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BASELINE STUDIES ON SELENIUM CYCLING

IN THE EARN LAKE ENVIRONMENT

For

MINE ENVIRONMENT RESEARCH GROUP (MERG)

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EXECUTIVE SUMMARY

Selenium ecotoxicology has been the subject of a number of recent reviews, although much of the data has focused on species endemic to temperate and sub-tropical aquatic systems. This has resulted in various recommendations regarding appropriate criteria for protecting aquatic life. The Yukon uses the CCME guideline of 1 ug/L, which is more stringent than the USEPA criterion of 5 ug/L. These recommendations were based primarily on data from two sites in the southern United States where significant selenium toxicity was observed due to effluent from coal fly-ash ponds. These sites are characterized with warm waters, organic rich sediments, and high biological productions containing higher trophic level species exotic to the north. The characteristics of most of the water bodies in the Yukon are very dissimilar to this scenario, and the current selenium guideline for the protection of aquatic biota may be far too conservative.

The geology of parts of the Yukon contains high baseline levels of selenium, magnesium and arsenic and has been attributed to the black shales (argillites) of the "Earn Group". There is currently active exploration at some of these locales, with a strong possibility for future mining. The mining and milling of ores within these areas has the potential to release selenium to the environment.

Biogeochemical cycling of selenium in the water column and sediments, as well as accumulation of selenium in the food web, was studied at a remote lake in central Yukon in June 2004. Earn Lake was chosen as the study site as routine testing discovered high levels of selenium (concentrations of 3 ppm) in whitefish tissue in 2002. These concentrations were generally an order of magnitude greater than the concentrations documented in whitefish tissues from other local lakes. The natural high levels of selenium in this system allowed it to be an excellent candidate for cycling studies.

Water testing determined that waterborne selenium is entering Earn Lake via Dromedary Creek draining Dromedary Mountain to the north and via Two Moose Creek draining the Earn Hills from the south. Selenium concentrations exceeded the CCME guideline at these sites as well as down lake. Lake bottom sediments did not contain excessive amounts of selenium. Sequential leach analysis determined that 10 to 25% of total selenium in the sediments was organic. Levels of body burden selenium in the invertebrate tissues appear to be in range with other limited Yukon data. Milk vetch is a plant known to accumulate selenium from the soil, and several specimens were

analyzed. The relative low concentrations present in the vetch samples would tend to indicate that the soils were not seleniferous at the collection locations. Mice tissues were analyzed and levels of selenium were within range for other documented wildlife. Concentrations of selenium in the fish tissues were generally greater for all species when compared to fish tissues collected from other non-impacted sites. Studies have suggested that cold water fish species are more tolerant of selenium than warm water fish.

Selenium is a micronutrient essential for animal life although there is a very narrow range between essential and toxic amounts. Due to the small sample size of fish utilized in this study, no assumptions can be made on whether the amounts documented in the fish tissues are healthy or detrimental in any way. Further assessments should be conducted at Earn Lake.

Future guidelines (in water and/or sediment) for the protection of aquatic life should generally be site specific and should consider the nature of the water (stream or lake), the degree of organic-rich sediments, the dominant species of selenium present in the water column and in the sediments, and the productivity of the water.

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1.0 INTRODUCTION

1.1 Background

Selenium ecotoxicology has been the subject of a number of recent reviews, although much of the data has focused on species endemic to temperate and sub-tropical aquatic systems. Far less information exists concerning fish and wildlife species characteristic of the cold water systems prevalent in Canada (Outridge *et al*, 1999). Various reviews indicate that selenium is considerably more toxic to fish than to aquatic plants and invertebrates. Much of the field data on selenium accumulation and toxicity in fish is from warm water lakes and reservoirs. The fish that inhabit these types of water, bass, bluegill, crappie, etc, are more sensitive to selenium than cold water lakes containing salmonids (salmon, trout, grayling and whitefish) (Outidge *et al*. 1999).

The recent interest in selenium toxicity to aquatic life has resulted in various recommendations regarding appropriate criteria for protecting aquatic life. The Yukon uses the CCME guideline of 1 ug/L, which is more stringent than the USEPA criterion of 5 ug/L. These recommendations were based primarily on data from two sites in the southern United States where significant selenium toxicity was observed due to effluent from coal fly-ash ponds. Review of water quality data shows that a number of streams and water bodies contain waterborne selenium concentrations that consistently exceed these guidelines, however no biological impact has been observed (Canton *et al*, 1997). The assumption is that all aquatic systems are characterized by organic-rich sediments and high biological productions, typical of the sites researched in the US, and are therefore highly efficient at accumulation and transforming selenium. The characteristics of most of the water bodies in the Yukon are very dissimilar to this scenario, and the current selenium guideline for the protection of aquatic biota may be far too conservative.

Selenium entering the receiving environment has become an emerging issue in the Yukon over the past several years. There are mining interests in areas with selenium-containing geology. The mining, milling and smelting of ores within these areas has the potential to release selenium to the environment.

As a first step in developing a unique guideline for the Yukon, studies were conducted on a remote, unaffected water body (Earn Lake). High baseline levels of selenium, magnesium and arsenic have been attributed to the black shales (argillites) of the "Earn Group", mapped in this region (map

sheet 105L). Earn Lake specifically, was chosen as the study site as routine testing discovered high levels of selenium (concentrations of 3 ppm) in whitefish tissue in 2002. These concentrations were generally an order of magnitude greater than the concentrations documented in whitefish tissues from other local lakes. The source of this selenium was unknown, however Earn Lake must be subject to natural inputs. The aquatic ecosystem was viewed as a whole unit. In attempts to gain an understanding of selenium cycling in the Earn Lake environment, water quality, resident biota, vegetation, and sediment quality were examined.

During planning discussions for this project, it was decided to include Stokes Lake, located upstream of Earn Lake, to provide background data for comparison purposes. No known previous sampling had been conducted here.

1.2 A Brief Synopsis on Selenium

Selenium is a naturally occurring metalloid discovered in 1818 by Swedish chemists J.J. Berzelius and J.G. Gahn. It has chemical properties very similar to sulphur and is often found associated with sulphide minerals.

Major uses of selenium include photoreceptors/semiconductors, glass, pigments, metallurgy and production of animal feed supplements. Selenium is also a micronutrient essential for life. It is incorporated into proteins to make selenoproteins, which are important antioxidant enzymes. They help to prevent cellular damage and the development of some chronic diseases from free radicals. Selenium is also essential for the normal functioning of the immune system and the thyroid gland.

Anthropologic sources of selenium to the environment generally include irrigation drainwater (of seleniferous soils in arid regions), releases from metallic ore mining and smelting, and fly ash from coal-fired power plants. Natural sources are due to weathering of seleniferous shales and soils.

Selenium is present in the environment in both inorganic and organic forms. Selenium is found in the ecosystem as elemental selenium [Se(0)], selenite [Se(IV)], selenate [Se(VI)] and organic selenides [Se(-II)]. Most of the oxidation states (selenite, selenate and organic selenides) can occur in either dissolved forms, particulate forms, or in the cells or tissues of living organisms. Elemental selenium can occur in bacterial cells, sediments and particles suspended in the water column (Bowie *et al*, 1996). Elemental selenium is stable, insoluble and poorly assimilated by aquatic

organisms (Canton *et al*, 1997). Selenate and selenite are often the dominant forms in aerobic waters and are potentially toxic to aquatic organisms (Canton *et al*, 1997). Primary producers form organic selenides through reductive assimilation of inorganic selenium. Organic selenides are also converted from selenite and selenate through biological uptake and excretion processes of the secondary producers. These organo-Se compounds are released to surface water and sediment upon death and decomposition of selenium-containing organisms. Organic selenium poses a much higher threat of direct toxicity and reproductive effects than selenite or selenate (Canton *et al*, 1997).

The lower trophic levels such as phytoplankton, bioconcentrate waterborne selenium several orders of magnitude above the concentrations in water (Lemly, 1992, Bowie *et al*, 1996). The higher trophic levels (zooplankton, benthos, fish and birds) obtain most of their selenium from food (Bowie *et al*, 1996).

There is a narrow range, about an order of magnitude, between the detrimental extremes of deficiency and toxicity of dietary selenium. Selenium deficiency is believed to be a more common problem globally than selenium toxicity, and causes “white muscle disease” in cattle and sheep. Selenium toxicity occurs when excess selenium substitutes for sulphur in sulphur-containing amino acids (cysteine and methionine). Selenium acts differently than sulphur, thus selenamino acids alter the normal function of the proteins into which they are incorporated. This is particularly a problem in rapidly growing fish and waterfowl embryos when the egg yolks are enriched in selenamino acids (Chapman, 2000).

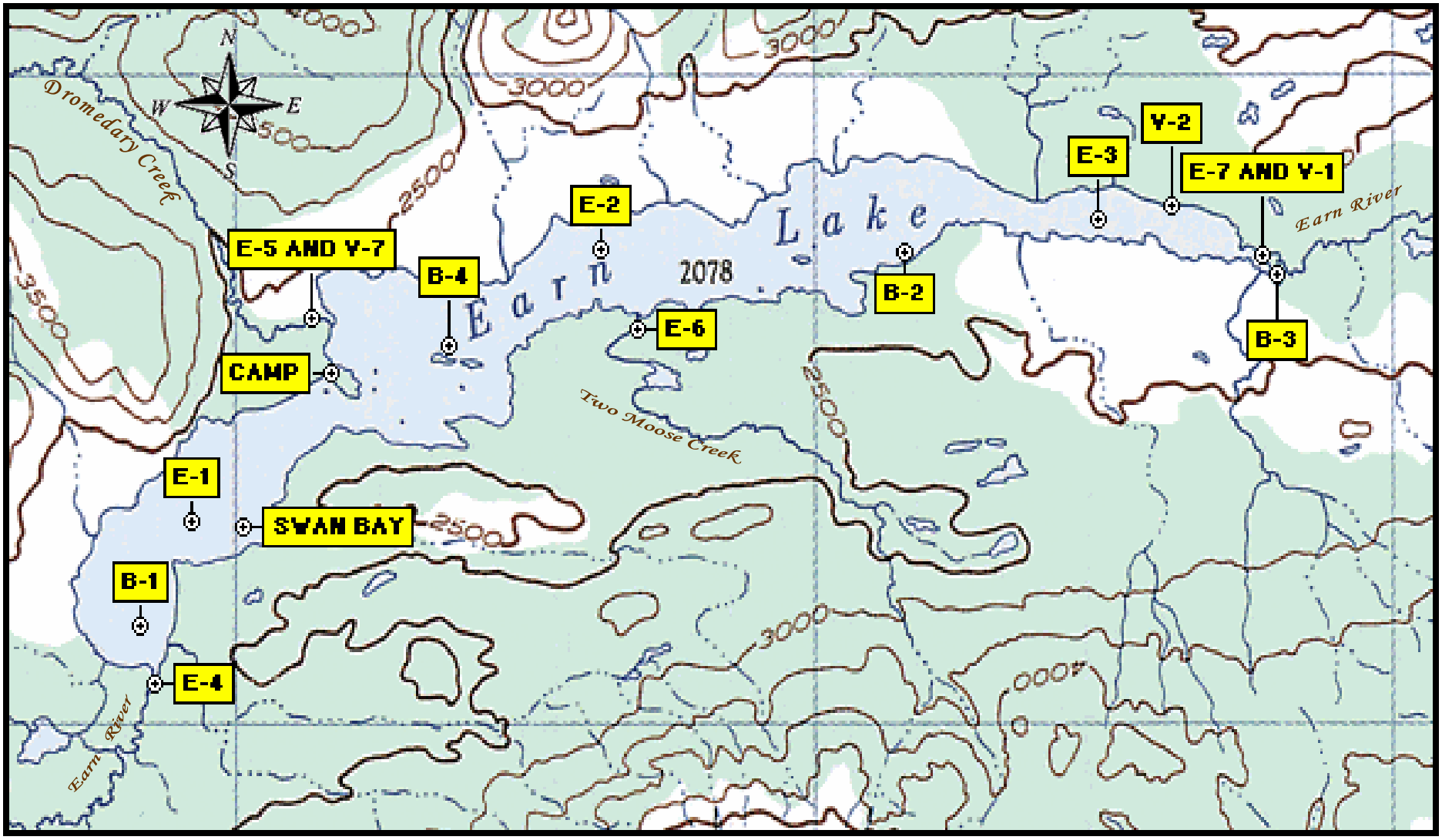


Figure 2.1 Sample Locations in the Earn Lake Study Area, June 2004.

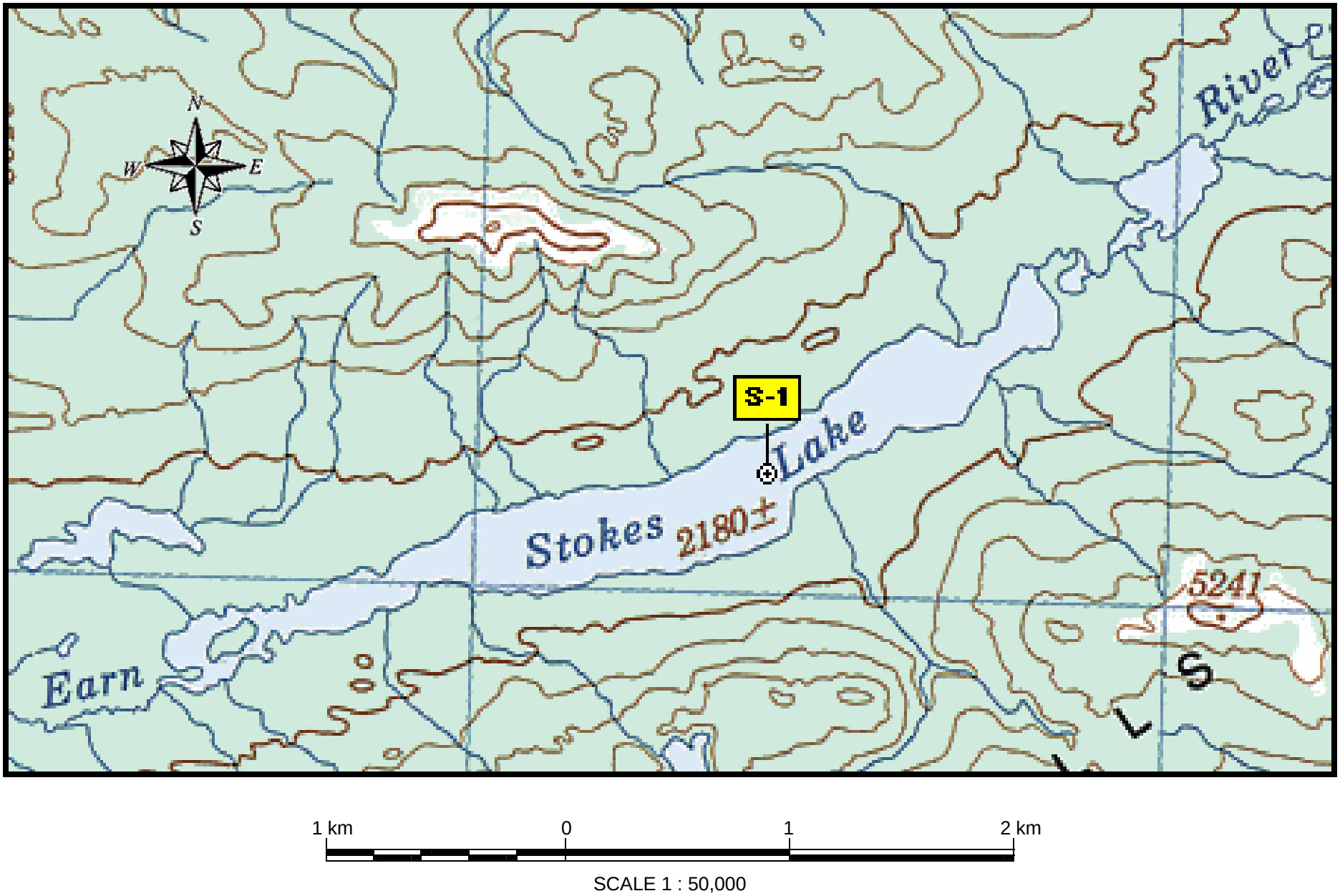


Figure 2.2 Sample Location on Stokes Lake, June 2004.

2.0 STUDY AREA

Earn Lake is located in central Yukon approximately 85 km northwest of Faro and approximately 115 km due east of Pelly Crossing at UTM 0536100 E and 6967100N. The surface area of the lake is 3,221 hectares with a volume of 0.682 cubic kilometres. The mean depth is 19.2 m with the deepest measuring 58.0 m. Earn River feeds Earn Lake at the east end and drains it from the west. Earn River enters the Pelly River approximately 25 km from the outlet of Earn Lake.

Stokes Lake is located on Earn River approximately 12 km upstream of Earn Lake. The surface area of the lake is 1,390 hectares with a volume of 0.373 cubic kilometres. The mean depth is approximately 26.8 m with the deepest measuring 65.0 m.

The watershed lies in the ecoregion called Yukon Plateau North, which is characterized by long, cold winters and warm summers. The Tintina Trench, a straight, deep valley formed by a large fault, traverses this ecoregion from southeast to northwest, and is part of the migration route of many bird species.

Several sites were sampled for a variety of matrices. These are displayed in Figures 2.1 and 2.2 and are described in Table 2.1. Numerous net sets for fish were set throughout the western half of the lake and have not been plotted or individually described.

TABLE 2.1 SAMPLING SITE DESCRIPTIONS, JUNE 2004

Site #	Site Description	UTM NAD 83 Zone 8	Sampling Matrix
E-1	Earn L. deep, west end	0531332 E 6965557 N	P, WQ,S, B, PK
E-2	Earn L. deep, central	0536136 E 6967149 N	P, WQ, S, B
E-3	Earn L. deep, east end	0544752 E 6967774 N	P, WQ, S, B
E-4	Earn R, Earn L. outlet	0528009 E 6960693 N	WQ, S, V, B
E-5	Dromedary Creek	0531109 E 6966282 N	WQ, S, V, B
E-6	Two Moose Creek	0536600 E 6966300 N	WQ, S, B
E-7	Earn R, Earn L. inlet	0547586 E 6967176 N	WQ, S, V, B
B-1	Earn L. shallow, near outlet	0528115 E 6961420 N	P, S, B
B-2	Earn L. shallow, eastern section	0541125 E 6967110 N	P, S, B
B-3	Earn L. shallow bay near inlet	0547840 E 6966769 N	P, S, B
B-4	Earn L. shallow, near big islands	0533471 E 6965768 N	P, S, B
Swan Bay	Earn L. south shore, west end	0529751 E 6963061 N	P
Camp	Earn L	0531451 E 6965373 N	SM, V
V-2	Earn L. east end, north shore	0546183 E 6969921 N	V
S-1	Stokes Lake, mid section	0564583 E 6971808 N	WQ, PK

Legend: P = profile WQ = water quality S = sediment B = benthic invertebrates
V = vegetation PK = plankton SM = small mammals

3.0 METHODS

All sampling was conducted from June 7th to June 12th, 2004. Air support to Earn Lake was provided by Black Sheep Aviation using their single otter aircraft. Although spacious, not all gear could be transported to site with one load. Budget constraints would not allow two trips with this aircraft, so some gear was left behind. One of the inflatable boats, and the fish nets remained in Whitehorse. It was intended that one inflatable boat would supply the necessary transportation on Earn Lake for both project teams. Prior to the day of departure, the owner of the outfitter's camp on Earn Lake could not be reached to determine the possibility of using any boats that may be on site.

Due to access for the float plane, the project team based their operations at the outfitter's camp (MacMillan River Adventures). Stu Withers and Bonnie Burns of Laberge Environmental Services, used an "Elgin" 15 foot aluminum boat powered with a 15 horse power motor to conduct their water quality, sediment, vegetation and invertebrates studies. In appreciation for the use of this craft, all of the remaining petrol and oil was donated to the outfitter at the termination of the field work.

Pat Roach of DIAND and Rem Ricks of W. R. Ricks Consulting used their 11 foot inflatable Zodiac® equipped with a Mercury 15 hp outboard motor for the fish surveys.

It was necessary for all samples to be kept cool on site. Due to the lack of a power source at the remote field site, a supply of –80°C ice was brought in and stored in coolers at the camp. This actually allowed the desired effect of freezing the tissue samples. A fresh supply of –80°C ice was delivered half way through the field work on June 9th, 2004.

Due to poor fishing success in Earn Lake, the complete study on Stokes Lake was cancelled. It was decided that the focus should remain on Earn Lake. Only water and plankton samples were collected from Stokes Lake when the Cessna 185 was available half way through the project.

Photographs of various aspects of the project are provided in Appendix A.

3.1 Water Chemistry Characterization

Bathymetric maps for Earn and Stokes Lake were obtained from Fisheries, Renewable Resources, Government of Yukon, during the planning stage to determine the location of the deep water areas.

These sites as well as the shallow zones were targeted for conducting profiles and the collection of representative water samples above and below the thermocline. Profiling was conducted with a YSI 6 Series Sonde provided by the Waste and Contaminants Branch of DIAND. Eight sites in Earn Lake were profiled for temperature, pH, conductivity, salinity, depth, and dissolved oxygen (mg/L and percent saturation). An Orion hand held conductivity and temperature meter was used for the creek sites. Instruments were calibrated daily.

Three sites within Earn Lake, E-1, E-2 and E-3, were sampled above and below the thermocline for water chemistry using a Van Dorn water sampler. Surface water samples were collected from Earn River at the inlet (E-7) and at the outlet (E-4) of Earn Lake. Water samples were also collected from Dromedary Creek (E-5) and Two Moose Creek (E-6). Water sampling and necessary preservation techniques followed standard protocols.

Samples were kept cool until shipped to Norwest Labs in Surrey, BC. The lab's methodologies and quality assurance and quality control are included in Appendix C.

3.2 Sediment Sampling

Lake bottom sediments were collected from E-1, E-2, E-3, E-4, E-7, B-1, B-2, B-3 and B-4, using a six inch ponar dredge. Material within the dredge was carefully removed with a stainless steel trowel and placed in ziplock® plastic bags. All air was removed from the bags prior to sealing. Stream bottom sediments were collected from Dromedary Creek, E-5, using a stainless steel trowel. Samples were placed into ziplock® bags.

Samples were kept cool until shipped to the Environment Canada laboratory in North Vancouver. Each sample was analyzed for a suite of metals and total organic carbon. In addition, all samples underwent sequential metal leach analysis to determine the organic selenium content.

3.3 Plankton Sampling

One quantitative sample was collected from E-1. A vertical haul was made with a Wisconsin tow net with a truncated cone to improve filtration efficiency, mesh size 76 microns, at a rate of approximately 0.5m/s from a depth of 37 meters. One grab sample was also collected from Stokes

Lake on June 9th 2004 to determine assemblage. The invertebrates collected in the cup attached to the plankton net were deposited in new one-litre nalgene bottles and preserved with Lugols solution. The samples were sent to Mary Bolin-Hawes in Victoria, BC for identification and enumeration.

Plankton was also collected for metal analyses to determine the body burden of metals at this trophic level. Many vertical hauls were made throughout the lake and composited to obtain as much biomass as possible. The samples were placed in a new, clean one-litre nalgene bottle and frozen. This sample was sent to the Environment Canada laboratory in North Vancouver and analyzed for a suite of metals.

3.4 Benthic Macro-invertebrate Sampling

Benthic macro-invertebrates were collected from E-1, E-2, E-3, E-4, E-7, B-1, B-2, B-3 and B-4, using a six inch ponar dredge (area = 0.0232 m^2). Benthos was also collected from Dromedary Creek (E-5) using a Surber Sampler (area = 0.0929 m^2) which had a 300 micron mesh. The bed material within the frame was cleaned and washed by hand, with the fast flowing current of the creek carrying the disturbed bottom fauna and detritus into the collection bag. Duplicate samples were collected from each site. One set was placed into one-litre wide mouth nalgene bottles and preserved with 10% formalin. These were sent to Dr. Charles Low, an entomologist in Victoria, BC for sorting, identification and enumeration.

The other set of samples was placed in ziplock® plastic bags and frozen as soon as possible. An additional invertebrate sample was prepared consisting of leeches that were attached to the gill nets and to the fish. At the Laberge Environmental Services' laboratory in Whitehorse, the samples were thawed, the invertebrates removed from the detritus, identified, rinsed with distilled water, placed into glass vials and refrozen. The vials were sent to the Environment Canada laboratory in North Vancouver and analyzed for a suite of metals.

3.5 Fish Surveys

As the nets had to be left behind, fishing was originally conducted by angling. This proved to be unsuccessful with few individuals being captured. Ranger Air Charter provided a Cessna 185 on floats to deliver the gill nets and more petrol and ice on June 9th. Water and sediment samples

that had been collected up until that time were sent back to Whitehorse on the return flight and forwarded by air to the appropriate laboratory in BC.

Multi-filament gill nets were used consisting of single panel nets that were 2 m (6.6 ft) high x 20 m (65.8 ft) long. Mesh sizes used were 3" (7.62 cm) and 3.5" (8.9 cm) for shallower (2.5 – 15 m) sets, and 4.5" (11.43 cm) and 5" (12.7 cm) for deeper (> 20 m) sets. All nets were equipped with bright orange floats at both ends.

Nets were generally set at right angles from the mainland or from islands, spanning a moderate drop-off. Some deep-water sets were free-standing (not attached to land). Gill nets were monitored hourly. Any fish captured were placed in a cooler with ice packs and processed at the end of the day.

Samples were taken from all fish captured at the end of each day. A shelter was provided as a rain stop and wind break. From each fish, two samples of muscle were taken (~ 20 grams), using standardized laboratory techniques. The samples were wrapped in treated tin foil and placed in a cooler. Gonadal and liver samples were also collected.

In addition, length and weight were collected from each fish, as well as the means for determining age at a later date. Sex, sexual maturity, stomach contents and general body condition were noted.

Samples were transported to Whitehorse, frozen to minus 80 °C, and eventually sent to the Freshwater Institute, DFO, Winnipeg, for analysis.

3.6 Vegetation Sampling

Whole plants, including the roots, were collected and placed into clean plastic bags. The exception to this was the willow sample. New growth of leaves were stripped from the twigs and placed into clean plastic bags. All samples were kept cool prior to shipment to Norwest Labs in Surrey and the Environment Canada lab in North Vancouver. At the labs, the samples were washed with distilled water, dried and analyzed for a suite of metals.

3.7 Small Mammal Sampling

Mice were captured using standard mouse traps set in various locations near the base camp. Whole bodies were kept in the -80°C cooler until they could be stored in the freezer. Mice were dissected with clean laboratory instruments (washed thoroughly and rinsed with distilled water) by Gamberg Consulting in Whitehorse. Entire livers and kidneys were extracted from each animal and stored separately in clean 20 mL polyethylene vials at –80^{o}C until analyzed. Samples were shipped frozen to Norwest Labs in Surrey, BC for an ICP MS scan. The liver samples were analyzed individually and the kidneys were composited as one sample.

4.0 RESULTS

4.1 Water Chemistry Characterization

4.1.1 Data Profiles

Eight sites were profiled in Earn Lake. The site descriptions are described in Table 4.1 and are displayed in Figure 2.1 (Section 2.0). Profiling only was done at Swan Bay, no other sampling was conducted here.

TABLE 4.1 PROFILE LOCATIONS IN EARN LAKE, JUNE 2004

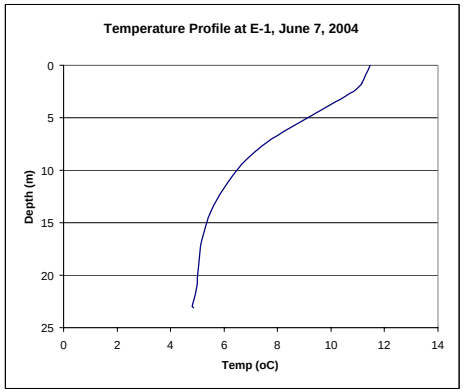
Site #	Site Description	Date, 2004	UTM NAD 83 Zone 8
E-1	Deep, west end	June 7	0531332 E 6965557 N
E-2	Deep, central	June 9	0536136 E 6967149 N
E-3	Deep, east end	June 8	0544752 E 6967774 N
B-1	Shallow, near outlet	June 11	0528115 E 6961420 N
B-2	Shallow, eastern section	June 8	0541125 E 6967110 N
B-3	Shallow bay near inlet	June 8	0547840 E 6966769 N
B-4	Shallow, near big islands	June 10	0533471 E 6965768 N
Swan Bay	South shore, west end	June 11	0529751 E 6963061 N

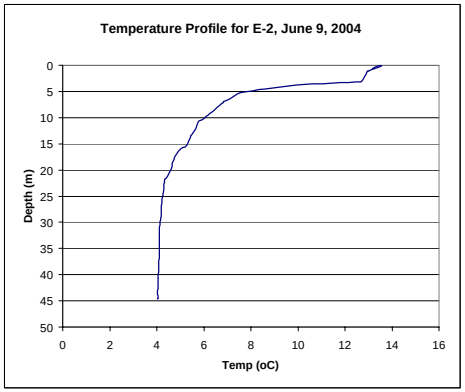
Complete profile data are presented in Appendix B. For most parameters, concentrations were fairly consistent from surface to bottom. Graphs for temperature profiles have been generated in Figure 4.1. The lake had begun to stratify by the sampling dates with a thermocline forming at a depth between 5 and 10 meters. Surface temperatures ranged between 12 ^{o}C and 14^{o}C for the entire lake. Temperatures approached 4 ^{o}C by approximately 15 meters.

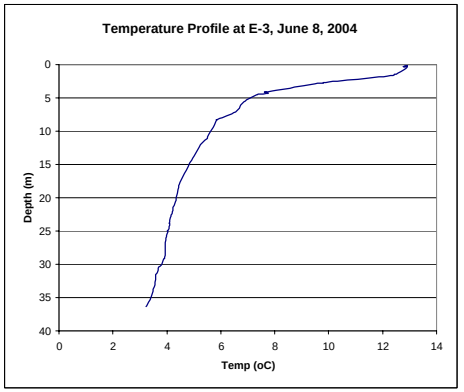
Profiles for dissolved oxygen were graphed in Figure 4.2. The lake was well aerated with waters even at depth well saturated. The water at E-3 appears super saturated and it is suspected that this could be instrument error.

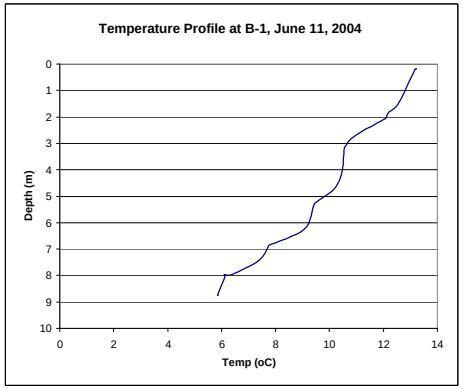
The total depth at E-2 was approximately 52m however the cable length of the YSI Sonde limited profiling to a depth of 44.6 m.

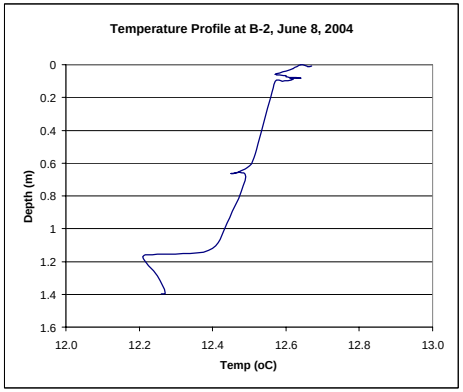
Figure 4.1 Temperature Profiles for Eight Sites in Earn Lake, June 2004

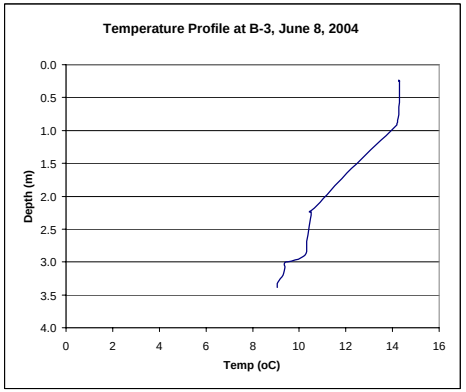


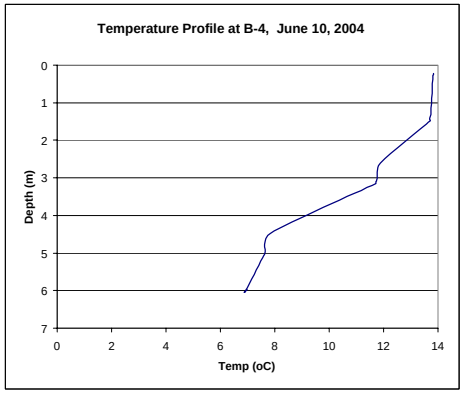












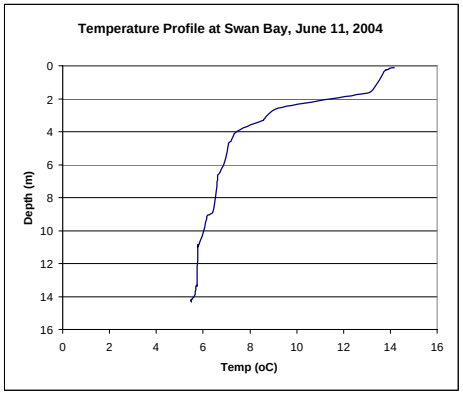
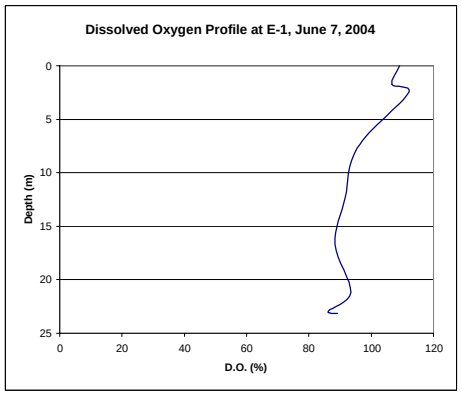
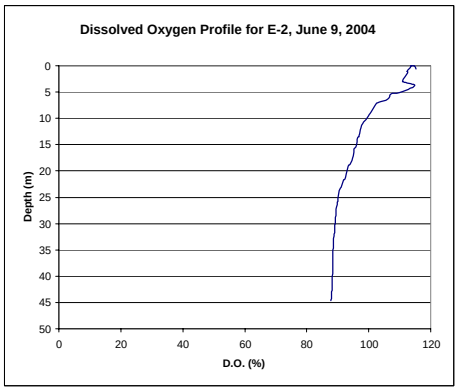
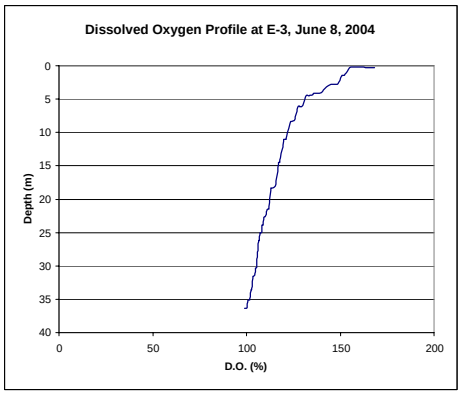
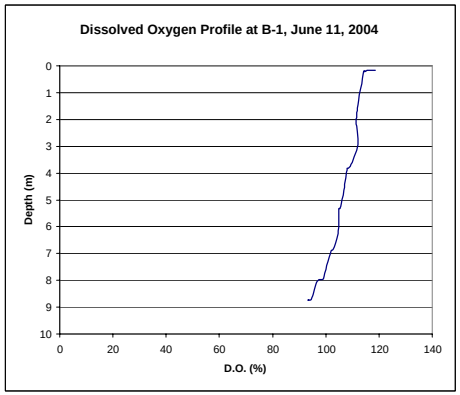


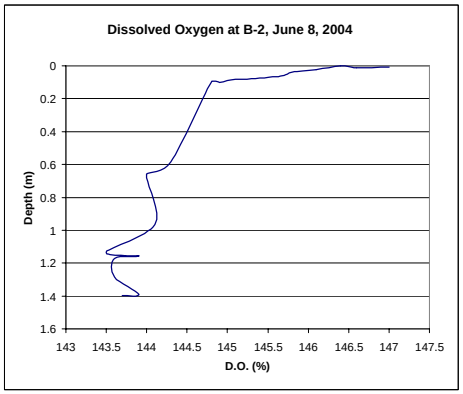
Figure 4.2 Dissolved Oxygen Profiles for Eight sites in Earn Lake, June 2004

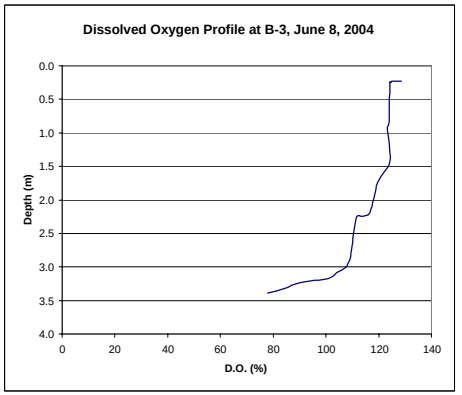


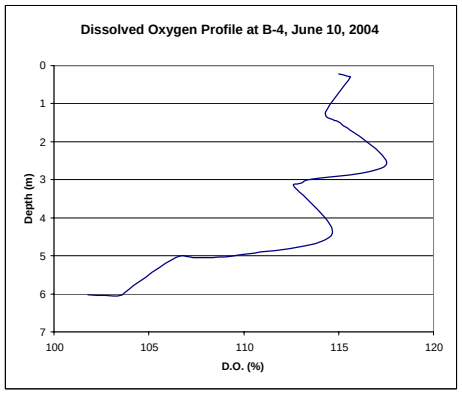


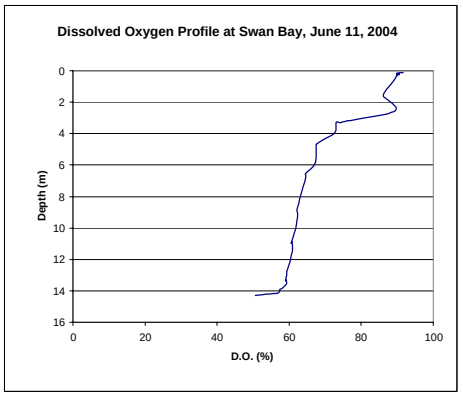












4.1.2 Water Chemistry

The complete analytical dataset for water chemistry in the study area is included in Appendix C. The results for several parameters have been summarized in Table 4.2 and compared to the applicable CCME (1999) guidelines for the protection of freshwater aquatic life.

All of the waters sampled were clear, tea coloured, slightly alkaline, and very hard. Colour ranged from 30 to 76 colour units in Earn and Stokes Lakes, and was visually brown. There were very little suspended solids in the water column however dissolved solids were high. Transparency of Earn Lake was measured with a Secchi disk at the deep water sites. Due to the dark colour of the lake and the abundance of zooplankton in the water column, the transparency was only around two meters.

Except for temperature, there was very little change in the chemistry of the water above and well below the thermocline, indicating that Earn Lake was well mixed at the time of sampling. Metal concentrations were generally low throughout the study area. The highest concentration of most of the parameters occurred in Two Moose Creek (E-6). The CCME guidelines for cadmium, copper and lead vary with the hardness of the sampled waters. Hardness is an important modifying factor in water quality as it can significantly influence the form and hence toxicity of numerous heavy metals. In general terms, toxicity of certain metals is lowered with an increase in hardness. The high hardness in the Earn Lake system may help to diminish the effects of dissolved metals on biota.

The CCME guideline for cadmium was slightly exceeded in the upper sample at E-1, Dromedary Creek (E-5), Two Moose Creek (E-6) and at the inlet of Earn Lake (E-7). The only other parameter to exceed the CCME guideline was selenium. On average, 86% of waterborne selenium was in the dissolved phase throughout the study area. The highest concentrations were documented in the two creek sites (E-5 and E-6). The selenium guideline was also exceeded at E-2, E-1 and at the outlet E-4. The sample sites upstream of the influence of these creeks, E-3 and E-7 met the guideline. Selenium values were also low upstream in Stokes Lake. It would appear that Dromedary Creek and Two Moose Creek, which drain areas containing seleniferous black shales, contribute to selenium loading in Earn Lake.

TABLE 4.2 **WATER QUALITY AT EARN AND STOKES LAKES, JUNE 2004**

Site #	E-1 @ 2m	E-1 @ 20m	E-2 @ 2m	E-2 @ 40m	E-3 @2m	E-3 @ 30m	E-4	E-5	E-6	E-7	S-1	Guideline*
Date, 2004	June 7	June 7	June 9	June 9	June 8	June 8	June 7	June 10	June 9	June 8	June 9	
Water Temperature (°C)	11.2	5.0	12.9	4.1	12.4	3.8	12.9	4.9	18.6	12.9	12.2	
Dissolved Oxygen (mg/L)	11.7	11.9	11.9	11.5	16.0	13.5	12.0	---	---	13.2		
Conductivity (uS/cm)	335	291	305	285	323	282	339	317	433	348	388	
pH	7.9	7.7	7.9	7.7	7.8	7.5	8.0	---	---	7.9		6.5 to 9.0
Total Organic Carbon (mg/L)	9.1	9.1	9.7	8.7	10	9.4	9.1	5.2	11.2	10.7	11.2	
Dissolved Organic Carbon (mg/L)	8.6	8.8	9.5	8.7	10	9.1	9.1	5.2	11.2	10.2	11	
Sulphate (mg/)L	112	116	111	118	114	115	112	63	130	132	114	
Ammonia Nitrogen (mg/L)	<0.05	<0.05	<0.05	0.090	<0.05	<0.05	<0.05	<0.05	0.090	<0.05	0.14	1.04**
Total Nitrogen (mg/L)	0.35	0.32	0.46	0.36	0.24	0.31	0.27	0.27	0.54	0.36	0.5	
Orthophosphate (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	0.05	<0.05	<0.05	0.005
Total Suspended Solids (mg/L)	<3	4	2	1	4	4	4	2	6	11	2	
Total Dissolved Solids (mg/L)	293	327	327	327	267	307	293	247	347	293	313	
Colour	36	30	46	34	46	38	37	34	76	48	48	
Chlorophyll-*a* (ug/L)	1.2		0.5		1.1						0.3	
Transparency (m)	1.8		2.0		1.9							
Arsenic - Total	0.0008	0.0009	0.0007	0.0008	0.0007	0.0007	0.0007	0.0006	0.0010	0.0006	0.0007	0.0050
Arsenic - Dissolved	0.0007	0.0007	0.0006	0.0007	0.0006	0.0005	0.0007	0.0006	0.0007	0.0005	0.0006	
Cadmium - Total	**0.00010**	0.00003	0.00007	0.00006	0.00004	0.00003	0.00002	**0.00011**	**0.00009**	**0.00009**	0.00007	***
Cadmium - Dissolved	<0.00001	<0.00001	0.00004	0.00003	0.00003	0.00002	<0.00001	0.00005	0.00004	0.00005	0.00004	
Copper - Total	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.004	0.003	0.002	0.004
Copper - Dissolved	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.004	0.002	0.002	
Iron - Total	<0.1	<0.1	0.2	0.1	<0.1	<0.1	<0.1	0.3	0.8	0.3	0.1	0.3
Lead - Total	0.00030	<0.0001	0.0003	0.00020	<0.0001	<0.0001	<0.0001	<0.0001	0.0004	0.0001	0.0006	0.007
Lead - Dissolved	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Selenium - Total	**0.0015**	**0.0011**	0.0010	**0.0014**	0.0007	0.0007	**0.0012**	**0.0056**	**0.0025**	0.0008	0.0008	
Selenium - Dissolved	0.0009	0.0008	0.0010	**0.0013**	0.0006	0.0007	**0.0011**	**0.0054**	**0.0025**	0.0005	0.0007	
Zinc - Total	0.009	0.005	0.005	0.005	0.006	0.006	0.003	0.005	0.009	0.009	0.007	0.03
Zinc - Dissolved	0.007	0.002	0.005	0.004	0.006	0.006	<0.001	0.003	0.002	0.008	0.005	
Hardness as CaCO3 mg/L	246	262	226	248	257	253	251	177	254	247	230	

* CCME (1999) Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life

** at pH 8 and temp at 10°C

*** Varies with Hardness: Hardness of 177 the guideline is 0.00005;
Hardness of 226 TO 257 the guideline is 0.00007;
Hardness of 262 the guideline is 0.00008 as according to the calculation 10{0.86[log(hardness)]-3.2}

Values in **bold** indicate that the CCME guideline has been exceeded

4.2 Sediment Chemistry

Bottom lake sediments were collected from seven locations in Earn Lake. Stream sediment samples were collected from the Earn River at the inlet and outlet, and from Dromedary Creek and Two Moose Creek. The sediments were analyzed for metals and total organic carbon (TOC). All analytical results are presented in Appendix D and are summarized in Table 4.3.

The concentrations of the selected metals were compared to the CCME (1999) interim freshwater sediment quality guidelines (ISQG), and to the probable effects levels (PEL). Generally concentrations greater than the PEL have a 50% incidence of creating adverse biological effects. No guidelines have been developed for selenium. To aid in interpretation of the data each metal was graphed (Figure 4.3).

