number: 2313139
Date: 2004-02-13
Date Submitted: 2003-08-25

Project: RBSM

P.O. Number:
Matrix: Soil

			LAB ID:	267940	267941	267942	267943	267944	GUIDELINE		
			Sample Date:	2003-08-19	2003-08-20	2003-08-20	2003-08-20	2003-08-20			
			Sample ID:	RBSM-TF-2B	RBSM-Mill-1	RBSM-Camp-1	RBSm-Landfill-1	RBSM-Gar-1A			
PARAMETER	UNITS	MDL							TYPE	LIMIT	UNITS
BTEX											
Benzene	ug/g	0.1		<0.1	<0.05	<0.05	<0.05	<0.05			
Ethylbenzene	ug/g	0.2		<0.2	<0.1	<0.1	<0.1	<0.1			
Toluene	ug/g	0.2		<0.2	<0.1	<0.1	<0.1	<0.1			
m/p-xylene	ug/g	0.4		<0.4	<0.2	<0.2	<0.2	<0.2			
o-xylene	ug/g	0.2		<0.2	<0.1	<0.1	<0.1	<0.1			
BTEX SURROGATES											
Toluene-d8	%			100	98	97	99	100			
Total Petroleum Hydrocarbons											
GRO (<C10)	ug/g	20				<20	<20				
DRO (C10-C24)	ug/g	20				<20	<20				
GRO + DRO	ug/g	20				<20	<20				
CCME Total Petroleum Hydrocarbons											
F1 (C5-C10)	ug/g	20		60	<20			<20			
F2 (C10-C16)	ug/g	10		4700	740			<10			
F3 (C16-C34)	ug/g	10		1600	1600			1800			
F4 (C34-C50)	ug/g	10		30	50			4800			

MDL = Method Detection Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment: This is an amendment and supercedes all previous copies of the report. Due to high analyte concentrations, 2X dilution was required for some samples.
All values include the dilution factor. QC was added to this report. February 13, 2004.

APPROVAL: _____
Mina Nasirai
Organic Lab Supervisor

Client: PWGSC - Edmonton
Suite 1000-9700 Jasper Avenue
Edmonton, AB
T5J 4E2
Attention: Giselle Cotta

Report Number: 2313139
Date: 2004-02-13
Date Submitted: 2003-08-25

Project: RBSM

P.O. Number:
Matrix: Soil

			LAB ID:					GUIDELINE		
			Sample Date:							
			Sample ID:	Blank	Standard Recovery %	Duplicate				
PARAMETER	UNITS	MDL						TYPE	LIMIT	UNITS
Polychlorinated Biphenyls - PCBs										
Polychlorinated Biphenyls (PCBs)	ug/g	0.1	<0.1	41	<0.1					

MDL = Method Detection Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL:
Mina Nasirai
Organic Lab Supervisor

ACCUTEST LABORATORIES LTD

REPORT OF ANALYSIS

Client: PWGSC - Edmonton
Suite 1000-9700 Jasper Avenue
Edmonton, AB
T5J 4E2
Attention: Giselle Cotta

Report Number: 2313139
Date: 2004-02-13
Date Submitted: 2003-08-25

Project: RBSM

P.O. Number:
Matrix: Soil

			LAB ID:	267941	267944	267945	267946	267947	GUIDELINE		
			Sample Date:	2003-08-20	2003-08-20	2003-08-20	2003-08-20	2003-08-20			
			Sample ID:	RBSM-Mill-1	RBSM-Gar-1A	RBSM-Gar-1B	RBSM-Gar-2A	RBSM-Gar-2B			
PARAMETER	UNITS	MDL							TYPE	LIMIT	UNITS
Polychlorinated Biphenyls - PCBs											
Polychlorinated Biphenyls (PCBs)	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1				

MDL = Method Detection Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL: _____
Mina Nasirai
Organic Lab Supervisor

Client: PWGSC - Edmonton
Suite 1000-9700 Jasper Avenue
Edmonton, AB
T5J 4E2
Attention: Giselle Cotta

Report Number: 2313139
Date: 2004-02-13
Date Submitted: 2003-08-25

Project: RBSM

P.O. Number:
Matrix: Soil

			LAB ID:					GUIDELINE		
			Sample Date:							
			Sample ID:	Blank	Standard Recovery %					
PARAMETER	UNITS	MDL						TYPE	LIMIT	UNITS
POLYNUCLEAR AROMATIC HYDROCARBONS - PAHs										
Acenaphthene	ug/g	0.2		<0.2	102					
Acenaphthylene	ug/g	0.2		<0.2	99					
Anthracene	ug/g	0.2		<0.2	97					
Benzo(a)anthracene	ug/g	0.2		<0.2	103					
Benzo(a)pyrene	ug/g	0.2		<0.2	100					
Benzo(b)fluoranthene	ug/g	0.2		<0.2	100					
Benzo(g,h,i)perylene	ug/g	0.2		<0.2	99					
Benzo(k)fluoranthene	ug/g	0.2		<0.2	100					
Chrysene	ug/g	0.2		<0.2	99					
Dibenzo(a,h)anthracene	ug/g	0.2		<0.2	99					
Fluoranthene	ug/g	0.2		<0.2	98					
Fluorene	ug/g	0.2		<0.2	101					
Indeno(1,2,3-c,d)pyrene	ug/g	0.2		<0.2	98					
Naphthalene	ug/g	0.2		<0.2	98					
Phenanthrene	ug/g	0.2		<0.2	99					
Pyrene	ug/g	0.2		<0.2	101					

MDL = Method Detection Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment: This is an amendment and supercedes all previous copies of this report. 10X dilution was required due to sample matrix interferences. The MDL's were adjusted accordingly. QC was added to this report. February, 13, 2004.