TABLE 4.3 SUMMARY OF METAL CONCENTRATIONS (ug/g) AND TOC (%W/W) IN EARN LAKE SEDIMENTS, 2004

SITE	DESCRIPTION	AS	CD	CU	PB	SE	ORGANO - SE	ZN	TOC %(W/W)
E-1	West end - deep	***59.0***	*3.44*	*81.1*	26.8	5.9	1.0	***407***	1.89
E-2	Central area - deep	***55.3***	*2.60*	*65.4*	20.6	4.2	0.9	***335***	2.09
E-3	East end - deep	***72.4***	***3.97***	*67.1*	19.7	5.3	0.9	***399***	3.41
E-4	Earn River at outlet	5.9	*0.62*	16.3	6.2	1.1	< 0.2	77.7	0.49
E-5	Dromedary Creek	***22.3***	*2.03*	*39.6*	11.1	3.7	0.7	*214*	0.41
E-6	Two Moose Creek	*11.1*	*2.37*	*40.9*	12.0	3.5	0.9	*172*	4.27
E-7	Earn River at inlet	*14.0*	*1.32*	26.6	10.4	1.8	0.2	*270*	0.59
B-1	Near outlet - shallow	*11.9*	*1.69*	*78.6*	*59.0*	2.0	0.2	*170*	2.38
B-2	Eastern section - shallow	*8.4*	*0.76*	20.4	5.3	1.3	< 0.2	84.1	1.48
B-3	Near inlet - shallow	*12.9*	*2.35*	*43.8*	12.1	3.8	0.7	*230*	4.63
B-4	Near big islands, shallow	***21.9***	*2.63*	*77.8*	19.2	3.0	0.7	***356***	1.28
ISQG		5.9	0.6	35.7	35.0			123	
PEL		17.0	3.5	197.0	91.3			315	

Note: ISQG = Interim freshwater Sediment Quality Guidelines (exceedences italicized)
PEL = Probable Effects Level (exceedences italicized and in bold)

The sediments from the deepest sections of Earn Lake (E-1, E-2 and E-3) generally had the highest concentrations of most of the metals, and the PEL for arsenic and zinc was exceeded at these sites. The PEL for arsenic was also exceeded in the sediments from Dromedary Creek (E-5) and from B-4, and for zinc in the sediments at B-4.

TABLE 4.2 **WATER QUALITY AT EARN AND STOKES LAKES, JUNE 2004**

Site #	E-1 @ 2m	E-1 @ 20m	E-2 @ 2m	E-2 @ 40m	E-3 @2m	E-3 @ 30m	E-4	E-5	E-6	E-7	S-1	Guideline*
Date, 2004	June 7	June 7	June 9	June 9	June 8	June 8	June 7	June 10	June 9	June 8	June 9	
Water Temperature (°C)	11.2	5.0	12.9	4.1	12.4	3.8	12.9	4.9	18.6	12.9	12.2	
Dissolved Oxygen (mg/L)	11.7	11.9	11.9	11.5	16.0	13.5	12.0	---	---	13.2		
Conductivity (uS/cm)	335	291	305	285	323	282	339	317	433	348	388	
pH	7.9	7.7	7.9	7.7	7.8	7.5	8.0	---	---	7.9		6.5 to 9.0
Total Organic Carbon (mg/L)	9.1	9.1	9.7	8.7	10	9.4	9.1	5.2	11.2	10.7	11.2	
Dissolved Organic Carbon (mg/L)	8.6	8.8	9.5	8.7	10	9.1	9.1	5.2	11.2	10.2	11	
Sulphate (mg/)L	112	116	111	118	114	115	112	63	130	132	114	
Ammonia Nitrogen (mg/L)	<0.05	<0.05	<0.05	0.090	<0.05	<0.05	<0.05	<0.05	0.090	<0.05	0.14	1.04**
Total Nitrogen (mg/L)	0.35	0.32	0.46	0.36	0.24	0.31	0.27	0.27	0.54	0.36	0.5	
Orthophosphate (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	0.05	<0.05	<0.05	0.005
Total Suspended Solids (mg/L)	<3	4	2	1	4	4	4	2	6	11	2	
Total Dissolved Solids (mg/L)	293	327	327	327	267	307	293	247	347	293	313	
Colour	36	30	46	34	46	38	37	34	76	48	48	
Chlorophyll-*a* (ug/L)	1.2		0.5		1.1						0.3	
Transparency (m)	1.8		2.0		1.9							
Arsenic - Total	0.0008	0.0009	0.0007	0.0008	0.0007	0.0007	0.0007	0.0006	0.0010	0.0006	0.0007	0.0050
Arsenic - Dissolved	0.0007	0.0007	0.0006	0.0007	0.0006	0.0005	0.0007	0.0006	0.0007	0.0005	0.0006	
Cadmium - Total	**0.00010**	0.00003	0.00007	0.00006	0.00004	0.00003	0.00002	**0.00011**	**0.00009**	**0.00009**	0.00007	***
Cadmium - Dissolved	<0.00001	<0.00001	0.00004	0.00003	0.00003	0.00002	<0.00001	0.00005	0.00004	0.00005	0.00004	
Copper - Total	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.004	0.003	0.002	0.004
Copper - Dissolved	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.004	0.002	0.002	
Iron - Total	<0.1	<0.1	0.2	0.1	<0.1	<0.1	<0.1	0.3	0.8	0.3	0.1	0.3
Lead - Total	0.00030	<0.0001	0.0003	0.00020	<0.0001	<0.0001	<0.0001	<0.0001	0.0004	0.0001	0.0006	0.007
Lead - Dissolved	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Selenium - Total	**0.0015**	**0.0011**	0.0010	**0.0014**	0.0007	0.0007	**0.0012**	**0.0056**	**0.0025**	0.0008	0.0008	
Selenium - Dissolved	0.0009	0.0008	0.0010	**0.0013**	0.0006	0.0007	**0.0011**	**0.0054**	**0.0025**	0.0005	0.0007	
Zinc - Total	0.009	0.005	0.005	0.005	0.006	0.006	0.003	0.005	0.009	0.009	0.007	0.03
Zinc - Dissolved	0.007	0.002	0.005	0.004	0.006	0.006	<0.001	0.003	0.002	0.008	0.005	
Hardness as CaCO3 mg/L	246	262	226	248	257	253	251	177	254	247	230	

* CCME (1999) Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life

** at pH 8 and temp at 10°C

*** Varies with Hardness: Hardness of 177 the guideline is 0.00005;
Hardness of 226 TO 257 the guideline is 0.00007;
Hardness of 262 the guideline is 0.00008 as according to the calculation 10{0.86[log(hardness)]-3.2}

Values in **bold** indicate that the CCME guideline has been exceeded

There was an anomalous concentration of 59 ug/g of lead in the sediments from B-1, which significantly exceeded the concentrations documented at the other sites. Copper levels were also high in the sediments at B-1, but were more in line with the concentrations reported at the other lake sites. The ISQG for copper was exceeded at most of the sites but was well below the PEL. Concentrations of copper were below the ISQG at the two Earn River sites and at B-2.

The ISQG for cadmium was exceeded at all of the sites and the PEL was exceeded at E-3.

Concentrations of total selenium ranged from 1.1 ug/g to 5.9 ug/g. Environment Canada, Environment Protection Branch, Whitehorse, maintains a database on metal concentrations in stream sediments throughout the Yukon. Of 605 detectable levels, the mean for selenium was 2.5 ug/g, ranging from 0.1 to 38.8 ug/g. The baseline levels of selenium in Earn Lake were frequently greater than the Yukon mean. Through sequential leach analysis, the organic content of selenium was determined in each sample. Organo-Se formed between 10 to 25% of the total selenium present.

The sediments collected from Earn River at the lake outlet (E-4) had the lowest concentrations of the metals examined.

4.3 Plankton Results

4.3.1 Assemblage

The algae of the open water of lakes are referred to as the phytoplankton and represent those organisms at the bottom of the food chain (primary producers). They are grazed on by zooplankton and in-stars of some species of benthic invertebrates. Zooplankton is a term used to describe tiny invertebrate animals that reside in the pelagic zone (water column) of a water body. Zooplankton can be an important food source for juvenile fish and comprise an important level of organic production in water bodies. Freshwater zooplankton are dominated by four major groups of animals: protozoa, rotifers and two subclasses of Crustaceans, cladocerans and copepods. Protozoans are mainly microscopic and form a minor part of zooplankton. Most rotifers are sessile and live in the benthic zone, although some species are completely planktonic. The majority of the zooplankton found in freshwater belong to the two subclasses of crustaceans.

The identification and enumeration of the quantitative sample collected from Earn Lake is presented in Appendix E. A summary of the findings is described below.

Diatoms formed the majority of the phytoplankton and the species *Achnanthes minutissima* was dominant. A few dinoflagellates were also present. *Achnanthes minutissima* is commonly the most dominant diatom in all sorts of trophic periphytic habits (Mary Hawes, personal communication). There was a large zooplankton population in the sample, dominated by copepods.

Based on the plankton results, Earn Lake appears to be quite productive. There were 23,176 algae cells /L and 1,982 copepods /L based on a total sampled volume of 166.7 litres.

The grab sample of Stokes Lake contained more algal material than the Earn Lake sample, but there were fewer copepods. Again diatoms dominated the population and *Achnanthes minutissima, Fragilaria vaucherial, Synedra ulna, Cymbells turgidae, Cocconeis placentula* and *Asterionella formosa* were identified, in descending order of abundance.

4.3.2 Tissue Analysis

Lab experiments have demonstrated that phytoplankton actively take up selenium. The passive adsorption of selenite to the cell walls represents an important component of initial uptake and the uptake of organo-Se appears to be more rapid (Bowie *et al*, 1996). The results for the metals in whole body plankton tissues from Earn Lake are included with the benthic invertebrate tissue data in Appendix G and in Table 4.6. The plankton tissues had the lowest concentration of most of the metals documented in the invertebrate tissues. The concentration of selenium in the plankton tissues was 0.0106 ug/g when converted to wet weight, more than a magnitude lower than the wet weight concentrations in the other invertebrate tissues.

4.4 Benthic Macro-invertebrates

4.4.1 Assemblage

Benthic macro-invertebrates are small animals without backbones that live on or in the bottom sediments of lakes and streams. Benthic invertebrates are important food sources for fish.

Taxonomic identification and enumeration results are presented in Appendix F. Five phyla were found in the study area, Arthropoda, Annelida, Mollusca, Nematoda and Cnidaria. A total of 73 different taxonomic groups were identified within these phyla.

The abundance data listed in Appendix F was calculated to density based on the surface area sampled at each site. Densities were very low in the communities at the deep water sites, E-1, E-2 and E-3. For the most part, the shallow lake sites had greater populations with numbers ranging from 1,034 to 13,319 individuals/m^2.

The community at Earn River at the lake outlet had a very high population with 216,164 individuals/m^2, the majority of which belonged to the phylum Cnidaria (hydra, a freshwater relative of jellyfishes and sea anemones). Although not conspicuous, hydras are typical representatives of the fauna of unpolluted streams and rivers, and the littoral zone of lakes (Pennak, 1989). The community at the lake inlet had a very low population with 302 organisms/m^2. There were 3,681 individuals/m^2 in Dromedary Creek.

The taxonomic richness, a measure of diversity, was determined for each community by enumerating the number of different taxa at each site. The lowest diversity coincided with the communities with the lowest numbers, E-2 and E-7. The most diverse community occurred at B4 where 27 different taxonomic groups were identified.

The composition of each community was calculated as a percentage of the major groups identified at the sites (Table 4.4). Any group(s) that forms 25% or more of the population is considered to be dominant. The communities differed considerably. Those residing in the deep waters were generally dominated by chironomids (belonging to the Order Diptera) or worms. The community at E-3 also had a large presence of clams. There was little to no representation of mayflies, stoneflies or caddisflies at these sites.

The communities located in the shallow waters (B-1 to B-4) were quite dissimilar. When the data is examined by location within the study area however, it appeared that the sites in the western half of Earn Lake were dominated by Diptera, and the sites in the eastern half were dominated by clams and/or worm like organisms (Oligochaeta and Nematoda). Ostracoda (seed shrimps) shared dominance with Nematoda at the very eastern end of the lake (B-3).

TABLE 4.4 THE PERCENTAGE OF COMPOSITION OF DIFFERENT TAXONOMIC GROUPS AT EACH SITE

TAXONOMIC GROUP	E-1	E-2	E-3	E-4	E-5	E-7	B-1	B-2	B-3	B-4
Ephemeroptera (mayflies)	0.0	0.0	0.0	0.02	58.5	0.0	0.0	0.0	0.0	0.0
Plecoptera (stoneflies)	0.0	0.0	0.0	0.00	9.6	0.0	0.0	0.0	0.4	0.0
Trichoptera (caddisflies)	0.0	0.0	0.0	0.04	1.2	0.0	3.4	0.0	0.0	1.6
Diptera (true flies)	78.8	80.0	7.7	3.9	26.9	28.6	70.1	25.0	23.5	64.4
Oligochaeta (aquatic earthworms)	3.0	0.0	15.4	2.2	0.9	0.0	0.7	45.8	3.5	6.5
Nematoda (roundworms)	9.1	20.0	30.8	0.7	0.3	0.0	0.7	0.0	28.1	13.6
Bivalva (clams)	6.10	0.00	39	4.10	0.30	57.10	1.4	29.2	8.5	8.4
Cnidaria (Hydra)	0.0	0.0	0.0	89.1	0.6	0.0	0.0	0.0	0.0	0.3
Ostracoda (seed shrimps)	0.0	0.0	0.0	0.0	0.0	0.0	19.7	0.0	35.4	3.2
Other	3.0	0.0	7.7	0.0	1.8	14.3	4.2	0.0	0.4	1.2

* Other includes one or more of the following taxonomic groups:

Homoptera	Collembola	Copepoda
Coleoptera	Hydracarina	Hirudinea
Thysanoptera	Amphipoda	

Over half of the community at E-7, Earn River near the inlet of the lake, was comprised of clams. This is markedly different from Earn River at the outlet of Earn Lake, E-4, where 90% of the community belonged to the phylum Cnidaria. The composition of the community located at E-5, Dromedary Creek was very different from the other sites. This is not surprising as it represents a lotic environment rather than a lentic one. The velocity was estimated to be between 1.5 to 2.0 meters per second at E-5. Benthos that prefer clean washed gravels, such as mayflies and stoneflies, were abundant here.

All relevant data have been summarized in Table 4.5.

TABLE 4.5 SUMMARY OF BENTHIC DATA AND SITE CONDITIONS, EARN LAKE, JUNE 2004

Site	Date 2004	Depth (m)	Temp (°C)	pH	D.O. (mg/L)	Density (#/m²)	Taxonomic Richness	Dominant Taxa
E1	June 7	23	4.9	7.7	11.4	1,422	11	Diptera
E2	June 9	45	4.0	7.7	11.5	216	3	Diptera
E3	June 8	30	4.0	7.5	13.0	560	5	Bivalva & Nematoda
E4	June 7	1.5	12.9	8.0	12.0	216,164	22	Cnidaria
E5	June 10	0.2	4.9	---	---	3,681	25	Ephemeroptera & Diptera
E7	June 8	1.5	12.9	7.9	13.2	302	3	Bivalva & Diptera
B1	June 7	9.0	5.9	7.7	11.7	6,336	20	Diptera
B2	June 8	1.5	12.1	7.9	15.4	1,034	6	Oligochaeta & Bivalva
B3	June 8	3.5	9.1	7.4	9.0	11,207	19	Ostracoda & Nematoda
B4	June 10	6.0	7.0	7.8	12.2	13,319	27	Diptera

4.4.2 Tissue Analysis

It appears that benthic invertebrates take up selenium through the food they ingest rather than from the water column (Bowie *et al*, 1996, Lemly, 1992) All invertebrate tissue results are presented in Appendix G. Environment Canada reported the results in dry wet. These were converted to wet weight to allow for consistency with the other tissue data from the study area and for comparisons with other benthic data. Due to the low amount of biomass that could be collected, samples had to be pooled. The deep water invertebrates and E-4 were combined into one sample, the shallow sites including E-7 into one sample, and the Dromedary Creek sample was kept as a single sample. Leeches were collected from the sampled fish and the fish nets each evening, and these were analyzed as a separate sample. The majority of the biomass in the Earn Lake samples was comprised of chironomids, most of which were bloodworms, (Sub Family Chironominae). These red-coloured chironomid larvae contain hemoglobin that is efficient in trapping oxygen allowing them to live in the bottom mud of deep lakes where oxygen levels are usually low. Although the profile data indicates that the water is well oxygenated at

depth, this is likely because the lake had recently completed the spring turnover injecting oxygen rich surface waters throughout the water column. Stoneflies formed the bulk of the biomass from Dromedary Creek. Most of the leeches were from the family Piscicolidae of the order Rhynchobdellidae

Concentrations of selected metals in invertebrate tissues are summarized in Table 4.6. The highest concentrations of most of the metals were found in the tissues of the invertebrates from the deep water sites. The leech tissues had the highest concentration of selenium and zinc. The plankton tissues had the lowest concentrations of the examined metals.

TABLE 4.6 METALS CONCENTRATIONS IN INVERTEBRATE TISSUES, JUNE 2004

Metal (ug/g wet weight)	Deep	Shallow	Dromedary Cr.	Leeches	Plankton
Arsenic (As)	0.7874	0.1848	0.1152	0.0912	0.0176
Cadmium (Cd)	0.279	0.1232	0.1512	0.18753	0.00928
Copper (Cu)	9.238	9.184	10.368	4.5372	0.185
Lead (Pb)	1.798	0.6888	0.65088	0.37221	0.0628
Nickel (Ni)	1.6306	0.6048	0.6516	0.21888	0.0922
Mercury (Hg)	0.016802	0.00448	0.010152	0.001881	0.00159
Selenium (Se)	0.4216	0.3024	0.4752	0.7581	0.0106
Zinc (Zn)	16.2	16.8	37.2	37.8	0.762
% moisture	93.8	94.4	92.8	94.3	99.8

Limited data on metals in benthic tissues exists from water bodies in the Yukon Territory. During an aquatic effects study on the Pelly River during the summer of 2004 (Nordin, 2004) benthic invertebrates were collected from the Earn River at the mouth and analyzed for metals. A similar study was conducted during the summer of 2002 (Gartner Lee Ltd, 2003) on possible effects from the Anvil Range Mine near Faro, and benthos was collected from Anvil and Vangorda Creeks. Determining metal concentration in benthos tissues from Finlayson Creek is a component of Teck Cominco's Kudz Ze Kayah water licence and this study has been completed in 2002 (Laberge Environmental Services and Can-Nic-A-Nick Environmental, 2003.) and in 2004 (Laberge Environmental Services and Can-Nic-A-Nick Environmental, 2005). Teck Cominco's lab

(Phillip Analytical) used a relatively high detection limit making it difficult to adequately compare the data from the various studies (Table 4.7). The limited data-set suggest that the concentrations documented during the Earn Lake study are relatively similar to the other Yukon sites. Selenium concentrations in the leech tissues from Earn Lake were the highest.

Table 4.7 Selenium Concentrations in Benthos Tissues from Various Sites in the Yukon Territory

Site	Date	Selenium ug/g wet weight
Earn Lake, deep sites	June 2004	0.42
Earn Lake, shallow site	June 2004	0.30
Dromedary Creek	June 2004	0.48
Earn Lake, leeches	June 2004	0.76
Earn River at mouth	August 2004	0.14
Anvil Creek upstream of Rose Creek	July 2002	0.3
Vangorda Creek at mouth	July 2002	0.4
Finlayson Creek upstream Geona Creek	August 2002	0.5
Finlayson Creek upstream Geona Creek	August 2004	<0.5
Finlayson Creek downstream Geona Creek	August 2002	<0.5
Finlayson Creek downstream Geona Creek	August 2004	<0.5
Finlayson Creek at Robert Campbell Hwy	August 2002	<0.5
Finlayson Creek at Robert Campbell Hwy	August 2004	<0.5

4.5 Fish

A total of 15 fish were captured, 13 northern pike (*Esox lucius*), one lake whitefish *(Coregonus clupeaformis*) and one arctic grayling (*Thymallus arcticus*). Most of the fish were females, many had empty stomachs, and all the pike were parasitized to some degree. The sample data is presented in Appendix H.

Muscle, liver and gonad tissues were removed from each fish and analyzed for mercury, selenium and arsenic. This data is also included in Appendix H. Pat Roach has made a notation by the data in Appendix H adjacent to the lake whitefish metal data. It appears that the gonad and liver tissue results have been reversed. For purposes of this report, it has been assumed that this has happened and the data has been tabulated accordingly. A summary of selenium data is presented in Table 4.8. The highest concentrations were found in the livers.

TABLE 4.8 SELENIUM CONCENTRATIONS IN FISH TISSUES, EARN LAKE 2004				
Species	**N**	**Selenium ug/g wet weight**		
		Muscle	**Liver**	**Gonad**
Northern Pike - average	13	1.0 (0.1)	2.0 (0.3)	1.1 (0.2)
Lake Whitefish	1	1.7	3.6	0.7
Arctic Grayling	1	0.9	3.5	3.1
Numbers in brackets indicate standard deviation				

Both lake whitefish and arctic grayling feed on invertebrates. Pike are predators, considered to be the top of the food chain, with fish usually forming the majority of their diet. Whitefish were found in the stomach of two of the pike sampled (Sample #8909 and #8911) The selenium concentrations were generally lower in the tissues of the pike than in the other two fish. Patterns have been observed in some food chains in which whole body selenium increased up to and including herbivorous fish or zooplankton, but declined between herbivores and carnivorous consumers (Outridge *et al*, 1999). The sample size of the various fish species from Earn Lake is too small to draw any meaningful conclusions regarding food-chain accumulations of selenium.

In 2002, Renewable Resources, Fisheries Branch, YTG, conducted net sampling in Earn Lake on June 24th and 25th. Twenty-seven sets yielded 50 lake whitefish. Muscle tissues from five adults and 7 immature fish were analyzed for selenium. The selenium concentrations in the adult tissues ranged from 1.5 ug/g to 3.1 ug/g wet weight (Gamberg and Selkirk First Nation, 2003). The single adult lake whitefish captured in June 2004 fell within this range with a concentration of 1.7 ug/g wet weight.

These concentrations are approximately a magnitude greater than the selenium concentrations documented in lake whitefish muscle tissues collected from Tadru Lake in June 2002, located approximately 60 km south west of Earn Lake. Concentrations ranged from 0.198 to 0.251 ug/g wet weight in the seven adult fish analyzed (Gamberg and Selkirk First Nation, 2003).

Renewable Resources also set nets in Stokes Lake in June 2002, capturing 14 lake whitefish and two pike. No fish samples were collected for metals analyses.

The US Fish and Wildlife Service collected fish from 112 stations at key points in major rivers throughout the United States and in the Great Lakes in 1984 and 1985, under the National Contaminant Biomonitoring Program (Schmitt and Brumbaugh, 1990). Two bottom-feeding species and one predatory species were collected from each site. Whole body samples were analyzed for a variety of metals, including selenium. The geometric mean for selenium for all of these samples was 0.42 ug/g wet weight and the maximum concentration was 2.30 ug/g wet weight . The highest concentrations of selenium were found in fish collected from the arid and semi-arid areas of the western United States. The majority of the fish sampled are species exotic to the Yukon. There were however, a few fish analyzed that were found in the Earn Lake study area. The individual selenium data have been summarized in Table 4.9.

TABLE 4.9 SELENIUM CONCENTRATIONS IN US FISH

Species	Location	[Se] ug/g wet weight
Arctic grayling	Chena River, Fairbanks, AK	0.58
Northern Pike	Mississippi River, MN	0.17
Northern Pike	Souris River, ND	0.18
Lake Whitefish	Lake Superior, MI	0.56
Lake Whitefish	Lake Superior, MI	0.60

The limited data presented above suggests that the concentrations found in the fish from Earn Lake are up to a magnitude greater than those found in the same species collected in the US. Direct comparisons cannot be made however, as the US study used samples ground from whole fish whereas the Earn Lake study analyzed individual tissue types. Whole body analysis would tend to dilute the sample as not all tissue types would concentrate selenium to the same degree.

4.6 Vegetation Analysis

Several species of terrestrial plants were collected and tested for uptake of metals, as plant matter can form the diet of several mammalian species. The *Astragalus* genus (milk vetch) can serve as bioindicators of the underlying seleniferous geology (Outridge *et al*, 1999) and was targeted as the species of collection. Grazers eating such plants can experience a variety of disorders including death (Chapman, 2000). Milk vetch was not overly abundant in the study area however, and several specimens of a similar plant, *Oxytropis sp.* were also collected.

Although sedges are not particularly a preferred diet choice for small mammals, it was collected from Earn River at the inlet due to the lack of other suitable vegetation. Analysis of moose tissue has shown high selenium levels in the Earn Lake area (Gamberg and Selkirk First Nation, 2003), consequently some browsed felt-leaf willow leaves, *Salix alaxensis,* were also sampled. The analytical results are provided in Appendix I. The analysis of selected metals reported in dry weight are summarized in Table 4.10.

The highest concentrations of most of the metals occurred in the sedge tissues. Selenium concentrations ranged from below detection to 1.0 ug/g. The highest levels of selenium were documented in the milk vetch tissues.

TABLE 4.10 CONCENTRATIONS OF VARIOUS METALS FOUND IN VEGETATION TISSUES, EARN LAKE, JUNE 2004

Sample # :	V-1	V-6	V-3A	V-3B	V-3C	V-4	V-5	V-2	V-7
Common Name:	Sedge	Felt-leaf willow	Locoweed	Locoweed	Locoweed	Milk vetch	Milk vetch	Milk vetch	Milk vetch
Scientific Name:	*Carex aquatilis*	*Salix alaxensis*	*Oxytropis campestris*	*O. splendens*	*O. viscida*	*Astragalus eucosmus*	*A. adsurgens*	*A. americanus*	*A. alpinus*
Location:	Earn R, E-7	Earn R, E-4	Camp	Camp	Camp	Camp	Camp	North shore, near E-3	E-5
Date sampled:	June 8	June 11	June 8	June 8	June 8	June 10	June 10	June 8	June 10
Metals (ug/g dry wt)									
Arsenic	<0.3	<0.03	<0.3	<0.3	<0.3	0.1	0.05	<0.3	0.1
Selenium	<0.2	0.1	<0.2	<0.2	0.2	0.6	1.0	<0.2	0.3
Mercury	<0.01	0.003	0.012	<0.01	<0.01	0.007	0.002	<0.01	0.003
Aluminum	996	81.2	219	111	58.4	8.4	<0.6	139	15.1
Cadmium	0.37	0.3	<0.05	<0.05	0.090	0.01	0.006	0.071	0.02
Chromium	9.76	0.4	2.73	0.60	0.80	0.5	0.2	0.71	0.8
Copper	10.0	1.6	5.06	6.21	5.63	3.3	0.7	8.62	1.1
Lead	3.0	0.016	1.0	2.0	3.0	0.04	0.03	2.0	0.1
Nickel	6.27	0.3	5.36	6.31	3.12	2.4	1.2	4.46	3.3
Zinc	42.4	38.8	26.1	27.6	8.65	4.3	8.2	29.3	6.6

There are 44 detectable selenium results out of 232 analysis in the Northern Contaminants Database for vegetation tissues. Excluding the data for lichen and mushrooms, selenium ranged from 0.03 ug/g to 0.3 ug/g wet weight in the tissues of trees, shrubs and forbs. No vetch or locoweeds are included in this database. The levels recorded in the *Astragalus* of the Earn Lake study area are greater than these documented in other vegetation tissue in the Yukon.

Selenium concentrations ranged from 3 to 1125 ug/g in two species of the selenium accumulating plant genus *Astragalus,* collected in natural seleniferous regions of the prairie provinces (Outridge *et al*, 1999). The levels documented in milk vetch from the Earn Lake study area were under 3 ug/g.

Aquatic plants reduce and incorporate inorganic species of selenium into organic species, increasing the bioavailability of selenium to herbivorous aquatic invertebrates and fish (Sobolewski, 1999). Earn Lake was pretty much devoid of aquatic plants and none were collected for analysis.

4.7 Small Mammals

The project was expanded to include small mammals and rodents were the target group. They generally feed on vegetative matter, some of which readily take up selenium from the soil. Three deer mice (*Peromyscus maniculatus*) were captured in the study area, all near the base camp, representing a very small sample size. The mice were processed and analyzed, with selected parameters presented in Table 4.11. Each liver was analyzed individually whereas the kidneys were combined and analyzed as one sample. The complete analytical lab report is presented in Appendix J.

Trace metals are natural components of the environment. Although some metals are essential for life, all metals are toxic at sufficiently high concentrations. Concentrations of the metals examined were higher in the kidney tissue than in the liver tissue. Mary Gamberg of Gamberg Consulting analyzed the results and indicated that the concentrations of lead, arsenic, cadmium, copper and nickel appear to be normal background levels. The data appears to be in line with what has been documented in other wildlife tissues, and should not be cause for concern. The selenium concentrations are within the adequate range for domestic rabbits - the closest model to be found for mice, indicating that it is unlikely that selenium is a problem. However, three samples are not a very robust model for an ecosystem. Depending on the microhabitat, the selenium content of the soil, and the presence or absence of selenium accumulating plants, there could be a wide variety of selenium body burdens encountered within a relatively small area. Referring back to Section 4.6, there is little evidence of significant accumulations of selenium in the tissues of the vegetation tested in the camp area.

There is a possibility that hepatic copper may be low in the mouse tissues. There has also been a question as to whether moose in the Yukon suffer from marginal copper deficiency. Since little work has been done on elemental requirements in wildlife, extrapolations are sometimes made from cattle and other domestic animals, recognizing that requirements may not be the same. There have not been signs of copper deficiency in Yukon moose. If copper levels are low, they are not low enough to cause observable symptoms.

TABLE 4.11 METAL CONTENT IN MOUSE TISSUE, EARN LAKE, JUNE 2004

Metal (ug/g wet wt)	Kidney (n=3)	Liver (n=1)	Liver (n=1)	Liver (n=1)
Arsenic	0.07	0.05	0.07	0.04
Cadmium	1.29	0.0475	0.0669	0.0459
Copper	6.75	4.31	5.54	5.75
Lead	0.176	0.042	0.11	0.076
Nickel	0.29	0.19	0.22	0.16
Selenium	1.96	1.34	1.73	1.32

4.8 Wildlife Observations

General observations of wildlife were made during the course of the study. There was a great deal of moose sign and three individuals were seen. One moose was observed swimming across Earn Lake, down lake from the island in front of the base camp at 8am on June 8th. On June 9th two moose were sighted at Two Moose Creek, hence its name.

Several swans were observed daily. Two pairs were observed on several occasions at the far east end of the lake and a group of eight were observed in Swan Bay on June 11th. Other waterfowl were observed but not identified.

No bear sign was evident.

5.0 DISCUSSION

As discussed in the Introduction, low concentrations of selenium are essential to animal nutrition. There is however, a narrow range, about an order of magnitude, between the detrimental extremes of deficiency and toxicity of dietary selenium. The form of selenium plays a large role in its toxicity with organo-Se being the most toxic form (Canton *et al*, 1997), and selenite being more toxic than selenate (Sobolewski, 1999). Lab studies showed that selenite was about 4 to 9 times more toxic than selenate to juvenile salmonids (Buhl and Hamilton, 1991). Selenite is the predominant form in anoxic environments, such as groundwater, where as selenate tends to predominate in aerated environments, such as surface waters (Sobolewski, 1999).

With the exception of the measurement of organic selenium in sediments, only total selenium was analyzed in the various matrices. Commercial laboratories do not regularly analyze organic selenium, selenite or selenate in water, sediment or tissues. Even among commercial laboratories there is a relatively high level of analytical variability in the analysis of total selenium (Chapman, 2000). Environment Canada opened their laboratory in North Vancouver to a Ph.D. student from UBC conducting sediment extraction testing and thus had access to organic content analyses in the submitted sediment samples. These types of analyses tend to be limited to university laboratories where specialized research projects by master and Ph.D. students are undertaken. The interpretation of the data in this study is hampered, as the form of selenium documented in the water column and in the tissues is unknown.

Overall, biological interactions with selenium are dominated by the lower trophic levels, primarily phytoplankton and bacterioplankton. Lab experiments demonstrated that phytoplankton actively took up inorganic selenium compounds (selenate, selenite), where passive adsorption of selenite to the cell walls represented an important component of initial uptake. The uptake of organo-Se was more rapid (Bowie *et al*, 1996). Several studies have shown that plankton can accumulate selenium many times higher than waterborne concentrations, and appear to be largely unaffected with residues of 30 ug/g dry weight or more in their tissues (Lemly, 1992). The implications of the metal accumulating properties of plankton can have favourable applications. Field and pilot scale tests have demonstrated that phytoplankton are effective at reducing metal concentrations in mine environments such as contaminated pit lakes (Lorax Environmental, 2004).

Zooplankton experiments showed that selenium was actively incorporated from food, and it appeared that foodborne uptake is more important than waterborne uptake. It is the primary producers and primary consumer levels (zooplankton and benthos) of the food chain that most of the bioaccumulation occurs (Lemly, 1992). Selenium toxicity to lower trophic levels has occurred at very high concentrations (Bowie *et al*, 1996).

The uptake of selenium in benthic invertebrates is through their diet and through their interaction with the bottom sediments. The sediments are extremely important in both the biogeochemical cycling of selenium and perhaps in the accumulation of selenium in fish through the benthic food web. The sediments are the major repository of the selenium loadings and a source of exposure to benthic organisms. Accumulation of selenium in the sediments depends on deposition rates of clays, detritus, and algae. Inorganic particles include precipitated elemental selenium, and selenite and selenate adsorbed to settled clays. The organic particles are derived from settling plankton and organic detritus and consist largely of organic selenides, but also include selenite and selenate taken up by aquatic organisms (and incorporated in fecal pellets), and selenite and selenate adsorbed to phytoplankton and microbial cell surfaces (Bowie *et al*, 1996).

Fish accumulate selenium primarily as organo-Se from aquatic plants, invertebrates and forage fish, rather than by direct assimilation of inorganic selenium from water (Outridge *et al*, 1999). Plants play a key role in increasing the bioavailability of selenium in aquatic ecosystems by reducing and incorporating inorganic species of selenium into organic species of selenium. Selenium retained in plants and animals will either be taken up by predators or cycle through detritus upon death of the organism (Sobolewski, 1999).

By far, fish and birds (shorebirds and waterfowl) are the organisms most susceptible to selenium toxicity (Sobolewski, 1999). Reduced growth and reproduction appear to be the most sensitive indicators of dietary selenium toxicity in fish and birds (Bowie *et al*, 1996). Effects of selenium on fish also include abnormalities such as blindness, and reduced hatching success (Chapman, 2000). Deformities in fish have also been documented (Sobolewski, 1999).

There is a direct relationship within a given ecosystem between waterborne selenium and tissue selenium, but the relationship can differ considerably from site to site (Sobolewski, 1999). Therefore it is currently impossible to develop generic guidelines to predict tissue selenium from waterborne selenium and to predict with certainty if toxic conditions will develop. The most important aspect of selenium residues in aquatic food chains is not direct toxicity to the

organisms themselves, but rather the dietary source of selenium they provide to fish and wildlife species that feed on them. The environmental selenium cycle includes strong bioaccumulation steps in the aquatic food chain that greatly increases the dietary levels of selenium available to fish and birds that consume aquatic organisms. Thus a small increase in waterborne selenium will result in a disproportionately large elevation of selenium residues present in fish and wildlife tissues (Lemly, 1992).

Because of the dietary exposure pathway, assessment of selenium risks to the environment is best accomplished by evaluating concentrations in tissues rather than in the water. Lemly (1992) has suggested that since food-chain organisms such as zooplantkon, benthic invertebrates and certain forage fishes can accumulate up to 30ug/g dry weight selenium with no apparent effect on their survival or reproduction, the dietary toxicity threshold for fish and wildlife should be only 3 ug/g. These food organisms could supply a toxic dose of selenium while being unaffected themselves. Because of this, food-chain organisms containing 3 ug/g dry weight or more should be viewed as potentially lethal to fish and aquatic birds that consume them. Lemly (1992) has developed toxic effects threshold limits for selenium in water, food-chain organisms and in fish tissues.

The United States Fish and Wildlife Service (USFWS) reviewed many studies researching selenium effects to fish and aquatic birds, and developed thresholds for various tissues. Brix *et al* (2000) evaluated these thresholds and the scientific literature upon which they were based. They found the USFWS thresholds were too conservative and were not well supported by the literature. They established alternative thresholds that they believe are more scientifically defensible and provide a more accurate assessment of potential selenium impacts to the environment. All of these suggested thresholds have been tabulated and compared with the data generated from this study in Table 5.1. As fish tissues from Earn Lake were reported in wet weight, they have been converted to dry weight based on the assumption of 75% moisture content, as used by Lemly (1992). Concentrations were reported in dry weight in the lab reports for plankton and benthic invertebrates (Appendix G).

TABLE 5.1 CONCENTRATIONS OF SELENIUM IN VARIOUS SUBSTANCES							
	Water (ug/L)	Food Chain Organisms (ug/g) dry wt		Fish Whole Body (ug/g) dry wt	Fish Muscle (ug/g) dry wt	Fish Liver (ug/g) dry wt	Fish Ovary (ug/g) dry wt
Suggested thresholds by Lemly, 1992	2.0	3.0		4.0	8.0	12.0	10.0
Suggested thresholds by USWFA		3.0		4.0			10.0
Suggested thresholds by Brix *et al*, 2000		11 (cold water) 10 (warm water)		6 (cold water) 9 (warm water)			17
Mean Levels found in Earn Lake matrices	1.6	5.3 plankton	8.0 benthos		6.8 (LWF) 3.6 (AG) 4.0 (NP)	14.4 (LWF) 14.0 (AG) 8.0 (NP)	2.8 (LWF) 12.4 (AG) 5.8 (NP)
Legend: LWF = lake whitefish AG = Arctic grayling NP = northern pike							

Concentrations of selenium in the food-chain organisms from Earn Lake were higher than the suggested thresholds developed by Lemly and USFWS, yet the mean concentration in the waters of Earn Lake was slightly less than the desired level. The dietary selenium concentrations in Earn Lake did meet the Brix threshold. USFWS and Brix developed thresholds for whole body fish tissue and fish ovaries. Whole body analysis was not done on the Earn Lake samples. Only Lemly developed threshold levels for fish muscle and liver tissues. Concentrations in Earn Lake fish muscle tissues were below the suggested threshold for all species. The concentrations in the liver tissues of Arctic grayling and lake whitefish were slightly greater than the threshold level but below for the pike tissues. Both the grayling and the whitefish had invertebrates in their stomach and appeared healthy. The levels of selenium in fish ovaries varied significantly among the Earn Lake species. The concentration in the Arctic grayling exceeded the USFWS and Lemly thresholds but met the Brix threshold. Concentrations were low in the whitefish and pike tissues.

The levels in all tissues of the predator species, northern pike, were well below the suggested toxic levels. Most of the pike had empty stomachs and two contained whitefish. One pike had a deformity, it was missing its left pelvic fin (Appendix H). It would be premature to suggest that this could be a result of selenium toxicity as the concentrations in the tissues of this individual fell in the mid range of those documented in the tissues of the other undeformed pike. Further sampling would be required to determine if this is incidental or a more common occurrence in the pike population. The rate of deformity in pike of other lakes is also unknown.

Several studies have indicated that waterborne selenium alone can be an unreliable predictor of chronic toxicity. Adams *et al* (2000) believes that the use of a single guideline value for selenium in surface waters is inappropriate. Due to the nature of selenium bioaccumulation properties, there should be different guidelines for surface waters that are lotic (moving – streams, rivers) than for lentic (standing – ponds, lakes). Environments that are standing or slow-moving with low flushing rates are particularly conducive to selenium accumulation in sediments. Large deposits of organic-rich sediment serve as a site for selenium storage and remobilization through the benthic-detritial food web and rooted plants (Canton and Van Derveer, 1997). There are correspondingly significant differences in the bioaccumulation of selenium by fish and invertebrates from lotic and lentic water bodies, and selenate is much less bioaccumulative than selenite. Bioaccumulation in fish is a factor of 10 or higher in lentic systems as compared to lotic systems (Adams, *et al*, 2000).

Canton and Van Derveer (2000) are of the opinion that particulate selenium measured as either sediment, detritial or suspended particulate selenium, is a better predictor of adverse biological effects. There is more strength in cause and effect using sediments (high sediment concentrations are correlated with biological effects while high waterborne concentrations may not be). With regard to consistency, reproductive failures of birds and/or fish related to selenium toxicity have been documented at sites with comparable sediment concentrations, whereas waterborne concentrations varied. There also appears to be a strong correlation with the organic nature of the sediments. Those that were organic rich allowed processes to occur that increased the potential for movement of selenium into the benthic-detrital food web, and in turn amplify subsequent exposure to higher trophic levels.

There is a strong argument for using site specific parameters rather than a single generic guideline for waterborne selenium. However, before site specific guidelines can be developed, the site in question needs to be fully assessed. There must be a reasonable understanding of selenium chemistry in that system and of the factors controlling the conversion of inorganic forms to the more toxic organic forms. The food chain relationships must also be understood. The key study components to explore are: determine the present health of the waterfowl, fish and benthos communities; determine the selenium mobilization mechanism; map the exposed watershed to determine high risk area; monitor water, sediment and biota based on food-chain relationships; and investigate predictive studies in the laboratory and/or in the high risk areas.

This current study represents a beginning in the understanding of the fate and behavior of selenium in the Earn Lake environment. Further research is required prior to the development of

selenium guidelines for the Yukon Territory. It is apparent that conditions and species in northern Canada are significantly different from those that the guidelines currently in use were established under, hence it is important to continue efforts in implementing a local guideline.

Ultimately, when future guidelines are proposed for development, the following factors should be considered:

- Whether the water in question is lotic or lentic
- The dominant species of selenium present in the system
- The productivity of the water body (based on the abundance of phytoplankton that readily bioconcentrate selenium)
- The degree of organic rich sediments present in the system

6.0 RECOMMENDATIONS

Continued research should be carried out in the Earn Lake study area to gain a better understanding of the fate and behavior of selenium in the typical environment of northern Canada. Specifically these should include but not be limited to the following:

- Attempt to determine the mass balance of selenium in the Earn Lake system. This would entail collecting accurate flow measurements on the major incoming streams for loading calculations, and on Earn River at the outlet.

- Search out an appropriate laboratory and have water samples analyzed for organo-Se, selenate and selenite to determine the dominant selenium species in the water column. All of the above incoming streams will be sampled as well.

- Significantly increase the sample size for all species of fish. Collect tissue samples as in the current study, and analyze a sub set for the various species of selenium. Attempt to assess the various populations.

- Duplicate the benthic invertebrate sampling program to develop more confidence in the data

- Duplicate the sampling program on Stokes Lake to determine if the behaviour of selenium is similar.

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APPENDIX A

PHOTOGRAPHS, EARN LAKE JUNE 2004

Photo #1: Pulling nets, west end of Earn Lake.

Photo #2: Removing liver sample from a pike.

Photo #3: East end of Earn Lake showing site locations for B-3 and E-7.

Photo #4: Earn River, inlet to Earn Lake looking upstream, E-7.

Photo #5: Earn River, outlet of Earn Lake looking downstream, E-4.

Photo #6: Dromedary Creek looking upstream, E-5.

Photo #7: Aerial view of camp, zodiac departing for fish sampling.

Photo #8: Conducting plankton hauls in Earn Lake.

Photo # 9: Conducting profiles in Earn Lake at E-3.

Photo #10: Sampling fish in the ‘lab tent’ at camp, Earn Lake.

APPENDIX B

PROFILE DATA, EARN LAKE JUNE 2004

APPENDIX B

PROFILE DATA FOR EARN LAKE, JUNE 2004

Profile Data at E-1

Date	Time	Temp	SpCond	Cond	TDS	Salinity	DO %	DO Conc	PressureA	Depth	pH	pHmV
M/D/Y	hh:mm:ss	C	mS/cm	uS/cm	g/L	ppt	%	mg/L	psia	m		mV
6/07/04	14:21:18	11.46	0.456	338	0.297	0.22	109.1	11.88	14.07	0.025	7.96	-70.3
6/07/04	14:19:18	11.16	0.455	335	0.296	0.22	106.6	11.69	16.47	1.72	7.91	-67.2
6/07/04	14:04:35	10.83	0.455	332	0.296	0.22	111.9	12.38	17.61	2.519	7.84	-63.2
6/07/04	14:17:18	7.41	0.466	309	0.303	0.23	95.6	11.47	24.91	7.661	7.8	-60.2
6/07/04	14:15:18	5.85	0.47	298	0.306	0.23	91.7	11.44	31.55	12.334	7.76	-57.4
6/07/04	14:13:18	5.17	0.472	293	0.307	0.23	88.4	11.22	37.71	16.672	7.71	-54.7
6/07/04	14:06:38	4.97	0.472	291	0.307	0.23	93.5	11.93	44.09	21.164	7.69	-53.5
6/07/04	14:10:59	4.8	0.47	289	0.306	0.23	86.2	11.05	46.6	22.934	7.7	-53.8
6/07/04	14:08:39	4.86	0.473	291	0.308	0.23	89.1	11.4	46.86	23.118	7.73	-55.8

Profile Data at E-2

Date	Time	Temp	SpCond	Cond	TDS	Salinity	DO %	DO Conc	PressureA	Depth	pH	pHmV
M/D/Y	hh:mm:ss	C	mS/cm	uS/cm	g/L	ppt	%	mg/L	psia	m		mV
6/09/04	14:14:44	4.19	0.476	287	0.31	0.23	91	11.86	51.17	26.151	7.71	-54.5
6/09/04	14:17:31	13.18	0.388	300	0.252	0.19	115.3	12.09	14.86	0.582	7.9	-66.9
6/09/04	14:17:41	13.48	0.386	301	0.251	0.19	114.6	11.94	14.1	0.048	7.9	-67.1
6/09/04	14:17:51	13.5	0.386	301	0.251	0.19	113.9	11.85	14.08	0.036	7.9	-67.2
6/09/04	14:18:01	13.55	0.386	302	0.251	0.19	113.7	11.82	14.07	0.029	7.9	-67.2
6/09/04	14:18:11	13.54	0.387	302	0.252	0.19	113.6	11.81	14.25	0.151	7.9	-67.2
6/09/04	14:18:21	13.02	0.393	303	0.256	0.19	112.4	11.82	15.53	1.054	7.91	-67.3
6/09/04	14:18:31	12.96	0.395	304	0.257	0.19	112.5	11.85	15.64	1.136	7.91	-67.4
6/09/04	14:18:41	12.93	0.396	305	0.258	0.19	112.5	11.86	15.93	1.335	7.91	-67.4
6/09/04	14:18:51	12.73	0.399	305	0.259	0.19	111	11.75	18.15	2.9	7.91	-67.3
6/09/04	14:19:01	12.68	0.4	306	0.26	0.19	111.5	11.82	18.52	3.161	7.91	-67.3
6/09/04	14:19:11	9.9	0.429	305	0.279	0.21	114.9	12.99	19.34	3.738	7.91	-66.7
6/09/04	14:19:21	7.68	0.454	304	0.295	0.22	109.9	13.1	21.36	5.161	7.89	-65.3
6/09/04	14:19:31	7.46	0.458	304	0.297	0.22	107.1	12.83	21.63	5.35	7.87	-64.3
6/09/04	14:19:41	7.12	0.462	304	0.3	0.22	106.1	12.83	23.02	6.332	7.85	-63.2
6/09/04	14:19:51	6.83	0.465	304	0.302	0.22	103.2	12.57	23.84	6.909	7.85	-62.7
6/09/04	14:20:01	6.8	0.465	303	0.302	0.22	102.5	12.49	24.21	7.17	7.84	-62.2
6/09/04	14:20:11	6.3	0.47	302	0.306	0.23	100.4	12.38	26.9	9.064	7.82	-61.4
6/09/04	14:20:21	6.22	0.471	302	0.306	0.23	100.2	12.38	27.23	9.295	7.82	-61
6/09/04	14:20:31	5.93	0.474	301	0.308	0.23	98.8	12.3	28.84	10.428	7.81	-60.4
6/09/04	14:20:41	5.78	0.475	300	0.308	0.23	98.4	12.3	29.3	10.753	7.8	-59.9
6/09/04	14:20:51	5.66	0.475	300	0.309	0.23	97.3	12.2	31.3	12.159	7.79	-59.4
6/09/04	14:21:01	5.44	0.477	299	0.31	0.23	96.8	12.2	33.19	13.488	7.78	-59
6/09/04	14:21:11	5.43	0.477	298	0.31	0.23	96.4	12.16	33.34	13.596	7.78	-58.9
6/09/04	14:21:21	5.25	0.478	298	0.311	0.23	95.8	12.13	35.95	15.434	7.77	-58.3
6/09/04	14:21:31	5.03	0.481	297	0.312	0.23	95.3	12.14	36.56	15.862	7.77	-58.1
6/09/04	14:21:41	4.82	0.483	297	0.314	0.23	95	12.17	38.34	17.116	7.76	-57.6
6/09/04	14:21:51	4.66	0.484	296	0.315	0.23	93.9	12.08	40.63	18.729	7.76	-57.4
6/09/04	14:22:01	4.66	0.483	296	0.314	0.23	93.5	12.03	40.82	18.868	7.76	-57.2
6/09/04	14:22:11	4.63	0.483	295	0.314	0.23	93.1	11.99	41.93	19.643	7.75	-57.1
6/09/04	14:22:21	4.41	0.486	295	0.316	0.23	92.3	11.95	44.53	21.475	7.75	-56.6
6/09/04	14:22:31	4.36	0.485	294	0.315	0.23	91.9	11.92	44.74	21.625	7.75	-56.6
6/09/04	14:22:41	4.33	0.485	293	0.315	0.23	91.5	11.88	45.82	22.386	7.74	-56.2
6/09/04	14:22:51	4.29	0.485	293	0.315	0.23	91	11.83	46.89	23.136	7.74	-56.1
6/09/04	14:23:01	4.29	0.484	293	0.315	0.23	90.8	11.79	46.98	23.205	7.73	-55.9
6/09/04	14:23:11	4.27	0.483	292	0.314	0.23	90.3	11.73	48.67	24.393	7.73	-55.8
6/09/04	14:23:21	4.23	0.483	291	0.314	0.23	90.1	11.72	50.63	25.77	7.73	-55.6
6/09/04	14:23:31	4.22	0.483	291	0.314	0.23	89.9	11.7	50.98	26.017	7.73	-55.6
6/09/04	14:23:41	4.21	0.482	291	0.313	0.23	89.9	11.7	51.05	26.068	7.73	-55.5
6/09/04	14:23:51	4.2	0.481	290	0.313	0.23	89.4	11.65	53.21	27.587	7.73	-55.4
6/09/04	14:24:01	4.19	0.481	290	0.313	0.23	89.5	11.65	53.92	28.091	7.72	-55.3
6/09/04	14:24:11	4.16	0.481	289	0.312	0.23	89.2	11.63	56.06	29.593	7.72	-55.3
6/09/04	14:24:21	4.13	0.48	289	0.312	0.23	89.3	11.65	56.72	30.059	7.72	-55.2
6/09/04	14:24:31	4.13	0.48	289	0.312	0.23	89.1	11.62	57.15	30.366	7.72	-55.2
6/09/04	14:24:41	4.12	0.479	288	0.312	0.23	89	11.61	58.88	31.584	7.72	-55
6/09/04	14:24:51	4.11	0.479	288	0.311	0.23	88.8	11.59	59.4	31.947	7.72	-55.1
6/09/04	14:25:01	4.11	0.478	287	0.311	0.23	88.7	11.58	61.82	33.653	7.72	-54.9
6/09/04	14:25:11	4.1	0.478	287	0.311	0.23	88.6	11.57	62.76	34.314	7.72	-55
6/09/04	14:25:21	4.1	0.477	287	0.31	0.23	88.5	11.55	64.85	35.789	7.72	-54.8
6/09/04	14:25:31	4.1	0.477	286	0.31	0.23	88.5	11.55	65.93	36.545	7.72	-54.8
6/09/04	14:25:41	4.1	0.476	286	0.309	0.23	88.5	11.55	66.06	36.637	7.71	-54.8
6/09/04	14:25:51	4.09	0.476	286	0.309	0.23	88.3	11.53	67.87	37.911	7.71	-54.8
6/09/04	14:26:01	4.08	0.475	285	0.309	0.23	88.3	11.54	69.38	38.976	7.71	-54.7
6/09/04	14:26:11	4.08	0.475	285	0.309	0.23	88.3	11.53	69.58	39.115	7.71	-54.8
6/09/04	14:26:21	4.06	0.474	285	0.308	0.23	88.1	11.51	72.1	40.894	7.71	-54.6
6/09/04	14:26:31	4.06	0.474	284	0.308	0.23	88.2	11.52	72.55	41.206	7.71	-54.6
6/09/04	14:26:41	4.05	0.474	284	0.308	0.23	88.1	11.51	74.62	42.666	7.71	-54.5
6/09/04	14:26:51	4.04	0.473	284	0.308	0.23	88	11.5	75.45	43.248	7.71	-54.5

APPENDIX B

PROFILE DATA FOR EARN LAKE, JUNE 2004

M/D/Y	hh:mm:ss	C	mS/cm	uS/cm	g/L	ppt	%	mg/L	psia	m		mV
6/09/04	14:27:01	4.05	0.473	283	0.307	0.23	87.9	11.49	76.9	44.272	7.71	-54.4
6/09/04	14:27:11	4.05	0.473	283	0.307	0.23	87.8	11.48	77.36	44.594	7.71	-54.5
6/09/04	14:27:21	4.04	0.478	287	0.311	0.23	87.8	11.48	77.4	44.623	7.71	-54.4
6/09/04	14:27:31	4.04	0.479	287	0.311	0.23	87.7	11.47	77.41	44.63	7.71	-54.5
6/09/04	14:27:41	4.04	0.478	286	0.31	0.23	87.7	11.46	77.41	44.633	7.71	-54.5

Profile Data at E-3

Date	Time	Temp	SpCond	Cond	TDS	Salinity	DO %	DO Conc	PressureA	Depth	pH	pHmV
M/D/Y	hh:mm:ss	C	mS/cm	uS/cm	g/L	ppt	%	mg/L	psia	m		mV
6/08/04	13:02:19	12.84	0.423	325	0.275	0.2	192.1	20.29	14.42	0.274	7.85	-64.2
6/08/04	13:02:29	12.78	0.423	324	0.275	0.2	170.7	18.06	14.43	0.282	7.85	-64.1
6/08/04	13:02:39	12.85	0.423	325	0.275	0.2	168.2	17.76	14.44	0.289	7.85	-63.9
6/08/04	13:02:49	12.77	0.423	324	0.275	0.2	166.2	17.58	14.48	0.318	7.85	-64.1
6/08/04	13:02:59	12.78	0.423	325	0.275	0.2	163.4	17.28	14.41	0.265	7.85	-63.9
6/08/04	13:03:09	12.89	0.423	325	0.275	0.2	161.6	17.05	14.31	0.198	7.85	-64
6/08/04	13:03:19	12.91	0.423	326	0.275	0.2	160.4	16.92	14.32	0.205	7.85	-63.9
6/08/04	13:03:29	12.91	0.423	325	0.275	0.2	159.3	16.8	14.32	0.203	7.85	-64.1
6/08/04	13:03:39	12.91	0.423	325	0.275	0.2	157.7	16.63	14.32	0.205	7.85	-64
6/08/04	13:03:49	12.89	0.423	325	0.275	0.2	156.9	16.55	14.32	0.205	7.85	-64.1
6/08/04	13:03:59	12.91	0.423	325	0.275	0.2	155.5	16.4	14.32	0.205	7.85	-64
6/08/04	13:04:09	12.86	0.423	325	0.275	0.2	154.1	16.28	14.89	0.602	7.85	-64.1
6/08/04	13:04:19	12.5	0.426	324	0.277	0.21	152.3	16.21	16.04	1.415	7.85	-63.9
6/08/04	13:04:29	12.46	0.426	324	0.277	0.21	151.6	16.15	16.12	1.469	7.85	-64
6/08/04	13:04:39	12.43	0.426	323	0.277	0.21	151	16.09	16.12	1.471	7.85	-63.7
6/08/04	13:04:49	12.38	0.426	323	0.277	0.21	150.4	16.05	16.3	1.595	7.85	-63.7
6/08/04	13:04:59	9.79	0.428	304	0.278	0.21	148.7	16.85	17.87	2.702	7.84	-63.1
6/08/04	13:05:09	9.79	0.428	303	0.278	0.21	146.6	16.61	17.99	2.786	7.84	-62.7
6/08/04	13:05:19	9.59	0.428	302	0.278	0.21	145.1	16.52	18.02	2.807	7.83	-62.2
6/08/04	13:05:29	9.06	0.425	296	0.276	0.21	142.6	16.45	18.48	3.131	7.82	-61.5
6/08/04	13:05:39	8.4	0.424	290	0.276	0.21	140.8	16.5	19.24	3.668	7.81	-60.6
6/08/04	13:05:49	7.8	0.427	286	0.277	0.21	139.9	16.63	19.74	4.017	7.79	-59.8
6/08/04	13:05:59	7.61	0.427	285	0.278	0.21	137.9	16.47	19.84	4.087	7.79	-59.4
6/08/04	13:06:09	7.66	0.427	286	0.277	0.21	136	16.22	19.85	4.095	7.78	-59.1
6/08/04	13:06:19	7.77	0.426	286	0.277	0.21	135.5	16.11	20.13	4.292	7.77	-58.5
6/08/04	13:06:29	7.37	0.429	284	0.279	0.21	133.7	16.07	20.36	4.454	7.76	-58.1
6/08/04	13:06:39	7.36	0.429	285	0.279	0.21	133	15.98	20.39	4.475	7.76	-57.8
6/08/04	13:06:49	7.34	0.429	284	0.279	0.21	131.9	15.85	20.42	4.499	7.76	-57.6
6/08/04	13:06:59	6.85	0.433	283	0.281	0.21	130.4	15.86	22.01	5.617	7.75	-56.9
6/08/04	13:07:09	6.74	0.434	283	0.282	0.21	129.6	15.82	22.62	6.045	7.74	-56.7
6/08/04	13:07:19	6.73	0.434	283	0.282	0.21	129.1	15.76	22.69	6.096	7.74	-56.5
6/08/04	13:07:29	6.73	0.434	283	0.282	0.21	128.5	15.68	22.68	6.093	7.73	-56.3
6/08/04	13:07:39	6.74	0.434	283	0.282	0.21	127.6	15.58	22.67	6.084	7.73	-56.2
6/08/04	13:07:49	6.55	0.435	282	0.283	0.21	126.5	15.51	24.11	7.1	7.72	-55.7
6/08/04	13:07:59	5.92	0.442	281	0.287	0.21	125.7	15.65	25.66	8.186	7.72	-55.2
6/08/04	13:08:09	5.83	0.443	281	0.288	0.21	125	15.6	25.81	8.295	7.71	-55
6/08/04	13:08:19	5.86	0.443	281	0.288	0.21	124.2	15.5	25.83	8.311	7.71	-54.9
6/08/04	13:08:29	5.83	0.443	281	0.288	0.21	123.4	15.4	25.83	8.305	7.71	-54.7
6/08/04	13:08:39	5.77	0.443	280	0.288	0.21	122.9	15.36	26.89	9.055	7.7	-54.3
6/08/04	13:08:49	5.51	0.446	280	0.29	0.21	121.3	15.27	29.44	10.854	7.69	-53.8
6/08/04	13:08:59	5.5	0.447	280	0.29	0.22	121.1	15.25	29.72	11.046	7.69	-53.7
6/08/04	13:09:09	5.5	0.447	280	0.29	0.22	120.8	15.21	29.73	11.051	7.69	-53.7
6/08/04	13:09:19	5.5	0.447	280	0.29	0.22	120.2	15.13	29.73	11.053	7.69	-53.5
6/08/04	13:09:29	5.5	0.447	280	0.29	0.22	119.7	15.08	29.73	11.055	7.69	-53.5
6/08/04	13:09:39	5.3	0.448	279	0.291	0.22	119.5	15.12	30.87	11.854	7.68	-53.1
6/08/04	13:09:49	4.93	0.451	278	0.293	0.22	117.9	15.07	34.26	14.245	7.67	-52.6
6/08/04	13:09:59	4.89	0.452	278	0.294	0.22	117.7	15.05	34.65	14.519	7.67	-52.5
6/08/04	13:10:09	4.89	0.452	278	0.294	0.22	117.2	15	34.67	14.531	7.67	-52.3
6/08/04	13:10:19	4.65	0.454	278	0.295	0.22	116.3	14.97	37.18	16.304	7.66	-51.6
6/08/04	13:10:29	4.46	0.457	278	0.297	0.22	115.2	14.9	39.61	18.013	7.65	-51
6/08/04	13:10:39	4.44	0.457	278	0.297	0.22	114.7	14.85	39.95	18.251	7.64	-50.8
6/08/04	13:10:49	4.44	0.457	278	0.297	0.22	114	14.75	39.99	18.281	7.64	-50.8
6/08/04	13:10:59	4.44	0.457	278	0.297	0.22	113.4	14.68	40	18.288	7.64	-50.6
6/08/04	13:11:09	4.44	0.457	278	0.297	0.22	113.1	14.63	40	18.285	7.64	-50.5
6/08/04	13:11:19	4.31	0.459	278	0.299	0.22	112.4	14.6	43.24	20.571	7.63	-49.8
6/08/04	13:11:29	4.22	0.462	278	0.3	0.22	111.9	14.56	44.5	21.456	7.62	-49.5
6/08/04	13:11:39	4.22	0.461	278	0.3	0.22	111.5	14.51	44.59	21.521	7.62	-49.2
6/08/04	13:11:49	4.22	0.462	278	0.3	0.22	110.9	14.43	44.62	21.539	7.62	-49.2
6/08/04	13:11:59	4.19	0.463	279	0.301	0.22	110.6	14.4	45.67	22.281	7.61	-48.8
6/08/04	13:12:09	4.15	0.465	280	0.302	0.22	109.9	14.33	46.14	22.608	7.61	-48.7
6/08/04	13:12:19	4.15	0.465	280	0.303	0.22	109.8	14.31	46.15	22.621	7.61	-48.6
6/08/04	13:12:29	4.15	0.465	280	0.302	0.22	109.6	14.28	46.16	22.625	7.6	-48.5
6/08/04	13:12:39	4.16	0.465	280	0.302	0.22	109.2	14.23	46.39	22.787	7.6	-48.4
6/08/04	13:12:49	4.09	0.466	280	0.303	0.22	108.8	14.21	47.94	23.878	7.6	-48.1
6/08/04	13:12:59	4.09	0.466	280	0.303	0.22	108.6	14.18	47.93	23.872	7.59	-47.9
6/08/04	13:13:09	4.1	0.466	280	0.303	0.22	108.3	14.14	47.96	23.893	7.59	-47.9
6/08/04	13:13:19	4.1	0.466	280	0.303	0.22	108.2	14.13	47.97	23.902	7.59	-47.8
6/08/04	13:13:29	4.05	0.467	280	0.303	0.22	108.1	14.12	49.23	24.789	7.59	-47.6
6/08/04	13:13:39	4.02	0.467	280	0.304	0.22	107.7	14.09	49.56	25.018	7.59	-47.5

APPENDIX B

PROFILE DATA FOR EARN LAKE, JUNE 2004

M/D/Y	hh:mm:ss	C	mS/cm	uS/cm	g/L	ppt	%	mg/L	psia	m		mV
6/08/04	13:13:49	4.03	0.467	280	0.304	0.22	107.4	14.05	49.59	25.04	7.59	-47.5
6/08/04	13:13:59	4.03	0.467	280	0.304	0.22	107.3	14.04	49.6	25.046	7.59	-47.5
6/08/04	13:14:09	4.03	0.467	280	0.304	0.22	107.1	14.01	49.78	25.173	7.59	-47.4
6/08/04	13:14:19	3.97	0.468	280	0.304	0.22	106.8	14	51.05	26.069	7.58	-47.1
6/08/04	13:14:29	3.97	0.468	280	0.304	0.22	106.8	13.99	51.16	26.146	7.58	-47.1
6/08/04	13:14:39	3.97	0.468	280	0.304	0.22	106.6	13.97	51.2	26.171	7.58	-47.1
6/08/04	13:14:49	3.97	0.468	280	0.304	0.22	106.5	13.95	51.22	26.19	7.58	-47
6/08/04	13:14:59	3.95	0.468	280	0.304	0.22	106.1	13.91	52.77	27.277	7.58	-46.9
6/08/04	13:15:09	3.95	0.468	280	0.304	0.22	106.1	13.91	53.2	27.579	7.58	-46.8
6/08/04	13:15:19	3.95	0.468	280	0.304	0.22	106.1	13.91	53.22	27.599	7.58	-46.8
6/08/04	13:15:29	3.94	0.468	280	0.304	0.22	105.8	13.87	54.14	28.243	7.57	-46.7
6/08/04	13:15:39	3.94	0.468	280	0.304	0.23	105.8	13.87	54.41	28.431	7.57	-46.6
6/08/04	13:15:49	3.94	0.468	280	0.304	0.22	105.7	13.86	54.75	28.676	7.57	-46.6
6/08/04	13:15:59	3.91	0.469	280	0.305	0.23	105.6	13.85	55.38	29.116	7.57	-46.4
6/08/04	13:16:09	3.91	0.469	280	0.305	0.23	105.5	13.84	55.43	29.156	7.57	-46.5
6/08/04	13:16:19	3.9	0.469	280	0.305	0.23	105.4	13.83	55.46	29.177	7.57	-46.5
6/08/04	13:16:29	3.79	0.471	280	0.306	0.23	105.5	13.88	56.78	30.106	7.56	-46.2
6/08/04	13:16:39	3.7	0.473	281	0.308	0.23	105.1	13.87	57.13	30.35	7.56	-46.1
6/08/04	13:16:49	3.71	0.473	281	0.307	0.23	104.7	13.81	57.17	30.375	7.56	-46
6/08/04	13:16:59	3.63	0.475	281	0.309	0.23	104.3	13.78	58.55	31.353	7.55	-45.6
6/08/04	13:17:09	3.59	0.475	281	0.309	0.23	103.9	13.74	58.86	31.565	7.55	-45.5
6/08/04	13:17:19	3.59	0.475	281	0.309	0.23	103.5	13.69	58.88	31.582	7.55	-45.4
6/08/04	13:17:29	3.55	0.477	281	0.31	0.23	103.2	13.68	61.07	33.121	7.54	-45
6/08/04	13:17:39	3.51	0.477	281	0.31	0.23	102.8	13.63	61.66	33.538	7.54	-44.8
6/08/04	13:17:49	3.52	0.477	281	0.31	0.23	102.4	13.57	61.7	33.572	7.54	-44.8
6/08/04	13:17:59	3.43	0.48	282	0.312	0.23	102.1	13.56	63.22	34.639	7.53	-44.3
6/08/04	13:18:09	3.39	0.481	282	0.312	0.23	101.7	13.53	63.87	35.093	7.53	-44.2
6/08/04	13:18:19	3.39	0.481	282	0.312	0.23	101.2	13.46	63.92	35.133	7.53	-44.1
6/08/04	13:18:29	3.39	0.48	282	0.312	0.23	100.7	13.4	64.06	35.227	7.53	-44
6/08/04	13:18:39	3.24	0.485	283	0.315	0.23	100.3	13.4	65.55	36.28	7.5	-42.7
6/08/04	13:18:49	3.22	0.485	284	0.316	0.23	99.7	13.32	65.67	36.363	7.49	-41.9
6/08/04	13:18:59	3.22	0.599	350	0.389	0.29	99.1	13.23	65.67	36.364	7.48	-41.2
6/08/04	13:19:09	3.22	1.221	713	0.794	0.6	98.6	13.15	65.67	36.356	7.47	-40.9
6/08/04	13:19:19	3.22	1.352	790	0.879	0.67	98.1	13.06	65.67	36.353	7.47	-40.6
6/08/04	13:19:29	3.22	1.451	847	0.943	0.72	97.7	13.01	65.68	36.354	7.46	-40.3
6/08/04	13:19:39	3.22	1.56	911	1.014	0.78	97.4	12.97	65.68	36.353	7.46	-40
6/08/04	13:19:49	3.22	1.647	962	1.071	0.83	97.1	12.92	65.68	36.352	7.45	-39.9
6/08/04	13:19:59	3.22	1.721	1005	1.119	0.86	96.9	12.89	65.68	36.351	7.45	-39.6
6/08/04	13:20:09	3.22	1.771	1034	1.151	0.89	96.7	12.87	65.67	36.347	7.45	-39.5
6/08/04	13:20:19	3.22	1.81	1057	1.177	0.91	96.4	12.82	64.85	35.766	7.45	-39.4
6/08/04	13:20:29	3.24	1.83	1070	1.19	0.92	96.4	12.82	64.31	35.384	7.45	-39.5
6/08/04	13:20:39	3.25	1.893	1106	1.23	0.95	96.4	12.81	64.3	35.381	7.45	-39.5
6/08/04	13:20:49	3.25	1.906	1114	1.239	0.96	96.6	12.83	64.32	35.39	7.45	-39.8
6/08/04	13:20:59	3.27	1.92	1123	1.248	0.97	96.6	12.82	64.33	35.399	7.45	-39.8
6/08/04	13:21:09	3.36	1.931	1133	1.255	0.97	96.4	12.78	64.34	35.406	7.44	-39.2
6/08/04	13:21:19	3.34	1.945	1141	1.264	0.98	96.5	12.79	64.35	35.412	7.45	-39.5
6/08/04	13:21:29	3.51	1.945	1146	1.264	0.98	96.5	12.73	60.41	32.643	7.46	-40.1
6/08/04	13:21:39	3.85	1.929	1150	1.254	0.98	97.8	12.78	56.07	29.583	7.47	-40.9
6/08/04	13:21:49	3.93	1.926	1151	1.252	0.97	99	12.91	55.68	29.312	7.49	-41.7
6/08/04	13:21:59	3.92	1.929	1153	1.254	0.98	99.8	13.02	55.66	29.3	7.49	-42

Profile Data at B-1

Date	Time	Temp	SpCond	Cond	TDS	Salinity	DO %	DO Conc	PressureA	Depth	pH	pHmV
M/D/Y	hh:mm:ss	C	mS/cm	uS/cm	g/L	ppt	%	mg/L	psia	m		mV
6/11/04	10:37:08	13.22	0.429	333	0.279	0.21	118.7	12.44	14.28	0.175	8.03	-74.5
6/11/04	10:37:18	13.22	0.429	332	0.279	0.21	115.6	12.11	14.28	0.173	8.03	-74.7
6/11/04	10:37:28	13.21	0.429	332	0.279	0.21	115.2	12.07	14.3	0.188	8.03	-74.7
6/11/04	10:37:38	13.21	0.429	332	0.279	0.21	114.8	12.03	14.31	0.195	8.03	-74.8
6/11/04	10:37:48	13.2	0.429	332	0.279	0.21	114.7	12.01	14.32	0.2	8.03	-74.8
6/11/04	10:37:58	13.19	0.429	332	0.279	0.21	114.5	12	14.32	0.205	8.03	-74.9
6/11/04	10:38:08	13.18	0.429	332	0.279	0.21	114.3	11.99	14.31	0.196	8.03	-74.9
6/11/04	10:38:18	12.5	0.435	331	0.283	0.21	111.8	11.9	16.27	1.576	8.03	-74.4
6/11/04	10:38:28	12.19	0.438	331	0.285	0.21	111.5	11.95	16.62	1.82	8.02	-73.7
6/11/04	10:38:38	12.16	0.439	331	0.285	0.21	111.5	11.96	16.71	1.888	8.01	-73.3
6/11/04	10:38:48	12.09	0.439	331	0.286	0.21	111.3	11.96	16.93	2.043	8.01	-73
6/11/04	10:38:58	12.06	0.439	331	0.286	0.21	111.3	11.96	16.97	2.071	8	-72.7
6/11/04	10:39:08	12.04	0.439	330	0.285	0.21	111.3	11.97	17	2.09	8	-72.5
6/11/04	10:39:18	10.71	0.454	330	0.295	0.22	112.1	12.43	18.19	2.928	7.99	-71.6
6/11/04	10:39:28	10.52	0.455	329	0.296	0.22	109.1	12.15	19.36	3.756	7.96	-70.2
6/11/04	10:39:38	10.51	0.455	329	0.296	0.22	108.4	12.08	19.45	3.815	7.95	-69.6
6/11/04	10:39:48	10.51	0.454	329	0.295	0.22	108	12.03	19.45	3.819	7.95	-69.3
6/11/04	10:39:58	10.25	0.457	328	0.297	0.22	106.9	11.98	20.59	4.621	7.94	-68.7
6/11/04	10:40:08	9.46	0.465	327	0.302	0.23	105.6	12.06	21.5	5.261	7.92	-67.8
6/11/04	10:40:18	9.44	0.465	327	0.302	0.23	105.4	12.04	21.57	5.311	7.92	-67.3
6/11/04	10:40:28	9.43	0.464	326	0.302	0.22	104.9	11.98	21.58	5.316	7.91	-67.1
6/11/04	10:40:38	9.07	0.468	326	0.304	0.23	104.7	12.06	22.9	6.245	7.9	-66.4
6/11/04	10:40:48	7.77	0.483	324	0.314	0.23	102.6	12.2	23.76	6.851	7.89	-65.4
6/11/04	10:40:58	7.74	0.483	324	0.314	0.23	102.1	12.16	23.82	6.896	7.88	-65

APPENDIX B

PROFILE DATA FOR EARN LAKE, JUNE 2004

M/D/Y	hh:mm:ss	C	mS/cm	uS/cm	g/L	ppt	%	mg/L	psia	m		mV
6/11/04	10:41:08	7.38	0.487	323	0.317	0.24	100.3	12.04	24.59	7.438	7.87	-64.3
6/11/04	10:41:18	6.39	0.5	322	0.325	0.24	99.1	12.2	25.33	7.957	7.86	-63.2
6/11/04	10:41:28	6.1	0.503	322	0.327	0.24	97.5	12.08	25.34	7.964	7.84	-62.4
6/11/04	10:41:38	6.12	0.502	321	0.326	0.24	96.7	11.98	25.47	8.054	7.83	-61.8
6/11/04	10:41:48	5.89	0.504	320	0.328	0.24	94.8	11.82	26.3	8.639	7.8	-60
6/11/04	10:41:58	5.87	0.504	320	0.328	0.24	94.3	11.76	26.43	8.733	7.75	-57.1
6/11/04	10:42:08	5.88	0.503	319	0.327	0.24	93.4	11.65	26.42	8.725	7.71	-54.5
6/11/04	10:42:18	5.87	0.503	319	0.327	0.24	93.5	11.66	26.44	8.736	7.68	-53.3

Profile Data for B-2

Date	Time	Temp	SpCond	Cond	TDS	Salinity	DO %	DO Conc	PressureA	Depth	pH	pHmV
M/D/Y	hh:mm:ss	C	mS/cm	uS/cm	g/L	ppt	%	mg/L	psia	m		mV
6/08/04	14:34:41	12.7	2.15	1645	1.397	1.11	156.7	16.51	14.02	-0.008	7.91	-67.3
6/08/04	14:34:51	12.7	2.139	1637	1.391	1.1	148.5	15.65	14.01	-0.018	7.89	-66.5
6/08/04	14:35:01	12.67	2.137	1634	1.389	1.1	147.7	15.58	14.02	-0.011	7.89	-66.2
6/08/04	14:35:11	12.67	2.134	1632	1.387	1.1	147.2	15.52	14.03	-0.002	7.88	-66
6/08/04	14:35:21	12.67	2.131	1629	1.385	1.1	147	15.49	14.04	0.007	7.88	-65.6
6/08/04	14:35:31	12.66	2.129	1627	1.384	1.1	146.6	15.46	14.05	0.01	7.88	-65.5
6/08/04	14:35:41	12.64	2.128	1625	1.383	1.1	146.4	15.45	14.03	0.001	7.87	-65.4
6/08/04	14:35:51	12.62	2.127	1624	1.383	1.09	146.1	15.42	14.06	0.022	7.87	-65.4
6/08/04	14:36:01	12.6	2.126	1622	1.382	1.09	145.8	15.4	14.09	0.04	7.87	-65.2
6/08/04	14:36:11	12.57	2.126	1621	1.382	1.09	145.7	15.4	14.12	0.059	7.87	-65.3
6/08/04	14:36:21	12.6	2.122	1619	1.379	1.09	145.6	15.38	14.13	0.068	7.87	-65.1
6/08/04	14:36:31	12.6	2.12	1618	1.378	1.09	145.4	15.35	14.14	0.073	7.87	-65.2
6/08/04	14:36:41	12.64	2.117	1617	1.376	1.09	145.2	15.32	14.15	0.083	7.87	-65.1
6/08/04	14:36:51	12.61	2.117	1616	1.376	1.09	145.1	15.32	14.15	0.083	7.87	-65.1
6/08/04	14:37:01	12.62	2.115	1615	1.375	1.09	145	15.3	14.16	0.091	7.87	-65
6/08/04	14:37:11	12.59	2.115	1614	1.375	1.09	144.9	15.3	14.17	0.1	7.87	-65.2
6/08/04	14:37:21	12.57	2.114	1612	1.374	1.09	144.8	15.3	14.17	0.1	7.87	-65.1
6/08/04	14:37:31	12.51	2.118	1612	1.376	1.09	144.3	15.27	14.86	0.584	7.87	-65.2
6/08/04	14:37:41	12.47	2.119	1612	1.377	1.09	144	15.25	14.96	0.656	7.87	-65.1
6/08/04	14:37:51	12.45	2.119	1611	1.377	1.09	144	15.25	14.98	0.665	7.87	-65.1
6/08/04	14:38:01	12.49	2.116	1610	1.375	1.09	144	15.24	15	0.682	7.87	-65.1
6/08/04	14:38:11	12.44	2.118	1610	1.377	1.09	144.1	15.27	15.4	0.965	7.87	-65.1
6/08/04	14:38:21	12.39	2.119	1609	1.378	1.09	143.5	15.23	15.64	1.131	7.87	-65.1
6/08/04	14:38:31	12.25	2.125	1608	1.381	1.09	143.9	15.32	15.68	1.157	7.87	-65.2
6/08/04	14:38:41	12.21	2.126	1606	1.382	1.09	143.6	15.3	15.7	1.171	7.87	-65.1
6/08/04	14:38:51	12.25	2.124	1607	1.381	1.09	143.6	15.29	15.86	1.286	7.87	-65.1
6/08/04	14:39:01	12.27	2.121	1605	1.378	1.09	143.9	15.31	16.01	1.39	7.87	-64.9
6/08/04	14:39:11	12.26	2.119	1603	1.377	1.09	143.7	15.29	16.01	1.396	7.87	-64.8
6/08/04	14:39:21	12.14	2.124	1602	1.38	1.09	143.7	15.33	15.93	1.338	7.86	-64.6
6/08/04	14:39:31	12.12	2.124	1601	1.38	1.09	143.7	15.34	16	1.387	7.86	-64.5
6/08/04	14:39:41	12.1	2.123	1600	1.38	1.09	143.8	15.36	16	1.389	7.86	-64.3
6/08/04	14:39:51	12.1	2.121	1598	1.379	1.09	143.9	15.37	16	1.386	7.86	-64.3
6/08/04	14:40:01	12.11	2.119	1597	1.377	1.09	144.2	15.39	16	1.385	7.86	-64.3
6/08/04	14:40:11	12.12	2.117	1596	1.376	1.09	144.2	15.39	16	1.384	7.86	-64.5
6/08/04	14:40:21	12.11	2.116	1595	1.375	1.09	144.3	15.41	16	1.384	7.86	-64.6
6/08/04	14:40:31	12.14	2.113	1594	1.373	1.09	144.2	15.38	16	1.385	7.87	-64.8
6/08/04	14:40:41	12.12	2.112	1592	1.373	1.09	144.2	15.39	16	1.384	7.87	-64.9
6/08/04	14:40:51	12.15	2.109	1591	1.371	1.08	144.1	15.37	15.99	1.382	7.87	-65
6/08/04	14:41:01	12.11	2.109	1590	1.371	1.09	144	15.37	15.99	1.382	7.87	-65

Profile Data for B-3

Date	Time	Temp	SpCond	Cond	TDS	Salinity	DO %	DO Conc	PressureA	Depth	pH	pHmV
M/D/Y	hh:mm:ss	C	mS/cm	uS/cm	g/L	ppt	%	mg/L	psia	m		mV
6/08/04	11:03:23	14.27	0.457	364	0.297	0.22	128.5	13.15	14.36	0.229	7.86	-65
6/08/04	11:03:33	14.27	0.457	364	0.297	0.22	125.2	12.81	14.36	0.233	7.86	-65.1
6/08/04	11:03:43	14.28	0.457	363	0.297	0.22	124.8	12.76	14.37	0.239	7.87	-65.2
6/08/04	11:03:53	14.28	0.458	364	0.297	0.22	124.7	12.75	14.38	0.244	7.86	-65.1
6/08/04	11:04:03	14.29	0.457	364	0.297	0.22	124.4	12.72	14.39	0.25	7.87	-65.2
6/08/04	11:04:13	14.3	0.457	364	0.297	0.22	124.3	12.71	14.38	0.243	7.87	-65.2
6/08/04	11:04:23	14.26	0.457	363	0.297	0.22	123.9	12.68	15.1	0.755	7.87	-65.2
6/08/04	11:04:33	14.18	0.457	363	0.297	0.22	123.7	12.68	15.3	0.892	7.86	-65
6/08/04	11:04:43	14.2	0.457	363	0.297	0.22	123.2	12.62	15.33	0.916	7.86	-64.9
6/08/04	11:04:53	12.72	0.48	368	0.312	0.23	124.3	13.16	16.05	1.42	7.83	-62.8
6/08/04	11:05:03	11.83	0.481	360	0.312	0.23	119.6	12.92	16.49	1.733	7.78	-60
6/08/04	11:05:13	10.65	0.487	354	0.317	0.24	116.7	12.96	17.13	2.184	7.75	-57.9
6/08/04	11:05:23	10.43	0.482	348	0.313	0.23	113.5	12.66	17.21	2.24	7.73	-56.5
6/08/04	11:05:33	10.51	0.481	348	0.313	0.23	111.6	12.43	17.23	2.25	7.7	-55.1
6/08/04	11:05:43	10.32	0.485	349	0.316	0.24	109.8	12.28	17.85	2.687	7.68	-53.8
6/08/04	11:05:53	10.28	0.486	350	0.316	0.24	109.2	12.22	18.11	2.87	7.66	-52.8
6/08/04	11:06:03	9.96	0.485	346	0.316	0.24	108.1	12.2	18.23	2.959	7.65	-51.8
6/08/04	11:06:13	9.38	0.484	339	0.314	0.23	107.5	12.3	18.31	3.01	7.63	-50.6
6/08/04	11:06:23	9.39	0.469	329	0.305	0.23	104.1	11.9	18.41	3.082	7.59	-48.6
6/08/04	11:06:33	9.34	0.463	325	0.301	0.22	101.1	11.58	18.53	3.169	7.53	-45
6/08/04	11:06:43	9.24	0.464	324	0.301	0.22	90.1	10.34	18.63	3.235	7.48	-41.8
6/08/04	11:06:53	9.07	0.466	324	0.303	0.23	84.3	9.71	18.76	3.326	7.43	-39.1

APPENDIX B

PROFILE DATA FOR EARN LAKE, JUNE 2004

M/D/Y	hh:mm:ss	C	mS/cm	uS/cm	g/L	ppt	%	mg/L	psia	m		mV
6/08/04	11:07:03	9.05	0.465	323	0.302	0.23	78	9	18.84	3.388	7.4	-37.1

Profile Data for B-4

Date	Time	Temp	SpCond	Cond	TDS	Salinity	DO %	DO Conc	PressureA	Depth	pH	pHmV
M/D/Y	hh:mm:ss	C	mS/cm	uS/cm	g/L	ppt	%	mg/L	psia	m		mV
6/10/04	12:04:07	11.84	0.459	344	0.298	0.22	110.6	11.94	13.52	-0.363	5.97	46.3
6/10/04	12:04:17	13.83	0.402	316	0.261	0.19	115	11.88	14.35	0.227	7.97	-71
6/10/04	12:04:27	13.84	0.402	317	0.262	0.19	115.3	11.91	14.39	0.254	7.97	-71
6/10/04	12:04:37	13.82	0.403	317	0.262	0.19	115.5	11.93	14.44	0.287	7.97	-71
6/10/04	12:04:47	13.82	0.403	317	0.262	0.19	115.6	11.94	14.46	0.302	7.97	-71
6/10/04	12:04:57	13.74	0.404	317	0.262	0.2	114.3	11.84	15.77	1.223	7.96	-70.9
6/10/04	12:05:07	13.7	0.404	317	0.263	0.2	114.8	11.89	16.08	1.445	7.96	-70.8
6/10/04	12:05:17	13.71	0.404	317	0.263	0.2	115	11.91	16.13	1.482	7.96	-70.6
6/10/04	12:05:27	11.88	0.422	316	0.274	0.2	117.5	12.68	17.73	2.607	7.96	-70.1
6/10/04	12:05:37	11.76	0.423	316	0.275	0.2	113.3	12.26	18.32	3.019	7.94	-69.1
6/10/04	12:05:47	11.74	0.424	316	0.275	0.2	113.1	12.25	18.41	3.083	7.93	-68.4
6/10/04	12:05:57	11.72	0.423	316	0.275	0.2	112.8	12.22	18.46	3.118	7.92	-68
6/10/04	12:06:07	11.72	0.423	316	0.275	0.2	112.6	12.2	18.5	3.147	7.92	-67.8
6/10/04	12:06:17	7.84	0.467	314	0.303	0.23	114.6	13.6	20.4	4.484	7.91	-66.9
6/10/04	12:06:27	7.65	0.468	313	0.304	0.23	109.7	13.08	21.1	4.98	7.89	-65.6
6/10/04	12:06:37	7.62	0.468	313	0.304	0.23	107.5	12.83	21.19	5.043	7.88	-64.7
6/10/04	12:06:47	7.61	0.467	312	0.304	0.23	106.4	12.7	21.21	5.052	7.87	-64
6/10/04	12:06:57	7.04	0.474	311	0.308	0.23	104	12.59	22.34	5.854	7.85	-63.2
6/10/04	12:07:07	6.9	0.474	310	0.308	0.23	103.5	12.58	22.61	6.042	7.85	-62.9
6/10/04	12:07:17	6.88	0.473	310	0.308	0.23	102.7	12.49	22.61	6.042	7.84	-62.6
6/10/04	12:07:27	6.91	0.472	309	0.307	0.23	101.8	12.37	22.57	6.016	7.84	-62.3
6/10/04	12:07:37	6.99	0.47	308	0.306	0.23	101	12.25	22.53	5.986	7.83	-62

Profile Data for Swan Bay

Date	Time	Temp	SpCond	Cond	TDS	Salinity	DO %	DO Conc	PressureA	Depth	pH	pHmV
M/D/Y	hh:mm:ss	C	mS/cm	uS/cm	g/L	ppt	%	mg/L	psia	m		mV
6/11/04	11:41:21	14.16	0.438	347	0.285	0.21	91.6	9.39	14.21	0.126	7.99	-72.3
6/11/04	11:41:31	13.95	0.439	346	0.285	0.21	89.9	9.27	14.27	0.166	8.01	-73.5
6/11/04	11:41:41	13.95	0.438	346	0.285	0.21	90.5	9.32	14.33	0.209	8.01	-73.7
6/11/04	11:41:51	13.86	0.439	345	0.285	0.21	90.4	9.34	14.36	0.233	8.01	-73.8
6/11/04	11:42:01	13.87	0.438	345	0.285	0.21	90.4	9.33	14.37	0.241	8.01	-73.9
6/11/04	11:42:11	13.87	0.438	345	0.285	0.21	89.8	9.27	14.38	0.241	8.02	-73.9
6/11/04	11:42:21	13.81	0.438	345	0.285	0.21	90	9.3	14.38	0.248	8.02	-74
6/11/04	11:42:31	13.82	0.438	344	0.285	0.21	90	9.3	14.4	0.258	8.02	-74
6/11/04	11:42:41	13.79	0.438	344	0.284	0.21	90.1	9.32	14.4	0.261	8.02	-74.1
6/11/04	11:42:51	13.79	0.438	344	0.284	0.21	90.1	9.32	14.41	0.268	8.02	-74.1
6/11/04	11:43:01	13.26	0.442	343	0.287	0.21	86.3	9.03	16.05	1.422	8.02	-73.9
6/11/04	11:43:11	13.13	0.443	343	0.288	0.21	86.1	9.04	16.31	1.607	8.01	-73.4
6/11/04	11:43:21	13.11	0.443	342	0.288	0.21	86.1	9.04	16.34	1.628	8.01	-73.2
6/11/04	11:43:31	9.23	0.487	340	0.317	0.24	89.4	10.26	17.65	2.545	8.01	-72.4
6/11/04	11:43:41	8.62	0.493	339	0.32	0.24	75.7	8.82	18.6	3.219	7.96	-69.8
6/11/04	11:43:51	8.59	0.493	339	0.321	0.24	74.2	8.65	18.7	3.29	7.94	-68.5
6/11/04	11:44:01	8.59	0.492	338	0.32	0.24	73	8.51	18.73	3.311	7.93	-67.6
6/11/04	11:44:11	7.48	0.506	337	0.329	0.25	72.7	8.71	19.63	3.945	7.91	-66.5
6/11/04	11:44:21	7.18	0.508	335	0.33	0.25	68.2	8.23	20.53	4.574	7.89	-65.5
6/11/04	11:44:31	7.12	0.508	334	0.33	0.25	67.9	8.21	20.63	4.646	7.88	-64.8
6/11/04	11:44:41	7.09	0.507	333	0.329	0.25	67.5	8.16	20.69	4.691	7.87	-64.4
6/11/04	11:44:51	6.92	0.508	332	0.33	0.25	67.4	8.18	22.3	5.82	7.86	-63.7
6/11/04	11:45:01	6.67	0.51	331	0.331	0.25	64.5	7.89	23.35	6.562	7.85	-63.2
6/11/04	11:45:11	6.62	0.509	330	0.331	0.25	64.6	7.91	23.46	6.642	7.85	-62.9
6/11/04	11:45:21	6.61	0.507	329	0.33	0.25	64.4	7.88	23.85	6.916	7.85	-62.6
6/11/04	11:45:31	6.44	0.508	328	0.33	0.25	62.1	7.63	26.56	8.821	7.84	-62.2
6/11/04	11:45:41	6.27	0.509	327	0.331	0.25	62.4	7.71	26.88	9.05	7.84	-62.2
6/11/04	11:45:51	6.17	0.509	326	0.331	0.25	62.3	7.71	26.96	9.106	7.84	-62
6/11/04	11:46:01	6.03	0.51	325	0.331	0.25	61.9	7.69	28.3	10.045	7.83	-61.8
6/11/04	11:46:11	5.78	0.512	324	0.333	0.25	60.5	7.56	29.64	10.994	7.83	-61.3
6/11/04	11:46:21	5.76	0.511	323	0.332	0.25	60.7	7.6	29.5	10.89	7.82	-61.1
6/11/04	11:46:31	5.76	0.51	322	0.331	0.25	60.9	7.61	30.35	11.492	7.82	-60.8
6/11/04	11:46:41	5.75	0.509	322	0.331	0.25	59.3	7.41	32.21	12.804	7.81	-60.6
6/11/04	11:46:51	5.75	0.508	321	0.33	0.25	59.3	7.42	32.49	12.999	7.81	-60.6
6/11/04	11:47:01	5.75	0.506	320	0.329	0.24	59.3	7.42	32.53	13.027	7.81	-60.5
6/11/04	11:47:11	5.73	0.505	319	0.328	0.24	59.2	7.41	32.75	13.184	7.81	-60.5
6/11/04	11:47:21	5.73	0.504	318	0.328	0.24	59.1	7.39	32.95	13.32	7.81	-60.4
6/11/04	11:47:31	5.73	0.503	318	0.327	0.24	59	7.39	32.99	13.351	7.81	-60.4
6/11/04	11:47:41	5.72	0.502	317	0.326	0.24	59	7.39	32.96	13.327	7.81	-60.4
6/11/04	11:47:51	5.7	0.501	316	0.326	0.24	59.4	7.44	33.24	13.523	7.81	-60.3
6/11/04	11:48:01	5.67	0.501	316	0.325	0.24	58.1	7.28	33.71	13.857	7.81	-60.2
6/11/04	11:48:11	5.66	0.5	315	0.325	0.24	57.5	7.21	33.72	13.864	7.8	-60.1
6/11/04	11:48:21	5.62	0.5	315	0.325	0.24	57.4	7.2	33.91	14	7.8	-60.1
6/11/04	11:48:31	5.55	0.498	313	0.324	0.24	57.2	7.19	34.03	14.084	7.8	-59.9
6/11/04	11:48:41	5.53	0.499	313	0.324	0.24	56.6	7.12	34.14	14.158	7.8	-59.7
6/11/04	11:48:51	5.51	0.5	314	0.325	0.24	54.4	6.84	34.23	14.225	7.78	-58.6

APPENDIX B

PROFILE DATA FOR EARN LAKE, JUNE 2004

M/D/Y	hh:mm:ss	C	mS/cm	uS/cm	g/L	ppt	%	mg/L	psia	m		mV
6/11/04	11:49:01	5.49	0.499	313	0.324	0.24	50.6	6.38	34.31	14.278	7.69	-53.5
6/11/04	11:49:11	5.49	0.498	312	0.324	0.24	48.6	6.12	34.29	14.267	7.61	-48.8
6/11/04	11:49:21	5.5	0.498	312	0.323	0.24	46.1	5.8	34.18	14.186	7.59	-47.9
6/11/04	11:49:31	5.51	0.498	312	0.323	0.24	45.4	5.72	34.4	14.344	7.64	-51
6/11/04	11:49:41	5.52	0.497	312	0.323	0.24	49.7	6.25	34.39	14.336	7.68	-52.9
6/11/04	11:49:51	5.48	0.496	311	0.322	0.24	51.7	6.51	34.29	14.269	7.66	-51.6
6/11/04	11:50:01	5.47	0.494	310	0.321	0.24	54.2	6.83	34.08	14.119	7.7	-54
6/11/04	11:50:11	5.58	0.491	309	0.319	0.24	55.4	6.97	31.28	12.148	7.74	-56.6

APPENDIX C

ANALYTICAL RESULTS AND METHODOLOGIES FOR WATER CHEMISTRY, JUNE 2004

NORWEST LABS

Control Number E 133038

Environmental Sample Information Sheet

NOTE: Proper completion of this form is required in order to proceed with analysis
See reverse for your nearest Norwest location and proper sampling protocol

Billing Address:
Company: DIAND
Address: Waste Management
300-300 Main St.
Whitehorse, Yukon
Attention: Pat Roach
Phone: 867-667-3283
Fax:
Cell:
e-mail:

QA/QC Report ☑
Report Result: Fax ☐ Mail ☑ Courier ☐ e-mail ☑

Copy of Report To: Copy of invoice: ☐
Company: Laberge Environmental Services,
Address: P.O. Box 21072
Whitehorse YT Y1A 6P7
Attention: Bonnie Burns
Phone: 867-668-6838
Fax:
Cell:
e-mail: laberge@internorth.com

Email invoice to this address for approval ☐
Report Result: Fax ☐ Mail ☑ Courier ☐ e-mail ☑

Information to be included on Report and Invoice
Project ID:
Project Name: Se study @ Earn Lake
Project Location: Earn Lake
Legal Location: Stokes Lake
PO#:
Proj. Acct. Code:
Agreement ID:

RUSH Please contact the laboratory to confirm rush dates and times before submitting samples.
Upon filling out this section, client accepts that surcharges will be attached to this analysis
Required on: all analyses or as indicated ☐ or ☐
Date Required:
Signature:
Norwest Authorization:

Sample Custody (Please Print)
Sampled by: Date
Company: Signature
Relinquished by: JUN 10 2004
Company: Date
Waybill number:
Received by: Donna
Company: 313713. Date: June 10/04

RECEIVED

Special Instructions / Comments ☐ Check here if Norwest is required to report results directly to a regulatory body (Please include contact information)

Se is our focus for this study so please analyze for Se using your most accurate method.
* Also analyze for Selenate & selenite from E-1 @ 2m.