APPROVAL: _____
Mina Nasirai
Organic Lab Supervisor

ACCUTEST LABORATORIES LTD

REPORT OF ANALYSIS

Client: PWGSC - Edmonton
Suite 1000-9700 Jasper Avenue
Edmonton, AB
T5J 4E2
Attention: Giselle Cotta

Report Number: 2313139
Date: 2004-02-13
Date Submitted: 2003-08-25

Project: RBSM

P.O. Number:
Matrix: Soil

			LAB ID:	267941	267944	267945	267946	267947	GUIDELINE		
			Sample Date:	2003-08-20	2003-08-20	2003-08-20	2003-08-20	2003-08-20			
			Sample ID:	RBSM-Mill-1	RBSM-Gar-1A	RBSM-Gar-1B	RBSM-Gar-2A	RBSM-Gar-2B			
PARAMETER	UNITS	MDL							TYPE	LIMIT	UNITS
POLYNUCLEAR AROMATIC HYDROCARBONS - PAHs											
Acenaphthene	ug/g	1		<1	<5	<1	<1	<1			
Acenaphthylene	ug/g	1		<1	<5	<1	<1	<1			
Anthracene	ug/g	1		<1	<5	<1	<1	<1			
Benzo(a)anthracene	ug/g	1		<1	<5	<1	<1	<1			
Benzo(a)pyrene	ug/g	1		<1	<5	<1	<1	<1			
Benzo(b)fluoranthene	ug/g	1		<1	<5	<1	<1	<1			
Benzo(g,h,i)perylene	ug/g	1		<1	<5	<1	<1	<1			
Benzo(k)fluoranthene	ug/g	1		<1	<5	<1	<1	<1			
Chrysene	ug/g	1		<1	<5	<1	<1	<1			
Dibenzo(a,h)anthracene	ug/g	1		<1	<5	<1	<1	<1			
Fluoranthene	ug/g	1		<1	<5	<1	<1	<1			
Fluorene	ug/g	1		<1	<5	<1	<1	<1			
Indeno(1,2,3-c,d)pyrene	ug/g	1		<1	<5	<1	<1	<1			
Naphthalene	ug/g	1		<1	<5	<1	<1	<1			
Phenanthrene	ug/g	1		<1	<5	<1	<1	<1			
Pyrene	ug/g	1		<1	<5	<1	<1	<1			

MDL = Method Detection Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment: This is an amendment and supercedes all previous copies of this report. Various dilutions were required due to sample matrix interferences. The MDL's were adjusted accordingly. QC was added to this report. February, 13, 2004.

APPROVAL: _____
Mina Nasirai
Organic Lab Supervisor

ACCUTEST LABORATORIES LTD

REPORT OF ANALYSIS

Client: PWGSC - Edmonton
Suite 1000-9700 Jasper Avenue
Edmonton, AB
T5J 4E2
Attention: Giselle Cotta

Report Number: 2313139
Date: 2003-09-08
Date Submitted: 2003-08-25

Project: RBSM

P.O. Number:
Matrix: Soil

			LAB ID:	267946	267947				GUIDELINE		
			Sample Date:	2003-08-20	2003-08-20						
			Sample ID:	RBSM-Gar-2A	RBSM-Gar-2B						
PARAMETER	UNITS	MDL							TYPE	LIMIT	UNITS
Cyanide (free)	ug/g	0.10		<0.10	<0.10						
Arsenic	ug/g	0.4		6.1	10.1						
Barium	ug/g	1		455	406						
Cadmium	ug/g	0.5		<0.5	<0.5						
Chromium	ug/g	1		106	74						
Copper	ug/g	1		84	112						
Iron	ug/g	1		49000	57600						
Lead	ug/g	1		28	42						
Manganese	ug/g	1		1120	1200						
Aluminum	ug/g	1		12800	14500						
Beryllium	ug/g	1		<1	<1						
Cobalt	ug/g	1		15	14						
Molybdenum	ug/g	1		11	10						
Nickel	ug/g	1		51	35						
Silver	ug/g	1		2	2						
Strontium	ug/g	1		20	20						
Thallium	ug/g	1		<1	<1						
Vanadium	ug/g	1		33	33						
Zinc	ug/g	1		74	120						

MDL = Method Detection Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL: _____
Lorna Wilson
Agriculture Lab Supervisor

ACCUTEST LABORATORIES LTD

REPORT OF ANALYSIS

Client: PWGSC - Edmonton
Suite 1000-9700 Jasper Avenue
Edmonton, AB
T5J 4E2
Attention: Giselle Cotta

Report Number: 2313139
Date: 2003-09-08
Date Submitted: 2003-08-25

Project: RBSM

P.O. Number:
Matrix: Soil

			LAB ID:	267941	267942	267943	267944	267945	GUIDELINE		
			Sample Date:	2003-08-20	2003-08-20	2003-08-20	2003-08-20	2003-08-20			
			Sample ID:	RBSM-Mill-1	RBSM-Camp-1	RBSm-Landfill-1	RBSM-Gar-1A	RBSM-Gar-1B			
PARAMETER	UNITS	MDL							TYPE	LIMIT	UNITS
Cyanide (free)	ug/g	0.10		<0.10	IS	IS	<0.1	<0.10			
Arsenic	ug/g	0.4		35.6	17.2	2.8	33.1	16.9			
Barium	ug/g	1		33	119	56	138	152			
Cadmium	ug/g	0.5		5.5	1.1	<0.5	4.3	6.9			
Chromium	ug/g	1		104	166	24	101	136			
Copper	ug/g	1		108	90	21	152	426			
Iron	ug/g	1		97700	58400	14700	50000	64600			
Lead	ug/g	1		156	74	7	420	110			
Manganese	ug/g	1		1030	1220	197	820	932			
Aluminum	ug/g	1		19100	25300	6000	19800	24400			
Beryllium	ug/g	1		<1	<1	<1	<1	<1			
Cobalt	ug/g	1		25	24	6	60	81			
Molybdenum	ug/g	1		2	11	2	4	5			
Nickel	ug/g	1		76	89	16	94	105			
Silver	ug/g	1		35	63	3	117	50			
Strontium	ug/g	1		32	22	13	19	17			
Thallium	ug/g	1		<1	<1	<1	<1	<1			
Vanadium	ug/g	1		78	93	28	83	69			
Zinc	ug/g	1		172	138	42	329	142			

MDL = Method Detection Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

267942 & 943: PAH results are unavailable due to laboratory error. IS = Insufficient Sample.

APPROVAL: _____
Lorna Wilson
Agriculture Lab Supervisor

Client: PWGSC - Edmonton
Suite 1000-9700 Jasper Avenue
Edmonton, AB
T5J 4E2
Attention: Giselle Cotta

Report Number: 2313138
Date: 2004-02-13
Date Submitted: 2003-08-25

Project: RBSM

P.O. Number:
Matrix: Soil

			LAB ID:					GUIDELINE		
			Sample Date:							
			Sample ID:	Blank	Standard Recovery %	Duplicate RBSM-TF-SD				
PARAMETER	UNITS	MDL						TYPE	LIMIT	UNITS
BTEX										
Benzene	ug/g	0.05	<0.05	106	<0.1					
Ethylbenzene	ug/g	0.1	<0.1	101	<0.2					
Toluene	ug/g	0.1	<0.1	100	<0.2					
m/p-xylene	ug/g	0.2	<0.2	96	5.5					
o-xylene	ug/g	0.1	<0.1	104	10.1					
BTEX SURROGATES										
Toluene-d8	%		97	98	100					
CCME Total Petroleum Hydrocarbons										
F2-F4 (C10-C50)	ug/g	20	<20	93						
F2 (C10-C16)	ug/g	10	<10	119						

MDL = Method Detection Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment: This is an amendment and supercedes all previous copies of the report. Due to high analyte concentrations, 2X dilution was required for some samples.
All values include the dilution factor. QC has been added to this report. February 13, 2004.

APPROVAL: _____
Mina Nasirai
Organic Lab Supervisor

ACCUTEST LABORATORIES LTD

REPORT OF ANALYSIS

Client: PWGSC - Edmonton
Suite 1000-9700 Jasper Avenue
Edmonton, AB
T5J 4E2
Attention: Giselle Cotta

Report Number: 2313138
Date: 2004-02-13
Date Submitted: 2003-08-25

Project: RBSM

P.O. Number:
Matrix: Soil

	LAB ID:	267935	267936	267937	267938	267939	GUIDELINE		
	Sample Date:	2003-08-19	2003-08-19	2003-08-19	2003-08-19	2003-08-19			
	Sample ID:	RBSM-TF-1A	RBSM-TF-1C	RBSM-TF-3A	RBSM-TF-3B	RBSM-TF-5B			
PARAMETER	UNITS	MDL					TYPE	LIMIT	UNITS
BTEX									
Benzene	ug/g	0.05	<0.1	<0.1	<0.05	<0.05	<0.1			
Ethylbenzene	ug/g	0.1	<0.2	0.4	<0.1	<0.1	<0.2			
Toluene	ug/g	0.1	<0.2	<0.2	<0.1	<0.1	<0.2			
m/p-xylene	ug/g	0.2	<0.4	9.1	<0.2	<0.2	6.0			
o-xylene	ug/g	0.1	<0.2	5.7	<0.1	<0.1	10.9			
BTEX SURROGATES									
Toluene-d8	%		97	103	98	99	100			
CCME Total Petroleum Hydrocarbons									
F1 (C5-C10)	ug/g	20	60	60	<20	<20	80			
F2 (C10-C16)	ug/g	10	20000	1300	290	710	11000			
F3 (C16-C34)	ug/g	10	8600	180	200	250	2100			
F4 (C34-C50)	ug/g	10	<10	<10	<10	<10	40			

MDL = Method Detection Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment: This is an amendment and supercedes all previous copies of the report. Due to high analyte concentrations, 2X dilution was required for some samples.
All values include the dilution factor. QC has been added to this report. February 13, 2004.

APPROVAL: _____
Mina Nasirai
Organic Lab Supervisor

ACCUTEST LABORATORIES LTD

REPORT OF ANALYSIS

Client: PWGSC - Edmonton
Suite 1000-9700 Jasper Avenue
Edmonton, AB
T5J 4E2
Attention: Giselle Cotta

Report Number: 2313138
Date: 2004-02-13
Date Submitted: 2003-08-25

Project: RBSM

P.O. Number:
Matrix: Soil

			LAB ID:	267935					GUIDELINE		
			Sample Date:	2003-08-19							
			Sample ID:	RBSM-TF-1A	Blank	Standard Recovery %					
PARAMETER	UNITS	MDL							TYPE	LIMIT	UNITS
POLYNUCLEAR AROMATIC HYDROCARBONS - PAHs											
Acenaphthene	ug/g	5	<5	<0.2	102						
Acenaphthylene	ug/g	5	<5	<0.2	99						
Anthracene	ug/g	5	<5	<0.2	97						
Benzo(a)anthracene	ug/g	5	<5	<0.2	103						
Benzo(a)pyrene	ug/g	5	<5	<0.2	100						
Benzo(b)fluoranthene	ug/g	5	<5	<0.2	100						
Benzo(g,h,i)perylene	ug/g	5	<5	<0.2	99						
Benzo(k)fluoranthene	ug/g	5	<5	<0.2	100						
Chrysene	ug/g	5	<5	<0.2	99						
Dibenzo(a,h)anthracene	ug/g	5	<5	<0.2	99						
Fluoranthene	ug/g	5	<5	<0.2	98						
Fluorene	ug/g	5	<5	<0.2	101						
Indeno(1,2,3-c,d)pyrene	ug/g	5	<5	<0.2	98						
Naphthalene	ug/g	5	<5	<0.2	98						
Phenanthrene	ug/g	5	<5	<0.2	99						
Pyrene	ug/g	5	<5	<0.2	101						