	Sample Identification	Location	Depth IN CM M	Date / Time Sampled	Matrix	Sampling Method	Number of Containers: Chlorophyll-a	Total metals: ultratrace	Dissolved " "	TTS, TDS	TN, NO_2, NO_3, NH_3	Cl, F	Total PO_4	SO_4	Turbidity	Colour, Cond	TOC	DOC
	Enter tests above (✔ relevant samples below)						✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
1	E-1 @ 2m		—	June 7/04	H_2O		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
2	E-1 @ 20 m		—	" "	"			✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
3	Earn R @ Earn L. outlet - E-4		—	" "	"			✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
4	E-3 @ 2m		—	June 8/04	"		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
5	E-3 @ 30 m		—	"	"			✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
6	Earn R @ Earn L. inlet		—	"	"			✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
7			—															
8			—															
9			—															
10	Note: Metals samples are not preserved		—															
11	- Dissolved metals samples have not		—															
12	been filtered. Please filter prior		—															
13	to analysis.		—															
14			—															
15			—															

NOTE: All hazardous samples must be labelled according to WHMIS guidelines.
Accredited by the Standards Council of Canada for specific tests

NWL008 (98/01)

Report Transmission Cover Page

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID:
Name: Se Study @ Earn Lake
Location: Earn Lake & Stokes Lake
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **313713**
Control Number: E 133038
Date Received: Jun 10, 2004
Date Reported: Jun 21, 2004
Report Number: 561224

Copies	Contact	Company	Address				
1	Pat Roach	Indian & Northern Affairs Canada	300, 300 Main Street Whitehorse, YT Y1A 2B5	Fax Email Custom Email	x	Post Pickup Courier	x
		Phone:	(867) 667-3139	Web		Hand	
		Fax:	(867) 667-3271	Email Notification			
		Email:					

_____ # OF PAGES IN THIS TRANSMISSION

Report Transmission Notes

Agreement Notes

Lot Notes

Sample Notes:

Notes to Clients

Lot Notes:

Sample Notes:

Batch Notes:

Method Notes:

Method Result Notes:

QC Result Notes:

Reports associated with this Lot

Id/Format/Reported Date	Id/Format/Reported Date	Id/Format/Reported Date
561224 Envir2QC 3 Smp & DL		

Comment:
See Methodology and Notes page of Analytical Report for all comments pertaining to this report.

If this report transmission is not satisfactory, please send report requirements to the address at the top of this page.

Sample Custody

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID:
Name: Se Study @ Earn Lake
Location: Earn Lake & Stokes Lake
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **313713**
Control Number: E 133038
Date Received: Jun 10, 2004
Date Reported: Jun 21, 2004
Report Number: 561224

Sample Disposal Date: Jul 21, 2004

All samples will be stored until this date unless other instructions are received. Please indicate other requirements below and return this form to the address or fax number on the upper right of this page.

_____ **Extend Sample Storage Until** _____ **(MM/DD/YY)**

The following charges apply to extended sample storage:

Storage for 1 to 5 samples per month	$ 10.00
Storage for 6 to 20 samples per month	$ 15.00
Storage for 21 to 50 samples per month	$ 30.00
Storage for 51 to 200 samples per month	$ 60.00
Storage for more than 200 samples per month	$ 110.00

_____ **Return Sample, collect, to the address below via:**

_____ Greyhound
_____ Loomis
_____ Purolator
_____ Other (Specify) _____

Name: _____
Company: _____
Address: _____
_____
Phone: _____
Fax: _____
Signature: _____

If no other arrangements have been made, samples will be disposed of on Jul 21, 2004.

Analytical Report

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID:
Name: Se Study @ Earn Lake
Location: Earn Lake & Stokes Lake
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **313713**
Control Number: E 133038
Date Received: Jun 10, 2004
Date Reported: Jun 21, 2004
Report Number: 561224

	NWL Number	313713-1	313713-2	313713-3	
	Sample Description	E - 1 @ 2m / 7-June-04	E - 1 @ 20m / 7-June-04	Earn R @ Earn L. Outlet - E - 4 / 7-June-04	
	Matrix	Water - General	Water - General	Water - General	
Analyte		**Units**	**Results**	**Results**	**Results**	**Detection Limit**
Inorganic Nonmetallic Parameters						
Ammonium - N		mg/L	<0.05	<0.05	<0.05	0.05
Kjeldahl Nitrogen	Total	mg/L	0.35	0.32	0.27	0.05
Nitrogen	Total	mg/L	0.35	0.32	0.27	
Orthophosphate-P	Dissolved	mg/L	<0.05	<0.05	<0.05	0.05
Organic Carbon	Total	mg/L	9.1	9.1	9.1	0.5
Organic Carbon	Dissolved	mg/L	8.6	8.8	9.1	0.5
Metals Dissolved						
Silicon	Dissolved	mg/L	3.46	3.72	3.46	0.05
Sulphur	Dissolved	mg/L	37.3	38.7	37.4	0.05
Aluminum	Dissolved	mg/L	0.008	0.009	0.006	0.005
Antimony	Dissolved	mg/L	0.0004	0.0003	0.0002	0.0002
Arsenic	Dissolved	mg/L	0.0007	0.0007	0.0007	0.0002
Barium	Dissolved	mg/L	0.047	0.052	0.045	0.001
Beryllium	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Bismuth	Dissolved	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Boron	Dissolved	mg/L	0.005	0.005	0.005	0.002
Cadmium	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Chromium	Dissolved	mg/L	<0.0005	0.0012	<0.0005	0.0005
Cobalt	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Copper	Dissolved	mg/L	0.002	0.002	0.002	0.001
Lead	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium	Dissolved	mg/L	0.008	0.009	0.008	0.001
Molybdenum	Dissolved	mg/L	0.002	0.002	0.002	0.001
Nickel	Dissolved	mg/L	0.0016	0.0024	0.0016	0.0005
Selenium	Dissolved	mg/L	0.0009	0.0008	0.0011	0.0002
Silver	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Strontium	Dissolved	mg/L	0.260	0.272	0.249	0.001
Thallium	Dissolved	mg/L	<0.00005	<0.00005	<0.00005	0.00005
Tin	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Titanium	Dissolved	mg/L	0.0022	0.0023	0.0024	0.0005
Uranium	Dissolved	mg/L	0.0009	0.0010	0.0010	0.0005
Vanadium	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Zinc	Dissolved	mg/L	0.007	0.002	<0.001	0.001
Metals Total						
Calcium	Total	mg/L	57.9	61.7	59.2	0.2

NORWEST LABS

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Analytical Report

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID:
Name: Se Study @ Earn Lake
Location: Earn Lake & Stokes Lake
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **313713**
Control Number: E 133038
Date Received: Jun 10, 2004
Date Reported: Jun 21, 2004
Report Number: 561224

	NWL Number	313713-1	313713-2	313713-3	
	Sample Description	E - 1 @ 2m / 7-June-04	E - 1 @ 20m / 7-June-04	Earn R @ Earn L. Outlet - E - 4 / 7-June-04	
	Matrix	Water - General	Water - General	Water - General	
Analyte		**Units**	**Results**	**Results**	**Results**	**Detection Limit**
Metals Total - Continued						
Iron	Total	mg/L	<0.1	<0.1	<0.1	0.1
Magnesium	Total	mg/L	24.7	26.3	25.1	0.1
Manganese	Total	mg/L	<0.005	<0.005	0.005	0.005
Potassium	Total	mg/L	1.4	1.4	1.4	0.4
Silicon	Total	mg/L	3.26	3.48	3.38	0.05
Sodium	Total	mg/L	3.5	3.7	3.5	0.4
Sulphur	Total	mg/L	34.8	37.0	35.3	0.05
Aluminum	Total	mg/L	0.041	0.020	0.051	0.005
Antimony	Total	mg/L	0.0034	0.0007	0.0002	0.0002
Arsenic	Total	mg/L	0.0008	0.0009	0.0007	0.0002
Barium	Total	mg/L	0.053	0.053	0.054	0.001
Beryllium	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Bismuth	Total	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Boron	Total	mg/L	0.006	0.006	0.006	0.002
Cadmium	Total	mg/L	0.00010	0.00003	0.00002	0.00001
Chromium	Total	mg/L	<0.0005	0.0017	<0.0005	0.0005
Cobalt	Total	mg/L	0.0001	<0.0001	0.0001	0.0001
Copper	Total	mg/L	0.003	0.002	0.002	0.001
Lead	Total	mg/L	0.0003	<0.0001	<0.0001	0.0001
Lithium	Total	mg/L	0.010	0.011	0.010	0.001
Molybdenum	Total	mg/L	0.002	0.002	0.002	0.001
Nickel	Total	mg/L	0.0028	0.0026	0.0024	0.0005
Selenium	Total	mg/L	0.0015	0.0011	0.0012	0.0002
Silver	Total	mg/L	0.0002	0.0001	0.0001	0.0001
Strontium	Total	mg/L	0.276	0.290	0.281	0.001
Thallium	Total	mg/L	<0.00005	<0.00005	<0.00005	0.00005
Tin	Total	mg/L	<0.001	<0.001	<0.001	0.001
Titanium	Total	mg/L	0.0038	0.0034	0.0043	0.0005
Uranium	Total	mg/L	0.0010	0.0010	0.0010	0.0005
Vanadium	Total	mg/L	0.0003	0.0002	0.0004	0.0001
Zinc	Total	mg/L	0.009	0.005	0.003	0.001
Zirconium	Total	mg/L	<0.001	<0.001	<0.001	0.001
Physical and Aggregate Properties						
Solids	Total Dissolved	mg/L dried at 180°C	293	327	293	7

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Analytical Report

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID:
Name: Se Study @ Earn Lake
Location: Earn Lake & Stokes Lake
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **313713**
Control Number: E 133038
Date Received: Jun 10, 2004
Date Reported: Jun 21, 2004
Report Number: 561224

		NWL Number	313713-1	313713-2	313713-3	
		Sample Description	E - 1 @ 2m / 7-June-04	E - 1 @ 20m / 7-June-04	Earn R @ Earn L. Outlet - E - 4 / 7-June-04	
		Matrix	Water - General	Water - General	Water - General	
Analyte		**Units**	**Results**	**Results**	**Results**	**Detection Limit**
Physical and Aggregate Properties - Continued						
Turbidity		NTU	2.5	1.9	2.1	0.1
Solids	Total Suspended	mg/L	<3	4	4	1
Colour	Apparent	Colour units	36	30	37	5
Routine Water						
pH			8.04	8.04	8.11	
Electrical Conductivity		µS/cm at 25C	444	466	452	1
Calcium	Dissolved	mg/L	57.5	57.7	58.7	0.2
Magnesium	Dissolved	mg/L	24.1	24.5	24.6	0.1
Sodium	Dissolved	mg/L	3.4	3.4	3.4	0.4
Potassium	Dissolved	mg/L	1.2	1.2	1.2	0.4
Iron	Dissolved	mg/L	0.04	0.02	0.03	0.01
Manganese	Dissolved	mg/L	<0.005	<0.005	<0.005	0.005
Chloride	Dissolved	mg/L	<0.5	0.7	<0.5	0.5
Fluoride		mg/L	0.11	0.12	0.12	0.05
Nitrate - N		mg/L	<0.1	<0.1	<0.1	0.1
Nitrite - N		mg/L	<0.05	<0.05	<0.05	0.05
Sulphate (SO4)	Dissolved	mg/L	112	116	112	0.2

		NWL Number	313713-1	313713-4		
		Sample Description	E - 1 @ 2m / 7-June-04	E - 3 @ 2m / 8-June-04		
		Matrix	Water - General	Water - General		
Analyte		**Units**	**Results**	**Results**	**Results**	**Detection Limit**
General Water Qualtity						
Chlorophyll-a	Calculated Value	ug/L	1.2	1.1		0.5
Phaeophytin	Calculated Value	ug/L	0.7	0.6		0.5

NORWEST LABS

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Analytical Report

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID:
Name: Se Study @ Earn Lake
Location: Earn Lake & Stokes Lake
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **313713**
Control Number: E 133038
Date Received: Jun 10, 2004
Date Reported: Jun 21, 2004
Report Number: 561224

			NWL Number	313713-4	313713-5	313713-6	
			Sample Description	E - 3 @ 2m / 8-June-04	E - 3 @ 30m / 8-June-04	Earn R @ Earn L. Inlet / 8-June-04	
			Matrix	Water - General	Water - General	Water - General	
Analyte		**Units**		**Results**	**Results**	**Results**	**Detection Limit**
Inorganic Nonmetallic Parameters							
Ammonium - N		mg/L		<0.05	<0.05	<0.05	0.05
Kjeldahl Nitrogen	Total	mg/L		0.24	0.31	0.36	0.05
Nitrogen	Total	mg/L		0.24	0.31	0.36	
Orthophosphate-P	Dissolved	mg/L		<0.05	<0.05	<0.05	0.05
Organic Carbon	Total	mg/L		10.0	9.4	10.7	0.5
Organic Carbon	Dissolved	mg/L		10.0	9.1	10.2	0.5
Metals Dissolved							
Silicon	Dissolved	mg/L		3.13	3.46	3.08	0.05
Sulphur	Dissolved	mg/L		38.0	38.4	44.1	0.05
Aluminum	Dissolved	mg/L		0.020	0.009	0.012	0.005
Antimony	Dissolved	mg/L		0.0002	<0.0002	0.0002	0.0002
Arsenic	Dissolved	mg/L		0.0006	0.0005	0.0005	0.0002
Barium	Dissolved	mg/L		0.044	0.047	0.043	0.001
Beryllium	Dissolved	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Bismuth	Dissolved	mg/L		<0.0005	<0.0005	<0.0005	0.0005
Boron	Dissolved	mg/L		0.005	0.005	0.006	0.002
Cadmium	Dissolved	mg/L		0.00003	0.00002	0.00005	0.00001
Chromium	Dissolved	mg/L		<0.0005	<0.0005	<0.0005	0.0005
Cobalt	Dissolved	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Copper	Dissolved	mg/L		0.002	0.002	0.002	0.001
Lead	Dissolved	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Lithium	Dissolved	mg/L		0.008	0.009	0.009	0.001
Molybdenum	Dissolved	mg/L		0.002	0.002	0.002	0.001
Nickel	Dissolved	mg/L		0.0022	0.0020	0.0026	0.0005
Selenium	Dissolved	mg/L		0.0006	0.0007	0.0005	0.0002
Silver	Dissolved	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Strontium	Dissolved	mg/L		0.243	0.259	0.245	0.001
Thallium	Dissolved	mg/L		<0.00005	<0.00005	<0.00005	0.00005
Tin	Dissolved	mg/L		<0.001	<0.001	<0.001	0.001
Titanium	Dissolved	mg/L		0.0026	0.0026	0.0029	0.0005
Uranium	Dissolved	mg/L		0.0008	0.0009	0.0009	0.0005
Vanadium	Dissolved	mg/L		0.0001	<0.0001	0.0002	0.0001
Zinc	Dissolved	mg/L		0.006	0.006	0.008	0.001
Metals Total							
Calcium	Total	mg/L		59.2	58.1	50.3	0.2
Iron	Total	mg/L		<0.1	<0.1	0.3	0.1

NORWEST LABS

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Analytical Report

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID:
Name: Se Study @ Earn Lake
Location: Earn Lake & Stokes Lake
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **313713**
Control Number: E 133038
Date Received: Jun 10, 2004
Date Reported: Jun 21, 2004
Report Number: 561224

	NWL Number	313713-4	313713-5	313713-6	
	Sample Description	E - 3 @ 2m / 8-June-04	E - 3 @ 30m / 8-June-04	Earn R @ Earn L. Inlet / 8-June-04	
	Matrix	Water - General	Water - General	Water - General	
Analyte	**Units**	**Results**	**Results**	**Results**	**Detection Limit**
Metals Total - Continued					
Magnesium Total	mg/L	26.6	26.3	29.4	0.1
Manganese Total	mg/L	0.008	<0.005	0.023	0.005
Potassium Total	mg/L	1.5	1.4	1.4	0.4
Silicon Total	mg/L	3.38	3.27	3.07	0.05
Sodium Total	mg/L	3.8	3.8	4.2	0.4
Sulphur Total	mg/L	37.3	36.9	38.4	0.05
Aluminum Total	mg/L	0.047	0.019	0.120	0.005
Antimony Total	mg/L	0.0003	0.0003	0.0003	0.0002
Arsenic Total	mg/L	0.0007	0.0007	0.0006	0.0002
Barium Total	mg/L	0.051	0.050	0.053	0.001
Beryllium Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Bismuth Total	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Boron Total	mg/L	0.006	0.007	0.007	0.002
Cadmium Total	mg/L	0.00004	0.00003	0.00009	0.00001
Chromium Total	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Cobalt Total	mg/L	0.0001	<0.0001	0.0002	0.0001
Copper Total	mg/L	0.002	0.002	0.003	0.001
Lead Total	mg/L	<0.0001	<0.0001	0.0001	0.0001
Lithium Total	mg/L	0.011	0.011	0.012	0.001
Molybdenum Total	mg/L	0.002	0.002	0.002	0.001
Nickel Total	mg/L	0.0028	0.0028	0.0038	0.0005
Selenium Total	mg/L	0.0007	0.0007	0.0008	0.0002
Silver Total	mg/L	0.0001	<0.0001	<0.0001	0.0001
Strontium Total	mg/L	0.289	0.287	0.258	0.001
Thallium Total	mg/L	<0.00005	<0.00005	<0.00005	0.00005
Tin Total	mg/L	<0.001	<0.001	<0.001	0.001
Titanium Total	mg/L	0.0050	0.0032	0.0055	0.0005
Uranium Total	mg/L	0.0010	0.0010	0.0010	0.0005
Vanadium Total	mg/L	0.0004	0.0002	0.0011	0.0001
Zinc Total	mg/L	0.006	0.006	0.009	0.001
Zirconium Total	mg/L	<0.001	<0.001	<0.001	0.001
Physical and Aggregate Properties					
Solids Total Dissolved	mg/L dried at 180°C	267	307	293	7
Turbidity	NTU	3.2	3.0	3.2	0.1
Solids Total Suspended	mg/L	4	4	11	1

NORWEST LABS

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Analytical Report

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID:
Name: Se Study @ Earn Lake
Location: Earn Lake & Stokes Lake
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **313713**
Control Number: E 133038
Date Received: Jun 10, 2004
Date Reported: Jun 21, 2004
Report Number: 561224

	NWL Number	313713-4	313713-5	313713-6	
	Sample Description	E - 3 @ 2m / 8-June-04	E - 3 @ 30m / 8-June-04	Earn R @ Earn L. Inlet / 8-June-04	
	Matrix	Water - General	Water - General	Water - General	
Analyte	**Units**	**Results**	**Results**	**Results**	**Detection Limit**
Physical and Aggregate Properties - Continued					
Colour, Apparent	Colour units	46	38	48	5
Routine Water					
pH		8.06	8.02	8.06	
Electrical Conductivity	µS/cm at 25C	430	461	446	1
Calcium, Dissolved	mg/L	50.6	55.7	48.0	0.2
Magnesium, Dissolved	mg/L	24.7	24.9	27.6	0.1
Sodium, Dissolved	mg/L	3.5	3.5	3.8	0.4
Potassium, Dissolved	mg/L	1.2	1.2	1.1	0.4
Iron, Dissolved	mg/L	0.05	0.04	0.07	0.01
Manganese, Dissolved	mg/L	<0.005	<0.005	0.010	0.005
Chloride, Dissolved	mg/L	<0.5	1.1	0.8	0.5
Fluoride	mg/L	0.12	0.12	0.13	0.05
Nitrate - N	mg/L	<0.1	<0.1	<0.1	0.1
Nitrite - N	mg/L	<0.05	<0.05	<0.05	0.05
Sulphate (SO4), Dissolved	mg/L	114	115	132	0.2

Approved by: C William Warning

Bill Warning, B.Sc.
Lab Operations Manager

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Quality Control

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID:
Name: Se Study @ Earn Lake
Location: Earn Lake & Stokes Lake
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 313713
Control Number: E 133038
Date Received: Jun 10, 2004
Date Reported: Jun 21, 2004
Report Number: 561224

Inorganic Nonmetallic Parameters

Blanks	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Ammonium - N	mg/L	<0.05	0.00	-0.08	0.08	✓
Kjeldahl Nitrogen	mg/L	0.05	0.00	-0.05	0.05	✓
Orthophosphate-P	mg/L	<0.05	0.00	-0.05	0.05	✓
Organic Carbon	mg/L	<0.5	0.0	-0.5	0.5	✓
Material Used:	Edmonton Method Blank					
Date Acquired:	Jun 16, 2004					
Acquired By:						

Replicates	Units	Replicate1	Replicate2	% RSD Criteria	Absolute Criteria	Passed QC
Ammonium - N	mg/L	0.24	0.24	9.99	0.10	✓
Kjeldahl Nitrogen	mg/L	0.31	0.32	9.99	0.30	✓
Orthophosphate-P	mg/L	1.8	1.8	9.99	0.05	✓
Organic Carbon	mg/L	8.8	8.8	10.0	1.0	✓
Material Used:	Edmonton Duplicate					
Date Acquired:	Jun 16, 2004					
Acquired By:						

Control Sample	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Ammonium - N	mg/L	2.99	2.99	2.59	3.39	✓
Kjeldahl Nitrogen	mg/L	18.5	15.3	11.7	18.9	✓
Organic Carbon	mg/L	119	116	98	134	✓
Material Used:	Water High					
Date Acquired:	Jun 16, 2004					
Acquired By:	Linda Li					
Ammonium - N	mg/L	0.78	0.79	0.66	0.91	✓
Kjeldahl Nitrogen	mg/L	3.17	3.00	2.41	3.59	✓
Orthophosphate-P	mg/L	0.41	0.40	0.34	0.45	✓
Organic Carbon	mg/L	16.0	15.0	13.2	16.8	✓
Material Used:	Water Low					
Date Acquired:	Jun 16, 2004					
Acquired By:						
Organic Carbon	mg/L	3.3	3.0	2.4	3.7	✓
Material Used:	Water Trace					
Date Acquired:	Jun 16, 2004					
Acquired By:						

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Quality Control

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300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID:
Name: Se Study @ Earn Lake
Location: Earn Lake & Stokes Lake
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 313713
Control Number: E 133038
Date Received: Jun 10, 2004
Date Reported: Jun 21, 2004
Report Number: 561224

Metals Dissolved

Blanks	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Sulphur	mg/L	23.9	0.08	-2.22	2.39	✓
Aluminum	ug/L	<5	-2	-8	4	✓
Antimony	ug/L	<0.2	0.0	-0.1	0.2	✓
Arsenic	ug/L	<0.2	0.0	0.0	0.0	✓
Barium	ug/L	<1	0	0	0	✓
Beryllium	ug/L	<0.1	0.0	0.0	0.0	✓
Bismuth	ug/L	<0.5	0.0	-0.1	0.1	✓
Boron	ug/L	<2	0	-2	2	✓
Cadmium	ug/L	<0.01	0.00	-0.01	0.01	✓
Chromium	ug/L	<0.5	-0.1	-0.4	0.2	✓
Cobalt	ug/L	<0.1	0.0	0.0	0.0	✓
Copper	ug/L	<1	0	-1	1	✓
Lead	ug/L	<0.1	0.0	0.0	0.0	✓
Lithium	ug/L	<1	0	0	0	✓
Molybdenum	ug/L	<1	0	0	0	✓
Nickel	ug/L	<0.5	0.0	-0.3	0.3	✓
Selenium	ug/L	<0.2	-0.1	-0.3	0.1	✓
Silver	ug/L	<0.1	0.0	0.0	0.0	✓
Strontium	ug/L	<1	0	0	0	✓
Thallium	ug/L	<0.05	0.00	0.00	0.01	✓
Tin	ug/L	<1	0	0	0	✓
Titanium	ug/L	<0.5	0.0	-0.2	0.1	✓
Uranium	ug/L	<0.5	0.0	0.0	0.0	✓
Vanadium	ug/L	<0.1	0.0	-0.1	0.0	✓
Zinc	ug/L	<1	0	-1	1	✓

Material Used: Edmonton Method Blank
Date Acquired: Jun 16, 2004
Acquired By: Jesse Dang

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Quality Control

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID:
Name: Se Study @ Earn Lake
Location: Earn Lake & Stokes Lake
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 313713
Control Number: E 133038
Date Received: Jun 10, 2004
Date Reported: Jun 21, 2004
Report Number: 561224

Metals Dissolved (Continued...)

Replicates	Units	Replicate1	Replicate2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	8.44	8.44	9.99	0.01	✓
Sulphur	mg/L	284	283	9.99	0.02	✓
Aluminum	ug/L	20	16	10	11	✓
Antimony	ug/L	0.2	0.2	10.0	0.4	✓
Arsenic	ug/L	0.7	0.8	10.0	0.4	✓
Barium	ug/L	44	44	10	2	✓
Beryllium	ug/L	<0.1	<0.1	10.0	0.2	✓
Bismuth	ug/L	<0.5	<0.5	10.0	1.1	✓
Boron	ug/L	5	5	10	4	✓
Cadmium	ug/L	0.03	<0.01	9.99	0.02	✓
Chromium	ug/L	4.0	4.2	10.0	1.1	✓
Cobalt	ug/L	0.6	0.7	10.0	0.2	✓
Copper	ug/L	3	5	10	2	✓
Lead	ug/L	<0.1	<0.1	10.0	0.2	✓
Lithium	ug/L	8	8	10	2	✓
Molybdenum	ug/L	2	2	10	2	✓
Nickel	ug/L	2.2	2.1	10.0	1.1	✓
Selenium	ug/L	0.7	0.8	10.0	0.4	✓
Silver	ug/L	<0.1	<0.1	10.0	0.2	✓
Strontium	ug/L	618	667	10	2	✓
Thallium	ug/L	0.05	0.05	9.99	0.11	✓
Tin	ug/L	<1	<1	10	2	✓
Titanium	ug/L	8.1	8.3	10.0	1.1	✓
Uranium	ug/L	8.8	9.2	10.0	1.1	✓
Vanadium	ug/L	0.5	0.5	10.0	0.2	✓
Zinc	ug/L	6	8	10	2	✓

Material Used: Edmonton Duplicate
Date Acquired: Jun 16, 2004
Acquired By: Jesse Dang

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Quality Control

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID:
Name: Se Study @ Earn Lake
Location: Earn Lake & Stokes Lake
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 313713
Control Number: E 133038
Date Received: Jun 10, 2004
Date Reported: Jun 21, 2004
Report Number: 561224

Metals Dissolved (Continued...)

Control Sample		Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Silicon		mg/L	24.5	25.0	22.5	27.5	✓
Sulphur		mg/L	49.5	49.8	44.6	55.0	✓
Material Used:	Metals High						
Date Acquired:	Jun 16, 2004						
Acquired By:	To Thong						
Silicon		mg/L	0.46	0.50	0.45	0.55	✓
Sulphur		mg/L	0.95	1.02	0.81	1.23	✓
Aluminum		ug/L	1020	1000	850	1150	✓
Antimony		ug/L	39.8	40.0	34.0	46.0	✓
Arsenic		ug/L	39.3	40.0	34.0	46.0	✓
Barium		ug/L	200	200	170	230	✓
Beryllium		ug/L	20.9	20.0	17.0	23.0	✓
Bismuth		ug/L	103	100	85	115	✓
Boron		ug/L	399	400	340	460	✓
Cadmium		ug/L	2.07	2.00	1.70	2.30	✓
Chromium		ug/L	98.1	100	85	115	✓
Cobalt		ug/L	20.3	20.0	17.0	23.0	✓
Copper		ug/L	193	200	170	230	✓
Lead		ug/L	20.3	20.0	17.0	23.0	✓
Lithium		ug/L	198	200	170	230	✓
Molybdenum		ug/L	198	200	170	230	✓
Nickel		ug/L	98.8	100	85	115	✓
Selenium		ug/L	37.5	40.0	34.0	46.0	✓
Silver		ug/L	20.8	20.0	17.0	23.0	✓
Strontium		ug/L	195	200	170	230	✓
Thallium		ug/L	10.5	10.0	8.5	11.5	✓
Tin		ug/L	189	200	170	230	✓
Titanium		ug/L	102	100	85	115	✓
Uranium		ug/L	102	100	85	115	✓
Vanadium		ug/L	20.4	20.0	17.0	23.0	✓
Zinc		ug/L	186	200	170	230	✓
Material Used:	Metals Low						
Date Acquired:	Jun 16, 2004						
Acquired By:	Jesse Dang						

Norwest Labs
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Quality Control

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID:
Name: Se Study @ Earn Lake
Location: Earn Lake & Stokes Lake
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 313713
Control Number: E 133038
Date Received: Jun 10, 2004
Date Reported: Jun 21, 2004
Report Number: 561224

Metals Dissolved (Continued...)

Control Sample	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Aluminum	ug/L	52	50	43	58	✓
Antimony	ug/L	2.2	2.0	1.7	2.3	✓
Arsenic	ug/L	2.1	2.0	1.7	2.3	✓
Barium	ug/L	10	10	9	12	✓
Beryllium	ug/L	1.1	1.0	0.9	1.2	✓
Bismuth	ug/L	5.1	5.0	4.3	5.8	✓
Boron	ug/L	23	20	17	23	✓
Cadmium	ug/L	0.11	0.10	0.09	0.12	✓
Chromium	ug/L	4.9	5.0	4.3	5.8	✓
Cobalt	ug/L	1.1	1.0	0.9	1.2	✓
Copper	ug/L	10	10	9	12	✓
Lead	ug/L	1.0	1.0	0.9	1.2	✓
Lithium	ug/L	11	10	9	12	✓
Molybdenum	ug/L	10	10	9	12	✓
Nickel	ug/L	5.2	5.0	4.3	5.8	✓
Selenium	ug/L	2.0	2.0	1.7	2.3	✓
Silver	ug/L	1.1	1.0	0.9	1.2	✓
Strontium	ug/L	11	10	9	12	✓
Thallium	ug/L	0.52	0.50	0.43	0.58	✓
Tin	ug/L	10	10	9	12	✓
Titanium	ug/L	5.4	5.0	4.3	5.8	✓
Uranium	ug/L	5.2	5.0	4.3	5.8	✓
Vanadium	ug/L	1.0	1.0	0.9	1.2	✓
Zinc	ug/L	10	10	9	12	✓

Material Used: Metals Trace
Date Acquired: Jun 16, 2004
Acquired By: Jesse Dang

NORWEST LABS

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
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Quality Control

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project
ID:
Name: Se Study @ Earn Lake
Location: Earn Lake & Stokes Lake
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **313713**
Control Number: E 133038
Date Received: Jun 10, 2004
Date Reported: Jun 21, 2004
Report Number: 561224

Metals Total

Blanks	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	<0.2	0.0	0.0	0.1	✓
Iron	mg/L	<0.1	0.0	0.0	0.0	✓
Magnesium	mg/L	<0.1	0.0	0.0	0.0	✓
Manganese	mg/L	<0.005	0.000	-0.001	0.001	✓
Potassium	mg/L	<0.4	0.0	-0.1	0.1	✓
Silicon	mg/L	<0.05	0.02	-0.04	0.09	✓
Sodium	mg/L	<0.4	0.1	-0.2	0.3	✓
Sulphur	mg/L	<0.05	0.01	-0.03	0.04	✓
Aluminum	ug/L	<5	0	-5	5	✓
Antimony	ug/L	<0.2	0.0	-0.2	0.2	✓
Arsenic	ug/L	<0.2	0.0	-0.2	0.2	✓
Barium	ug/L	<1	0	-1	1	✓
Beryllium	ug/L	<0.1	0.0	-0.1	0.1	✓
Bismuth	ug/L	<0.5	0.0	-0.5	0.5	✓
Boron	ug/L	<2	0	-2	2	✓
Cadmium	ug/L	<0.01	0.00	-0.01	0.01	✓
Chromium	ug/L	<0.5	0.0	-0.5	0.5	✓
Cobalt	ug/L	<0.1	0.0	-0.1	0.1	✓
Copper	ug/L	<1	0	-1	1	✓
Lead	ug/L	<0.1	0.0	-0.1	0.1	✓
Lithium	ug/L	<1	0	-1	1	✓
Molybdenum	ug/L	<1	0	-1	1	✓
Nickel	ug/L	<0.5	0.0	-0.5	0.5	✓
Selenium	ug/L	<0.2	0.0	-0.2	0.2	✓
Silver	ug/L	<0.1	0.0	-0.1	0.1	✓
Strontium	ug/L	<1	0	-1	1	✓
Thallium	ug/L	<0.05	0.00	-0.05	0.05	✓
Tin	ug/L	<1	0	-1	1	✓
Titanium	ug/L	<0.5	0.0	-0.5	0.5	✓
Uranium	ug/L	<0.5	0.0	-0.5	0.5	✓
Vanadium	ug/L	<0.1	0.0	-0.1	0.1	✓
Zinc	ug/L	<1	0	-1	1	✓
Zirconium	ug/L	<1	0	-1	1	✓

Material Used: Edmonton Method Blank
Date Acquired: Jun 16, 2004
Acquired By: Jesse Dang

Norwest Labs
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Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Quality Control

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID:
Name: Se Study @ Earn Lake
Location: Earn Lake & Stokes Lake
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 313713
Control Number: E 133038
Date Received: Jun 10, 2004
Date Reported: Jun 21, 2004
Report Number: 561224

Metals Total (Continued...)

Replicates	Units	Replicate1	Replicate2	% RSD Criteria	Absolute Criteria	Passed QC
Calcium	mg/L	59.2	56.8	10.0	0.6	✓
Iron	mg/L	<0.1	0.1	10.0	0.0	✓
Magnesium	mg/L	26.6	25.8	10.0	0.2	✓
Manganese	mg/L	0.008	0.008	9.990	0.001	✓
Potassium	mg/L	1.5	1.4	10.0	1.2	✓
Silicon	mg/L	3.38	3.32	9.99	0.01	✓
Sodium	mg/L	3.8	3.7	10.0	1.2	✓
Sulphur	mg/L	37.3	36.0	9.99	0.03	✓
Aluminum	ug/L	20	25	10	11	✓
Antimony	ug/L	0.7	0.7	10.0	0.4	✓
Arsenic	ug/L	0.9	0.6	10.0	0.4	✓
Barium	ug/L	54	54	10	2	✓
Beryllium	ug/L	<0.1	<0.1	10.0	0.2	✓
Bismuth	ug/L	<0.5	<0.5	10.0	1.1	✓
Boron	ug/L	6	6	10	4	✓
Cadmium	ug/L	0.04	0.04	9.99	0.02	✓
Chromium	ug/L	1.7	<0.5	10.0	1.1	✓
Cobalt	ug/L	0.1	0.1	10.0	0.2	✓
Copper	ug/L	3	3	10	2	✓
Lead	ug/L	0.3	0.3	10.0	0.2	✓
Lithium	ug/L	11	11	10	2	✓
Molybdenum	ug/L	2	2	10	2	✓
Nickel	ug/L	2.6	2.7	10.0	1.1	✓
Selenium	ug/L	1.1	1.0	10.0	0.4	✓
Silver	ug/L	0.1	0.1	10.0	0.2	✓
Strontium	ug/L	290	287	10	2	✓
Thallium	ug/L	<0.05	<0.05	9.99	0.11	✓
Tin	ug/L	<1	<1	10	2	✓
Titanium	ug/L	3.4	3.3	10.0	1.1	✓
Uranium	ug/L	1.0	1.0	10.0	1.1	✓
Vanadium	ug/L	0.3	0.4	10.0	0.2	✓
Zinc	ug/L	5	4	10	2	✓
Zirconium	ug/L	<1	<1	10	2	✓

Material Used: Edmonton Duplicate
Date Acquired: Jun 16, 2004
Acquired By: Jesse Dang

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Quality Control

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID:
Name: Se Study @ Earn Lake
Location: Earn Lake & Stokes Lake
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 313713
Control Number: E 133038
Date Received: Jun 10, 2004
Date Reported: Jun 21, 2004
Report Number: 561224

Metals Total (Continued...)

Control Sample	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	50.5	49.6	45.6	53.7	✓
Iron	mg/L	2.1	2.0	1.8	2.2	✓
Magnesium	mg/L	19.9	20.3	18.6	22.0	✓
Manganese	mg/L	0.496	0.479	0.451	0.507	✓
Potassium	mg/L	48.2	47.8	43.5	52.1	✓
Silicon	mg/L	4.50	5.00	4.50	5.50	✓
Sodium	mg/L	49.2	49.1	44.4	53.8	✓
Sulphur	mg/L	9.49	9.68	8.74	10.62	✓
Aluminum	ug/L	330	322	273	371	✓
Antimony	ug/L	10.7	11.5	10.2	12.8	✓
Arsenic	ug/L	10.4	11.5	10.3	12.7	✓
Barium	ug/L	65	61	52	69	✓
Beryllium	ug/L	6.7	5.9	4.9	7.0	✓
Bismuth	ug/L	26.8	30.2	26.0	34.4	✓
Boron	ug/L	135	125	102	148	✓
Cadmium	ug/L	0.66	0.63	0.47	0.78	✓
Chromium	ug/L	32.9	31.8	27.5	36.2	✓
Cobalt	ug/L	6.7	6.4	5.4	7.5	✓
Copper	ug/L	63	63	55	70	✓
Lead	ug/L	5.7	6.2	5.4	7.0	✓
Lithium	ug/L	70	65	53	76	✓
Molybdenum	ug/L	60	61	53	69	✓
Nickel	ug/L	32.3	31.4	27.0	35.8	✓
Selenium	ug/L	10.7	11.0	9.7	12.3	✓
Silver	ug/L	6.4	6.2	5.5	7.0	✓
Strontium	ug/L	59	64	55	72	✓
Thallium	ug/L	2.84	3.14	2.56	3.72	✓
Tin	ug/L	60	59	52	66	✓
Titanium	ug/L	33.0	31.5	27.0	36.0	✓
Uranium	ug/L	27.5	30.8	26.9	34.7	✓
Vanadium	ug/L	6.5	6.5	5.4	7.6	✓
Zinc	ug/L	57	59	49	69	✓
Zirconium	ug/L	60	62	53	72	✓

Material Used: Edmonton Digestion Check
Date Acquired: Jun 16, 2004
Acquired By: Jesse Dang

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
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Quality Control

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID:
Name: Se Study @ Earn Lake
Location: Earn Lake & Stokes Lake
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 313713
Control Number: E 133038
Date Received: Jun 10, 2004
Date Reported: Jun 21, 2004
Report Number: 561224

Metals Total (Continued...)

Control Sample	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	252	253	232	274	✓
Iron	mg/L	10.0	9.7	9.1	10.3	✓
Magnesium	mg/L	100	102	92	112	✓
Manganese	mg/L	2.40	2.45	2.27	2.63	✓
Potassium	mg/L	252	253	226	280	✓
Silicon	mg/L	23.4	25.0	22.5	27.5	✓
Sodium	mg/L	255	251	221	281	✓
Sulphur	mg/L	49.2	50.0	46.3	53.7	✓

Material Used: Metals High
Date Acquired: Jun 16, 2004
Acquired By: Fernando Maglalang

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Quality Control

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID:
Name: Se Study @ Earn Lake
Location: Earn Lake & Stokes Lake
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 313713
Control Number: E 133038
Date Received: Jun 10, 2004
Date Reported: Jun 21, 2004
Report Number: 561224

Metals Total (Continued...)

Control Sample	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	4.9	4.7	4.3	5.2	✓
Iron	mg/L	0.2	0.2	0.2	0.2	✓
Magnesium	mg/L	2.0	1.9	1.7	2.1	✓
Manganese	mg/L	0.048	0.048	0.043	0.052	✓
Potassium	mg/L	4.8	5.0	4.4	5.6	✓
Silicon	mg/L	0.46	0.50	0.45	0.55	✓
Sodium	mg/L	4.8	5.2	4.4	6.1	✓
Sulphur	mg/L	0.92	0.98	0.82	1.13	✓
Aluminum	ug/L	960	1000	850	1150	✓
Antimony	ug/L	39.6	40.0	34.0	46.0	✓
Arsenic	ug/L	38.1	40.0	34.0	46.0	✓
Barium	ug/L	198	200	170	230	✓
Beryllium	ug/L	21.8	20.0	17.0	23.0	✓
Bismuth	ug/L	97.9	100	85	115	✓
Boron	ug/L	402	400	340	460	✓
Cadmium	ug/L	1.95	2.00	1.70	2.30	✓
Chromium	ug/L	96.7	100	85	115	✓
Cobalt	ug/L	19.5	20.0	17.0	23.0	✓
Copper	ug/L	191	200	170	230	✓
Lead	ug/L	19.8	20.0	17.0	23.0	✓
Lithium	ug/L	205	200	170	230	✓
Molybdenum	ug/L	201	200	170	230	✓
Nickel	ug/L	94.1	100	85	115	✓
Selenium	ug/L	38.2	40.0	34.0	46.0	✓
Silver	ug/L	20.7	20.0	17.0	23.0	✓
Strontium	ug/L	196	200	170	230	✓
Thallium	ug/L	9.96	10.0	8.5	11.5	✓
Tin	ug/L	194	200	170	230	✓
Titanium	ug/L	97.1	100	85	115	✓
Uranium	ug/L	98.2	100	85	115	✓
Vanadium	ug/L	19.4	20.0	17.0	23.0	✓
Zinc	ug/L	193	200	170	230	✓
Zirconium	ug/L	193	200	170	230	✓

Material Used: Metals Low
Date Acquired: Jun 16, 2004
Acquired By: Jesse Dang

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Quality Control

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID:
Name: Se Study @ Earn Lake
Location: Earn Lake & Stokes Lake
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 313713
Control Number: E 133038
Date Received: Jun 10, 2004
Date Reported: Jun 21, 2004
Report Number: 561224

Metals Total (Continued...)

Control Sample	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Aluminum	ug/L	52	50	43	58	✓
Antimony	ug/L	1.9	2.0	1.7	2.3	✓
Arsenic	ug/L	1.9	2.0	1.7	2.3	✓
Barium	ug/L	10	10	9	12	✓
Beryllium	ug/L	1.0	1.0	0.9	1.2	✓
Bismuth	ug/L	5.0	5.0	4.3	5.8	✓
Boron	ug/L	21	20	17	23	✓
Cadmium	ug/L	0.11	0.10	0.09	0.12	✓
Chromium	ug/L	5.2	5.0	4.3	5.8	✓
Cobalt	ug/L	1.1	1.0	0.9	1.2	✓
Copper	ug/L	10	10	9	12	✓
Lead	ug/L	1.0	1.0	0.9	1.2	✓
Lithium	ug/L	11	10	9	12	✓
Molybdenum	ug/L	9	10	9	12	✓
Nickel	ug/L	5.4	5.0	4.3	5.8	✓
Selenium	ug/L	2.0	2.0	1.7	2.3	✓
Silver	ug/L	1.0	1.0	0.9	1.2	✓
Strontium	ug/L	10	10	9	12	✓
Thallium	ug/L	0.49	0.50	0.43	0.58	✓
Tin	ug/L	10	10	9	12	✓
Titanium	ug/L	5.2	5.0	4.3	5.8	✓
Uranium	ug/L	4.9	5.0	4.3	5.8	✓
Vanadium	ug/L	1.0	1.0	0.9	1.2	✓
Zinc	ug/L	10	10	9	12	✓
Zirconium	ug/L	10	10	9	12	✓

Material Used: Metals Trace
Date Acquired: Jun 16, 2004
Acquired By: Jesse Dang

NORWEST LABS

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Quality Control

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300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID:
Name: Se Study @ Earn Lake
Location: Earn Lake & Stokes Lake
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 313713
Control Number: E 133038
Date Received: Jun 10, 2004
Date Reported: Jun 21, 2004
Report Number: 561224

Physical and Aggregate Properties

Blanks		Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Solids		mg/L dried at	<7	0	0	0	✓
Turbidity		NTU	<0.1	0.0	-0.1	0.1	✓
Material Used:	Edmonton Method Blank						
Date Acquired:	Jun 17, 2004						
Acquired By:	Alexsandra Robert						

Replicates		Units	Replicate1	Replicate2	% RSD Criteria	Absolute Criteria	Passed QC
Solids		mg/L dried at	693	687	10	15	✓
Turbidity		NTU	6.5	6.8	10.0	0.2	✓
Solids		mg/L	83	89	10	15	✓
Material Used:	Edmonton Duplicate						
Date Acquired:	Jun 16, 2004						
Acquired By:							

Control Sample		Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Turbidity		NTU	2150	2187	1958	2416	✓
Material Used:	Turbidity High						
Date Acquired:	Jun 17, 2004						
Acquired By:	Alexsandra Robert						
Turbidity		NTU	7440	7609	6876	8343	✓
Material Used:	Turbidity Ultra High						
Date Acquired:	Jun 17, 2004						
Acquired By:	Alexsandra Robert						
Solids		mg/L dried at	513	506	407	605	✓
Turbidity		NTU	160	164	147	181	✓
Solids		mg/L	188	200	180	220	✓
Material Used:	Water High						
Date Acquired:	Jun 16, 2004						
Acquired By:	Ryan Lyster						
Solids		mg/L dried at	87	101	64	138	✓
Turbidity		NTU	14.4	14.8	13.3	16.3	✓
Solids		mg/L	19	20	18	22	✓
Material Used:	Water Low						
Date Acquired:	Jun 16, 2004						
Acquired By:	Ryan Lyster						
Turbidity		NTU	1.4	1.5	1.3	1.6	✓
Material Used:	Water Trace						
Date Acquired:	Jun 17, 2004						
Acquired By:	Alexsandra Robert						

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Y1A 2B5
Attn: Pat Roach
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Company:

Project ID:
Name: Se Study @ Earn Lake
Location: Earn Lake & Stokes Lake
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 313713
Control Number: E 133038
Date Received: Jun 10, 2004
Date Reported: Jun 21, 2004
Report Number: 561224

Routine Water

Blanks	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	<0.5	0.0	-0.5	0.5	✓
Fluoride	mg/L	<0.05	0.00	-0.04	0.04	✓
Nitrate - N	mg/L	<0.1	0.0	-0.1	0.1	✓
Nitrite - N	mg/L	<0.05	0.00	-0.01	0.01	✓
Material Used:	Edmonton Method Blank					
Date Acquired:	Jun 15, 2004					
Acquired By:	Jodi Johnston					

Replicates	Units	Replicate1	Replicate2	% RSD Criteria	Absolute Criteria	Passed QC
pH		8.61	8.66	9.99	0.10	✓
Electrical Conductivity	dS/m at 25C	2.49	2.50	9.990	0.002	✓
Calcium	mg/L	224	224	10.0	0.6	✓
Magnesium	mg/L	216	217	10.0	0.2	✓
Sodium	mg/L	380	381	10.0	1.2	✓
Potassium	mg/L	3.5	4.0	10.0	1.2	✓
Iron	mg/L	3.73	3.71	9.99	0.01	✓
Manganese	mg/L	1.34	1.45	9.990	0.001	✓
Chloride	mg/L	36.8	36.6	10.0	0.5	✓
Material Used:	Edmonton Duplicate					
Date Acquired:	Jun 16, 2004					
Acquired By:						

NORWEST LABS

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Y1A 2B5
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Sampled By:
Company:

Project ID:
Name: Se Study @ Earn Lake
Location: Earn Lake & Stokes Lake
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **313713**
Control Number: E 133038
Date Received: Jun 10, 2004
Date Reported: Jun 21, 2004
Report Number: 561224

Routine Water (Continued...)

Control Sample		Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Chloride		mg/L	2100	2087	1875	2299	✓
Material Used:	Chloride High						
Date Acquired:	Jun 16, 2004						
Acquired By:							
Calcium		mg/L	252	251	237	265	✓
Magnesium		mg/L	98.7	102	95	109	✓
Sodium		mg/L	240	250	236	264	✓
Potassium		mg/L	244	251	234	268	✓
Iron		mg/L	9.82	9.73	9.26	10.20	✓
Manganese		mg/L	2.44	2.42	2.32	2.53	✓
Material Used:	Metals High						
Date Acquired:	Jun 16, 2004						
Acquired By:	To Thong						
Calcium		mg/L	5.0	4.8	4.3	5.3	✓
Magnesium		mg/L	1.9	2.0	1.7	2.2	✓
Sodium		mg/L	4.6	5.2	4.3	6.1	✓
Potassium		mg/L	4.6	5.0	4.5	5.4	✓
Iron		mg/L	0.20	0.20	0.15	0.24	✓
Manganese		mg/L	0.048	0.049	0.044	0.054	✓
Material Used:	Metals Low						
Date Acquired:	Jun 16, 2004						
Acquired By:	To Thong						
pH			9.15	9.23	9.11	9.35	✓
Electrical Conductivity		dS/m at 25C	2.75	2.73	2.61	2.85	✓
Chloride		mg/L	79.8	81.0	76.4	85.6	✓
Fluoride		mg/L	10.6	9.95	9.26	10.64	✓
Nitrate - N		mg/L	10.4	10.0	9.6	10.4	✓
Nitrite - N		mg/L	10.3	10.0	9.6	10.4	✓
Material Used:	Water High						
Date Acquired:	Jun 15, 2004						
Acquired By:	Marc Dzura						
pH			6.86	6.90	6.83	6.97	✓
Electrical Conductivity		dS/m at 25C	0.078	0.076	0.070	0.081	✓
Chloride		mg/L	15.0	14.9	13.2	16.6	✓
Fluoride		mg/L	0.52	0.51	0.43	0.58	✓
Nitrate - N		mg/L	0.5	0.5	0.4	0.6	✓
Nitrite - N		mg/L	0.50	0.50	0.44	0.55	✓
Material Used:	Water Low						
Date Acquired:	Jun 15, 2004						
Acquired By:	Marc Dzura						

Norwest Labs
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Fax: (604) 514-3323

Methodology and Notes

Bill to: Indian & Northern Affairs Canada
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300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID:
Name: Se Study @ Earn Lake
Location: Earn Lake & Stokes Lake
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **313713**
Control Number: E 133038
Date Received: Jun 10, 2004
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Method of Analysis:

MethodName	Reference		Method	Date Analysis Started	Location
(Ortho)Phosphate in Water	APHA	*	Automated Ascorbic Acid Reduction Method, 4500-P F	16-Jun-04	Norwest Labs Edmonton
Alkalinity, pH, and EC in water	APHA	*	Conductivity - Laboratory Method, 2510 B	16-Jun-04	Norwest Labs Edmonton
Alkalinity, pH, and EC in water	APHA	*	Electrometric Method, 4500-H+ B	16-Jun-04	Norwest Labs Edmonton
Ammonium in Water	APHA	*	Automated Phenate Method, 4500-NH3 G	15-Jun-04	Norwest Labs Edmonton
Anions (Routine) by Ion Chromatography	APHA		Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	15-Jun-04	Norwest Labs Edmonton
Carbon Organic (Dissolved) in water (DOC)	APHA		High-Temperature Combustion Method, 5310 B	16-Jun-04	Norwest Labs Edmonton
Carbon Organic (Total) in water (TOC)	APHA		High-Temperature Combustion Method, 5310 B	16-Jun-04	Norwest Labs Edmonton
Chloride in Water	APHA	*	Automated Ferricyanide Method, 4500-Cl- E	16-Jun-04	Norwest Labs Edmonton
Chlorophyll-a & Phaeophytin	APHA	*	Chlorophyll - Spectrophotometric Method, 10200 H	11-Jun-04	Norwest Labs Surrey
Colour (Apparent) in water	APHA	*	Visual Comparison Method, 2120 B	17-Jun-04	Norwest Labs Edmonton
Kjeldahl Nitrogen & Phosphorus (Total) in Water	Alberta Research Council	*	Nitrogen, Total Kjeldahl, 07021 626	16-Jun-04	Norwest Labs Edmonton
Metals ICP-MS (Dissolved) in water	US EPA	*	Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	17-Jun-04	Norwest Labs Edmonton
Metals ICP-MS (Total) in water	US EPA	*	Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	15-Jun-04	Norwest Labs Edmonton
Metals Trace (Dissolved) in water	APHA	*	Inductively Coupled Plasma (ICP) Method, 3120 B	17-Jun-04	Norwest Labs Edmonton
Metals Trace (Total) in water	APHA	*	Inductively Coupled Plasma (ICP) Method, 3120 B	15-Jun-04	Norwest Labs Edmonton
Solids Dissolved (Total, Fixed and Volatile)	APHA	*	Total Dissolved Solids Dried at 180 C, 2540 C	16-Jun-04	Norwest Labs Edmonton
Solids Suspended (Total, Fixed and Volatile)	APHA	*	Total Suspended Solids Dried at 103-105'C, 2540 D	16-Jun-04	Norwest Labs Edmonton
Turbidity in Water	APHA	*	Nephelometric Method, 2130 B	17-Jun-04	Norwest Labs Edmonton

* Norwest method(s) is based on reference method

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted

Methodology and Notes

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
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Bill to: Indian & Northern Affairs Canada
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Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID:
Name: Se Study @ Earn Lake
Location: Earn Lake & Stokes Lake
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P.O.:
Acct. Code:

NWL Lot ID: **313713**
Control Number: E 133038
Date Received: Jun 10, 2004
Date Reported: Jun 21, 2004
Report Number: 561224

References:

Alberta Research Council	Methods Manual for Chemical Analysis of Water and Wastes
APHA	Standard Methods for the Examination of Water and Wastewater
US EPA	US Environmental Protection Agency Test Methods

Comments:

NORWEST LABS

314475

INFORMATION SHEET
WATERS

1 of 2

CONTROL NUMBER
W 51479

RESULTS & INVOICE TO:
COMPANY: DIAND, Waste Management
ADDRESS: 300 - 300 Main St.
CITY/TOWN: Whitehorse
PROVINCE: Yukon
POSTAL CODE:
ATTENTION: Pat Roach
PHONE: 867 - 667 - 3283
FAX:
CELL:

COPY OF RESULTS TO:
COMPANY: Laberge Environmental Services
ADDRESS: PO Box 21072
CITY/TOWN: Whitehorse, YT
PROVINCE: Y1A 6P7
POSTAL CODE:
ATTENTION: Bonnie Burns
PHONE: 867 - 668 - 6838
FAX: email:
CELL: laberge@internorth.com

WORK ORDER NO.
314475

DATE STAMP
RECEIVED
JUN 15 2004
5:20pm

PURCHASE ORDER NO.:

PROJECT REF.: EARN LAKE Se Study

REF./QUOTE NO.:

DATE SAMPLED D 10 M 06 Y 04 NUMBER OF SAMPLES WATER LIQ WASTE OTHER (SPECIFY)

SPECIAL INSTRUCTIONS (SEE OVER FOR IMPORTANT SAMPLE INFORMATION INSTRUCTIONS AND ANALYSIS CODES)
Se is our focus for this study so please analyze for Se using your most accurate method. also analyze for selenate + selenite from E-2 @ 40 m.

QA REPORT

RUSH
(UPON FILLING IN THIS SECTION THE CLIENT ACCEPTS THAT SURCHARGES WILL BE ATTACHED TO THE ANALYSIS)
NORWEST AUTHORIZATION
NAME DATE
RUSH DATE REQUIRED D M Y
TIME HR. MIN.

CLIENT NO.
LP
COMPLETION DATE D M Y

SAMPLE CUSTODY	SAMPLED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
	Bonnie Burns			
	COMPANY LES	COMPANY	COMPANY	COMPANY NWL-SRY
	DATE June 9-11/04	DATE	DATE	DATE June 15/04

	SITE I.D.	SAMPLE DESCRIPTION	OTHER	ANALYSIS PACKAGE CODES (USE CODES LISTED ON THE REVERSE OF THIS SHEET)	LAB CODING
1		STOKES LAKE		Chlorophylla, total + dissolved	
2		E-2 @ 2m		metals - ultratrace, TJS, TDS,	
3				TN, NO2, NO3, NH3, Cl, F, DOC	
4				Total PO4, SO4, Turb, Colour, TOC,	
5		E-2 @ 40 m		- same as above except	
6		E-5 Dromedary Cr		for chlorophylla.	
7		E-6, Two Moose Cr.			
8					
9					
10				Note: metals samples not preserved	
11				Please filter dissolved samples	
12				prior to analysis.	
13					
14					
15					

AGRI-FOOD ENVIRONMENTAL

EDMONTON	PH. (403) 438-5522	FAX (403) 434-8586
CALGARY	PH. (403) 291-2022	FAX (403) 291-2021
LANGLEY	PH. (604) 530-4344	FAX (604) 534-9996
LETHBRIDGE	PH. (403) 329-9266	FAX (403) 327-8527
WINNIPEG	PH. (204) 982-8630	FAX (204) 275-6019

ENERGY RESOURCE

EDMONTON	PH. (403) 454-1504	FAX (403) 451-4022
CALGARY	PH. (403) 291-3024	FAX (403) 250-2819
GRANDE PRAIRIE	PH. (403) 532-8709	FAX (403) 539-0611
FORT ST. JOHN	PH. (250) 785-2731	FAX (250) 785-7092
ESTEVAN	PH. (306) 634-7218	FAX (306) 634-4101

NOTE: Please complete this form in its entirety to ensure correct testing and reporting requirements.

ACCREDITED BY THE STANDARDS COUNCIL OF CANADA FOR SPECIFIC TESTS.

Report Transmission Cover Page

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: **(604) 514-3322**
Fax: **(604) 514-3323**

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By: Bonnie Burns
Company: LES

Project ID: Earn Lake Se Study
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **314475**
Control Number: W 51479
Date Received: Jun 15, 2004
Date Reported: Jun 24, 2004
Report Number: 562426

Copies	Contact	Company	Address
1	**Pat Roach**	Indian & Northern Affairs Canada	300, 300 Main Street Whitehorse, YT Y1A 2B5
	Web		
	Email Notification	Phone: (867) 667-3139	Fax: (867) 667-3271
	Delivery Strategy / Format	Email:	
	Post		
	Fax		

NOTE: * indicates a preliminary report is required

_____ # OF PAGES IN THIS TRANSMISSION

Report Transmission Notes

Agreement Notes

Lot Notes

Sample Notes:

Notes to Clients

Lot Notes:

Sample Notes:

Batch Notes:

Method Notes:

Method Result Note

Reports associated with this Lot

Id/Format/Reported Date	Id/Format/Reported Date	Id/Format/Reported Date
562426 Envir2QC 3 Smp & DL 24-Jun-04		

Comment:
See Methodology and Notes page of Analytical Report for all comments pertaining to this report.

If this report transmission is not satisfactory, please send report requirements to the address at the top of this page.

Sample Custody

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
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NWL Lot ID: **314475**
Control Number: W 51479
Date Received: Jun 15, 2004
Date Reported: Jun 24, 2004
Report Number: 562426

Sample Disposal Date: Jul 24, 2004

All samples will be stored until this date unless other instructions are received. Please indicate other requirements below and return this form to the address or fax number on the upper right of this page.

_____ **Extend Sample Storage Until** _____ **(MM/DD/YY)**

The following charges apply to extended sample storage:

Storage for 1 to 5 samples per month	$ 10.00
Storage for 6 to 20 samples per month	$ 15.00
Storage for 21 to 50 samples per month	$ 30.00
Storage for 51 to 200 samples per month	$ 60.00
Storage for more than 200 samples per month	$ 110.00

_____ **Return Sample, collect, to the address below via:**

_____ Greyhound
_____ Loomis
_____ Purolator
_____ Other (Specify) _____

Name: _____
Company: _____
Address: _____
_____
Phone: _____
Fax: _____
Signature: _____

If no other arrangements have been made, samples will be disposed of on Jul 24, 2004.

Analytical Report

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
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NWL Lot ID: **314475**
Control Number: W 51479
Date Received: Jun 15, 2004
Date Reported: Jun 24, 2004
Report Number: 562426

	NWL Number	314475-1	314475-2		
	Sample Description	Stokes Lake / June 9-11 / 04	E-2 @ 2m / June 9-11 / 04		
	Matrix	Water - General	Water - General		
Analyte		**Units**	**Results**	**Results**	**Results**	**Detection Limit**
General Water Qualtity						
Chlorophyll-a	Calculated Value	ug/L	0.3	0.5		0.5
Phaeophytin	Calculated Value	ug/L	0.5	0.2		0.5

NORWEST LABS

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Date Received: Jun 15, 2004
Date Reported: Jun 24, 2004
Report Number: 562426

			NWL Number	314475-1	314475-2	314475-3	
			Sample Description	Stokes Lake / June 9-11 / 04	E-2 @ 2m / June 9-11 / 04	E-2 @ 40m / June 9-11 / 04	
			Matrix	Water - General	Water - General	Water - General	
Analyte		**Units**		**Results**	**Results**	**Results**	**Detection Limit**
Inorganic Nonmetallic Parameters							
Ammonium - N		mg/L		0.14	<0.05	0.09	0.05
Kjeldahl Nitrogen	Total	mg/L		0.50	0.46	0.36	0.05
Nitrogen	Total	mg/L		0.50	0.46	0.36	
Orthophosphate-P	Dissolved	mg/L		<0.05	<0.05	<0.05	0.05
Organic Carbon	Total	mg/L		11.2	9.7	8.7	0.5
Organic Carbon	Dissolved	mg/L		11.0	9.5	8.7	0.5
Metals Dissolved							
Silicon	Dissolved	mg/L		3.07	3.18	3.58	0.05
Sulphur	Dissolved	mg/L		37.9	36.9	39.5	0.05
Aluminum	Dissolved	mg/L		0.009	0.008	0.006	0.005
Antimony	Dissolved	mg/L		0.0002	0.0003	0.0003	0.0002
Arsenic	Dissolved	mg/L		0.0006	0.0006	0.0007	0.0002
Barium	Dissolved	mg/L		0.041	0.044	0.047	0.001
Beryllium	Dissolved	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Bismuth	Dissolved	mg/L		<0.0005	<0.0005	<0.0005	0.0005
Boron	Dissolved	mg/L		0.006	0.005	0.006	0.002
Cadmium	Dissolved	mg/L		0.00004	0.00004	0.00003	0.00001
Chromium	Dissolved	mg/L		0.0009	0.0009	0.0010	0.0005
Cobalt	Dissolved	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Copper	Dissolved	mg/L		0.002	0.002	0.002	0.001
Lead	Dissolved	mg/L		0.0001	<0.0001	<0.0001	0.0001
Lithium	Dissolved	mg/L		0.007	0.007	0.008	0.001
Molybdenum	Dissolved	mg/L		0.002	0.002	0.002	0.001
Nickel	Dissolved	mg/L		0.0028	0.0026	0.0023	0.0005
Selenium	Dissolved	mg/L		0.0007	0.0010	0.0013	0.0002
Silver	Dissolved	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Strontium	Dissolved	mg/L		0.217	0.241	0.269	0.001
Thallium	Dissolved	mg/L		<0.00005	<0.00005	<0.00005	0.00005
Tin	Dissolved	mg/L		<0.001	<0.001	<0.001	0.001
Titanium	Dissolved	mg/L		0.0022	0.0020	0.0024	0.0005
Uranium	Dissolved	mg/L		0.0006	0.0006	0.0008	0.0005
Vanadium	Dissolved	mg/L		0.0002	0.0002	0.0001	0.0001
Zinc	Dissolved	mg/L		0.005	0.005	0.004	0.001
Metals Total							
Calcium	Total	mg/L		45.9	51.8	57.8	0.2
Iron	Total	mg/L		0.1	0.2	0.1	0.1

NORWEST LABS

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Analytical Report

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By: Bonnie Burns
Company: LES

Project ID: Earn Lake Se Study
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **314475**
Control Number: W 51479
Date Received: Jun 15, 2004
Date Reported: Jun 24, 2004
Report Number: 562426

			NWL Number	314475-1	314475-2	314475-3	
			Sample Description	Stokes Lake / June 9-11 / 04	E-2 @ 2m / June 9-11 / 04	E-2 @ 40m / June 9-11 / 04	
			Matrix	Water - General	Water - General	Water - General	
Analyte		**Units**		**Results**	**Results**	**Results**	**Detection Limit**
Metals Total - Continued							
Magnesium	Total	mg/L		28.0	23.5	25.2	0.1
Manganese	Total	mg/L		0.011	0.010	0.007	0.005
Potassium	Total	mg/L		1.3	1.3	1.3	0.4
Silicon	Total	mg/L		3.18	3.25	3.67	0.05
Sodium	Total	mg/L		4.0	3.3	3.5	0.4
Sulphur	Total	mg/L		36.1	34.1	36.8	0.05
Aluminum	Total	mg/L		0.060	0.071	0.064	0.005
Antimony	Total	mg/L		0.0002	0.0003	0.0004	0.0002
Arsenic	Total	mg/L		0.0007	0.0007	0.0008	0.0002
Barium	Total	mg/L		0.043	0.048	0.053	0.001
Beryllium	Total	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Bismuth	Total	mg/L		<0.0005	<0.0005	<0.0005	0.0005
Boron	Total	mg/L		0.006	0.006	0.006	0.002
Cadmium	Total	mg/L		0.00007	0.00007	0.00006	0.00001
Chromium	Total	mg/L		0.0012	0.0012	0.0013	0.0005
Cobalt	Total	mg/L		<0.0001	<0.0001	<0.0001	0.0001
Copper	Total	mg/L		0.002	0.002	0.002	0.001
Lead	Total	mg/L		0.0006	0.0003	0.0002	0.0001
Lithium	Total	mg/L		0.010	0.009	0.009	0.001
Molybdenum	Total	mg/L		0.002	0.002	0.002	0.001
Nickel	Total	mg/L		0.0035	0.0031	0.0029	0.0005
Selenium	Total	mg/L		0.0008	0.0010	0.0014	0.0002
Silver	Total	mg/L		0.0001	0.0001	<0.0001	0.0001
Strontium	Total	mg/L		0.230	0.256	0.278	0.001
Thallium	Total	mg/L		<0.00005	<0.00005	<0.00005	0.00005
Tin	Total	mg/L		<0.001	<0.001	<0.001	0.001
Titanium	Total	mg/L		0.0026	0.0030	0.0030	0.0005
Uranium	Total	mg/L		0.0009	0.0010	0.0011	0.0005
Vanadium	Total	mg/L		0.0005	0.0005	0.0004	0.0001
Zinc	Total	mg/L		0.007	0.005	0.005	0.001
Zirconium	Total	mg/L		<0.001	<0.001	<0.001	0.001
Physical and Aggregate Properties							
Solids	Total Dissolved	mg/L dried at 180°C		313	327	327	7
Turbidity		NTU		2.3	2.4	3.8	0.1
Solids	Total Suspended	mg/L		2	2	1	1

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Analytical Report

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By: Bonnie Burns
Company: LES

Project ID: Earn Lake Se Study
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **314475**
Control Number: W 51479
Date Received: Jun 15, 2004
Date Reported: Jun 24, 2004
Report Number: 562426

			NWL Number	314475-1	314475-2	314475-3	
			Sample Description	Stokes Lake / June 9-11 / 04	E-2 @ 2m / June 9-11 / 04	E-2 @ 40m / June 9-11 / 04	
			Matrix	Water - General	Water - General	Water - General	
Analyte		**Units**		**Results**	**Results**	**Results**	**Detection Limit**
Physical and Aggregate Properties - Continued							
Colour	Apparent	Colour units		48	46	34	5
Routine Water							
pH				8.08	8.12	8.10	
Electrical Conductivity		µS/cm at 25C		434	431	470	1
Calcium	Dissolved	mg/L		42.3	54.2	60.3	0.2
Magnesium	Dissolved	mg/L		29.5	24.4	25.7	0.1
Sodium	Dissolved	mg/L		4.2	3.5	3.6	0.4
Potassium	Dissolved	mg/L		1.4	1.3	1.5	0.4
Iron	Dissolved	mg/L		0.07	0.03	0.03	0.01
Manganese	Dissolved	mg/L		0.052	0.007	0.005	0.005
Chloride	Dissolved	mg/L		1.6	1.4	1.0	0.5
Fluoride		mg/L		0.09	0.09	0.09	0.05
Nitrate - N		mg/L		<0.1	<0.1	<0.1	0.1
Nitrite - N		mg/L		<0.05	<0.05	<0.05	0.05
Sulphate (SO4)	Dissolved	mg/L		114	111	118	0.2

Analytical Report

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By: Bonnie Burns
Company: LES

Project ID: Earn Lake Se Study
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **314475**
Control Number: W 51479
Date Received: Jun 15, 2004
Date Reported: Jun 24, 2004
Report Number: 562426

	NWL Number	314475-4	314475-5		
	Sample Description	E-5 Dromedary Cr. / June 9-11 / 04	E-6 Two Moose Cr. / June 9-11 / 04		
	Matrix	Water - General	Water - General		
Analyte		**Units**	**Results**	**Results**	**Results**	**Detection Limit**
Inorganic Nonmetallic Parameters						
Ammonium - N		mg/L	<0.05	0.09		0.05
Kjeldahl Nitrogen	Total	mg/L	0.27	0.54		0.05
Nitrogen	Total	mg/L	0.27	0.54		
Orthophosphate-P	Dissolved	mg/L	0.06	0.05		0.05
Organic Carbon	Total	mg/L	5.2	11.2		0.5
Organic Carbon	Dissolved	mg/L	5.2	11.2		0.5
Metals Dissolved						
Silicon	Dissolved	mg/L	4.46	3.98		0.05
Sulphur	Dissolved	mg/L	21.0	43.4		0.05
Aluminum	Dissolved	mg/L	0.020	0.119		0.005
Antimony	Dissolved	mg/L	0.0003	0.0003		0.0002
Arsenic	Dissolved	mg/L	0.0006	0.0007		0.0002
Barium	Dissolved	mg/L	0.060	0.059		0.001
Beryllium	Dissolved	mg/L	<0.0001	<0.0001		0.0001
Bismuth	Dissolved	mg/L	<0.0005	<0.0005		0.0005
Boron	Dissolved	mg/L	0.004	0.005		0.002
Cadmium	Dissolved	mg/L	0.00005	0.00004		0.00001
Chromium	Dissolved	mg/L	0.0010	0.0012		0.0005
Cobalt	Dissolved	mg/L	<0.0001	<0.0001		0.0001
Copper	Dissolved	mg/L	0.002	0.004		0.001
Lead	Dissolved	mg/L	<0.0001	<0.0001		0.0001
Lithium	Dissolved	mg/L	0.005	0.006		0.001
Molybdenum	Dissolved	mg/L	0.002	0.002		0.001
Nickel	Dissolved	mg/L	0.0019	0.0023		0.0005
Selenium	Dissolved	mg/L	0.0054	0.0025		0.0002
Silver	Dissolved	mg/L	<0.0001	<0.0001		0.0001
Strontium	Dissolved	mg/L	0.181	0.229		0.001
Thallium	Dissolved	mg/L	<0.00005	<0.00005		0.00005
Tin	Dissolved	mg/L	<0.001	<0.001		0.001
Titanium	Dissolved	mg/L	0.0016	0.0069		0.0005
Uranium	Dissolved	mg/L	0.0008	0.0008		0.0005
Vanadium	Dissolved	mg/L	0.0002	0.0009		0.0001
Zinc	Dissolved	mg/L	0.003	0.002		0.001
Metals Total						
Calcium	Total	mg/L	52.1	66.8		0.2
Iron	Total	mg/L	0.3	0.8		0.1

NORWEST LABS

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Analytical Report

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By: Bonnie Burns
Company: LES

Project ID: Earn Lake Se Study
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **314475**
Control Number: W 51479
Date Received: Jun 15, 2004
Date Reported: Jun 24, 2004
Report Number: 562426

	NWL Number	314475-4	314475-5		
	Sample Description	E-5 Dromedary Cr. / June 9-11 / 04	E-6 Two Moose Cr. / June 9-11 / 04		
	Matrix	Water - General	Water - General		
Analyte		**Units**	**Results**	**Results**	**Results**	**Detection Limit**
Metals Total - Continued						
Magnesium	Total	mg/L	11.4	21.2		0.1
Manganese	Total	mg/L	0.014	0.043		0.005
Potassium	Total	mg/L	0.8	1.4		0.4
Silicon	Total	mg/L	4.28	5.72		0.05
Sodium	Total	mg/L	1.6	2.9		0.4
Sulphur	Total	mg/L	20.5	43.1		0.05
Aluminum	Total	mg/L	0.058	0.703		0.005
Antimony	Total	mg/L	0.0003	0.0004		0.0002
Arsenic	Total	mg/L	0.0006	0.0010		0.0002
Barium	Total	mg/L	0.061	0.089		0.001
Beryllium	Total	mg/L	<0.0001	<0.0001		0.0001
Bismuth	Total	mg/L	<0.0005	<0.0005		0.0005
Boron	Total	mg/L	0.005	0.006		0.002
Cadmium	Total	mg/L	0.00011	0.00009		0.00001
Chromium	Total	mg/L	0.0018	0.0013		0.0005
Cobalt	Total	mg/L	<0.0001	0.0003		0.0001
Copper	Total	mg/L	0.002	0.004		0.001
Lead	Total	mg/L	<0.0001	0.0004		0.0001
Lithium	Total	mg/L	0.007	0.006		0.001
Molybdenum	Total	mg/L	0.002	0.002		0.001
Nickel	Total	mg/L	0.0023	0.0034		0.0005
Selenium	Total	mg/L	0.0056	0.0025		0.0002
Silver	Total	mg/L	<0.0001	0.0001		0.0001
Strontium	Total	mg/L	0.183	0.240		0.001
Thallium	Total	mg/L	<0.00005	<0.00005		0.00005
Tin	Total	mg/L	<0.001	<0.001		0.001
Titanium	Total	mg/L	0.0024	0.0238		0.0005
Uranium	Total	mg/L	0.0012	0.0012		0.0005
Vanadium	Total	mg/L	0.0006	0.0039		0.0001
Zinc	Total	mg/L	0.005	0.009		0.001
Zirconium	Total	mg/L	<0.001	<0.001		0.001
Physical and Aggregate Properties						
Solids	Total Dissolved	mg/L dried at 180°C	247	347		7
Turbidity		NTU	2.9	22.2		0.1
Solids	Total Suspended	mg/L	2	6		1

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Analytical Report

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By: Bonnie Burns
Company: LES

Project ID: Earn Lake Se Study
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **314475**
Control Number: W 51479
Date Received: Jun 15, 2004
Date Reported: Jun 24, 2004
Report Number: 562426

	NWL Number	314475-4	314475-5		
	Sample Description	E-5 Dromedary Cr. / June 9-11 / 04	E-6 Two Moose Cr. / June 9-11 / 04		
	Matrix	Water - General	Water - General		
Analyte		**Units**	**Results**	**Results**	**Results**	**Detection Limit**
Physical and Aggregate Properties - Continued						
Colour	Apparent	Colour units	34	76		5
Routine Water						
pH			8.16	8.16		
Electrical Conductivity		µS/cm at 25C	340	477		1
Calcium	Dissolved	mg/L	49.0	61.4		0.2
Magnesium	Dissolved	mg/L	11.4	22.8		0.1
Sodium	Dissolved	mg/L	1.8	3.1		0.4
Potassium	Dissolved	mg/L	0.9	1.2		0.4
Iron	Dissolved	mg/L	0.05	0.12		0.01
Manganese	Dissolved	mg/L	0.009	0.007		0.005
Chloride	Dissolved	mg/L	<0.5	1.2		0.5
Fluoride		mg/L	0.09	0.06		0.05
Nitrate - N		mg/L	<0.1	<0.1		0.1
Nitrite - N		mg/L	<0.05	<0.05		0.05
Sulphate (SO4)	Dissolved	mg/L	63.0	130		0.2

Approved by: C William Warning

Bill Warning, B.Sc.
Lab Operations Manager

NORWEST LABS

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Quality Control

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By: Bonnie Burns
Company: LES

Project
ID: Earn Lake Se Study
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 314475
Control Number: W 51479
Date Received: Jun 15, 2004
Date Reported: Jun 24, 2004
Report Number: 562426

Inorganic Nonmetallic Parameters

Blanks	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Ammonium - N	mg/L	<0.05	0.00	-0.08	0.08	✓
Kjeldahl Nitrogen	mg/L	0.05	0.00	-0.05	0.05	✓
Orthophosphate-P	mg/L	<0.05	0.00	-0.05	0.05	✓
Organic Carbon	mg/L	<0.5	0.0	-0.5	0.5	✓
Material Used:	Edmonton Method Blank					
Date Acquired:	Jun 18, 2004					
Acquired By:	Linda Li					

Replicates	Units	Replicate1	Replicate2	% RSD Criteria	Absolute Criteria	Passed QC
Ammonium - N	mg/L	1810	1790	9.99	0.10	✓
Kjeldahl Nitrogen	mg/L	2.05	1.82	9.99	0.30	✓
Orthophosphate-P	mg/L	<0.05	<0.05	9.99	0.05	✓
Organic Carbon	mg/L	3.6	3.7	10.0	1.0	✓
Material Used:	Edmonton Duplicate					
Date Acquired:	Jun 18, 2004					
Acquired By:	Linda Li					

Control Sample	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Ammonium - N	mg/L	2.90	2.99	2.59	3.39	✓
Kjeldahl Nitrogen	mg/L	15.0	15.3	11.7	18.9	✓
Organic Carbon	mg/L	118	116	98	134	✓
Material Used:	Water High					
Date Acquired:	Jun 18, 2004					
Acquired By:	Linda Li					
Ammonium - N	mg/L	0.80	0.79	0.66	0.91	✓
Kjeldahl Nitrogen	mg/L	2.89	3.00	2.41	3.59	✓
Orthophosphate-P	mg/L	0.42	0.40	0.34	0.45	✓
Organic Carbon	mg/L	15.5	15.0	13.2	16.8	✓
Material Used:	Water Low					
Date Acquired:	Jun 18, 2004					
Acquired By:	Linda Li					
Organic Carbon	mg/L	3.0	3.0	2.4	3.7	✓
Material Used:	Water Trace					
Date Acquired:	Jun 18, 2004					
Acquired By:	Linda Li					

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Quality Control

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By: Bonnie Burns
Company: LES

Project
ID: Earn Lake Se Study
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 314475
Control Number: W 51479
Date Received: Jun 15, 2004
Date Reported: Jun 24, 2004
Report Number: 562426

Metals Dissolved

Blanks	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Sulphur	mg/L	<0.05	0.08	-2.22	2.39	✓
Aluminum	ug/L	<5	-2	-8	4	✓
Antimony	ug/L	<0.2	0.0	-0.1	0.2	✓
Arsenic	ug/L	<0.2	0.0	0.0	0.0	✓
Barium	ug/L	<1	0	0	0	✓
Beryllium	ug/L	<0.1	0.0	0.0	0.0	✓
Bismuth	ug/L	<0.5	0.0	-0.1	0.1	✓
Boron	ug/L	<2	0	-2	2	✓
Cadmium	ug/L	<0.01	0.00	-0.01	0.01	✓
Chromium	ug/L	<0.5	-0.1	-0.4	0.2	✓
Cobalt	ug/L	<0.1	0.0	0.0	0.0	✓
Copper	ug/L	<1	0	-1	1	✓
Lead	ug/L	<0.1	0.0	0.0	0.0	✓
Lithium	ug/L	<1	0	0	0	✓
Molybdenum	ug/L	<1	0	0	0	✓
Nickel	ug/L	<0.5	0.0	-0.3	0.3	✓
Selenium	ug/L	<0.2	-0.1	-0.3	0.1	✓
Silver	ug/L	<0.1	0.0	0.0	0.0	✓
Strontium	ug/L	<1	0	0	0	✓
Thallium	ug/L	<0.05	0.00	0.00	0.01	✓
Tin	ug/L	<1	0	0	0	✓
Titanium	ug/L	<0.5	0.0	-0.2	0.1	✓
Uranium	ug/L	<0.5	0.0	0.0	0.0	✓
Vanadium	ug/L	<0.1	0.0	-0.1	0.0	✓
Zinc	ug/L	<1	0	-1	1	✓

Material Used: Edmonton Method Blank
Date Acquired: Jun 18, 2004
Acquired By: Jesse Dang

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Quality Control

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By: Bonnie Burns
Company: LES

Project
ID: Earn Lake Se Study
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 314475
Control Number: W 51479
Date Received: Jun 15, 2004
Date Reported: Jun 24, 2004
Report Number: 562426

Metals Dissolved (Continued...)

Replicates	Units	Replicate1	Replicate2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	7.45	7.42	9.99	0.01	✓
Sulphur	mg/L	704	692	9.99	0.02	✓
Aluminum	ug/L	20	21	10	11	✓
Antimony	ug/L	0.3	0.3	10.0	0.4	✓
Arsenic	ug/L	0.6	0.6	10.0	0.4	✓
Barium	ug/L	60	60	10	2	✓
Beryllium	ug/L	<0.1	<0.1	10.0	0.2	✓
Bismuth	ug/L	<0.5	<0.5	10.0	1.1	✓
Boron	ug/L	43	42	10	4	✓
Cadmium	ug/L	0.22	0.22	9.99	0.02	✓
Chromium	ug/L	1.0	0.9	10.0	1.1	✓
Cobalt	ug/L	<0.1	<0.1	10.0	0.2	✓
Copper	ug/L	2	2	10	2	✓
Lead	ug/L	0.3	0.3	10.0	0.2	✓
Lithium	ug/L	6	6	10	2	✓
Molybdenum	ug/L	2	2	10	2	✓
Nickel	ug/L	1.9	1.8	10.0	1.1	✓
Selenium	ug/L	5.4	5.7	10.0	0.4	✓
Silver	ug/L	<0.1	<0.1	10.0	0.2	✓
Strontium	ug/L	647	636	10	2	✓
Thallium	ug/L	<0.05	<0.05	9.99	0.11	✓
Tin	ug/L	<1	<1	10	2	✓
Titanium	ug/L	1.6	1.7	10.0	1.1	✓
Uranium	ug/L	1.4	1.4	10.0	1.1	✓
Vanadium	ug/L	0.2	0.2	10.0	0.2	✓
Zinc	ug/L	3	3	10	2	✓

Material Used: Edmonton Duplicate
Date Acquired: Jun 18, 2004
Acquired By: Jesse Dang

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Quality Control

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By: Bonnie Burns
Company: LES

Project
ID: Earn Lake Se Study
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 314475
Control Number: W 51479
Date Received: Jun 15, 2004
Date Reported: Jun 24, 2004
Report Number: 562426

Metals Dissolved (Continued...)

Control Sample		Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Silicon		mg/L	25.3	25.0	22.5	27.5	✓
Sulphur		mg/L	48.9	49.8	44.6	55.0	✓
Material Used:	Metals High						
Date Acquired:	Jun 18, 2004						
Acquired By:	To Thong						
Silicon		mg/L	0.49	0.50	0.45	0.55	✓
Sulphur		mg/L	0.93	1.02	0.81	1.23	✓
Aluminum		ug/L	952	1000	850	1150	✓
Antimony		ug/L	39.7	40.0	34.0	46.0	✓
Arsenic		ug/L	39.0	40.0	34.0	46.0	✓
Barium		ug/L	202	200	170	230	✓
Beryllium		ug/L	20.3	20.0	17.0	23.0	✓
Bismuth		ug/L	99.1	100	85	115	✓
Boron		ug/L	390	400	340	460	✓
Cadmium		ug/L	2.10	2.00	1.70	2.30	✓
Chromium		ug/L	98.4	100	85	115	✓
Cobalt		ug/L	20.3	20.0	17.0	23.0	✓
Copper		ug/L	193	200	170	230	✓
Lead		ug/L	20.2	20.0	17.0	23.0	✓
Lithium		ug/L	202	200	170	230	✓
Molybdenum		ug/L	200	200	170	230	✓
Nickel		ug/L	97.5	100	85	115	✓
Selenium		ug/L	39.7	40.0	34.0	46.0	✓
Silver		ug/L	20.5	20.0	17.0	23.0	✓
Strontium		ug/L	198	200	170	230	✓
Thallium		ug/L	9.96	10.0	8.5	11.5	✓
Tin		ug/L	198	200	170	230	✓
Titanium		ug/L	96.4	100	85	115	✓
Uranium		ug/L	98.4	100	85	115	✓
Vanadium		ug/L	20.3	20.0	17.0	23.0	✓
Zinc		ug/L	200	200	170	230	✓
Material Used:	Metals Low						
Date Acquired:	Jun 18, 2004						
Acquired By:	Jesse Dang						

Norwest Labs
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Fax: (604) 514-3323

Quality Control

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By: Bonnie Burns
Company: LES

Project
ID: Earn Lake Se Study
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 314475
Control Number: W 51479
Date Received: Jun 15, 2004
Date Reported: Jun 24, 2004
Report Number: 562426

Metals Dissolved (Continued...)