MDL = Method Detection Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment: This is an amendment and supercedes all previous copies of this report. 50X dilution was required due to sample matrix interferences. The MDL's were adjusted accordingly. QC has been added to this report. February 13, 2004.

APPROVAL: _____
Mina Nasirai
Organic Lab Supervisor

ACCUTEST LABORATORIES LTD

REPORT OF ANALYSIS

Client: PWGSC - Edmonton
Suite 1000-9700 Jasper Avenue
Edmonton, AB
T5J 4E2
Attention: Giselle Cotta

Report Number: 2313138
Date: 2004-02-13
Date Submitted: 2003-08-25

Project: RBSM

P.O. Number:
Matrix: Soil

			LAB ID:	267935					GUIDELINE		
			Sample Date:	2003-08-19							
			Sample ID:	RBSM-TF-1A	Blank	Standard Recovery %					
PARAMETER	UNITS	MDL							TYPE	LIMIT	UNITS
Polychlorinated Biphenyls - PCBs											
Polychlorinated Biphenyls (PCBs)	ug/g	0.1	<0.1	<0.1	41						

MDL = Method Detection Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment: This is an amendment and supercedes all previous copies of this report.

APPROVAL: _____
Mina Nasirai
Organic Lab Supervisor

ACCUTEST LABORATORIES LTD

REPORT OF ANALYSIS

Client: PWGSC - Edmonton
Suite 1000-9700 Jasper Avenue
Edmonton, AB
T5J 4E2
Attention: Giselle Cotta

Report Number: 2313138
Date: 2003-09-03
Date Submitted: 2003-08-25

Project: RBSM

P.O. Number:
Matrix: Soil

			LAB ID:	267935					GUIDELINE		
			Sample Date:	2003-08-19							
			Sample ID:	RBSM-TF-1A							
PARAMETER	UNITS	MDL							TYPE	LIMIT	UNITS
Cyanide (free)	ug/g	0.10	<0.10								
Arsenic	ug/g	0.4	1.9								
Barium	ug/g	1	85								
Cadmium	ug/g	0.5	0.6								
Chromium	ug/g	1	20								
Copper	ug/g	1	29								
Iron	ug/g	1	10500								
Lead	ug/g	1	4								
Manganese	ug/g	1	245								
Aluminum	ug/g	1	6300								
Beryllium	ug/g	1	<1								
Cobalt	ug/g	1	5								
Molybdenum	ug/g	1	1								
Nickel	ug/g	1	13								
Silver	ug/g	1	<1								
Strontium	ug/g	1	52								
Thallium	ug/g	1	<1								
Vanadium	ug/g	1	25								
Zinc	ug/g	1	57								

MDL = Method Detection Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL: _____
Lorna Wilson
Agriculture Lab Supervisor

Client: PWGSC - Edmonton
Suite 1000-9700 Jasper Avenue
Edmonton, AB
T5J 4E2
Attention: Giselle Cotta

Report Number: 2313133
Date: 2003-10-23
Date Submitted: 2003-08-25

Project: RBSM

P.O. Number:
Matrix: Water

			LAB ID:	267908	267909	267910			GUIDELINE		
			Sample Date:	2003-08-20	2003-08-20	2003-08-19					
			Sample ID:	RBSM-Ger-W-1	RBSM-Val-1	Ida-1					
PARAMETER	UNITS	MDL							TYPE	LIMIT	UNITS
Cyanide (free)	mg/L	0.005			0.013						
Aluminum	mg/L	0.01	0.01	0.03	0.12						
Arsenic	mg/L	0.001	<0.001	<0.001	<0.001						
Barium	mg/L	0.01	0.13	0.16	0.02						
Beryllium	mg/L	0.001	<0.001	<0.001	<0.001						
Boron	mg/L	0.05	0.50	0.49	<0.05						
Cadmium	mg/L	0.0001	0.0001	<0.0001	0.0003						
Chromium	mg/L	0.001	0.007	0.004	0.003						
Cobalt	mg/L	0.0002	<0.0002	<0.0002	0.0002						
Copper	mg/L	0.001	0.003	0.002	0.008						
Iron	mg/L	0.01	0.04	2.38	0.10						
Lead	mg/L	0.001	<0.001	<0.001	0.002						
Manganese	mg/L	0.005	<0.005	0.023	0.028						
Molybdenum	mg/L	0.005	<0.005	<0.005	<0.005						
Nickel	mg/L	0.001	<0.005	<0.005	<0.005						
Silicon	mg/L	0.1	4.7	3.9	1.0						
Silver	mg/L	0.0001	<0.0001	<0.0001	0.0001						
Strontium	mg/L	0.002	0.065	0.046	0.123						
Thallium	mg/L	0.001	<0.001	<0.001	<0.001						
Titanium	mg/L	0.01	0.02	0.02	<0.01						
Vanadium	mg/L	0.001	0.003	0.001	<0.001						
Zinc	mg/L	0.005	<0.005	<0.005	<0.005						

MDL = Method Detection Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

267908: Please note that due to insufficient sample submission, no DRO results for 267908 could be reported.