Control Sample	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Aluminum	ug/L	55	50	43	58	✓
Antimony	ug/L	2.0	2.0	1.7	2.3	✓
Arsenic	ug/L	2.1	2.0	1.7	2.3	✓
Barium	ug/L	10	10	9	12	✓
Beryllium	ug/L	1.1	1.0	0.9	1.2	✓
Bismuth	ug/L	5.0	5.0	4.3	5.8	✓
Boron	ug/L	22	20	17	23	✓
Cadmium	ug/L	0.10	0.10	0.09	0.12	✓
Chromium	ug/L	5.2	5.0	4.3	5.8	✓
Cobalt	ug/L	1.1	1.0	0.9	1.2	✓
Copper	ug/L	11	10	9	12	✓
Lead	ug/L	1.0	1.0	0.9	1.2	✓
Lithium	ug/L	11	10	9	12	✓
Molybdenum	ug/L	10	10	9	12	✓
Nickel	ug/L	5.0	5.0	4.3	5.8	✓
Selenium	ug/L	1.9	2.0	1.7	2.3	✓
Silver	ug/L	1.0	1.0	0.9	1.2	✓
Strontium	ug/L	11	10	9	12	✓
Thallium	ug/L	0.52	0.50	0.43	0.58	✓
Tin	ug/L	10	10	9	12	✓
Titanium	ug/L	5.2	5.0	4.3	5.8	✓
Uranium	ug/L	5.0	5.0	4.3	5.8	✓
Vanadium	ug/L	1.1	1.0	0.9	1.2	✓
Zinc	ug/L	11	10	9	12	✓

Material Used: Metals Trace
Date Acquired: Jun 18, 2004
Acquired By: Jesse Dang

NORWEST LABS

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Quality Control

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By: Bonnie Burns
Company: LES

Project
ID: Earn Lake Se Study
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 314475
Control Number: W 51479
Date Received: Jun 15, 2004
Date Reported: Jun 24, 2004
Report Number: 562426

Metals Total

Blanks	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	<0.2	0.0	0.0	0.1	✓
Iron	mg/L	<0.1	0.0	0.0	0.0	✓
Magnesium	mg/L	<0.1	0.0	0.0	0.0	✓
Manganese	mg/L	<0.005	0.000	-0.001	0.001	✓
Potassium	mg/L	<0.4	0.0	-0.1	0.1	✓
Silicon	mg/L	<0.05	0.02	-0.04	0.09	✓
Sodium	mg/L	<0.4	0.1	-0.2	0.3	✓
Sulphur	mg/L	<0.05	0.01	-0.03	0.04	✓
Aluminum	ug/L	<5	0	-5	5	✓
Antimony	ug/L	<0.2	0.0	-0.2	0.2	✓
Arsenic	ug/L	<0.2	0.0	-0.2	0.2	✓
Barium	ug/L	<1	0	-1	1	✓
Beryllium	ug/L	<0.1	0.0	-0.1	0.1	✓
Bismuth	ug/L	<0.5	0.0	-0.5	0.5	✓
Boron	ug/L	<2	0	-2	2	✓
Cadmium	ug/L	<0.01	0.00	-0.01	0.01	✓
Chromium	ug/L	<0.5	0.0	-0.5	0.5	✓
Cobalt	ug/L	<0.1	0.0	-0.1	0.1	✓
Copper	ug/L	<1	0	-1	1	✓
Lead	ug/L	<0.1	0.0	-0.1	0.1	✓
Lithium	ug/L	<1	0	-1	1	✓
Molybdenum	ug/L	<1	0	-1	1	✓
Nickel	ug/L	<0.5	0.0	-0.5	0.5	✓
Selenium	ug/L	<0.2	0.0	-0.2	0.2	✓
Silver	ug/L	<0.1	0.0	-0.1	0.1	✓
Strontium	ug/L	<1	0	-1	1	✓
Thallium	ug/L	<0.05	0.00	-0.05	0.05	✓
Tin	ug/L	<1	0	-1	1	✓
Titanium	ug/L	<0.5	0.0	-0.5	0.5	✓
Uranium	ug/L	<0.5	0.0	-0.5	0.5	✓
Vanadium	ug/L	<0.1	0.0	-0.1	0.1	✓
Zinc	ug/L	<1	0	-1	1	✓
Zirconium	ug/L	<1	0	-1	1	✓

Material Used: Edmonton Method Blank
Date Acquired: Jun 18, 2004
Acquired By:

NORWEST LABS

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Quality Control

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By: Bonnie Burns
Company: LES

Project
ID: Earn Lake Se Study
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **314475**
Control Number: W 51479
Date Received: Jun 15, 2004
Date Reported: Jun 24, 2004
Report Number: 562426

Metals Total (Continued...)

Replicates	Units	Replicate1	Replicate2	% RSD Criteria	Absolute Criteria	Passed QC
Calcium	mg/L	24.8	25.3	10.0	0.6	✓
Iron	mg/L	0.2	0.2	10.0	0.0	✓
Magnesium	mg/L	4.5	4.5	10.0	0.2	✓
Manganese	mg/L	0.007	0.006	9.990	0.001	✓
Potassium	mg/L	0.6	0.6	10.0	1.2	✓
Silicon	mg/L	7.87	7.89	9.99	0.01	✓
Sodium	mg/L	3.9	3.7	10.0	1.2	✓
Sulphur	mg/L	0.42	0.40	9.99	0.03	✓
Aluminum	ug/L	<5	<5	10	11	✓
Antimony	ug/L	<0.2	<0.2	10.0	0.4	✓
Arsenic	ug/L	<0.2	<0.2	10.0	0.4	✓
Barium	ug/L	2	2	10	2	✓
Beryllium	ug/L	<0.1	<0.1	10.0	0.2	✓
Bismuth	ug/L	<0.5	<0.5	10.0	1.1	✓
Boron	ug/L	26	25	10	4	✓
Cadmium	ug/L	<0.01	<0.01	9.99	0.02	✓
Chromium	ug/L	<0.5	<0.5	10.0	1.1	✓
Cobalt	ug/L	<0.1	<0.1	10.0	0.2	✓
Copper	ug/L	10	10	10	2	✓
Lead	ug/L	<0.1	<0.1	10.0	0.2	✓
Lithium	ug/L	<1	<1	10	2	✓
Molybdenum	ug/L	1	1	10	2	✓
Nickel	ug/L	<0.5	<0.5	10.0	1.1	✓
Selenium	ug/L	<0.2	<0.2	10.0	0.4	✓
Silver	ug/L	<0.1	<0.1	10.0	0.2	✓
Strontium	ug/L	54	54	10	2	✓
Thallium	ug/L	<0.05	<0.05	9.99	0.11	✓
Tin	ug/L	<1	<1	10	2	✓
Titanium	ug/L	<0.5	<0.5	10.0	1.1	✓
Uranium	ug/L	<0.5	<0.5	10.0	1.1	✓
Vanadium	ug/L	<0.1	0.1	10.0	0.2	✓
Zinc	ug/L	2	2	10	2	✓
Zirconium	ug/L	<1	<1	10	2	✓

Material Used: Edmonton Duplicate
Date Acquired: Jun 18, 2004
Acquired By:

NORWEST LABS

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Quality Control

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By: Bonnie Burns
Company: LES

Project
ID: Earn Lake Se Study
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 314475
Control Number: W 51479
Date Received: Jun 15, 2004
Date Reported: Jun 24, 2004
Report Number: 562426

Metals Total (Continued...)

Control Sample	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	49.3	49.6	45.6	53.7	✓
Iron	mg/L	2.1	2.0	1.8	2.2	✓
Magnesium	mg/L	21.2	20.3	18.6	22.0	✓
Manganese	mg/L	0.492	0.479	0.451	0.507	✓
Potassium	mg/L	47.1	47.8	43.5	52.1	✓
Silicon	mg/L	4.79	5.00	4.50	5.50	✓
Sodium	mg/L	47.6	49.1	44.4	53.8	✓
Sulphur	mg/L	9.48	9.68	8.74	10.62	✓
Aluminum	ug/L	310	322	273	371	✓
Antimony	ug/L	10.9	11.5	10.2	12.8	✓
Arsenic	ug/L	11.7	11.5	10.3	12.7	✓
Barium	ug/L	57	61	52	69	✓
Beryllium	ug/L	5.0	5.9	4.9	7.0	✓
Bismuth	ug/L	30.5	30.2	26.0	34.4	✓
Boron	ug/L	114	125	102	148	✓
Cadmium	ug/L	0.70	0.63	0.47	0.78	✓
Chromium	ug/L	32.2	31.8	27.5	36.2	✓
Cobalt	ug/L	6.4	6.4	5.4	7.5	✓
Copper	ug/L	63	63	55	70	✓
Lead	ug/L	6.3	6.2	5.4	7.0	✓
Lithium	ug/L	68	65	53	76	✓
Molybdenum	ug/L	62	61	53	69	✓
Nickel	ug/L	31.6	31.4	27.0	35.8	✓
Selenium	ug/L	11.2	11.0	9.7	12.3	✓
Silver	ug/L	6.4	6.2	5.5	7.0	✓
Strontium	ug/L	64	64	55	72	✓
Thallium	ug/L	3.21	3.14	2.56	3.72	✓
Tin	ug/L	59	59	52	66	✓
Titanium	ug/L	32.6	31.5	27.0	36.0	✓
Uranium	ug/L	32.4	30.8	26.9	34.7	✓
Vanadium	ug/L	6.4	6.5	5.4	7.6	✓
Zinc	ug/L	61	59	49	69	✓
Zirconium	ug/L	67	62	53	72	✓

Material Used: Edmonton Digestion Check
Date Acquired: Jun 18, 2004
Acquired By:

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Quality Control

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By: Bonnie Burns
Company: LES

Project
ID: Earn Lake Se Study
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 314475
Control Number: W 51479
Date Received: Jun 15, 2004
Date Reported: Jun 24, 2004
Report Number: 562426

Metals Total (Continued...)

Control Sample	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	252	253	232	274	✓
Iron	mg/L	10.2	9.7	9.1	10.3	✓
Magnesium	mg/L	101	102	92	112	✓
Manganese	mg/L	2.42	2.45	2.27	2.63	✓
Potassium	mg/L	254	253	226	280	✓
Silicon	mg/L	24.8	25.0	22.5	27.5	✓
Sodium	mg/L	255	251	221	281	✓
Sulphur	mg/L	49.5	50.0	46.3	53.7	✓

Material Used: Metals High
Date Acquired: Jun 21, 2004
Acquired By: To Thong

NORWEST LABS

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Quality Control

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By: Bonnie Burns
Company: LES

Project
ID: Earn Lake Se Study
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 314475
Control Number: W 51479
Date Received: Jun 15, 2004
Date Reported: Jun 24, 2004
Report Number: 562426

Metals Total (Continued...)

Control Sample	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	4.6	4.7	4.3	5.2	✓
Iron	mg/L	0.2	0.2	0.2	0.2	✓
Magnesium	mg/L	1.9	1.9	1.7	2.1	✓
Manganese	mg/L	0.048	0.048	0.043	0.052	✓
Potassium	mg/L	4.8	5.0	4.4	5.6	✓
Silicon	mg/L	0.47	0.50	0.45	0.55	✓
Sodium	mg/L	4.8	5.2	4.4	6.1	✓
Sulphur	mg/L	0.93	0.98	0.82	1.13	✓
Aluminum	ug/L	968	1000	850	1150	✓
Antimony	ug/L	38.0	40.0	34.0	46.0	✓
Arsenic	ug/L	37.7	40.0	34.0	46.0	✓
Barium	ug/L	189	200	170	230	✓
Beryllium	ug/L	19.7	20.0	17.0	23.0	✓
Bismuth	ug/L	98.4	100	85	115	✓
Boron	ug/L	397	400	340	460	✓
Cadmium	ug/L	1.98	2.00	1.70	2.30	✓
Chromium	ug/L	95.3	100	85	115	✓
Cobalt	ug/L	19.7	20.0	17.0	23.0	✓
Copper	ug/L	190	200	170	230	✓
Lead	ug/L	19.8	20.0	17.0	23.0	✓
Lithium	ug/L	200	200	170	230	✓
Molybdenum	ug/L	184	200	170	230	✓
Nickel	ug/L	96.8	100	85	115	✓
Selenium	ug/L	37.6	40.0	34.0	46.0	✓
Silver	ug/L	20.5	20.0	17.0	23.0	✓
Strontium	ug/L	185	200	170	230	✓
Thallium	ug/L	9.86	10.0	8.5	11.5	✓
Tin	ug/L	182	200	170	230	✓
Titanium	ug/L	94.9	100	85	115	✓
Uranium	ug/L	93.1	100	85	115	✓
Vanadium	ug/L	19.9	20.0	17.0	23.0	✓
Zinc	ug/L	193	200	170	230	✓
Zirconium	ug/L	194	200	170	230	✓

Material Used: Metals Low
Date Acquired: Jun 18, 2004
Acquired By:

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Quality Control

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By: Bonnie Burns
Company: LES

Project
ID: Earn Lake Se Study
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 314475
Control Number: W 51479
Date Received: Jun 15, 2004
Date Reported: Jun 24, 2004
Report Number: 562426

Metals Total (Continued...)

Control Sample	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Aluminum	ug/L	53	50	43	58	✓
Antimony	ug/L	1.9	2.0	1.7	2.3	✓
Arsenic	ug/L	2.0	2.0	1.7	2.3	✓
Barium	ug/L	9	10	9	12	✓
Beryllium	ug/L	1.0	1.0	0.9	1.2	✓
Bismuth	ug/L	5.0	5.0	4.3	5.8	✓
Boron	ug/L	20	20	17	23	✓
Cadmium	ug/L	0.11	0.10	0.09	0.12	✓
Chromium	ug/L	5.1	5.0	4.3	5.8	✓
Cobalt	ug/L	1.0	1.0	0.9	1.2	✓
Copper	ug/L	10	10	9	12	✓
Lead	ug/L	1.0	1.0	0.9	1.2	✓
Lithium	ug/L	10	10	9	12	✓
Molybdenum	ug/L	10	10	9	12	✓
Nickel	ug/L	5.3	5.0	4.3	5.8	✓
Selenium	ug/L	2.0	2.0	1.7	2.3	✓
Silver	ug/L	1.0	1.0	0.9	1.2	✓
Strontium	ug/L	10	10	9	12	✓
Thallium	ug/L	0.49	0.50	0.43	0.58	✓
Tin	ug/L	9	10	9	12	✓
Titanium	ug/L	5.2	5.0	4.3	5.8	✓
Uranium	ug/L	4.9	5.0	4.3	5.8	✓
Vanadium	ug/L	1.0	1.0	0.9	1.2	✓
Zinc	ug/L	10	10	9	12	✓
Zirconium	ug/L	11	10	9	12	✓

Material Used: Metals Trace
Date Acquired: Jun 18, 2004
Acquired By:

NORWEST LABS

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Quality Control

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By: Bonnie Burns
Company: LES

Project
ID: Earn Lake Se Study
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **314475**
Control Number: W 51479
Date Received: Jun 15, 2004
Date Reported: Jun 24, 2004
Report Number: 562426

Physical and Aggregate Properties

Blanks	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Solids	mg/L dried at	33	0	0	0	✓
Turbidity	NTU	<0.1	0.0	-0.1	0.1	✓
Material Used:	Edmonton Method Blank					
Date Acquired:	Jun 21, 2004					
Acquired By:	Ryan Lyster					

Replicates	Units	Replicate1	Replicate2	% RSD Criteria	Absolute Criteria	Passed QC
Solids	mg/L dried at	53	40	10	15	✓
Turbidity	NTU	9.9	9.6	10.0	0.2	✓
Solids	mg/L	239	237	10	15	✓
Material Used:	Edmonton Duplicate					
Date Acquired:	Jun 18, 2004					
Acquired By:	Ryan Lyster					

Control Sample	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	2130	2187	1958	2416	✓
Material Used:	Turbidity High					
Date Acquired:	Jun 21, 2004					
Acquired By:	Ryan Lyster					
Turbidity	NTU	7400	7609	6876	8343	✓
Material Used:	Turbidity Ultra High					
Date Acquired:	Jun 21, 2004					
Acquired By:	Ryan Lyster					
Solids	mg/L dried at	520	506	407	605	✓
Turbidity	NTU	159	164	147	181	✓
Solids	mg/L	197	200	180	220	✓
Material Used:	Water High					
Date Acquired:	Jun 18, 2004					
Acquired By:	Ryan Lyster					
Solids	mg/L dried at	120	101	64	138	✓
Turbidity	NTU	14.3	14.8	13.3	16.3	✓
Solids	mg/L	20	20	18	22	✓
Material Used:	Water Low					
Date Acquired:	Jun 18, 2004					
Acquired By:	Sheila Nelson					
Turbidity	NTU	1.4	1.5	1.3	1.6	✓
Material Used:	Water Trace					
Date Acquired:	Jun 21, 2004					
Acquired By:	Ryan Lyster					

NORWEST LABS

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Quality Control

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By: Bonnie Burns
Company: LES

Project
ID: Earn Lake Se Study
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **314475**
Control Number: W 51479
Date Received: Jun 15, 2004
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Routine Water

Blanks	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	<0.5	0.0	-0.5	0.5	✓
Fluoride	mg/L	<0.05	0.00	-0.04	0.04	✓
Nitrate - N	mg/L	<0.1	0.0	-0.1	0.1	✓
Nitrite - N	mg/L	<0.05	0.00	-0.01	0.01	✓
Material Used:	Edmonton Method Blank					
Date Acquired:	Jun 18, 2004					
Acquired By:	Marc Dzura					

Replicates	Units	Replicate1	Replicate2	% RSD Criteria	Absolute Criteria	Passed QC
pH		8.38	8.39	9.99	0.10	✓
Electrical Conductivity	dS/m at 25C	2.49	2.50	9.990	0.002	✓
Calcium	mg/L	333	330	10.0	0.6	✓
Magnesium	mg/L	50.8	50.9	10.0	0.2	✓
Sodium	mg/L	8830	8700	10.0	1.2	✓
Potassium	mg/L	5.6	5.6	10.0	1.2	✓
Iron	mg/L	15.2	15.1	9.99	0.01	✓
Manganese	mg/L	2.01	2.01	9.990	0.001	✓
Chloride	mg/L	5.6	5.2	10.0	0.5	✓
Fluoride	mg/L	0.09	0.09	9.99	0.04	✓
Nitrate - N	mg/L	0.3	0.3	10.0	0.0	✓
Nitrite - N	mg/L	<0.05	<0.05	9.99	0.01	✓
Material Used:	Edmonton Duplicate					
Date Acquired:	Jun 18, 2004					
Acquired By:	Marc Dzura					

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300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By: Bonnie Burns
Company: LES

Project
ID: Earn Lake Se Study
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 314475
Control Number: W 51479
Date Received: Jun 15, 2004
Date Reported: Jun 24, 2004
Report Number: 562426

Routine Water (Continued...)

Control Sample		Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Chloride		mg/L	2030	2087	1875	2299	✓
Material Used:	Chloride High						
Date Acquired:	Jun 18, 2004						
Acquired By:							
Calcium		mg/L	255	251	237	265	✓
Magnesium		mg/L	100	102	95	109	✓
Sodium		mg/L	259	250	236	264	✓
Potassium		mg/L	257	251	234	268	✓
Iron		mg/L	9.98	9.73	9.26	10.20	✓
Manganese		mg/L	2.43	2.42	2.32	2.53	✓
Material Used:	Metals High						
Date Acquired:	Jun 18, 2004						
Acquired By:	To Thong						
Calcium		mg/L	4.9	4.8	4.3	5.3	✓
Magnesium		mg/L	2.1	2.0	1.7	2.2	✓
Sodium		mg/L	5.0	5.2	4.3	6.1	✓
Potassium		mg/L	5.0	5.0	4.5	5.4	✓
Iron		mg/L	0.20	0.20	0.15	0.24	✓
Manganese		mg/L	0.048	0.049	0.044	0.054	✓
Material Used:	Metals Low						
Date Acquired:	Jun 18, 2004						
Acquired By:	To Thong						
pH			9.16	9.23	9.11	9.35	✓
Electrical Conductivity		dS/m at 25C	2.72	2.73	2.61	2.85	✓
Chloride		mg/L	81.3	81.0	76.4	85.6	✓
Fluoride		mg/L	10.2	9.95	9.26	10.64	✓
Nitrate - N		mg/L	10.1	10.0	9.6	10.4	✓
Nitrite - N		mg/L	10.1	10.0	9.6	10.4	✓
Material Used:	Water High						
Date Acquired:	Jun 18, 2004						
Acquired By:	Marc Dzura						
pH			6.86	6.90	6.83	6.97	✓
Electrical Conductivity		dS/m at 25C	0.079	0.076	0.070	0.081	✓
Chloride		mg/L	14.2	14.9	13.2	16.6	✓
Fluoride		mg/L	0.51	0.51	0.43	0.58	✓
Nitrate - N		mg/L	0.5	0.5	0.4	0.6	✓
Nitrite - N		mg/L	0.51	0.50	0.44	0.55	✓
Material Used:	Water Low						
Date Acquired:	Jun 18, 2004						
Acquired By:	Marc Dzura						

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Methodology and Notes

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Attn: Pat Roach
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NWL Lot ID: **314475**
Control Number: W 51479
Date Received: Jun 15, 2004
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Method of Analysis:

MethodName	Reference		Method	Date Analysis Started	Location
(Ortho)Phosphate in Water	APHA	*	Automated Ascorbic Acid Reduction Method, 4500-P F	17-Jun-04	Norwest Labs Edmonton
Alkalinity, pH, and EC in water	APHA	*	Conductivity - Laboratory Method, 2510 B	21-Jun-04	Norwest Labs Edmonton
Alkalinity, pH, and EC in water	APHA	*	Electrometric Method, 4500-H+ B	21-Jun-04	Norwest Labs Edmonton
Ammonium in Water	APHA	*	Automated Phenate Method, 4500-NH3 G	18-Jun-04	Norwest Labs Edmonton
Anions (Routine) by Ion Chromatography	APHA		Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	18-Jun-04	Norwest Labs Edmonton
Carbon Organic (Dissolved) in water (DOC)	APHA		High-Temperature Combustion Method, 5310 B	18-Jun-04	Norwest Labs Edmonton
Carbon Organic (Total) in water (TOC)	APHA		High-Temperature Combustion Method, 5310 B	18-Jun-04	Norwest Labs Edmonton
Chloride in Water	APHA	*	Automated Ferricyanide Method, 4500-Cl- E	18-Jun-04	Norwest Labs Edmonton
Chlorophyll-a & Phaeophytin	APHA	*	Chlorophyll - Spectrophotometric Method, 10200 H	16-Jun-04	Norwest Labs Surrey
Colour (Apparent) in water	APHA	*	Visual Comparison Method, 2120 B	21-Jun-04	Norwest Labs Edmonton
Kjeldahl Nitrogen & Phosphorus (Total) in Water	Alberta Research Council	*	Nitrogen, Total Kjeldahl, 07021 626	18-Jun-04	Norwest Labs Edmonton
Metals ICP-MS (Dissolved) in water	US EPA	*	Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	21-Jun-04	Norwest Labs Edmonton
Metals ICP-MS (Total) in water	US EPA	*	Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	18-Jun-04	Norwest Labs Edmonton
Metals Trace (Dissolved) in water	APHA	*	Inductively Coupled Plasma (ICP) Method, 3120 B	21-Jun-04	Norwest Labs Edmonton
Metals Trace (Dissolved) in water	APHA	*	Inductively Coupled Plasma (ICP) Method, 3120 B	21-Jun-04	Norwest Labs Edmonton
Metals Trace (Total) in water	APHA	*	Inductively Coupled Plasma (ICP) Method, 3120 B	18-Jun-04	Norwest Labs Edmonton
Metals Trace (Total) in water	APHA	*	Inductively Coupled Plasma (ICP) Method, 3120 B	18-Jun-04	Norwest Labs Edmonton
Solids Dissolved (Total, Fixed and Volatile)	APHA	*	Total Dissolved Solids Dried at 180 C, 2540 C	18-Jun-04	Norwest Labs Edmonton
Solids Suspended (Total, Fixed and Volatile)	APHA	*	Total Suspended Solids Dried at 103-105'C, 2540 D	18-Jun-04	Norwest Labs Edmonton

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted

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Methodology and Notes

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300, 300 Main Street
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Turbidity in Water	APHA	*	Nephelometric Method, 2130 B	21-Jun-04	Norwest Labs Edmonton

* Norwest method(s) is based on reference method

References:

Alberta Research Council	Methods Manual for Chemical Analysis of Water and Wastes
APHA	Standard Methods for the Examination of Water and Wastewater
US EPA	US Environmental Protection Agency Test Methods

Comments:

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Results relate only to samples as submitted

APPENDIX D

ANALYTICAL DATA FOR SEDIMENT, EARN LAKE

2645 Dollarton Highway
North Vancouver, BC. Canada V7H - 1B1
Phone (604) 924-2500 Fax (604) 924-2555

Environment Canada Environnement Canada

Final Analytical Results with QC data

PESC FOLDER # : 200400636

Location:	EARN LAKE
Type of Sample:	Soil (Bottom Sediment) (SOSE)
Submitted By:	Benoit Godin Environment Canada 91782 Alaska Hwy Whitehorse, YT Canada Y1A 5B7 Phone: 867-667-4592 Fax: 867-667-7962
Logged In:	Tuesday June 22, 2004
Completed:	Wednesday January 19, 2005 (488 results)
Client Code:	88-010 88-010 EP-Yukon Organo Selenium
Sample Priority:	Normal

Authorized by: _____

Richard Strub
QA Officer

Notes:

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
Order No: 105010 - E-1				
Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM				
General				
Moisture				
Moisture Content	SOSE	63.2	0.1	% (W/W)
pH sed. 1:2 CaCl2				
pH	SOSE	6.38	0.01	pH Units
pH in 0.01M CaCl2 (1:2 soil: CaCl2 solution ratio)				
Metals				
ICPMS Organo Se				
Selenium (Se)	SOSE	1.0	0.2	ug/g(dry)
ICPMS Total blockdig				
Antimony (Sb)	SOSE	0.872	0.005	ug/g (dry)
Arsenic (As)	SOSE	59.0	0.1	ug/g (dry)
Barium (Ba)	SOSE	1331	0.02	ug/g (dry)
Berylium (Be)	SOSE	0.922	0.002	ug/g (dry)
Bismuth (Bi)	SOSE	0.43	0.02	ug/g (dry)
Cadmium (Cd)	SOSE	3.44	0.01	ug/g (dry)
Chromium (Cr)	SOSE	27.3	0.2	ug/g (dry)
Cobalt (Co)	SOSE	16.6	0.005	ug/g (dry)
Copper (Cu)	SOSE	81.1	0.05	ug/g (dry)
Lead (Pb)	SOSE	26.8	0.01	ug/g (dry)
Lithium (Li)	SOSE	15.7	0.05	ug/g (dry)
Manganese (Mn)	SOSE	1419	0.005	ug/g (dry)
Molybdenum (Mo)	SOSE	7.64	0.05	ug/g (dry)
Nickel (Ni)	SOSE	76.1	0.05	ug/g (dry)
Selenium (Se)	SOSE	5.9	0.2	ug/g (dry)
Silver (Ag)	SOSE	1.10	0.02	ug/g (dry)
Strontium (Sr)	SOSE	84.7	0.005	ug/g (dry)
Thallium (Tl)	SOSE	0.501	0.002	ug/g (dry)
Tin (Sn)	SOSE	0.18	0.05	ug/g (dry)
Uranium (U)	SOSE	2.93	0.002	ug/g (dry)
Vanadium (V)	SOSE	76.2	0.05	ug/g (dry)
Zinc (Zn)	SOSE	407	0.1	ug/g (dry)
Order No: 105011 - E-2				
Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM				
General				
Moisture				
Moisture Content	SOSE	34.2	0.1	% (W/W)
pH sed. 1:2 CaCl2				
pH	SOSE	6.72	0.01	pH Units

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
pH in 0.01M CaCl2 (1:2 soil: CaCl2 solution ratio)				
Metals				
ICPMS Organo Se				
Selenium (Se)	SOSE	0.9	0.2	ug/g(dry)
ICPMS Total blockdig				
Antimony (Sb)	SOSE	1.04	0.005	ug/g (dry)
Arsenic (As)	SOSE	55.3	0.1	ug/g (dry)
Barium (Ba)	SOSE	1395	0.02	ug/g (dry)
Berylium (Be)	SOSE	0.743	0.002	ug/g (dry)
Bismuth (Bi)	SOSE	0.30	0.02	ug/g (dry)
Cadmium (Cd)	SOSE	2.60	0.01	ug/g (dry)
Chromium (Cr)	SOSE	22.2	0.2	ug/g (dry)
Cobalt (Co)	SOSE	15.4	0.005	ug/g (dry)
Copper (Cu)	SOSE	65.4	0.05	ug/g (dry)
Lead (Pb)	SOSE	20.6	0.01	ug/g (dry)
Lithium (Li)	SOSE	12.3	0.05	ug/g (dry)
Manganese (Mn)	SOSE	2810	0.005	ug/g (dry)
Molybdenum (Mo)	SOSE	6.81	0.05	ug/g (dry)
Nickel (Ni)	SOSE	64.9	0.05	ug/g (dry)
Selenium (Se)	SOSE	4.2	0.2	ug/g (dry)
Silver (Ag)	SOSE	1.16	0.02	ug/g (dry)
Strontium (Sr)	SOSE	91.1	0.005	ug/g (dry)
Thallium (Tl)	SOSE	0.395	0.002	ug/g (dry)
Tin (Sn)	SOSE	0.15	0.05	ug/g (dry)
Uranium (U)	SOSE	1.96	0.002	ug/g (dry)
Vanadium (V)	SOSE	66.2	0.05	ug/g (dry)
Zinc (Zn)	SOSE	335	0.1	ug/g (dry)
Order No: 105012 - E-3				
Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM				
General				
Moisture				
Moisture Content	SOSE	66.6	0.1	% (W/W)
pH sed. 1:2 CaCl2				
pH	SOSE	6.74	0.01	pH Units
pH in 0.01M CaCl2 (1:2 soil: CaCl2 solution ratio)				
Metals				
ICPMS Organo Se				
Selenium (Se)	SOSE	0.9	0.2	ug/g(dry)
ICPMS Total blockdig				
Antimony (Sb)	SOSE	0.576	0.005	ug/g (dry)
Arsenic (As)	SOSE	72.4	0.1	ug/g (dry)
Barium (Ba)	SOSE	1379	0.02	ug/g (dry)

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
Berylium (Be)	SOSE	0.784	0.002	ug/g (dry)
Bismuth (Bi)	SOSE	0.27	0.02	ug/g (dry)
Cadmium (Cd)	SOSE	3.97	0.01	ug/g (dry)
Chromium (Cr)	SOSE	19.2	0.2	ug/g (dry)
Cobalt (Co)	SOSE	17.5	0.005	ug/g (dry)
Copper (Cu)	SOSE	67.1	0.05	ug/g (dry)
Lead (Pb)	SOSE	19.7	0.01	ug/g (dry)
Lithium (Li)	SOSE	10.3	0.05	ug/g (dry)
Manganese (Mn)	SOSE	7432	0.005	ug/g (dry)
Molybdenum (Mo)	SOSE	8.48	0.05	ug/g (dry)
Nickel (Ni)	SOSE	66.3	0.05	ug/g (dry)
Selenium (Se)	SOSE	5.3	0.2	ug/g (dry)
Silver (Ag)	SOSE	0.97	0.02	ug/g (dry)
Strontium (Sr)	SOSE	87.6	0.005	ug/g (dry)
Thallium (Tl)	SOSE	0.344	0.002	ug/g (dry)
Tin (Sn)	SOSE	0.13	0.05	ug/g (dry)
Uranium (U)	SOSE	2.34	0.002	ug/g (dry)
Vanadium (V)	SOSE	74.6	0.05	ug/g (dry)
Zinc (Zn)	SOSE	399	0.1	ug/g (dry)

Order No: 105013 - E-4
Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM

General

Moisture

Moisture Content	SOSE	16.0	0.1	% (W/W)

pH sed. 1:2 CaCl2

pH	SOSE	6.94	0.01	pH Units

pH in 0.01M CaCl2 (1:2 soil: CaCl2 solution ratio)

Metals

ICPMS Organo Se

Selenium (Se)	SOSE	< 0.2	0.2	ug/g(dry)

ICPMS Total blockdig

Antimony (Sb)	SOSE	0.184	0.005	ug/g (dry)
Arsenic (As)	SOSE	5.9	0.1	ug/g (dry)
Barium (Ba)	SOSE	464	0.02	ug/g (dry)
Berylium (Be)	SOSE	0.225	0.002	ug/g (dry)
Bismuth (Bi)	SOSE	0.10	0.02	ug/g (dry)
Cadmium (Cd)	SOSE	0.62	0.01	ug/g (dry)
Chromium (Cr)	SOSE	9.1	0.2	ug/g (dry)
Cobalt (Co)	SOSE	3.03	0.005	ug/g (dry)
Copper (Cu)	SOSE	16.3	0.05	ug/g (dry)
Lead (Pb)	SOSE	6.19	0.01	ug/g (dry)
Lithium (Li)	SOSE	6.74	0.05	ug/g (dry)
Manganese (Mn)	SOSE	111	0.005	ug/g (dry)

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
Molybdenum (Mo)	SOSE	0.59	0.05	ug/g (dry)
Nickel (Ni)	SOSE	16.4	0.05	ug/g (dry)
Selenium (Se)	SOSE	1.1	0.2	ug/g (dry)
Silver (Ag)	SOSE	0.22	0.02	ug/g (dry)
Strontium (Sr)	SOSE	48.3	0.005	ug/g (dry)
Thallium (Tl)	SOSE	0.121	0.002	ug/g (dry)
Tin (Sn)	SOSE	0.08	0.05	ug/g (dry)
Uranium (U)	SOSE	1.13	0.002	ug/g (dry)
Vanadium (V)	SOSE	32.4	0.05	ug/g (dry)
Zinc (Zn)	SOSE	77.7	0.1	ug/g (dry)

Order No: 105014 - E-5
Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM

General

Moisture

Moisture Content	SOSE	16.8	0.1	% (W/W)

pH sed. 1:2 CaCl2

pH	SOSE	7.42	0.01	pH Units

pH in 0.01M CaCl2 (1:2 soil: CaCl2 solution ratio)

Metals

ICPMS Organo Se

Selenium (Se)	SOSE	0.7	0.2	ug/g(dry)

ICPMS Total blockdig

Antimony (Sb)	SOSE	1.75	0.005	ug/g (dry)
Arsenic (As)	SOSE	22.3	0.1	ug/g (dry)
Barium (Ba)	SOSE	1334	0.02	ug/g (dry)
Berylium (Be)	SOSE	0.369	0.002	ug/g (dry)
Bismuth (Bi)	SOSE	0.14	0.02	ug/g (dry)
Cadmium (Cd)	SOSE	2.03	0.01	ug/g (dry)
Chromium (Cr)	SOSE	13.0	0.2	ug/g (dry)
Cobalt (Co)	SOSE	10.1	0.005	ug/g (dry)
Copper (Cu)	SOSE	39.6	0.05	ug/g (dry)
Lead (Pb)	SOSE	11.1	0.01	ug/g (dry)
Lithium (Li)	SOSE	9.15	0.05	ug/g (dry)
Manganese (Mn)	SOSE	646	0.005	ug/g (dry)
Molybdenum (Mo)	SOSE	5.65	0.05	ug/g (dry)
Nickel (Ni)	SOSE	43.2	0.05	ug/g (dry)
Selenium (Se)	SOSE	3.7	0.2	ug/g (dry)
Silver (Ag)	SOSE	0.72	0.02	ug/g (dry)
Strontium (Sr)	SOSE	70.9	0.005	ug/g (dry)
Thallium (Tl)	SOSE	0.222	0.002	ug/g (dry)
Tin (Sn)	SOSE	0.08	0.05	ug/g (dry)
Uranium (U)	SOSE	1.49	0.002	ug/g (dry)
Vanadium (V)	SOSE	33.4	0.05	ug/g (dry)

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
Zinc (Zn)	SOSE	214	0.1	ug/g (dry)

Order No: 105015 - E-6
Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM

General

Moisture

Moisture Content	SOSE	42.2	0.1	% (W/W)

pH sed. 1:2 CaCl2

pH	SOSE	6.71	0.01	pH Units

pH in 0.01M CaCl2 (1:2 soil: CaCl2 solution ratio)

Metals

ICPMS Organo Se

Selenium (Se)	SOSE	0.9	0.2	ug/g(dry)

ICPMS Total blockdig

Antimony (Sb)	SOSE	0.558	0.005	ug/g (dry)
Arsenic (As)	SOSE	11.1	0.1	ug/g (dry)
Barium (Ba)	SOSE	836	0.02	ug/g (dry)
Berylium (Be)	SOSE	0.435	0.002	ug/g (dry)
Bismuth (Bi)	SOSE	0.17	0.02	ug/g (dry)
Cadmium (Cd)	SOSE	2.37	0.01	ug/g (dry)
Chromium (Cr)	SOSE	14.5	0.2	ug/g (dry)
Cobalt (Co)	SOSE	10.5	0.005	ug/g (dry)
Copper (Cu)	SOSE	40.9	0.05	ug/g (dry)
Lead (Pb)	SOSE	12	0.01	ug/g (dry)
Lithium (Li)	SOSE	8.48	0.05	ug/g (dry)
Manganese (Mn)	SOSE	950	0.005	ug/g (dry)
Molybdenum (Mo)	SOSE	2.10	0.05	ug/g (dry)
Nickel (Ni)	SOSE	37	0.05	ug/g (dry)
Selenium (Se)	SOSE	3.5	0.2	ug/g (dry)
Silver (Ag)	SOSE	0.46	0.02	ug/g (dry)
Strontium (Sr)	SOSE	67	0.005	ug/g (dry)
Thallium (Tl)	SOSE	0.251	0.002	ug/g (dry)
Tin (Sn)	SOSE	0.12	0.05	ug/g (dry)
Uranium (U)	SOSE	1.73	0.002	ug/g (dry)
Vanadium (V)	SOSE	43.4	0.05	ug/g (dry)
Zinc (Zn)	SOSE	172	0.1	ug/g (dry)

Order No: 105016 - E-7
Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM

General

Moisture

Moisture Content	SOSE	16.6	0.1	% (W/W)

pH sed. 1:2 CaCl2

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
pH	SOSE	7.01	0.01	pH Units
pH in 0.01M CaCl2 (1:2 soil: CaCl2 solution ratio)				
Metals				
ICPMS Organo Se				
Selenium (Se)	SOSE	0.2	0.2	ug/g(dry)
ICPMS Total blockdig				
Antimony (Sb)	SOSE	0.443	0.005	ug/g (dry)
Arsenic (As)	SOSE	14.0	0.1	ug/g (dry)
Barium (Ba)	SOSE	1124	0.02	ug/g (dry)
Berylium (Be)	SOSE	0.584	0.002	ug/g (dry)
Bismuth (Bi)	SOSE	0.12	0.02	ug/g (dry)
Cadmium (Cd)	SOSE	1.32	0.01	ug/g (dry)
Chromium (Cr)	SOSE	12.0	0.2	ug/g (dry)
Cobalt (Co)	SOSE	7.93	0.005	ug/g (dry)
Copper (Cu)	SOSE	26.6	0.05	ug/g (dry)
Lead (Pb)	SOSE	10.4	0.01	ug/g (dry)
Lithium (Li)	SOSE	8.49	0.05	ug/g (dry)
Manganese (Mn)	SOSE	303	0.005	ug/g (dry)
Molybdenum (Mo)	SOSE	4.26	0.05	ug/g (dry)
Nickel (Ni)	SOSE	32.2	0.05	ug/g (dry)
Selenium (Se)	SOSE	1.8	0.2	ug/g (dry)
Silver (Ag)	SOSE	0.22	0.02	ug/g (dry)
Strontium (Sr)	SOSE	80.5	0.005	ug/g (dry)
Thallium (Tl)	SOSE	0.128	0.002	ug/g (dry)
Tin (Sn)	SOSE	0.07	0.05	ug/g (dry)
Uranium (U)	SOSE	2.09	0.002	ug/g (dry)
Vanadium (V)	SOSE	57.7	0.05	ug/g (dry)
Zinc (Zn)	SOSE	270	0.1	ug/g (dry)
Order No: 105017 - B-1				
Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM				
General				
Moisture				
Moisture Content	SOSE	48.5	0.1	% (W/W)
pH sed. 1:2 CaCl2				
pH	SOSE	6.78	0.01	pH Units
pH in 0.01M CaCl2 (1:2 soil: CaCl2 solution ratio)				
Metals				
ICPMS Organo Se				
Selenium (Se)	SOSE	0.2	0.2	ug/g(dry)
ICPMS Total blockdig				
Antimony (Sb)	SOSE	0.645	0.005	ug/g (dry)
Arsenic (As)	SOSE	11.9	0.1	ug/g (dry)

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
Barium (Ba)	SOSE	222	0.02	ug/g (dry)
Berylium (Be)	SOSE	0.340	0.002	ug/g (dry)
Bismuth (Bi)	SOSE	0.23	0.02	ug/g (dry)
Cadmium (Cd)	SOSE	1.69	0.01	ug/g (dry)
Chromium (Cr)	SOSE	10.7	0.2	ug/g (dry)
Cobalt (Co)	SOSE	4.98	0.005	ug/g (dry)
Copper (Cu)	SOSE	78.6	0.05	ug/g (dry)
Lead (Pb)	SOSE	59	0.01	ug/g (dry)
Lithium (Li)	SOSE	5.65	0.05	ug/g (dry)
Manganese (Mn)	SOSE	87.4	0.005	ug/g (dry)
Molybdenum (Mo)	SOSE	2.70	0.05	ug/g (dry)
Nickel (Ni)	SOSE	25.1	0.05	ug/g (dry)
Selenium (Se)	SOSE	2.0	0.2	ug/g (dry)
Silver (Ag)	SOSE	0.57	0.02	ug/g (dry)
Strontium (Sr)	SOSE	37.8	0.005	ug/g (dry)
Thallium (Tl)	SOSE	0.177	0.002	ug/g (dry)
Tin (Sn)	SOSE	0.13	0.05	ug/g (dry)
Uranium (U)	SOSE	1.15	0.002	ug/g (dry)
Vanadium (V)	SOSE	27.9	0.05	ug/g (dry)
Zinc (Zn)	SOSE	170	0.1	ug/g (dry)

Order No: 105018 - B-2
Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM

General

Moisture

Moisture Content	SOSE	50.8	0.1	% (W/W)

pH sed. 1:2 CaCl2

pH	SOSE	6.63	0.01	pH Units

pH in 0.01M CaCl2 (1:2 soil: CaCl2 solution ratio)

Metals

ICPMS Organo Se

Selenium (Se)	SOSE	< 0.2	0.2	ug/g(dry)

ICPMS Total blockdig

Antimony (Sb)	SOSE	0.527	0.005	ug/g (dry)
Arsenic (As)	SOSE	8.4	0.1	ug/g (dry)
Barium (Ba)	SOSE	155	0.02	ug/g (dry)
Berylium (Be)	SOSE	0.179	0.002	ug/g (dry)
Bismuth (Bi)	SOSE	0.05	0.02	ug/g (dry)
Cadmium (Cd)	SOSE	0.76	0.01	ug/g (dry)
Chromium (Cr)	SOSE	4.8	0.2	ug/g (dry)
Cobalt (Co)	SOSE	3.58	0.005	ug/g (dry)
Copper (Cu)	SOSE	20.4	0.05	ug/g (dry)
Lead (Pb)	SOSE	5.31	0.01	ug/g (dry)
Lithium (Li)	SOSE	2.58	0.05	ug/g (dry)

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
Manganese (Mn)	SOSE	206	0.005	ug/g (dry)
Molybdenum (Mo)	SOSE	1.47	0.05	ug/g (dry)
Nickel (Ni)	SOSE	15.2	0.05	ug/g (dry)
Selenium (Se)	SOSE	1.3	0.2	ug/g (dry)
Silver (Ag)	SOSE	0.15	0.02	ug/g (dry)
Strontium (Sr)	SOSE	25.5	0.005	ug/g (dry)
Thallium (Tl)	SOSE	0.048	0.002	ug/g (dry)
Tin (Sn)	SOSE	0.08	0.05	ug/g (dry)
Uranium (U)	SOSE	0.811	0.002	ug/g (dry)
Vanadium (V)	SOSE	25	0.05	ug/g (dry)
Zinc (Zn)	SOSE	84.1	0.1	ug/g (dry)

Order No: 105019 - B-3

Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM

General

Moisture

Moisture Content	SOSE	49.6	0.1	% (W/W)

pH sed. 1:2 CaCl2

pH	SOSE	6.19	0.01	pH Units

pH in 0.01M CaCl2 (1:2 soil: CaCl2 solution ratio)

Metals

ICPMS Organo Se

Selenium (Se)	SOSE	0.7	0.2	ug/g(dry)

ICPMS Total blockdig

Antimony (Sb)	SOSE	0.543	0.005	ug/g (dry)
Arsenic (As)	SOSE	12.9	0.1	ug/g (dry)
Barium (Ba)	SOSE	741	0.02	ug/g (dry)
Berylium (Be)	SOSE	0.394	0.002	ug/g (dry)
Bismuth (Bi)	SOSE	0.17	0.02	ug/g (dry)
Cadmium (Cd)	SOSE	2.35	0.01	ug/g (dry)
Chromium (Cr)	SOSE	14.2	0.2	ug/g (dry)
Cobalt (Co)	SOSE	8.36	0.005	ug/g (dry)
Copper (Cu)	SOSE	43.8	0.05	ug/g (dry)
Lead (Pb)	SOSE	12.1	0.01	ug/g (dry)
Lithium (Li)	SOSE	9.64	0.05	ug/g (dry)
Manganese (Mn)	SOSE	347	0.005	ug/g (dry)
Molybdenum (Mo)	SOSE	2.65	0.05	ug/g (dry)
Nickel (Ni)	SOSE	34.8	0.05	ug/g (dry)
Selenium (Se)	SOSE	3.8	0.2	ug/g (dry)
Silver (Ag)	SOSE	0.54	0.02	ug/g (dry)
Strontium (Sr)	SOSE	66.8	0.005	ug/g (dry)
Thallium (Tl)	SOSE	0.294	0.002	ug/g (dry)
Tin (Sn)	SOSE	0.08	0.05	ug/g (dry)
Uranium (U)	SOSE	1.51	0.002	ug/g (dry)

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
Vanadium (V)	SOSE	37.6	0.05	ug/g (dry)
Zinc (Zn)	SOSE	230	0.1	ug/g (dry)

Order No: 105020 - B-4
Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM

General

Moisture

Moisture Content	SOSE	57.8	0.1	% (W/W)

pH sed. 1:2 CaCl2

pH	SOSE	6.48	0.01	pH Units

pH in 0.01M CaCl2 (1:2 soil: CaCl2 solution ratio)

Metals

ICPMS Organo Se

Selenium (Se)	SOSE	0.7	0.2	ug/g(dry)