APPROVAL:

Ewan McRobbie
Inorganic Lab Supervisor

ACCUTEST LABORATORIES LTD

REPORT OF ANALYSIS

Client: PWGSC - Edmonton
Suite 1000-9700 Jasper Avenue
Edmonton, AB
T5J 4E2
Attention: Giselle Cotta

Report Number: 2313133
Date: 2003-10-23
Date Submitted: 2003-08-25

Project: RBSM

P.O. Number:
Matrix: Water

	LAB ID:	267903	267904	267905	267906	267907	GUIDELINE		
	Sample Date:	2003-08-19	2003-08-19	2003-08-19	2003-08-19	2003-08-19			
	Sample ID:	Field Blank	RBSM-1	RBSM-2	RBSM-3	RBSM-4			
PARAMETER	UNITS	MDL					TYPE	LIMIT	UNITS
Cyanide (free)	mg/L	0.005	<0.005	0.007	0.011	0.007	0.013			
Aluminum	mg/L	0.01	<0.01	0.37	0.15	0.18	0.11			
Arsenic	mg/L	0.001	<0.001	0.020	0.002	0.002	<0.001			
Barium	mg/L	0.01	<0.01	0.05	0.08	0.05	<0.01			
Beryllium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001			
Boron	mg/L	0.05	<0.05	<0.05	<0.05	0.05	<0.05			
Cadmium	mg/L	0.0001	<0.0001	0.0005	<0.0001	0.0010	0.0008			
Chromium	mg/L	0.001	<0.001	0.005	0.007	0.004	0.003			
Cobalt	mg/L	0.0002	<0.0002	0.0005	0.0007	0.0004	<0.0002			
Copper	mg/L	0.001	<0.001	0.011	0.003	0.012	0.002			
Iron	mg/L	0.01	<0.01	0.46	2.14	0.30	0.08			
Lead	mg/L	0.001	<0.001	0.013	<0.001	0.001	<0.001			
Manganese	mg/L	0.005	<0.005	0.023	0.172	0.100	0.029			
Molybdenum	mg/L	0.005	<0.005	0.019	<0.005	<0.005	<0.005			
Nickel	mg/L	0.001	<0.001	0.006	<0.005	<0.005	<0.005			
Silicon	mg/L	0.1	<0.1	1.5	4.2	1.5	0.1			
Silver	mg/L	0.0001	<0.0001	0.0002	<0.0001	<0.0001	0.0002			
Strontium	mg/L	0.002	<0.002	0.065	0.640	0.232	0.051			
Thallium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001			
Titanium	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01			
Vanadium	mg/L	0.001	<0.001	0.003	0.002	0.001	<0.001			
Zinc	mg/L	0.005	<0.005	<0.005	<0.005	0.036	<0.005			

MDL = Method Detection Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment: This is an amendment and supercedes all previous copies of this report. As results for samples "267908" & "267909" have been added.

APPROVAL: _____
Ewan McRobbie
Inorganic Lab Supervisor

Client: PWGSC - Edmonton
Suite 1000-9700 Jasper Avenue
Edmonton, AB
T5J 4E2
Attention: Giselle Cotta

Report Number: 2313133
Date: 2004-02-12
Date Submitted: 2003-08-25

Project: RBSM

P.O. Number:
Matrix: Water

			LAB ID:					GUIDELINE		
			Sample Date:							
			Sample ID:	Blank	Standard Recovery %	Duplicate				
PARAMETER	UNITS	MDL						TYPE	LIMIT	UNITS
BTEX										
Benzene	ug/L	0.5	<0.5	106	<0.5					
Ethylbenzene	ug/L	0.5	<0.5	101	<0.5					
Toluene	ug/L	0.5	<0.5	100	<0.5					
m/p-xylene	ug/L	1.0	<1.0	96	<1.0					
o-xylene	ug/L	0.5	<0.5	104	<0.5					
BTEX SURROGATES										
Toluene-d8	%		97	98	98					
Total Petroleum Hydrocarbons										
GRO (<C10)	mg/L	0.2	<0.2	92	<0.2					
DRO (C10-C24)	mg/L	0.2	<0.2	96						
GRO + DRO	mg/L	0.2	<0.2							

MDL = Method Detection Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

267908: Please note that due to insufficient sample submission, no DRO results for 267908 could be reported.

This is an amendment and supercedes all previous copies of this report.

APPROVAL: _____
Mina Nasirai
Organic Lab Supervisor

Client: PWGSC - Edmonton
Suite 1000-9700 Jasper Avenue
Edmonton, AB
T5J 4E2
Attention: Giselle Cotta

Report Number: 2313133
Date: 2004-02-12
Date Submitted: 2003-08-25

Project: RBSM

P.O. Number:
Matrix: Water

			LAB ID:	267908	267909	267910			GUIDELINE		
			Sample Date:	2003-08-20	2003-08-20	2003-08-19					
			Sample ID:	RSBM-Ger-W-1	RBSM-Val-1	Ida-1					
PARAMETER	UNITS	MDL							TYPE	LIMIT	UNITS
BTEX											
Benzene	ug/L	0.5		<0.5	<0.5	<0.5					
Ethylbenzene	ug/L	0.5		<0.5	<0.5	<0.5					
Toluene	ug/L	0.5		<0.5	<0.5	<0.5					
m/p-xylene	ug/L	1.0		<1.0	<1.0	<1.0					
o-xylene	ug/L	0.5		<0.5	<0.5	<0.5					
BTEX SURROGATES											
Toluene-d8	%			99	99	98					
Total Petroleum Hydrocarbons											
GRO (<C10)	mg/L	0.2		<0.2	<0.2	<0.2					
DRO (C10-C24)	mg/L	0.2			<0.2	<0.2					
GRO + DRO	mg/L	0.2			<0.2	<0.2					

MDL = Method Detection Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

267908: Please note that due to insufficient sample submission, no DRO results for 267908 could be reported.

This is an amendment and supercedes all previous copies of this report.

APPROVAL: _____
Mina Nasirai
Organic Lab Supervisor

ACCUTEST LABORATORIES LTD

REPORT OF ANALYSIS

Client: PWGSC - Edmonton
Suite 1000-9700 Jasper Avenue
Edmonton, AB
T5J 4E2
Attention: Giselle Cotta

Report Number: 2313133
Date: 2004-02-12
Date Submitted: 2003-08-25

Project: RBSM

P.O. Number:
Matrix: Water

	LAB ID:	267903	267904	267905	267906	267907	GUIDELINE		
	Sample Date:	2003-08-19	2003-08-19	2003-08-19	2003-08-19	2003-08-19			
	Sample ID:	Field Blank	RSBM-1	RSBM-2	RSBM-3	RSBM-4			
PARAMETER	UNITS	MDL					TYPE	LIMIT	UNITS
BTEX									
Benzene	ug/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Ethylbenzene	ug/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Toluene	ug/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
m/p-xylene	ug/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0		
o-xylene	ug/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
BTEX SURROGATES									
Toluene-d8	%		98	98	99	98	98		
Total Petroleum Hydrocarbons									
GRO (<C10)	mg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2		
DRO (C10-C24)	mg/L	0.2	<0.2	<0.2	<0.2	0.6	<0.2		
GRO + DRO	mg/L	0.2	<0.2	<0.2	<0.2	0.6	<0.2		

↑
edit

MDL = Method Detection Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:
This is an amendment and supercedes all previous copies of this report.

APPROVAL: _____
Mina Nasirai
Organic Lab Supervisor

Client: PWGSC - Edmonton
Suite 1000-9700 Jasper Avenue
Edmonton, AB
T5J 4E2
Attention: Giselle Cotta

Report Number: 2313133
Date: 2004-02-13
Date Submitted: 2003-08-25

Project: RBSM

P.O. Number:
Matrix: Water

			LAB ID:	267910					GUIDELINE		
			Sample Date:	2003-08-19							
			Sample ID:	Ida-1	Blank	Standard Recovery %					
PARAMETER	UNITS	MDL							TYPE	LIMIT	UNITS
Polychlorinated Biphenyls - PCBs											
Polychlorinated Biphenyls (PCBs)	ug/L	0.1	<0.1	<0.1	86						

MDL = Method Detection Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment: This is an amendment and supercedes all previous copies of this report.

APPROVAL: _____
Mina Nasirai
Organic Lab Supervisor

ACCUTEST LABORATORIES LTD

REPORT OF ANALYSIS

Client: PWGSC - Edmonton
Suite 1000-9700 Jasper Avenue
Edmonton, AB
T5J 4E2
Attention: Giselle Cotta

Report Number: 2313133
Date: 2004-02-13
Date Submitted: 2003-08-25

Project: RBSM

P.O. Number:
Matrix: Water

			LAB ID:	267903	267904	267905	267906	267907	GUIDELINE		
			Sample Date:	2003-08-19	2003-08-19	2003-08-19	2003-08-19	2003-08-19			
			Sample ID:	Field Blank	RSBM-1	RSBM-2	RSBM-3	RSBM-4			
PARAMETER	UNITS	MDL							TYPE	LIMIT	UNITS
Polychlorinated Biphenyls - PCBs											
Polychlorinated Biphenyls (PCBs)	ug/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1				

MDL = Method Detection Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment: This is an amendment and supercedes all previous copies of this report.

APPROVAL: _____
Mina Nasirai
Organic Lab Supervisor

CHAIN OF CUSTODY / ANALYTICAL REQUEST FORM

CLIENT: RESCAN ENVIRONMENTAL SERVICES LTD
ADDRESS: 6TH FLOOR, 1111 W. HASTINGS
CITY: VANCOUVER PROV.: BC POSTAL CODE: V6E
CONTACT: KYLE STANFIELD SAMPLER: LARA WOODHOUSE
TELEPHONE: 604 689 9460 FAX:
PROJECT NAME/NO.: ROBERTS LAKE
P.O. NO.: QUOTE NO.:
DATE SUBMITTED: ALS CONTACT: FRED CHEN

ALS Environmental

1988 Triumph Street
Vancouver, BC Canada V5L 1K5
TEL: 604-253-4188, 1-800-665-0243
FAX: 604-253-6700

#2 - 21 Highfield Circle SE
Calgary, AB Canada T2G 5N6
TEL: 403-214-5431, 1-866-722-6231
FAX: 403-214-5430

www.alsenviro.com

ANALYSIS REQUESTED

FOR LAB USE ONLY

LAB USE ONLY	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED (Y M D)	MATRIX	ACID BASE ACCOUNTING	METALS CONTENT X	# EXTRACTABLE METALS X	NOTES
T3589	SAMPLE 1	03 08 19 2:00 PM	ROCK	✓	✓	✓	
	SAMPLE 2	03 " " 2:05 PM	ROCK	✓	✓	✓	
	" 3	03 " " 2:15 PM	ROCK	✓	✓	✓	
	" 4	03 " " 3:00 PM	ROCK	✓	✓	✓	
	" 5 REP A	03 " " 3:45 PM	ROCK	✓	✓	✓	
	" 6	03 " " 4:30 PM	ROCK	✓	✓	✓	
	" 7	03 " " 5:00 PM	ROCK	✓	✓	✓	
	" 8	03 " ↓ 6:30 PM	ROCK	✓	✓	✓	
	" 9	03 " 20 : AM/PM	ROCK	✓	✓	✓	
	" 10	03 ↓ 20 : AM/PM	ROCK	✓	✓	✓	
	" 5 REP B	03 08 19 : AM/PM	ROCK				HOLD FOR ANALYSIS