ICPMS Total blockdig

Antimony (Sb)	SOSE	0.796	0.005	ug/g (dry)
Arsenic (As)	SOSE	21.9	0.1	ug/g (dry)
Barium (Ba)	SOSE	1035	0.02	ug/g (dry)
Berylium (Be)	SOSE	0.816	0.002	ug/g (dry)
Bismuth (Bi)	SOSE	0.28	0.02	ug/g (dry)
Cadmium (Cd)	SOSE	2.63	0.01	ug/g (dry)
Chromium (Cr)	SOSE	21.5	0.2	ug/g (dry)
Cobalt (Co)	SOSE	13.1	0.005	ug/g (dry)
Copper (Cu)	SOSE	77.8	0.05	ug/g (dry)
Lead (Pb)	SOSE	19.2	0.01	ug/g (dry)
Lithium (Li)	SOSE	15.3	0.05	ug/g (dry)
Manganese (Mn)	SOSE	274	0.005	ug/g (dry)
Molybdenum (Mo)	SOSE	5.05	0.05	ug/g (dry)
Nickel (Ni)	SOSE	77.7	0.05	ug/g (dry)
Selenium (Se)	SOSE	3.0	0.2	ug/g (dry)
Silver (Ag)	SOSE	1.01	0.02	ug/g (dry)
Strontium (Sr)	SOSE	67	0.005	ug/g (dry)
Thallium (Tl)	SOSE	0.362	0.002	ug/g (dry)
Tin (Sn)	SOSE	0.14	0.05	ug/g (dry)
Uranium (U)	SOSE	2.64	0.002	ug/g (dry)
Vanadium (V)	SOSE	61.5	0.05	ug/g (dry)
Zinc (Zn)	SOSE	356	0.1	ug/g (dry)

Order No: 105021 - E-1 REPLICATE
Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM

General

Moisture

Moisture Content	SOSE	61.6	0.1	% (W/W)

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
pH sed. 1:2 CaCl2				
pH	SOSE	6.48	0.01	pH Units
pH in 0.01M CaCl2 (1:2 soil: CaCl2 solution ratio)				
Metals				
ICPMS Organo Se				
Selenium (Se)	SOSE	1.0	0.2	ug/g(dry)
ICPMS Total blockdig				
Antimony (Sb)	SOSE	0.816	0.005	ug/g (dry)
Arsenic (As)	SOSE	63.5	0.1	ug/g (dry)
Barium (Ba)	SOSE	1352	0.02	ug/g (dry)
Berylium (Be)	SOSE	0.922	0.002	ug/g (dry)
Bismuth (Bi)	SOSE	0.41	0.02	ug/g (dry)
Cadmium (Cd)	SOSE	3.36	0.01	ug/g (dry)
Chromium (Cr)	SOSE	26.5	0.2	ug/g (dry)
Cobalt (Co)	SOSE	16.2	0.005	ug/g (dry)
Copper (Cu)	SOSE	78.3	0.05	ug/g (dry)
Lead (Pb)	SOSE	24.3	0.01	ug/g (dry)
Lithium (Li)	SOSE	15.3	0.05	ug/g (dry)
Manganese (Mn)	SOSE	1468	0.005	ug/g (dry)
Molybdenum (Mo)	SOSE	7.53	0.05	ug/g (dry)
Nickel (Ni)	SOSE	74.4	0.05	ug/g (dry)
Selenium (Se)	SOSE	5.4	0.2	ug/g (dry)
Silver (Ag)	SOSE	1.08	0.02	ug/g (dry)
Strontium (Sr)	SOSE	82.2	0.005	ug/g (dry)
Thallium (Tl)	SOSE	0.485	0.002	ug/g (dry)
Tin (Sn)	SOSE	0.18	0.05	ug/g (dry)
Uranium (U)	SOSE	2.72	0.002	ug/g (dry)
Vanadium (V)	SOSE	76.8	0.05	ug/g (dry)
Zinc (Zn)	SOSE	388	0.1	ug/g (dry)
Order No: 105022 - E-5 REPLICATE				
Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM				
General				
Moisture				
Moisture Content	SOSE	19.0	0.1	% (W/W)
pH sed. 1:2 CaCl2				
pH	SOSE	7.41	0.01	pH Units
pH in 0.01M CaCl2 (1:2 soil: CaCl2 solution ratio)				
Metals				
ICPMS Organo Se				
Selenium (Se)	SOSE	0.8	0.2	ug/g(dry)
ICPMS Total blockdig				
Antimony (Sb)	SOSE	1.61	0.005	ug/g (dry)

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
Arsenic (As)	SOSE	21.6	0.1	ug/g (dry)
Barium (Ba)	SOSE	1203	0.02	ug/g (dry)
Berylium (Be)	SOSE	0.376	0.002	ug/g (dry)
Bismuth (Bi)	SOSE	0.14	0.02	ug/g (dry)
Cadmium (Cd)	SOSE	2.02	0.01	ug/g (dry)
Chromium (Cr)	SOSE	12.2	0.2	ug/g (dry)
Cobalt (Co)	SOSE	10.1	0.005	ug/g (dry)
Copper (Cu)	SOSE	38.8	0.05	ug/g (dry)
Lead (Pb)	SOSE	10.1	0.01	ug/g (dry)
Lithium (Li)	SOSE	8.57	0.05	ug/g (dry)
Manganese (Mn)	SOSE	643	0.005	ug/g (dry)
Molybdenum (Mo)	SOSE	5.63	0.05	ug/g (dry)
Nickel (Ni)	SOSE	42.8	0.05	ug/g (dry)
Selenium (Se)	SOSE	3.9	0.2	ug/g (dry)
Silver (Ag)	SOSE	0.63	0.02	ug/g (dry)
Strontium (Sr)	SOSE	67.2	0.005	ug/g (dry)
Thallium (Tl)	SOSE	0.205	0.002	ug/g (dry)
Tin (Sn)	SOSE	0.08	0.05	ug/g (dry)
Uranium (U)	SOSE	1.42	0.002	ug/g (dry)
Vanadium (V)	SOSE	31	0.05	ug/g (dry)
Zinc (Zn)	SOSE	206	0.1	ug/g (dry)

Order No: 105023 - B-1 REPLICATE

Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM

General

Moisture

Moisture Content	SOSE	52.7	0.1	% (W/W)

pH sed. 1:2 CaCl2

pH	SOSE	6.87	0.01	pH Units

pH in 0.01M CaCl2 (1:2 soil: CaCl2 solution ratio)

Metals

ICPMS Organo Se

Selenium (Se)	SOSE	< 0.2	0.2	ug/g(dry)

ICPMS Total blockdig

Antimony (Sb)	SOSE	0.544	0.005	ug/g (dry)
Arsenic (As)	SOSE	10.2	0.1	ug/g (dry)
Barium (Ba)	SOSE	235	0.02	ug/g (dry)
Berylium (Be)	SOSE	0.272	0.002	ug/g (dry)
Bismuth (Bi)	SOSE	0.11	0.02	ug/g (dry)
Cadmium (Cd)	SOSE	1.49	0.01	ug/g (dry)
Chromium (Cr)	SOSE	10.6	0.2	ug/g (dry)
Cobalt (Co)	SOSE	4.91	0.005	ug/g (dry)
Copper (Cu)	SOSE	30.3	0.05	ug/g (dry)
Lead (Pb)	SOSE	9.63	0.01	ug/g (dry)

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
Lithium (Li)	SOSE	5.38	0.05	ug/g (dry)
Manganese (Mn)	SOSE	107	0.005	ug/g (dry)
Molybdenum (Mo)	SOSE	1.88	0.05	ug/g (dry)
Nickel (Ni)	SOSE	24.8	0.05	ug/g (dry)
Selenium (Se)	SOSE	1.9	0.2	ug/g (dry)
Silver (Ag)	SOSE	0.30	0.02	ug/g (dry)
Strontium (Sr)	SOSE	37.5	0.005	ug/g (dry)
Thallium (Tl)	SOSE	0.156	0.002	ug/g (dry)
Tin (Sn)	SOSE	0.10	0.05	ug/g (dry)
Uranium (U)	SOSE	1.13	0.002	ug/g (dry)
Vanadium (V)	SOSE	29.3	0.05	ug/g (dry)
Zinc (Zn)	SOSE	129	0.1	ug/g (dry)

Order No: 105024 - ONTARIO LAKE REF 1
Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM

Metals

ICPMS Organo Se

Selenium (Se)	SOSE	< 0.2	0.2	ug/g(dry)

ICPMS Total blockdig

Antimony (Sb)	SOSE	0.276	0.005	ug/g (dry)
Arsenic (As)	SOSE	14.6	0.1	ug/g (dry)
Barium (Ba)	SOSE	122	0.02	ug/g (dry)
Berylium (Be)	SOSE	0.772	0.002	ug/g (dry)
Bismuth (Bi)	SOSE	2.27	0.02	ug/g (dry)
Cadmium (Cd)	SOSE	3.77	0.01	ug/g (dry)
Chromium (Cr)	SOSE	76.2	0.2	ug/g (dry)
Cobalt (Co)	SOSE	13.1	0.005	ug/g (dry)
Copper (Cu)	SOSE	69.7	0.05	ug/g (dry)
Lead (Pb)	SOSE	233	0.01	ug/g (dry)
Lithium (Li)	SOSE	20.5	0.05	ug/g (dry)
Manganese (Mn)	SOSE	1057	0.005	ug/g (dry)
Molybdenum (Mo)	SOSE	1.57	0.05	ug/g (dry)
Nickel (Ni)	SOSE	50	0.05	ug/g (dry)
Selenium (Se)	SOSE	0.8	0.2	ug/g (dry)
Silver (Ag)	SOSE	1.29	0.02	ug/g (dry)
Strontium (Sr)	SOSE	69.1	0.005	ug/g (dry)
Thallium (Tl)	SOSE	0.597	0.002	ug/g (dry)
Tin (Sn)	SOSE	7.17	0.05	ug/g (dry)
Uranium (U)	SOSE	1	0.002	ug/g (dry)
Vanadium (V)	SOSE	31.7	0.05	ug/g (dry)
Zinc (Zn)	SOSE	1260	0.1	ug/g (dry)

Order No: 105025 - ONTARIO LAKE REF 2
Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM

Metals

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
ICPMS Organo Se				
Selenium (Se)	SOSE	< 0.2	0.2	ug/g(dry)
ICPMS Total blockdig				
Antimony (Sb)	SOSE	0.292	0.005	ug/g (dry)
Arsenic (As)	SOSE	14.1	0.1	ug/g (dry)
Barium (Ba)	SOSE	119	0.02	ug/g (dry)
Berylium (Be)	SOSE	0.781	0.002	ug/g (dry)
Bismuth (Bi)	SOSE	2.15	0.02	ug/g (dry)
Cadmium (Cd)	SOSE	3.58	0.01	ug/g (dry)
Chromium (Cr)	SOSE	74.0	0.2	ug/g (dry)
Cobalt (Co)	SOSE	12.6	0.005	ug/g (dry)
Copper (Cu)	SOSE	67.4	0.05	ug/g (dry)
Lead (Pb)	SOSE	226	0.01	ug/g (dry)
Lithium (Li)	SOSE	21.1	0.05	ug/g (dry)
Manganese (Mn)	SOSE	1030	0.005	ug/g (dry)
Molybdenum (Mo)	SOSE	1.56	0.05	ug/g (dry)
Nickel (Ni)	SOSE	48.9	0.05	ug/g (dry)
Selenium (Se)	SOSE	0.8	0.2	ug/g (dry)
Silver (Ag)	SOSE	1.34	0.02	ug/g (dry)
Strontium (Sr)	SOSE	67.6	0.005	ug/g (dry)
Thallium (Tl)	SOSE	0.597	0.002	ug/g (dry)
Tin (Sn)	SOSE	7.15	0.05	ug/g (dry)
Uranium (U)	SOSE	1.1	0.002	ug/g (dry)
Vanadium (V)	SOSE	31.7	0.05	ug/g (dry)
Zinc (Zn)	SOSE	1235	0.1	ug/g (dry)

Order No: 105026 - ONTARIO LAKE REF 3
Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM

Metals

ICPMS Organo Se				
Selenium (Se)	SOSE	< 0.2	0.2	ug/g(dry)
ICPMS Total blockdig				
Antimony (Sb)	SOSE	0.327	0.005	ug/g (dry)
Arsenic (As)	SOSE	14.7	0.1	ug/g (dry)
Barium (Ba)	SOSE	121	0.02	ug/g (dry)
Berylium (Be)	SOSE	0.716	0.002	ug/g (dry)
Bismuth (Bi)	SOSE	2.14	0.02	ug/g (dry)
Cadmium (Cd)	SOSE	3.64	0.01	ug/g (dry)
Chromium (Cr)	SOSE	76.3	0.2	ug/g (dry)
Cobalt (Co)	SOSE	12.8	0.005	ug/g (dry)
Copper (Cu)	SOSE	69.1	0.05	ug/g (dry)
Lead (Pb)	SOSE	233	0.01	ug/g (dry)
Lithium (Li)	SOSE	21.9	0.05	ug/g (dry)
Manganese (Mn)	SOSE	1067	0.005	ug/g (dry)
Molybdenum (Mo)	SOSE	1.71	0.05	ug/g (dry)

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
Nickel (Ni)	SOSE	49.5	0.05	ug/g (dry)
Selenium (Se)	SOSE	1.0	0.2	ug/g (dry)
Silver (Ag)	SOSE	1.39	0.02	ug/g (dry)
Strontium (Sr)	SOSE	69.8	0.005	ug/g (dry)
Thallium (Tl)	SOSE	0.608	0.002	ug/g (dry)
Tin (Sn)	SOSE	8.34	0.05	ug/g (dry)
Uranium (U)	SOSE	1.02	0.002	ug/g (dry)
Vanadium (V)	SOSE	32.7	0.05	ug/g (dry)
Zinc (Zn)	SOSE	1266	0.1	ug/g (dry)

Order No: 105027 - ONTARIO LAKE REF 4
Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM

Metals

ICPMS Organo Se

Selenium (Se)	SOSE	< 0.2	0.2	ug/g(dry)

ICPMS Total blockdig

Antimony (Sb)	SOSE	0.257	0.005	ug/g (dry)
Arsenic (As)	SOSE	14.7	0.1	ug/g (dry)
Barium (Ba)	SOSE	121	0.02	ug/g (dry)
Berylium (Be)	SOSE	0.784	0.002	ug/g (dry)
Bismuth (Bi)	SOSE	2.18	0.02	ug/g (dry)
Cadmium (Cd)	SOSE	3.68	0.01	ug/g (dry)
Chromium (Cr)	SOSE	77.2	0.2	ug/g (dry)
Cobalt (Co)	SOSE	13	0.005	ug/g (dry)
Copper (Cu)	SOSE	70.9	0.05	ug/g (dry)
Lead (Pb)	SOSE	236	0.01	ug/g (dry)
Lithium (Li)	SOSE	21.9	0.05	ug/g (dry)
Manganese (Mn)	SOSE	1085	0.005	ug/g (dry)
Molybdenum (Mo)	SOSE	1.52	0.05	ug/g (dry)
Nickel (Ni)	SOSE	50.5	0.05	ug/g (dry)
Selenium (Se)	SOSE	1.1	0.2	ug/g (dry)
Silver (Ag)	SOSE	1.24	0.02	ug/g (dry)
Strontium (Sr)	SOSE	70.5	0.005	ug/g (dry)
Thallium (Tl)	SOSE	0.612	0.002	ug/g (dry)
Tin (Sn)	SOSE	7.39	0.05	ug/g (dry)
Uranium (U)	SOSE	0.998	0.002	ug/g (dry)
Vanadium (V)	SOSE	32.5	0.05	ug/g (dry)
Zinc (Zn)	SOSE	1308	0.1	ug/g (dry)

Order No: 105028 - BLANK 1
Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM

Metals

ICPMS Organo Se

Selenium (Se)	SOSE	< 0.2	0.2	ug/g(dry)

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
ICPMS Total blockdig				
Antimony (Sb)	SOSE	0.022	0.005	ug/g (dry)
Arsenic (As)	SOSE	< 0.1	0.1	ug/g (dry)
Barium (Ba)	SOSE	< 0.02	0.02	ug/g (dry)
Berylium (Be)	SOSE	0.006	0.002	ug/g (dry)
Bismuth (Bi)	SOSE	< 0.02	0.02	ug/g (dry)
Cadmium (Cd)	SOSE	< 0.01	0.01	ug/g (dry)
Chromium (Cr)	SOSE	< 0.2	0.2	ug/g (dry)
Cobalt (Co)	SOSE	< 0.005	0.005	ug/g (dry)
Copper (Cu)	SOSE	< 0.05	0.05	ug/g (dry)
Lead (Pb)	SOSE	0.07	0.01	ug/g (dry)
Lithium (Li)	SOSE	< 0.05	0.05	ug/g (dry)
Manganese (Mn)	SOSE	0.182	0.005	ug/g (dry)
Molybdenum (Mo)	SOSE	0.29	0.05	ug/g (dry)
Nickel (Ni)	SOSE	0.16	0.05	ug/g (dry)
Selenium (Se)	SOSE	< 0.2	0.2	ug/g (dry)
Silver (Ag)	SOSE	< 0.02	0.02	ug/g (dry)
Strontium (Sr)	SOSE	0.030	0.005	ug/g (dry)
Thallium (Tl)	SOSE	< 0.002	0.002	ug/g (dry)
Tin (Sn)	SOSE	< 0.05	0.05	ug/g (dry)
Uranium (U)	SOSE	0.002	0.002	ug/g (dry)
Vanadium (V)	SOSE	0.64	0.05	ug/g (dry)
Zinc (Zn)	SOSE	2.3	0.1	ug/g (dry)

Order No: 105029 - BLANK 2
Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM

Metals

ICPMS Organo Se				
Selenium (Se)	SOSE	< 0.2	0.2	ug/g(dry)
ICPMS Total blockdig				
Antimony (Sb)	SOSE	0.015	0.005	ug/g (dry)
Arsenic (As)	SOSE	< 0.1	0.1	ug/g (dry)
Barium (Ba)	SOSE	< 0.02	0.02	ug/g (dry)
Berylium (Be)	SOSE	0.010	0.002	ug/g (dry)
Bismuth (Bi)	SOSE	< 0.02	0.02	ug/g (dry)
Cadmium (Cd)	SOSE	< 0.01	0.01	ug/g (dry)
Chromium (Cr)	SOSE	< 0.2	0.2	ug/g (dry)
Cobalt (Co)	SOSE	< 0.005	0.005	ug/g (dry)
Copper (Cu)	SOSE	< 0.05	0.05	ug/g (dry)
Lead (Pb)	SOSE	0.06	0.01	ug/g (dry)
Lithium (Li)	SOSE	< 0.05	0.05	ug/g (dry)
Manganese (Mn)	SOSE	0.158	0.005	ug/g (dry)
Molybdenum (Mo)	SOSE	0.16	0.05	ug/g (dry)
Nickel (Ni)	SOSE	0.16	0.05	ug/g (dry)
Selenium (Se)	SOSE	< 0.2	0.2	ug/g (dry)

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
Silver (Ag)	SOSE	< 0.02	0.02	ug/g (dry)
Strontium (Sr)	SOSE	0.031	0.005	ug/g (dry)
Thallium (Tl)	SOSE	< 0.002	0.002	ug/g (dry)
Tin (Sn)	SOSE	< 0.05	0.05	ug/g (dry)
Uranium (U)	SOSE	< 0.002	0.002	ug/g (dry)
Vanadium (V)	SOSE	0.61	0.05	ug/g (dry)
Zinc (Zn)	SOSE	1.8	0.1	ug/g (dry)

QC Information:

ANALYTE	ALIQ#	EXPECTED	RESULT	% REC	DIL'N	MDL	QC TYPE

ICPMS Total blockdig **UNITS:** ug/g (dry) **MATRIX:** SOSE

ANALYTE	ALIQ#	EXPECTED	RESULT	% REC	DIL'N	MDL	QC TYPE
Antimony (Sb)	109979-1	< MDL	0.012		1	0.005	BLL
Antimony (Sb)	109980-1	1.09	0.019	1.7	1	0.005	REF
Antimony (Sb)	109981-1		0.803		1	0.005	REF
Antimony (Sb)	109982-1		0.119		1	0.005	REF
Antimony (Sb)	108349-1		0.928	96.6	1	0.005	REP
Antimony (Sb)	108359-1		0.127	106.3	1	0.005	REP
Antimony (Sb)	108369-1		0.143	123.5	1	0.005	REP
Antimony (Sb)	109983-1		0.947	98.6	1	0.005	REP
Antimony (Sb)	109984-1		0.117	98.4	1	0.005	REP
Antimony (Sb)	109985-1		0.137	118.2	1	0.005	REP
Arsenic (As)	109979-1	< MDL	< 0.1		1	0.1	BLL
Arsenic (As)	109980-1	20.7	15.3	74.1	1	0.1	REF
Arsenic (As)	109981-1	26.2	21.0	80.3	1	0.1	REF
Arsenic (As)	109982-1	17.8	14.1	79.3	1	0.1	REF
Arsenic (As)	109983-1		27.5	104.0	1	0.1	REP
Arsenic (As)	109984-1		7.7	97.8	1	0.1	REP
Arsenic (As)	109985-1		7.2	100.0	1	0.1	REP
Barium (Ba)	109979-1	< MDL	< 0.02		1	0.02	BLL
Barium (Ba)	109982-1	220	111	50.4	1	0.02	REF
Barium (Ba)	108349-1		123	100.7	1	0.02	REP
Barium (Ba)	108359-1		155	98.2	1	0.02	REP
Barium (Ba)	108369-1		315	101.3	1	0.02	REP
Barium (Ba)	109983-1		121	99.1	1	0.02	REP
Barium (Ba)	109984-1		153	97.1	1	0.02	REP
Barium (Ba)	109985-1		316	101.5	1	0.02	REP
Berylium (Be)	109979-1	< MDL	< 0.002		1	0.002	BLL
Berylium (Be)	109980-1	2.32	0.696	30.0	1	0.002	REF
Berylium (Be)	109981-1	1.0	0.312	31.2	1	0.002	REF
Berylium (Be)	109982-1	1.37	0.688	50.3	1	0.002	REF
Berylium (Be)	109983-1		0.475	112.1	1	0.002	REP
Berylium (Be)	109984-1		0.373	109.4	1	0.002	REP
Berylium (Be)	109985-1		0.253	124.5	1	0.002	REP
Bismuth (Bi)	109979-1	< MDL	< 0.02		1	0.02	BLL
Bismuth (Bi)	109982-1	1.80	2.02	112.0	1	0.02	REF
Bismuth (Bi)	109983-1		0.24	99.7	1	0.02	REP
Bismuth (Bi)	109984-1		0.08	102.8	1	0.02	REP
Bismuth (Bi)	109985-1		0.08	104.9	1	0.02	REP
Cadmium (Cd)	109979-1	< MDL	< 0.01		1	0.01	BLL
Cadmium (Cd)	109980-1		0.22		1	0.01	REF
Cadmium (Cd)	109981-1		2.13		1	0.01	REF
Cadmium (Cd)	109982-1		3.52		1	0.01	REF
Cadmium (Cd)	108349-1		0.54	49.0	1	0.01	REP
Cadmium (Cd)	108359-1		0.94	94.3	1	0.01	REP
Cadmium (Cd)	108369-1		0.61	79.0	1	0.01	REP
Cadmium (Cd)	109983-1		1.17	106.9	1	0.01	REP
Cadmium (Cd)	109984-1		1.17	116.9	1	0.01	REP
Cadmium (Cd)	109985-1		0.77	99.4	1	0.01	REP
Chromium (Cr)	109979-1	< MDL	< 0.2		1	0.2	BLL
Chromium (Cr)	109980-1	106	22.2	21.0	1	0.2	REF
Chromium (Cr)	109981-1	90.7	44.0	48.5	1	0.2	REF

QC Information:

ANALYTE	ALIQ#	EXPECTED	RESULT	% REC	DIL'N	MDL	QC TYPE
Chromium (Cr)	109982-1		74.4		1	0.2	REF
Chromium (Cr)	108349-1		27.8	100.0	1	0.2	REP
Chromium (Cr)	108359-1		67.2	100.0	1	0.2	REP
Chromium (Cr)	108369-1		38.3	100.0	1	0.2	REP
Chromium (Cr)	109983-1		27.9	100.5	1	0.2	REP
Chromium (Cr)	109984-1		67.0	99.8	1	0.2	REP
Chromium (Cr)	109985-1		38.6	100.9	1	0.2	REP
Cobalt (Co)	109979-1	< MDL	< 0.005		1	0.005	BLL
Cobalt (Co)	109980-1	13.8	11.7	84.8	1	0.005	REF
Cobalt (Co)	109981-1	11.5	8.05	70.0	1	0.005	REF
Cobalt (Co)	109982-1	13.4	12.8	95.2	1	0.005	REF
Cobalt (Co)	109983-1		15.3	101.0	1	0.005	REP
Cobalt (Co)	109984-1		21.0	98.8	1	0.005	REP
Cobalt (Co)	109985-1		9.51	98.7	1	0.005	REP
Copper (Cu)	109979-1	< MDL	0.73		1	0.05	BLL
Copper (Cu)	109980-1	39.3	30.7	78.1	1	0.05	REF
Copper (Cu)	109981-1		265		1	0.05	REF
Copper (Cu)	109982-1		70.3		1	0.05	REF
Copper (Cu)	108349-1		43.8	100.7	1	0.05	REP
Copper (Cu)	108359-1		58.7	97.9	1	0.05	REP
Copper (Cu)	108369-1		25.3	101.6	1	0.05	REP
Copper (Cu)	109983-1		44.9	103.2	1	0.05	REP
Copper (Cu)	109984-1		59.7	99.5	1	0.05	REP
Copper (Cu)	109985-1		25.5	102.3	1	0.05	REP
Lead (Pb)	109979-1	< MDL	0.04		1	0.01	BLL
Lead (Pb)	109980-1	21.9	16.5	75.3	1	0.01	REF
Lead (Pb)	109981-1	183	160	87.5	1	0.01	REF
Lead (Pb)	109982-1	242	224	92.6	1	0.01	REF
Lead (Pb)	109983-1		16.8	103.1	1	0.01	REP
Lead (Pb)	109984-1		4.80	98.2	1	0.01	REP
Lead (Pb)	109985-1		4.79	102.3	1	0.01	REP
Lithium (Li)	109979-1	< MDL	< 0.05		1	0.05	BLL
Lithium (Li)	109980-1	73.9	22	29.7	1	0.05	REF
Lithium (Li)	109981-1	32.2	19	58.9	1	0.05	REF
Lithium (Li)	109982-1	32.9	19.9	60.5	1	0.05	REF
Lithium (Li)	109983-1		11.1	103.8	1	0.05	REP
Lithium (Li)	109984-1		14.7	101.3	1	0.05	REP
Lithium (Li)	109985-1		7.15	101.4	1	0.05	REP
Manganese (Mn)	109979-1	< MDL	0.120		1	0.005	BLL
Manganese (Mn)	109980-1	365	281	77.0	1	0.005	REF
Manganese (Mn)	109981-1	440	227	51.6	1	0.005	REF
Manganese (Mn)	109982-1	1207	1083	89.7	1	0.005	REF
Manganese (Mn)	109983-1		609	102.4	1	0.005	REP
Manganese (Mn)	109984-1		1648	99.4	1	0.005	REP
Manganese (Mn)	109985-1		2765	100.2	1	0.005	REP
Molybdenum (Mo)	109979-1	< MDL	0.06		1	0.05	BLL
Molybdenum (Mo)	109980-1	2.85	1.47	51.5	1	0.05	REF
Molybdenum (Mo)	109981-1	5.43	3.94	72.5	1	0.05	REF
Molybdenum (Mo)	109982-1	1.66	1.55	93.6	1	0.05	REF
Molybdenum (Mo)	109983-1		1.56	104.9	1	0.05	REP
Molybdenum (Mo)	109984-1		1.06	100.4	1	0.05	REP
Molybdenum (Mo)	109985-1		0.87	96.9	1	0.05	REP

QC Information:

ANALYTE	ALIQ#	EXPECTED	RESULT	% REC	DIL'N	MDL	QC TYPE
Nickel (Ni)	109979-1	< MDL	0.17		1	0.05	BLL
Nickel (Ni)	109980-1	49.3	38.9	78.9	1	0.05	REF
Nickel (Ni)	109981-1	39.5	29.2	74.0	1	0.05	REF
Nickel (Ni)	109982-1	53.8	49.4	91.7	1	0.05	REF
Nickel (Ni)	109983-1		37.5	101.5	1	0.05	REP
Nickel (Ni)	109984-1		48.8	99.3	1	0.05	REP
Nickel (Ni)	109985-1		61.7	99.2	1	0.05	REP
Selenium (Se)	109979-1	< MDL	< 0.2		1	0.2	BLL
Selenium (Se)	109980-1		0.7		1	0.2	REF
Selenium (Se)	109981-1		0.9		1	0.2	REF
Selenium (Se)	109982-1		1.0		1	0.2	REF
Selenium (Se)	108349-1		1.1	100.0	1	0.2	REP
Selenium (Se)	108359-1		0.7	99.9	1	0.2	REP
Selenium (Se)	108369-1		0.4	100.0	1	0.2	REP
Selenium (Se)	109983-1		1.1	100.2	1	0.2	REP
Selenium (Se)	109984-1		0.7	99.9	1	0.2	REP
Selenium (Se)	109985-1		0.4	100.0	1	0.2	REP
Silver (Ag)	109979-1	< MDL	< 0.02		1	0.02	BLL
Silver (Ag)	109980-1	0.18	0.16	87.8	1	0.02	REF
Silver (Ag)	109981-1	1.22	1.00	82.3	1	0.02	REF
Silver (Ag)	109982-1	1.69	1.31	77.7	1	0.02	REF
Silver (Ag)	109983-1		0.36	103.2	1	0.02	REP
Silver (Ag)	109984-1		0.14	103.5	1	0.02	REP
Silver (Ag)	109985-1		0.06	97.5	1	0.02	REP
Strontium (Sr)	109979-1	< MDL	0.006		1	0.005	BLL
Strontium (Sr)	109980-1	125	52	41.6	1	0.005	REF
Strontium (Sr)	109981-1	276	60.8	22.0	1	0.005	REF
Strontium (Sr)	109982-1	93.4	64	68.5	1	0.005	REF
Strontium (Sr)	109983-1		109	102.2	1	0.005	REP
Strontium (Sr)	109984-1		135	99.7	1	0.005	REP
Strontium (Sr)	109985-1		31.9	100.3	1	0.005	REP
Thallium (Tl)	109979-1	< MDL	< 0.002		1	0.002	BLL
Thallium (Tl)	109982-1	1.04	0.582	55.9	1	0.002	REF
Thallium (Tl)	109983-1		0.109	103.6	1	0.002	REP
Thallium (Tl)	109984-1		0.041	92.0	1	0.002	REP
Thallium (Tl)	109985-1		0.026	100.7	1	0.002	REP
Tin (Sn)	109979-1	< MDL	< 0.05		1	0.05	BLL
Tin (Sn)	109980-1	2.27	0.21	9.4	1	0.05	REF
Tin (Sn)	109981-1	19.8	14	70.8	1	0.05	REF
Tin (Sn)	109982-1	21.1	13.4	63.6	1	0.05	REF
Tin (Sn)	109983-1		0.35	100.0	1	0.05	REP
Tin (Sn)	109984-1		0.34	131.8	1	0.05	REP
Tin (Sn)	109985-1		0.96	109.1	1	0.05	REP
Uranium (U)	109979-1	< MDL	< 0.002		1	0.002	BLL
Uranium (U)	109982-1	1.44	0.890	61.8	1	0.002	REF
Uranium (U)	109983-1		0.828	99.3	1	0.002	REP
Uranium (U)	109984-1		0.463	98.3	1	0.002	REP
Uranium (U)	109985-1		0.523	106.0	1	0.002	REP
Vanadium (V)	109979-1	< MDL	0.65		1	0.05	BLL
Vanadium (V)	109980-1	252	49.4	19.6	1	0.05	REF
Vanadium (V)	109981-1	133	68.1	51.2	1	0.05	REF
Vanadium (V)	109982-1	76.5	29.9	39.1	1	0.05	REF

QC Information:

ANALYTE	ALIQ#	EXPECTED	RESULT	% REC	DIL'N	MDL	QC TYPE
Vanadium (V)	109983-1		58.3	100.2	1	0.05	REP
Vanadium (V)	109984-1		75.8	99.8	1	0.05	REP
Vanadium (V)	109985-1		34.5	99.5	1	0.05	REP
Zinc (Zn)	109979-1	< MDL	< 0.1		1	0.1	BLL
Zinc (Zn)	109980-1	172	126	73.3	1	0.1	REF
Zinc (Zn)	109981-1	364	327	89.9	1	0.1	REF
Zinc (Zn)	109982-1	1407	1252	89.0	1	0.1	REF
Zinc (Zn)	108349-1		105	103.9	1	0.1	REP
Zinc (Zn)	108359-1		86.3	90.8	1	0.1	REP
Zinc (Zn)	108369-1		43.9	108.9	1	0.1	REP
Zinc (Zn)	109983-1		103	101.7	1	0.1	REP
Zinc (Zn)	109984-1		85.6	90.1	1	0.1	REP
Zinc (Zn)	109985-1		40.9	101.3	1	0.1	REP

pH sed. 1:2 CaCl2 **UNITS:** pH Units **MATRIX:** SOSE

ANALYTE	ALIQ#	EXPECTED	RESULT	% REC	DIL'N	MDL	QC TYPE
pH	110003-1		4.93		1	0.01	BLL
pH	110004-1		7.11	101.4	1	0.01	REP
pH	110005-1		7.34	99.1	1	0.01	REP
pH	110006-1		6.44	100.9	1	0.01	REP

Note: **All QC information is batch associated. Duplicate analysis are not necessarily those of this report. Percent recovery for duplicate analysis represents the percent recovery of REP2 as compared to REP1 of a sample duplicate.**

BLE - Blank, Equipment
BLL - Blank, Method
BLX - Blank, Extraction
REA - Replicate Spike, Known Addition
REF - Reference Material
REG - Regular Sample
RRF - Replicate Reference Material
REK - Replicate, Spike
REP - Replicate, Regular
RTS - Replicate Test Sample
SPA - Spike, Known Addition
SPK - Spike
TST - Test Sample 1=Present 2=Absent
MDL - Method Detection Limit

Environment Canada Environnement Canada

Billing Estimate

PESC FOLDER # : 200400636

Invoice: 75330

------- Not an Invoice Do not Pay -------

EP-Yukon Organo Selenium

Location: EARN LAKE

TEST DESCRIPTION	MATRIX	QTY	UNITPRICE	PENALTY	SURCHARGE	NETPRICE
PESC - Inorganics						
ICPMS Organo Se	SOSE	20	$90.00	$0.00	$0.00	$1,800.00
ICPMS Total blockdig	SOSE	20	$90.00	$0.00	$0.00	$1,800.00
Moisture	SOSE	14	$15.00	$0.00	$0.00	$210.00
pH sed. 1:2 CaCl2	SOSE	14	$24.50	$0.00	$0.00	$343.00
					PESC - Inorganics Charges	**$4,153.00**
					Total Charged To: 88-010 EP-Yukon Organo Selenium	**$0.00**

Penalty - A charge that is removed from the price due to a test performed after a certian penalty time.
Surcharge - A service charge that is applied when tests are performed by a contract Lab.

Printed On: 19-Jan-2005

2645 Dollarton Highway
North Vancouver, BC. Canada V7H - 1B1
Phone (604) 924-2500 Fax (604) 924-2555

Environment Canada Environnement Canada

Final Analytical Results with QC data

PESC FOLDER # : 200500346

Location:	EARN LAKE
Type of Sample:	Soil (Bottom Sediment) (SOSE)
Submitted By:	Benoit Godin Environment Canada 91782 Alaska Hwy Whitehorse, YT Canada Y1A 5B7 Phone: 867-667-4592 Fax: 867-667-7962
Logged In:	Thursday March 3, 2005
Completed:	Friday March 18, 2005 (11 results)
Client Code:	88-010 88-010 EP-Yukon Organo Selenium
Sample Priority:	Normal

Authorized by: _____

Richard Strub
QA Officer

Notes:

OLD REPORT FOLDER 200400636

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
Order No: 118632 - E-1 **Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM**				
ALS				
TOC in soil				
Carbon, Total Organic	SOSE	1.89	0.050	% (W/W)
Order No: 118633 - E-2 **Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM**				
ALS				
TOC in soil				
Carbon, Total Organic	SOSE	2.09	0.050	% (W/W)
Order No: 118634 - E-3 **Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM**				
ALS				
TOC in soil				
Carbon, Total Organic	SOSE	3.41	0.050	% (W/W)
Order No: 118635 - E-4 **Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM**				
ALS				
TOC in soil				
Carbon, Total Organic	SOSE	0.49	0.050	% (W/W)
Order No: 118636 - E-5 **Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM**				
ALS				
TOC in soil				
Carbon, Total Organic	SOSE	0.41	0.050	% (W/W)
Order No: 118637 - E-6 **Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM**				
ALS				
TOC in soil				
Carbon, Total Organic	SOSE	4.27	0.050	% (W/W)
Order No: 118638 - E-7 **Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM**				
ALS				
TOC in soil				

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
Carbon, Total Organic	SOSE	0.59	0.050	% (W/W)

Order No: 118639 - B-1
Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM

ALS

TOC in soil

Carbon, Total Organic	SOSE	2.38	0.050	% (W/W)

Order No: 118640 - B-2
Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM

ALS

TOC in soil

Carbon, Total Organic	SOSE	1.48	0.050	% (W/W)

Order No: 118641 - B-3
Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM

ALS

TOC in soil

Carbon, Total Organic	SOSE	4.63	0.050	% (W/W)

Order No: 118642 - B-4
Start Date: 07/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM

ALS

TOC in soil

Carbon, Total Organic	SOSE	1.28	0.050	% (W/W)

Location: **PESC FOLDER # :**

QC Information:

ANALYTE	ALIQ#	EXPECTED	RESULT	% REC	DIL'N	MDL	QC TYPE
ANALYTE	ALIQ#	EXPECTED	RESULT	% REC	DIL'N	MDL	QC TYPE

Note: **All QC information is batch associated. Duplicate analysis are not necessarily those of this report. Percent recovery for duplicate analysis represents the percent recovery of REP2 as compared to REP1 of a sample duplicate.**

BLE - Blank, Equipment
BLL - Blank, Method
BLX - Blank, Extraction
REA - Replicate Spike, Known Addition
REF - Reference Material
REG - Regular Sample
RRF - Replicate Reference Material
REK - Replicate, Spike
REP - Replicate, Regular
RTS - Replicate Test Sample
SPA - Spike, Known Addition
SPK - Spike
TST - Test Sample 1=Present 2=Absent
MDL - Method Detection Limit

Environment Canada Environnement Canada

Billing Estimate

PESC FOLDER # : 200500346

Invoice: 76863

------- Not an Invoice Do not Pay -------

EP-Yukon Organo Selenium

Location: EARN LAKE

TEST DESCRIPTION	MATRIX	QTY	UNITPRICE	PENALTY	SURCHARGE	NETPRICE
Aurora Laboratory Services Ltd. (ALS)						
TOC in soil	SOSE	11	$32.00			$352.00
					Aurora Laboratory Services Ltd. (ALS) Charges	**$352.00**
			Total Charged To: 88-010 EP-Yukon Organo Selenium			**$352.00**

Penalty - A charge that removed from the price due to a test performed after a certian penalty time.
Surcharge - A service charge that is applied when tests are performed by a contract Lab.

Printed On: 18-Mar-2005

APPENDIX E

PLANKTON ASSEMBLAGE DATA

APPENDIX E

PLANKTON DATA, EARN LAKE, JUNE 2004

			#1 37M HAUL @ E.1	
Division	**Species**		cells x 10^3/L	$u^3 x 10^6$/L
CHLOROPHYTA				
	Elakatothrix gelatinosa		12.69	3.81
CHRYSOPHYTA				
	Dinobryon sertularia		38.07	45.69
CHRYSOPHYTA - DIATOMS				
	Achnanthes flexella		12.69	8.38
	Achnanthes minutissima		2588.87	181.22
	Achnanthes sp.		101.52	6.09
	Cocconeis placentula		38.07	34.26
	Cyclotella ocellata		25.38	9.39
	Cyclotella sp.		63.45	44.42
	Cymbella sp.		63.45	38.07
	Diatoma tenue v. elongatum		76.14	13.71
	Eunotia sp.		88.83	62.18
	Fragilaria capucina		126.91	106.60
	Fragilaria construens v. venter		76.14	14.47
	Fragilaria crotonensis		63.45	43.78
	Fragilaria vaucheriae		304.57	103.55
	Melosira granulata		101.52	91.37
	Navicula sp.		38.07	19.04
	Nitzschia sp.		25.38	6.09
	Synedra ulna		12.69	37.82
OTHER				
	c.f. Copepods		329.94	
TOTAL			4187.83	869.94

PLANKTON DATA, STOKES LAKE, JUNE 2004

More algal matrial than Earn Lake and fewer copeopds.

Diatoms:
Achnanthes minutissima, Fragilaria vaucheriae, Synedra ulna, Cymbella trugida, Cocconeis placentula, Asterionella formosa.