TURN AROUND REQUIRED:

☐ ROUTINE (7 - 10 WORKING DAYS)

☑ RUSH (SPECIFY DATE): _____ (SURCHARGES MAY APPLY)

SPECIAL INSTRUCTIONS (BILLING DETAILS, QC REPORTING, ETC.):

RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
L. Woodhouse	Aug 21, 2008	MAR	25/08/08
	TIME 2:10 PM		TIME 1:10
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
	TIME		TIME

FOR LAB USE ONLY

COOLER SEAL INTACT UPON RECEIPT? ☐ YES ☐ NO ☐ N/A

SAMPLE TEMPERATURE UPON RECEIPT: 22 °C

FROZEN? ☐ YES ☐ NO

REPORT COPY

CHAIN OF CUSTODY RECORD

ACCUTEST LABORATORIES LTD.

☐ 146 Colonnade Rd., Unit 8
Ottawa, ON K2E 7Y1
Ph: (613) 727-5692 Fax: (613) 727-5222

☐ 608 Norris Court
Kingston, ON K7P 2R9
Ph: (613) 634-9307 Fax: (613) 634-9308

LAB USE ONLY
Report Number: 231383

Company Name: PWGSC	Address: 1000- 9700 Jasper Ave.	☐ Fax Results to:
Report Attention: Giselle Cotta	City/Prov: Edmonton, AB Postal Code: T5J 4E2	☒ E-mail Results to: giselle.cotta@pwgsc.gc.ca
Phone: 780-497-3839 Waterworks #:	Project # RBSM * Quotation #	☐ Copy of Results to:

Invoice to:
(if different from above)

_____

_____

SAMPLE ANALYSIS REQUIRED

⇦ Indicate: F=Filtered or P=Preserved

Sample ID	Date/Time Collected	Sample Matrix	C=Comp. G=Grab	Number of Containers	Service Required ** R=Rush S=Standard	Hardness								Laboratory Identification	CRITERIA REQUIRED * (i.e. MOE GUCSO, CCME, PWQO, ODWS, Québec) MOE Reg. #: _____ Other: _____	MOE Reportable ?
Field Blank	03108119	water	G	1	S	✓								280371	ccme	Yes ☐ No ☐
RBSM-1				1		✓								371		Yes ☐ No ☐
RBSM-2				1		✓								375		Yes ☐ No ☐
RBSM-3				1		✓								376		Yes ☐ No ☐
RBSM-4				1		✓								377		Yes ☐ No ☐
Ida-1				1		✓								378		Yes ☐ No ☐
																Yes ☐ No ☐
																Yes ☐ No ☐
																Yes ☐ No ☐
																Yes ☐ No ☐
																Yes ☐ No ☐
																Yes ☐ No ☐

Sampled By: filled out by Steven	Date/Time:	Shipped Via:	Waybill #:
Relinquished By: Blair @ Accutest	Date/Time: Oct 27/03	Received By:	Date/Time:
Relinquished By: as per Giselle Cotta	Date/Time:	Received By Lab:	Date/Time:

Comments: Samples originally 231383

*** Indicates a required field. If not complete, analysis will proceed only on verification of missing information.** **** There may be a surcharge applied to "Rush" service. Please check with lab.**

Page _____ of _____

Copies: White – Sampler, Yellow – Laboratory, Pink – With Report

APPENDIX D:

SAMPLE DESCRIPTIONS

Appendix D
Water Sample Descriptions

Sample ID	Sample Location	GPS Co-ordinates		Sample Description
		Northing	Easting	
RBSM-1	Tailings pond	13435385	7563798	Surface water grab sample
RBSM-2	Standing water north of Fuel Area	13435473	7563893	Surface water grab sample
RBSM-3	Roberts Bay Silver Mine adit	13435456	7563839	Surface water grab sample
RBSM-4	Background Lake	13435607	7564622	Surface water grab sample
RBSM-Gar-W-1	Standing water east of the garage area	13435499	7563828	Surface water grab sample
RBSM-Val-1	Standing water in the muskeg area, east of the mine camp	13435431	7563883	Surface water grab sample
IDA-1	Ida Bay Silver Deposit adit	13436837	7569660	Surface water grab sample

APPENDIX E:

CCME NCS SCORE

CCME National Contaminated Sites Classification System
Revised Definitions

Site: Roberts Bay Silver Mine / Ida Bay Silver Deposit
Date: November 5,2003

Category	Evaluation Factor	Score	Rationale
1. Contaminant Characteristics	A. Degree of Hazard	14	There are elevated levels of metals (Ba, Cr, Cu, Pb, Ni, and Zn) in the soils, tailings, and waste rock at the site, which exceed the CCME Soil Quality guidelines for the Protection of Environmetnal and Human Health. In addition, mine water and tailings water at the site have concentrations of Al, Cd, Cr, CN, Fe, Pb and Zn) that exceed the CCME Water Quality Guidelines for the Protection of Aquatic Life - freshwater. The metal concentrations in the water and soil, waste rock, tailings are >2x the criteria. There are also barrels of POL product at the site.
	B. Contaminant Quantity	6	There is approximately 225 cubic metres of hydrocarbon contaminated soils at the site and 1400 cubic metres of waste rock with high metals concentrations
	C. Physical State	9	The mine water is in liquid form
	Special Considerations	0	No special considerations
	Total Scoring for CONTAMINANT CHARACTERISTICS	**29**	**Maximum Score = 33**
	Section A	14	
	Section B	6	
	Section C	9	
	Special Considerations	0	
Exposure Pathways: Groundwater*	A1. Known contamination and operable groundwater pathway within and / or beyond the property boundary	11	Mine water (groundwater)at the site has concentrations of Al, Cd, Cr, CN, Fe, Pb and Zn) that exceed the CCME Water Quality Guidelines for the Protection of Aquatic Life - freshwater. The metal concentrations in the water and soil, waste rock, tailings are >2x the criteria.
	OR		
	A2. Potential for Groundwater Contamination		
	2a. Engineered Subsurface Containment		
	2b. Thickness of Confining Layer Over Aquifer of Concern or Groundwater Exposure Pathway		
	2c. Hydraulic Conductivity of Confining Layer		
	2d. Annual Precipitation		
	2e. Hydraulic Conductivity of Aquifer of Concern		
	A3. Special Considerations	0	No special considerations
	Groundwater Scoring	**11**	**Maximum score = 11**
	Section 1 or 2	11	
	Section 3	0	
Exposure Pathways: Surface Water*	B1. Surface Water - Aquatic Environment Observed or measured contamination, above background conditions of surface water / effluent near the site which is considered an operable exposure pathway	11	Surface water at the site has concentrations of Al, Cd, Cr, CN, Fe, Pb and Zn) that exceed the CCME Water Quality Guidelines for the Protection of Aquatic Life - freshwater. The metal concentrations in the water and soil, waste rock, tailings are >2x the criteria.
	OR		
	B2. Potential for Surface Water Contamination		
	2a. Surface Containment		
	2b. Distance to Perennial Surface Water		
	2c. Topography		
	2d. Run-off Potential		
	2e. Flood Potential		
	B3. Special Considerations	0	No special considerations
	Surface Water Scoring	**11**	**Maximum score = 11**
	Section 1 or 2	11	
	Section 3	0	
Exposure Pathways: Direct Contact*	C1. Known Contamination of Media by direct contact	11	There are elevated levels of metals (Ba, Cr, Cu, Pb, Ni, and Zn) in the soils, tailings, and waste rock at the site, which exceed the CCME Soil Quality Guidelines for the Protection of Environmental and Human Health. The metal concentrations in the soil, waste rock, tailings are >2x the criteria.
	OR		
	C2. Potential for Direct Human and/or Animal Contact		
	2a. Vapour Emissions (gases, subsurface and surface generated vapours, contaminated dust)		
	2b. Accessibility of Site (Ability to Contact Materials)		
	2c. Hazardous Soil Gas Migration and Explosive Potential From the Site		
	C3. Special Considerations	0	No special considerations
	Direct Contact Scoring	**11**	**Maximum score = 11**
	Section 1 or 2	11	
	Section 3	0	
	Total Site Score for EXPOSURE PATHWAYS	**33**	**Maximum score =33**
	A. Groundwater	11	
	B. Surface Water	11	
	C. Direct Contact	11	
Receptors: Human and Animal Uses*	A1. Known adverse impact on humans or animals (domestic or documented traditional food source) as a result of the contaminated site		
	OR		
	A2. Potential for Impact on Humans or Animals		
	A2a. Drinking Water Supply		
	A2a i. Known Impact on Drinking Water Supply		
	OR		
	A2a ii. Potential for Impact on Drinking Water Supply		
	Proximity to Drinking Water Supply	4	The contaminated soils are located <1km from a drinking water supply.
	Availability of Alternative Drinking Water Supply	0.5	Alternate drinking water supply is available
	A2b. Water Resources (recreational, commercial, livestock, irrigation or other food chain uses)		
	A2b i. Water Resources are known to be adversely affected as a result of site contamination		
	OR		
	A2b ii. Potential for Impact on Water Resources		
	a. Proximity of Water Resources to Site (4)	0.5	The contaminated soils are located 1.1km from a water resource.
	b. Use of Water Resources (max 2)	1	The water resources are used for occasional recreational (fishing) and as a traditional food source.
	A2c. Direct Human Exposure		
	A2c i. Known Contamination of Land Used by Humans	5	There are elevated levels of metals (Ba, Cr, Cu, Pb, Ni, and Zn) in the soils, tailings, and waste rock at the site, which exceed the CCME Soil Quality Guidelines for the Protection of Environmental and Human Health. The metal concentrations in the soil, waste rock, tailings are >2x the criteria.
	OR		
	A2c ii. Potential Human Exposure Through Land Use		
	A3. Special Considerations	0	No special considerations
	Receptors - Human and Animal Use Scoring	**11**	**Maximum Score = 18**
Receptors: Environment*	B1. Known Impacts on the Environment as a Result of the Contaminated Sites		
	OR		
	B2. Potential for Impact on Environmental Receptors		
	B2a. Potential for Impact on Environmental Receptors	10	Contamination at the site is within 300 m of a sensitive arctic environment.
	B2b. Distance to an important or susceptible groundwater or surface water resource	2	Contaminated soils at the site are located 1.1 km from a surface water resource.
	B3. Special Considerations	0	No special considerations
	Environmental Receptor Scoring	**12**	**Maximum score = 16**
	Total site Score for RECEPTORS	**23**	**Maximum score = 34**
	A. Human and Animal Use	11	
	B. Environmental Receptors	12	
Total Score (Maximum = 100)		**85**	**Class 1**

APPENDIX F:

PRELIMINARY COST ESTIMATE