(Mary Hawes, Victoria, BC)

APPENDIX F

BENTHIC INVERTEBRATE ASSEMBLAGE DATA

APPENDIX F

BENTHIC INVERTEBRATE DATA, EARN LAKE, JUNE 2004

	E1		E2		E3		E4		E5		E7	
	#	%	#	%	#	%	#	%	#	%	#	%
PHYLUM ARTHROPODA												
Class Insecta												
Order Ephemeroptera												
Family Baetidae												
Baetis sp									61	17.8		
Family Heptageniidae												
Cinygmula sp									88	25.7		
Epeorus (Iron) sp									51	14.9		
Family Ephemereliidae												
Family Leptophlebiidae												
Paraleptophlebia sp							1	0.02				
Order Plecoptera												
Family Capnidae												
Capnia sp									1	0.3		
Family Perlodidae												
Skwala paralella									12	3.5		
Family Chloroperlidae												
Sweltsa sp gp									18	5.3		
Family Nemouridae												
Zapada sp									2	0.6		
Order Trichoptera												
Family Limnephilidae Unid J.D							1	0.02				
Ecclisomoecus sp									1	0.3		
Family Phryganeidae												
Agrypnia sp												
Family Hydropsychidae												
Arctopsyche sp									3	0.9		
Family Leptoceridae												
Ceraclea sp							1	0.02				
Family Lepidostomatidae												
Lepidostoma sp												
Family Leptoceridae												
Oecetis sp												
Order Diptera												
Diptera Unid L (terr.)												
Family Chironomidae												
Chironomidae Unid L	2	6.1					20	0.4	1	0.3		
Chironomidae Pupae							12	0.2				
Chironomidae Adult	1	3.0										
Sub Family Orthocladiinae												
Cardiocladius sp							4	0.1	1	0.3		
Cricotopus sp							68	1.4				
Eukiefferiella sp									3	0.9		
Phycoidella sp												
Psectrocladius sp									1	0.3		
Sub Family Diamesinae												
Diamesa sp									2	0.6		
Monodiamesa sp	1	3.0										
Odontomesa sp												
Sub Family Chironominae												
Chironomus sp	2	6.1			1	7.7						
Micropsectra sp	15	45.5	3	60			8	0.2				
Pagastiella sp												
Cryptochironomus sp												
Polypedilum (polypedilum) sp							12	0.2	1	0.3		
Rheotanytarsus sp												
Sub Family Tanypodinae												
Procladius sp	1	3.0	1	20								
Thienemannimyia sp							32	0.6				
Family Ceratopogonidae												
Bezzia sp												
Culicoides sp												
Mallochohelia sp												
Family Culicidae Unid J/D	4	12.1										
Family Empididae												
Chelifera sp												
Weidemannia sp							2	0.04				
Family Simulidae												
Cnephia sp							2	0.04				
Prosimulium sp L									83	24.3		
Simulium sp L							32	0.6				
Simulium sp P												
Family Tipulidae												

APPENDIX F

BENTHIC INVERTEBRATE DATA, EARN LAKE, JUNE 2004

	E1		E2		E3		E4		E5		E7	
	#	%	#	%	#	%	#	%	#	%	#	%
Antocha sp											2	28.6
Tipula sp							4	0.1				
Order Homoptera												
Family Aphididae											1	14.3
Order Coleoptera												
Family Elmidae												
Zaitzevia sp L												
Order Thysanoptera									1	0.3		
Order Collembola												
Isotomurus sp	1	3.0										
Class Arachnida												
Order Hydracarina												
Hydracarina Unid J/D												
Neumannia sp												
Oribatei (terrestrial)												
Piona sp												
Unioncola sp									3	0.9		
Class Crustacea												
Order Amphipoda												
Hyalella azteca												
Sub Class Copepoda												
Sub Order Cyclopoida					1	7.7			1	0.3		
Sub Order Harpacticoida									1	0.3		
Sub Class Ostracoda												
Ostracoda Unid												
Candona sp												
Cypria sp												
PHYLUM ANNELIDA												
Class Oligochaeta												
Family Enchytraeidae							88	1.8	1	0.3		
Family Lumbriculidae												
Lumbriculus variegatus												
Family Naididae												
Chaetogaster sp							8	0.2				
Nais sp	1	3.0										
Family Tubificidae Unid J					2	15.4	8	0.2	2	0.6		
Class Hirudinea												
Order Pharyngobdellida												
Helobdella stagnalis												
PHYLUM MOLLUSCA												
Class Bivalvia												
Family Pisididae												
Pisidium sp	2	6.1			5	38.5	204	4.1	1	0.3	4	57.1
Class Gastropoda												
Fossaria modicella							3	0.1				
Gyraulus parvus							2	0.04				
Valvata sincera												
PHYLUM NEMATODA	3	9.1	1	20	4	30.8	34	0.7	1	0.3		
PHYLUM CNIDARIA												
Class Hydrozoa												
Order Hydroida												
Hydra sp							4469	89.1	2	0.6		
TOTALS:	33		5		13		5015		342		7	
TAXONOMIC RICHNESS:	11		3		5		22		25		3	

APPENDIX F

BENTHIC INVERTEBRATE DATA, EARN LAKE, JUNE 2004

	B1		B2		B3		B4	
	#	%	#	%	#	%	#	%
PHYLUM ARTHROPODA								
Class Insecta								
Order Ephemeroptera								
Family Baetidae								
Baetis sp								
Family Heptageniidae								
Cinygmula sp								
Epeorus (Iron) sp								
Family Ephemereliidae								
Family Leptophlebiidae								
Paraleptophlebia sp								
Order Plecoptera								
Family Capnidae								
Capnia sp					1	0.4		
Family Perlodidae								
Skwala paralella								
Family Chloroperlidae								
Sweltsa sp gp								
Family Nemouridae								
Zapada sp								
Order Trichoptera								
Family Limnephilidae Unid J.D								
Ecclisomoecus sp								
Family Phryganeidae								
Agrypnia sp	5	3.4						
Family Hydropsychidae								
Arctopsyche sp								
Family Leptoceridae								
Ceraclea sp								
Family Lepidostomatidae								
Lepidostoma sp							1	0.3
Family Leptoceridae								
Oecetis sp							4	1.3
Order Diptera								
Diptera Unid L (terr.)					6	2.3		
Family Chironomidae								
Chironomidae Unid L	15	10.2			17	6.5	42	13.6
Chironomidae Pupae					1	0.4		
Chironomidae Adult								
Sub Family Orthocladiinae								
Cardiocladius sp	2	1.4					3	1.0
Cricotopus sp	4	2.7					2	0.6
Eukiefferiella sp	3	2.0						
Phycoidella sp							1	0.3
Psectrocladius sp	1	0.7						
Sub Family Diamesinae								
Diamesa sp								
Monodiamesa sp								
Odontomesa sp							3	1.0
Sub Family Chironominae								
Chironomus sp	55	37.4			1	0.4		
Micropsectra sp								
Pagastiella sp			1	4.2	1	0.4		
Cryptochironomus sp			1	4.2				
Polypedilum (polypedilum) sp	1	0.7			1	0.4	2	0.6
Rheotanytarsus sp	9	6.1			14	5.4	127	41.1
Sub Family Tanypodinae								
Procladius sp					15	5.8	10	3.2
Thienemannimyia sp	13	8.8			2	0.8	2	0.6
Family Ceratopogonidae								
Bezzia sp					1	0.4	2	0.6
Culicoides sp							2	0.6
Mallochohelia sp							3	1.0
Family Culicidae Unid J/D								
Family Empididae								
Chelifera sp					2	0.8		
Weidemannia sp								
Family Simulidae								
Cnephia sp			4	16.7				
Prosimulium sp L								
Simulium sp L								
Simulium sp P								
Family Tipulidae								

APPENDIX F

BENTHIC INVERTEBRATE DATA, EARN LAKE, JUNE 2004

	B1		B2		B3		B4	
	#	%	#	%	#	%	#	%
Antocha sp								
Tipula sp								
Order Homoptera								
Family Aphididae								
Order Coleoptera								
Family Elmidae								
Zaitzevia sp L								
Order Thysanoptera								
Order Collembola								
Isotomurus sp								
Class Arachnida								
Order Hydracarina								
Hydracarina Unid J/D					1	0.4		
Neumannia sp	1	0.7						
Oribatei (terrestrial)	1	0.7						
Piona sp	1	0.7						
Unioncola sp								
Class Crustacea								
Order Amphipoda								
Hyalella azteca							1	0.3
Sub Class Copepoda								
Sub Order Cyclopoida	2	1.4					1	0.3
Sub Order Harpacticoida	1	0.7					1	0.3
Sub Class Ostracoda								
Ostracoda Unid							10	3.2
Candona sp	5	3.4			40	15.4		
Cypria sp	24	16.3			52	20.0		
PHYLUM ANNELIDA								
Class Oligochaeta								
Family Enchytraeidae							5	1.6
Family Lumbriculidae								
Lumbriculus variegatus			5	20.8			4	1.3
Family Naididae								
Chaetogaster sp								
Nais sp							1	0.3
Family Tubificidae Unid J	1	0.7	6	25.0	9	3.5	10	3.2
Class Hirudinea								
Order Pharyngobdellida								
Helobdella stagnalis							1	0.3
PHYLUM MOLLUSCA								
Class Bivalvia								
Family Pisididae								
Pisidium sp	2	1.4	7	29.2	22	8.5	26	8.4
Class Gastropoda								
Fossaria modicella								
Gyraulus parvus					1	0.4		
Valvata sincera							2	0.6
PHYLUM NEMATODA	1	0.7			73	28.1	42	13.6
PHYLUM CNIDARIA								
Class Hydrozoa								
Order Hydroida								
Hydra sp							1	0.3
TOTALS:	147		24		260		309	
TAXONOMIC RICHNESS:	20		6		19		27	

APPENDIX G

ANALYTICAL RESULTS FOR INVERTEBRATE (BENTHOS AND PLANKTON) TISSUES

2645 Dollarton Highway
North Vancouver, BC. Canada V7H - 1B1
Phone (604) 924-2500 Fax (604) 924-2555

Environment Canada Environnement Canada

Final Analytical Results with QC data

PESC FOLDER # : 200401000

Location:	EARN LAKE
Type of Sample:	Animal Tissue / Fish (ANFI)
Submitted By:	Benoit Godin Environment Canada 91782 Alaska Hwy Whitehorse, YT Canada Y1A 5B7 Phone: 867-667-4592 Fax: 867-667-7962
Logged In:	Monday September 27, 2004
Completed:	Friday November 19, 2004 (266 results)
Client Code:	2561-101 2561-101 EP YUKON ENV ASSESSMENT
Sample Priority:	Normal

Authorized by: _____

Richard Strub
QA Officer

Notes:

B124=B1+B2+B4 E24=E2+E4

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
Order No: 109551 - E-5				**Arrival Temperature: 3°C**
Start Date: 01/06/2004 12:00:00AM				
General				
Moisture				
Moisture Content	ANFI	92.8	0.1	% (W/W)
Metals				
ICP total block dig				
Aluminum (Al)	ANFI	425	4	ug/g(dry)
Antimony (Sb)	ANFI	< 4	4	ug/g(dry)
Arsenic (As)	ANFI	< 4	4	ug/g(dry)
Barium (Ba)	ANFI	114	0.08	ug/g(dry)
Berylium (Be)	ANFI	< 0.08	0.08	ug/g(dry)
Boron (B)	ANFI	11.2	0.8	ug/g(dry)
Cadmium (Cd)	ANFI	1.9	0.4	ug/g(dry)
Calcium (Ca)	ANFI	10900	8	ug/g(dry)
Chromium (Cr)	ANFI	1.6	0.4	ug/g(dry)
Cobalt (Co)	ANFI	0.6	0.4	ug/g(dry)
Copper (Cu)	ANFI	116	0.4	ug/g(dry)
Iron (Fe)	ANFI	2200	0.4	ug/g(dry)
Lead (Pb)	ANFI	< 4	4	ug/g(dry)
Magnesium (Mg)	ANFI	1980	8	ug/g(dry)
Manganese (Mn)	ANFI	110	0.08	ug/g(dry)
Molybdenum (Mo)	ANFI	2.9	0.8	ug/g(dry)
Nickel (Ni)	ANFI	7	2	ug/g(dry)
Phosphorus (P)	ANFI	12100	80	ug/g(dry)
Potassium (K)	ANFI	873	8	ug/g(dry)
Selenium (Se)	ANFI	15	4	ug/g(dry)
Silicon (Si)	ANFI	505	4	ug/g(dry)
Silver (Ag)	ANFI	< 0.8	0.8	ug/g(dry)
Sodium (Na)	ANFI	419	8	ug/g(dry)
Strontium (Sr)	ANFI	32.0	0.08	ug/g(dry)
Sulfur (S)	ANFI	4670	4	ug/g(dry)
Tin (Sn)	ANFI	445	4	ug/g(dry)
Titanium (Ti)	ANFI	9.0	0.2	ug/g(dry)
Vanadium (V)	ANFI	3.3	0.8	ug/g(dry)
Zinc (Zn)	ANFI	507	0.2	ug/g(dry)
ICPMS Total blockdig				
Antimony (Sb)	ANFI	0.433	0.005	ug/g (dry)
Arsenic (As)	ANFI	1.6	0.1	ug/g (dry)
Barium (Ba)	ANFI	119	0.02	ug/g (dry)
Berylium (Be)	ANFI	0.101	0.002	ug/g (dry)
Bismuth (Bi)	ANFI	0.02	0.02	ug/g (dry)
Cadmium (Cd)	ANFI	2.10	0.01	ug/g (dry)
Chromium (Cr)	ANFI	1.9	0.2	ug/g (dry)

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
Cobalt (Co)	ANFI	0.893	0.005	ug/g (dry)
Copper (Cu)	ANFI	144	0.05	ug/g (dry)
Lead (Pb)	ANFI	9.04	0.01	ug/g (dry)
Lithium (Li)	ANFI	0.85	0.05	ug/g (dry)
Manganese (Mn)	ANFI	117	0.005	ug/g (dry)
Molybdenum (Mo)	ANFI	2.11	0.05	ug/g (dry)
Nickel (Ni)	ANFI	9.05	0.05	ug/g (dry)
Selenium (Se)	ANFI	6.6	0.2	ug/g (dry)
Silver (Ag)	ANFI	0.55	0.02	ug/g (dry)
Strontium (Sr)	ANFI	35.2	0.005	ug/g (dry)
Thallium (Tl)	ANFI	0.034	0.002	ug/g (dry)
Tin (Sn)	ANFI	462	0.01	ug/g (dry)
Uranium (U)	ANFI	0.215	0.002	ug/g (dry)
Vanadium (V)	ANFI	4.36	0.05	ug/g (dry)
Zinc (Zn)	ANFI	516	0.1	ug/g (dry)
Mercury -total				
Mercury (Hg)	ANFI	0.141	0.002	ug/g(dry)

Order No: 109552 - L
Start Date: 01/06/2004 12:00:00AM

General				
Moisture				
Moisture Content	ANFI	94.3	0.1	% (W/W)
Metals				
ICP total block dig				
Aluminum (Al)	ANFI	16	4	ug/g(dry)
Antimony (Sb)	ANFI	< 4	4	ug/g(dry)
Arsenic (As)	ANFI	< 4	4	ug/g(dry)
Barium (Ba)	ANFI	2.03	0.08	ug/g(dry)
Berylium (Be)	ANFI	< 0.08	0.08	ug/g(dry)
Boron (B)	ANFI	38.0	0.8	ug/g(dry)
Cadmium (Cd)	ANFI	3	0.4	ug/g(dry)
Calcium (Ca)	ANFI	1890	8	ug/g(dry)
Chromium (Cr)	ANFI	< 0.4	0.4	ug/g(dry)
Cobalt (Co)	ANFI	< 0.4	0.4	ug/g(dry)
Copper (Cu)	ANFI	56.1	0.4	ug/g(dry)
Iron (Fe)	ANFI	175	0.4	ug/g(dry)
Lead (Pb)	ANFI	< 4	4	ug/g(dry)
Magnesium (Mg)	ANFI	478	8	ug/g(dry)
Manganese (Mn)	ANFI	14.7	0.08	ug/g(dry)
Molybdenum (Mo)	ANFI	1.5	0.8	ug/g(dry)
Nickel (Ni)	ANFI	4	2	ug/g(dry)
Phosphorus (P)	ANFI	7500	80	ug/g(dry)
Potassium (K)	ANFI	1060	8	ug/g(dry)
Selenium (Se)	ANFI	18	4	ug/g(dry)

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
Silicon (Si)	ANFI	57	4	ug/g(dry)
Silver (Ag)	ANFI	< 0.8	0.8	ug/g(dry)
Sodium (Na)	ANFI	1380	8	ug/g(dry)
Strontium (Sr)	ANFI	4	0.08	ug/g(dry)
Sulfur (S)	ANFI	6290	4	ug/g(dry)
Tin (Sn)	ANFI	409	4	ug/g(dry)
Titanium (Ti)	ANFI	0.2	0.2	ug/g(dry)
Vanadium (V)	ANFI	< 0.8	0.8	ug/g(dry)
Zinc (Zn)	ANFI	652	0.2	ug/g(dry)
ICPMS Total blockdig				
Antimony (Sb)	ANFI	0.114	0.005	ug/g (dry)
Arsenic (As)	ANFI	1.6	0.1	ug/g (dry)
Barium (Ba)	ANFI	2.47	0.02	ug/g (dry)
Berylium (Be)	ANFI	0.012	0.002	ug/g (dry)
Bismuth (Bi)	ANFI	< 0.02	0.02	ug/g (dry)
Cadmium (Cd)	ANFI	3.29	0.01	ug/g (dry)
Chromium (Cr)	ANFI	2.5	0.2	ug/g (dry)
Cobalt (Co)	ANFI	0.500	0.005	ug/g (dry)
Copper (Cu)	ANFI	79.6	0.05	ug/g (dry)
Lead (Pb)	ANFI	6.53	0.01	ug/g (dry)
Lithium (Li)	ANFI	0.15	0.05	ug/g (dry)
Manganese (Mn)	ANFI	15.6	0.005	ug/g (dry)
Molybdenum (Mo)	ANFI	0.38	0.05	ug/g (dry)
Nickel (Ni)	ANFI	3.84	0.05	ug/g (dry)
Selenium (Se)	ANFI	13.3	0.2	ug/g (dry)
Silver (Ag)	ANFI	1.86	0.02	ug/g (dry)
Strontium (Sr)	ANFI	5.41	0.005	ug/g (dry)
Thallium (Tl)	ANFI	0.021	0.002	ug/g (dry)
Tin (Sn)	ANFI	427	0.01	ug/g (dry)
Uranium (U)	ANFI	0.041	0.002	ug/g (dry)
Vanadium (V)	ANFI	0.86	0.05	ug/g (dry)
Zinc (Zn)	ANFI	663	0.1	ug/g (dry)
Mercury -total				
Mercury (Hg)	ANFI	0.033	0.002	ug/g(dry)

Order No: 109553 - PLANKTON FROM EARN LAKE
Start Date: 01/06/2004 12:00:00AM

General				
Moisture				
Moisture Content	ANFI	99.8	0.1	% (W/W)
Metals				
ICP total block dig				
Aluminum (Al)	ANFI	1390	4	ug/g(dry)
Antimony (Sb)	ANFI	17	4	ug/g(dry)
Arsenic (As)	ANFI	7	4	ug/g(dry)

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
Barium (Ba)	ANFI	230	0.08	ug/g(dry)
Berylium (Be)	ANFI	< 0.08	0.08	ug/g(dry)
Boron (B)	ANFI	18.9	0.8	ug/g(dry)
Cadmium (Cd)	ANFI	4.3	0.4	ug/g(dry)
Calcium (Ca)	ANFI	35400	8	ug/g(dry)
Chromium (Cr)	ANFI	36.5	0.4	ug/g(dry)
Cobalt (Co)	ANFI	2.7	0.4	ug/g(dry)
Copper (Cu)	ANFI	82.9	0.4	ug/g(dry)
Iron (Fe)	ANFI	5270	0.4	ug/g(dry)
Lead (Pb)	ANFI	23	4	ug/g(dry)
Magnesium (Mg)	ANFI	8290	8	ug/g(dry)
Manganese (Mn)	ANFI	1163	0.08	ug/g(dry)
Molybdenum (Mo)	ANFI	9.4	0.8	ug/g(dry)
Nickel (Ni)	ANFI	42	2	ug/g(dry)
Phosphorus (P)	ANFI	11500	80	ug/g(dry)
Potassium (K)	ANFI	2690	8	ug/g(dry)
Selenium (Se)	ANFI	12	4	ug/g(dry)
Silicon (Si)	ANFI	1110	4	ug/g(dry)
Silver (Ag)	ANFI	1.0	0.8	ug/g(dry)
Sodium (Na)	ANFI	3640	8	ug/g(dry)
Strontium (Sr)	ANFI	186	0.08	ug/g(dry)
Sulfur (S)	ANFI	14500	4	ug/g(dry)
Tin (Sn)	ANFI	446	4	ug/g(dry)
Titanium (Ti)	ANFI	34.0	0.2	ug/g(dry)
Vanadium (V)	ANFI	7.1	0.8	ug/g(dry)
Zinc (Zn)	ANFI	379	0.2	ug/g(dry)
ICPMS Total blockdig				
Antimony (Sb)	ANFI	19.1	0.005	ug/g (dry)
Arsenic (As)	ANFI	8.8	0.1	ug/g (dry)
Barium (Ba)	ANFI	249	0.02	ug/g (dry)
Berylium (Be)	ANFI	0.100	0.002	ug/g (dry)
Bismuth (Bi)	ANFI	0.05	0.02	ug/g (dry)
Cadmium (Cd)	ANFI	4.64	0.01	ug/g (dry)
Chromium (Cr)	ANFI	44.7	0.2	ug/g (dry)
Cobalt (Co)	ANFI	3.61	0.005	ug/g (dry)
Copper (Cu)	ANFI	92.5	0.05	ug/g (dry)
Lead (Pb)	ANFI	31.4	0.01	ug/g (dry)
Lithium (Li)	ANFI	4.30	0.05	ug/g (dry)
Manganese (Mn)	ANFI	1130	0.005	ug/g (dry)
Molybdenum (Mo)	ANFI	7.61	0.05	ug/g (dry)
Nickel (Ni)	ANFI	46.1	0.05	ug/g (dry)
Selenium (Se)	ANFI	5.3	0.2	ug/g (dry)
Silver (Ag)	ANFI	0.93	0.02	ug/g (dry)
Strontium (Sr)	ANFI	175	0.005	ug/g (dry)
Thallium (Tl)	ANFI	0.094	0.002	ug/g (dry)
Tin (Sn)	ANFI	462	0.01	ug/g (dry)

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
Uranium (U)	ANFI	1.25	0.002	ug/g (dry)
Vanadium (V)	ANFI	9.02	0.05	ug/g (dry)
Zinc (Zn)	ANFI	381	0.1	ug/g (dry)
Mercury -total				
Mercury (Hg)	ANFI	0.795	0.002	ug/g(dry)

Order No: 109554 - B124
Start Date: 01/06/2004 12:00:00AM

General				
Moisture				
Moisture Content	ANFI	94.4	0.1	% (W/W)
Metals				
ICP total block dig				
Aluminum (Al)	ANFI	628	4	ug/g(dry)
Antimony (Sb)	ANFI	< 4	4	ug/g(dry)
Arsenic (As)	ANFI	8	4	ug/g(dry)
Barium (Ba)	ANFI	91.9	0.08	ug/g(dry)
Berylium (Be)	ANFI	< 0.08	0.08	ug/g(dry)
Boron (B)	ANFI	19.4	0.8	ug/g(dry)
Cadmium (Cd)	ANFI	2.0	0.4	ug/g(dry)
Calcium (Ca)	ANFI	212300	80	ug/g(dry)
Chromium (Cr)	ANFI	1.4	0.4	ug/g(dry)
Cobalt (Co)	ANFI	0.5	0.4	ug/g(dry)
Copper (Cu)	ANFI	151	0.4	ug/g(dry)
Iron (Fe)	ANFI	2440	0.4	ug/g(dry)
Lead (Pb)	ANFI	6	4	ug/g(dry)
Magnesium (Mg)	ANFI	573	8	ug/g(dry)
Manganese (Mn)	ANFI	95.2	0.08	ug/g(dry)
Molybdenum (Mo)	ANFI	1.3	0.8	ug/g(dry)
Nickel (Ni)	ANFI	5	2	ug/g(dry)
Phosphorus (P)	ANFI	3260	8	ug/g(dry)
Potassium (K)	ANFI	598	8	ug/g(dry)
Selenium (Se)	ANFI	6	4	ug/g(dry)
Silicon (Si)	ANFI	729	4	ug/g(dry)
Silver (Ag)	ANFI	< 0.8	0.8	ug/g(dry)
Sodium (Na)	ANFI	990	8	ug/g(dry)
Strontium (Sr)	ANFI	227	0.08	ug/g(dry)
Sulfur (S)	ANFI	3650	4	ug/g(dry)
Tin (Sn)	ANFI	512	4	ug/g(dry)
Titanium (Ti)	ANFI	12.8	0.2	ug/g(dry)
Vanadium (V)	ANFI	3	0.8	ug/g(dry)
Zinc (Zn)	ANFI	302	0.2	ug/g(dry)
ICPMS Total blockdig				
Antimony (Sb)	ANFI	0.814	0.005	ug/g (dry)
Arsenic (As)	ANFI	3.3	0.1	ug/g (dry)

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
Barium (Ba)	ANFI	104	0.02	ug/g (dry)
Berylium (Be)	ANFI	0.061	0.002	ug/g (dry)
Bismuth (Bi)	ANFI	0.09	0.02	ug/g (dry)
Cadmium (Cd)	ANFI	2.20	0.01	ug/g (dry)
Chromium (Cr)	ANFI	2.8	0.2	ug/g (dry)
Cobalt (Co)	ANFI	1.18	0.005	ug/g (dry)
Copper (Cu)	ANFI	164	0.05	ug/g (dry)
Lead (Pb)	ANFI	12.3	0.01	ug/g (dry)
Lithium (Li)	ANFI	0.99	0.05	ug/g (dry)
Manganese (Mn)	ANFI	113	0.005	ug/g (dry)
Molybdenum (Mo)	ANFI	0.97	0.05	ug/g (dry)
Nickel (Ni)	ANFI	10.8	0.05	ug/g (dry)
Selenium (Se)	ANFI	5.4	0.2	ug/g (dry)
Silver (Ag)	ANFI	1.81	0.02	ug/g (dry)
Strontium (Sr)	ANFI	268	0.005	ug/g (dry)
Thallium (Tl)	ANFI	0.044	0.002	ug/g (dry)
Tin (Sn)	ANFI	563	0.01	ug/g (dry)
Uranium (U)	ANFI	0.810	0.002	ug/g (dry)
Vanadium (V)	ANFI	4.52	0.05	ug/g (dry)
Zinc (Zn)	ANFI	300	0.1	ug/g (dry)
Mercury -total				
Mercury (Hg)	ANFI	0.080	0.002	ug/g(dry)

Order No: 109555 - E24
Start Date: 01/06/2004 12:00:00AM

General				
Moisture				
Moisture Content	ANFI	93.8	0.1	% (W/W)
Metals				
ICP total block dig				
Aluminum (Al)	ANFI	3280	4	ug/g(dry)
Antimony (Sb)	ANFI	< 4	4	ug/g(dry)
Arsenic (As)	ANFI	15	4	ug/g(dry)
Barium (Ba)	ANFI	313	0.08	ug/g(dry)
Berylium (Be)	ANFI	< 0.08	0.08	ug/g(dry)
Boron (B)	ANFI	16.6	0.8	ug/g(dry)
Cadmium (Cd)	ANFI	3.9	0.4	ug/g(dry)
Calcium (Ca)	ANFI	168200	80	ug/g(dry)
Chromium (Cr)	ANFI	6.1	0.4	ug/g(dry)
Cobalt (Co)	ANFI	3.2	0.4	ug/g(dry)
Copper (Cu)	ANFI	135	0.4	ug/g(dry)
Iron (Fe)	ANFI	11300	0.4	ug/g(dry)
Lead (Pb)	ANFI	18	4	ug/g(dry)
Magnesium (Mg)	ANFI	2020	8	ug/g(dry)
Manganese (Mn)	ANFI	868	0.08	ug/g(dry)

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
Molybdenum (Mo)	ANFI	3.6	0.8	ug/g(dry)
Nickel (Ni)	ANFI	22	2	ug/g(dry)
Phosphorus (P)	ANFI	4190	8	ug/g(dry)
Potassium (K)	ANFI	1530	8	ug/g(dry)
Selenium (Se)	ANFI	13	4	ug/g(dry)
Silicon (Si)	ANFI	1530	4	ug/g(dry)
Silver (Ag)	ANFI	< 0.8	0.8	ug/g(dry)
Sodium (Na)	ANFI	1810	8	ug/g(dry)
Strontium (Sr)	ANFI	214	0.08	ug/g(dry)
Sulfur (S)	ANFI	3680	4	ug/g(dry)
Tin (Sn)	ANFI	638	4	ug/g(dry)
Titanium (Ti)	ANFI	55.8	0.2	ug/g(dry)
Vanadium (V)	ANFI	15.8	0.8	ug/g(dry)
Zinc (Zn)	ANFI	265	0.2	ug/g(dry)
ICPMS Total blockdig				
Antimony (Sb)	ANFI	2.27	0.005	ug/g (dry)
Arsenic (As)	ANFI	12.7	0.1	ug/g (dry)
Barium (Ba)	ANFI	346	0.02	ug/g (dry)
Berylium (Be)	ANFI	0.214	0.002	ug/g (dry)
Bismuth (Bi)	ANFI	0.09	0.02	ug/g (dry)
Cadmium (Cd)	ANFI	4.50	0.01	ug/g (dry)
Chromium (Cr)	ANFI	8.6	0.2	ug/g (dry)
Cobalt (Co)	ANFI	4.65	0.005	ug/g (dry)
Copper (Cu)	ANFI	149	0.05	ug/g (dry)
Lead (Pb)	ANFI	29	0.01	ug/g (dry)
Lithium (Li)	ANFI	3.97	0.05	ug/g (dry)
Manganese (Mn)	ANFI	877	0.005	ug/g (dry)
Molybdenum (Mo)	ANFI	3.11	0.05	ug/g (dry)
Nickel (Ni)	ANFI	26.3	0.05	ug/g (dry)
Selenium (Se)	ANFI	6.8	0.2	ug/g (dry)
Silver (Ag)	ANFI	3.44	0.02	ug/g (dry)
Strontium (Sr)	ANFI	181	0.005	ug/g (dry)
Thallium (Tl)	ANFI	0.212	0.002	ug/g (dry)
Tin (Sn)	ANFI	719	0.01	ug/g (dry)
Uranium (U)	ANFI	0.918	0.002	ug/g (dry)
Vanadium (V)	ANFI	19.5	0.05	ug/g (dry)
Zinc (Zn)	ANFI	262	0.1	ug/g (dry)
Mercury -total				
Mercury (Hg)	ANFI	0.271	0.002	ug/g(dry)

QC Information:

ICP total block dig **UNITS:** ug/g(dry) **MATRIX:** ANFI

ANALYTE	ALIQ#	EXPECTED	RESULT	% REC	DIL'N	MDL	QC TYPE
Arsenic (As)	110000-1		10	60.7	1		REF
Arsenic (As)	110001-1		18	83.9	1		REF
Arsenic (As)	110002-1		16	89.8	1		REF
Cadmium (Cd)	110000-1		20	96.9	1		REF
Cadmium (Cd)	110001-1		27	100.4	1		REF
Cadmium (Cd)	110002-1		0	134.8	1		REF
Chromium (Cr)	110000-1		2	429.7	1		REF
Chromium (Cr)	110001-1		1	74.8	1		REF
Chromium (Cr)	110002-1		30	86.7	1		REF
Cobalt (Co)	110000-1		0	108.3	1		REF
Cobalt (Co)	110001-1		1	110.8	1		REF
Cobalt (Co)	110002-1		0	121.6	1		REF
Copper (Cu)	110000-1		33	126.0	1		REF
Copper (Cu)	110001-1		96	90.9	1		REF
Copper (Cu)	110002-1		7	302.2	1		REF
Lead (Pb)	110000-1		< 0		1		REF
Lead (Pb)	110001-1		< 0		1		REF
Lead (Pb)	110002-1		< 0		1		REF
Manganese (Mn)	110000-1		8	114.8	1		REF
Manganese (Mn)	110001-1		13	94.2	1		REF
Manganese (Mn)	110002-1		4	98.6	1		REF
Molybdenum (Mo)	110001-1		2	212.2	1		REF
Nickel (Ni)	110000-1		1	480.6	1		REF
Nickel (Ni)	110001-1		2	95.8	1		REF
Nickel (Ni)	110002-1		18	91.9	1		REF
Selenium (Se)	110000-1		11	178.5	1		REF
Selenium (Se)	110001-1		12	211.2	1		REF
Selenium (Se)	110002-1		7	518.5	1		REF
Silver (Ag)	109999-1		< 0		1		BLL
Silver (Ag)	110000-1		0	78.4	1		REF
Silver (Ag)	110002-1		< 0		1		REF
Strontium (Sr)	110001-1		52	114.6	1		REF
Zinc (Zn)	110000-1		89	104.2	1		REF
Zinc (Zn)	110001-1		181	100.3	1		REF
Zinc (Zn)	110002-1		24	94.1	1		REF

Mercury -total **UNITS:** ug/g(dry) **MATRIX:** ANFI

ANALYTE	ALIQ#	EXPECTED	RESULT	% REC	DIL'N	MDL	QC TYPE
Mercury (Hg)	110308-1	< MDL	0.007		1	0.002	BLL
Mercury (Hg)	110309-1	1.99	1.90	95.5	10	0.02	REF
Mercury (Hg)	110310-1	0.27	0.159	58.7	1	0.002	REF
Mercury (Hg)	110311-1	4.64	3.90	84.0	10	0.02	REF

Note: **All QC information is batch associated. Duplicate analysis are not necessarily those of this report. Percent recovery for duplicate analysis represents the percent recovery of REP2 as compared to REP1 of a sample duplicate.**

BLE - Blank, Equipment	BLL - Blank, Method	BLX - Blank, Extraction
REA - Replicate Spike, Known Addition	REF - Reference Material	REG - Regular Sample
RRF - Replicate Reference Material	REK - Replicate, Spike	REP - Replicate, Regular
RTS - Replicate Test Sample	SPA - Spike, Known Addition	SPK - Spike
TST - Test Sample 1=Present 2=Absent	MDL - Method Detection Limit	

Environment Canada Environnement Canada

Billing Estimate

PESC FOLDER # : 200401000

Invoice: 74150

------- Not an Invoice Do not Pay -------

EP YUKON ENV ASSESSMENT

Location: EARN LAKE

TEST DESCRIPTION	MATRIX	QTY	UNITPRICE	PENALTY	SURCHARGE	NETPRICE
PESC - Inorganics						
ICP total block dig	ANFI	5	$55.00			$275.00
ICPMS Total blockdig	ANFI	5	$90.00			$450.00
Mercury -total	ANFI	5	$52.50			$262.50
Moisture	ANFI	5	$15.00			$75.00
					PESC - Inorganics Charges	**$1,062.50**
					Total Charged To: 2561-101 EP YUKON ENV ASSESSMENT	**$1,062.50**

Penalty - A charge that is removed from the price due to a test performed after a certian penalty time.
Surcharge - A service charge that is applied when tests are performed by a contract Lab.

Printed On: 19-Nov-2004

APPENDIX H

FISH SAMPLE DATA, EARN LAKE

APPENDIX H SAMPLE DATA FOR FISH CAPTURED FROM EARN LAKE, JUNE 2004

Sample #	Fish #	Species	Fork Length (mm)	Weight (g)	Sex	Stomach Contents	Comments
8905A	8905	Northern Pike	615	1460	F	goop	birth defect - missing left pelvic fin
8905B							parasites
8905C							immature
8905D							
8906A	8906	Northern Pike	510	880	F	goop	many parasites
8906B							immature
8906C							
8906D							
8907A	8907	Northern Pike	605	1240	F	MT	heavy parasite load
8907B							immature
8907C							
8907D							
8908A	8908	Northern Pike	465	640	F	MT	heavy parasite load
8908B							immature
8908C							
8908D							
8909A	8909	Northern Pike	555	1020	F	whitefish	parasites
8909B							immature
8909C							
8909D							
8910A	8910	Lake Whitefish	405	720	M	insects	
8910B							
8910C							
8910D							
8911A	8911	Northern Pike	480	700	F	whitefish	parasites
8911B							immature
8911C							
8911D							
8912A	8912	Northern Pike	610	1480	F	MT	parasites
8912B							
8912C							
8912D							
8913A	8913	Northern Pike	530	960	M	MT	few parasites
8913B							immature
8913C							
8913D							
8914A	8914	Northern Pike	520	760	M	MT	few parasites
8914B							
8914C							
8914D							
8915A	8915	Northern Pike	480	680	F	MT	heavy parasite load
8915B							
8910C							
8915D							
8916A	8916	Northern Pike	460	640	F	MT	developing eggs
8916B							
8916C							
8916D							
8917A	8917	Arctic grayling	295	200	F	insects	scales sampled for aging
8917B							
8917C							
8917D							
8918A	8918	Northern Pike	590	1080	F	MT	few parasites
8918B							
8918C							
8918D							
8919A	8919	Northern Pike	530	960	F	MT	few parasites
8919B							
8919C							
8919D							

APPENDIX H

FISH TISSUE ANALYSIS

Lab # 04/F1159 - F1203
Earn Lake Lake Fish Caught June/04

A - muscle
C - liver
D - gonad

Lab #	Sample ID	Species	Mercury ug/g wet wt	Selenium ug/g wet wt	Arsenic ug/g wet wt	
04/F1159	8905A	Northern Pike	0.131	0.981	0.053	
04/F1160	8906A	Northern Pike	0.156	0.827	0.053	
04/F1161	8907A	Northern Pike	0.158	1.030	0.042	
04/F1162	8908A	Northern Pike	0.056	1.042	0.042	
04/F1163	8909A	Northern Pike	0.104	0.999	0.088	
04/F1164	8910A	Lake Whitefish	0.013	1.665	0.025	
04/F1165	8911A	Northern Pike	0.070	0.981	0.032	
04/F1166	8912A	Northern Pike	0.132	0.854	0.071	
04/F1167	8913A	Northern Pike	0.114	1.106	0.059	
04/F1168	8914A	Northern Pike	0.129	0.766	0.033	
04/F1169	8915A	Northern Pike	0.051	1.019	0.084	
04/F1170	8916A	Northern Pike	0.074	1.164	0.107	
04/F1171	8917A	Arctic Grayling	0.050	0.855	0.012	
04/F1172	8918A	Northern Pike	0.189	0.757	0.030	
04/F1173	8919A	Northern Pike	0.122	0.971	0.049	
04/F1174	8905C	Northern Pike	0.026	1.957	0.048	
04/F1175	8906C	Northern Pike	0.056	1.622	0.034	
04/F1176	8907C	Northern Pike	0.059	2.020	0.097	
04/F1177	8908C	Northern Pike	0.033	1.677	0.037	
04/F1178	8909C	Northern Pike	0.048	2.080	0.110	
04/F1179	8910C	Lake Whitefish	0.007	0.681	0.159	looks like gonad
04/F1180	8911C	Northern Pike	0.045	2.260	0.053	
04/F1181	8912C	Northern Pike	0.049	1.761	0.073	
04/F1182	8913C	Northern Pike	0.051	2.700	0.036	
04/F1183	8914C	Northern Pike	0.065	2.233	0.040	
04/F1184	8915C	Northern Pike	0.019	1.863	0.041	
04/F1185	8916C	Northern Pike	0.053	2.031	0.089	
04/F1186	8917C	Arctic Grayling	0.057	3.464	0.023	
04/F1187	8918C	Northern Pike	0.074	1.908	0.031	
04/F1188	8919C	Northern Pike	0.055	2.243	0.030	
04/F1189	8905D	Northern Pike	0.002	1.269	0.023	
04/F1190	8906D	Northern Pike	0.003	0.910	0.017	
04/F1191	8907D	Northern Pike	0.013	0.999	0.031	
04/F1192	8908D	Northern Pike	0.011	1.138	0.022	
04/F1193	8909D	Northern Pike	0.003	1.087	0.030	
04/F1194	8910D	Lake Whitefish	0.128	3.641	0.052	looks like liver
04/F1195	8911D	Northern Pike	0.007	1.151	0.015	
04/F1196	8912D	Northern Pike	0.004	0.948	0.043	
04/F1197	8913D	Northern Pike	0.020	1.204	0.031	
04/F1198	8914D	Northern Pike	0.025	0.734	0.030	
04/F1199	8915D	Northern Pike	0.015	1.092	0.017	
04/F1200	8916D	Northern Pike	0.009	1.320	0.021	
04/F1201	8917D	Arctic Grayling	0.016	3.118	0.046	
04/F1202	8918D	Northern Pike	0.013	1.139	0.013	
04/F1203	8919D	Northern Pike	0.010	1.159	0.010	

APPENDIX I

ANALYTICAL RESULTS FOR VEGETATION TISSUES

NORWEST LABS

INFORMATION SHEET
SOILS - WASTE - OTHER

3 of 3

CONTROL NUMBER
SO 35107

RESULTS & INVOICE TO: DIAND
COMPANY: Waste Management
ADDRESS: 300-300 Main Street
CITY/TOWN: Whitehorse
PROVINCE: Yukon
POSTAL CODE:
ATTENTION: Pat Roach
PHONE: 867-
FAX:
CELL:

COPY OF RESULTS TO: Laberge Environmental Services
COMPANY: Bonnie Burns
ADDRESS: PO Box 21072
CITY/TOWN: Whitehorse
PROVINCE: YT
POSTAL CODE: Y1A 6P7
ATTENTION: Bonnie Burns
PHONE: 867-668-6838
FAX:
~~CELL~~ email: laberge@internorth.com

WORK ORDER NO.
313742

DATE STAMP
RECEIVED
JUN 10 2004

PURCHASE ORDER NO.:

PROJECT REF.: EARN L. PROJECT

REF./QUOTE NO.:

DATE SAMPLED D 08 M 06 Y 04 NUMBER OF SAMPLES SOIL | SOLID WASTE | PLANT 5 | OTHER (SPECIFY)

SPECIAL INSTRUCTIONS (SEE OVER FOR IMPORTANT SAMPLE INFORMATION INSTRUCTIONS AND ANALYSIS CODES)

RUSH DATE REQUIRED D M Y ____ % SURCHARGE WILL APPLY ON RUSHES QA REPORT ☐

- Thoroughly rinse veg tissues with DI before processing to remove dust & soil particles
- Selenium is our focus for this study so please analyze for Se using your most accurate methods, also to low detection limits

CLIENT NO.

LP

COMPLETION DATE D M Y

SAMPLE CUSTODY	SAMPLED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
	COMPANY	COMPANY	COMPANY	COMPANY
	DATE	DATE	DATE	DATE

	SITE I.D.	SAMPLE DESCRIPTION	DEPTH (CM)	ANALYSIS PACKAGE CODES (USE CODES LISTED ON THE REVERSE OF THIS SHEET)	LAB CODING
1	V-1	Earn R. - inlet to Earn Lake (Sedge)	-	ICP scan using low detection limits. - be sure Se, Hg & As are elements in scan	
2			-		
3	V-2	North Shore of Earn L. (milk vetch)	-		
4			-		
5	V-3A	At camp - Oxytropis (mature)	-		
6			-		
7	V-3B	At camp - Oxytropis (immature)	-		
8			-		
9	V-3C	At camp - Oxytropis (different species)	-	NOTE: Please analyze for selenate & selenite from V-2.	
10			-		
11			-		
12			-		
13			-		
14			-		
15			-		

EDMONTON PH. (403) 438-5522 FAX (403) 438-0396
CALGARY PH. (403) 291-2022 FAX (403) 291-2021
LANGLEY PH. (604) 530-4344 FAX (604) 534-9996
LETHBRIDGE PH. (403) 329-9266 FAX (403) 327-8527
WINNIPEG PH. (204) 982-8630 FAX (204) 275-6019

NOTE: Please complete this form in its entirety to ensure correct testing and reporting requirements.

ACCREDITED BY THE STANDARDS COUNCIL OF CANADA FOR SPECIFIC TESTS.

Report Transmission Cover Page

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID:
Name: Earn L Project
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **313742**
Control Number: SO 35107
Date Received: Jun 10, 2004
Date Reported: Jun 18, 2004
Report Number: 561262

Copies	Contact	Company	Address				
1	Pat Roach	Indian & Northern Affairs Canada	300, 300 Main Street Whitehorse, YT Y1A 2B5	Fax Email Custom Email	x	Post Pickup Courier	x
		Phone:	(867) 667-3139	Web		Hand	
		Fax:	(867) 667-3271	Email Notification			
		Email:					

_____ # OF PAGES IN THIS TRANSMISSION

Report Transmission Notes

Agreement Notes

Lot Notes

Sample Notes:

Notes to Clients

Lot Notes:

Sample Notes:

Batch Notes:

Method Notes:

Method Result Notes:

QC Result Notes:

Reports associated with this Lot

Id/Format/Reported Date	Id/Format/Reported Date	Id/Format/Reported Date
561262 Envir2QC 3 Smp & DL		

Comment:
See Methodology and Notes page of Analytical Report for all comments pertaining to this report.

If this report transmission is not satisfactory, please send report requirements to the address at the top of this page.

Sample Custody

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID:
Name: Earn L Project
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **313742**
Control Number: SO 35107
Date Received: Jun 10, 2004
Date Reported: Jun 18, 2004
Report Number: 561262

Sample Disposal Date: Jul 18, 2004

All samples will be stored until this date unless other instructions are received. Please indicate other requirements below and return this form to the address or fax number on the upper right of this page.

_____ **Extend Sample Storage Until** _____ **(MM/DD/YY)**

The following charges apply to extended sample storage:

Storage for 1 to 5 samples per month	$ 10.00
Storage for 6 to 20 samples per month	$ 15.00
Storage for 21 to 50 samples per month	$ 30.00
Storage for 51 to 200 samples per month	$ 60.00
Storage for more than 200 samples per month	$ 110.00

_____ **Return Sample, collect, to the address below via:**

_____ Greyhound
_____ Loomis
_____ Purolator
_____ Other (Specify) _____

Name: _____
Company: _____
Address: _____
_____
Phone: _____
Fax: _____
Signature: _____

If no other arrangements have been made, samples will be disposed of on Jul 18, 2004.

Analytical Report

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID:
Name: Earn L Project
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **313742**
Control Number: SO 35107
Date Received: Jun 10, 2004
Date Reported: Jun 18, 2004
Report Number: 561262

			NWL Number	313742-1	313742-2	313742-3	
			Sample Description	V - 1 / Earn R. - Inlet to Earn Lake (Sedge) / Sampled : 08/06/04	V - 2 / North Shore of Earn L. (Milk Vetch) / Sampled : 08/06/04	V - 3A / At Camp - Oxytropis (Mature) / Sampled : 08/06/04	
			Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**		**Results**	**Results**	**Results**	**Detection Limit**
Metals Strong Acid Extractable							
Arsenic	Strong Acid Extractable	ug/g		<0.3	<0.3	<0.3	0.3
Selenium	Strong Acid Extractable	ug/g		<0.2	<0.2	<0.2	0.2
Metals Total							
Aluminum	Total	ug/g		996	139	219	1
Antimony	Total	ug/g		<2	<2	<2	2
Barium	Total	ug/g		73.5	27.4	81.2	0.05
Beryllium	Total	ug/g		0.12	<0.05	<0.05	0.05
Bismuth	Total	ug/g		<2	<2	<2	2
Cadmium	Total	ug/g		0.37	0.071	<0.05	0.05
Calcium	Total	ug/g		3480	5880	9110	1
Chromium	Total	ug/g		9.76	0.71	2.73	0.1
Cobalt	Total	ug/g		0.60	0.1	<0.1	0.1
Copper	Total	ug/g		10.0	8.62	5.06	0.1
Iron	Total	ug/g		886	96.1	273	0.2
Lead	Total	ug/g		3.0	2.0	1.0	1
Lithium	Total	ug/g		0.90	<0.6	<0.6	0.6
Magnesium	Total	ug/g		2110	1970	3040	1
Manganese	Total	ug/g		186	46.8	28.9	0.05
Molybdenum	Total	ug/g		1.0	2.0	2.0	1
Nickel	Total	ug/g		6.27	4.46	5.36	0.2
Phosphorus	Total	ug/g		2490	3350	3240	5
Potassium	Total	ug/g		19900	20300	20200	100
Silicon	Total	ug/g		989	191	253	5
Silver	Total	ug/g		0.40	<0.2	0.40	0.2
Sodium	Total	ug/g		173	54.8	37	5
Strontium	Total	ug/g		18.3	28.4	31.2	0.5
Thorium	Total	ug/g		<0.5	<0.5	<0.5	0.5
Tin	Total	ug/g		<1	<1	<1	1
Titanium	Total	ug/g		17.8	5.98	5.57	0.4
Uranium	Total	ug/g		<6	<6	<6	6
Vanadium	Total	ug/g		5.08	<0.1	0.40	0.1
Zinc	Total	ug/g		42.4	29.3	26.1	0.1
Zirconium	Total	ug/g		2.8	<0.5	<0.5	0.5
Mercury	Total	ug/g		<0.01	<0.01	0.012	0.01

NORWEST LABS

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Analytical Report

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID:
Name: Earn L Project
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **313742**
Control Number: SO 35107
Date Received: Jun 10, 2004
Date Reported: Jun 18, 2004
Report Number: 561262

	NWL Number	313742-4	313742-5		
	Sample Description	V - 3B / At Camp - Oxytropis (Immature) / Sampled : 08/06/04	V - 3C / At Camp - Oxytropics (Different Species) / Sampled : 08/06/04		
	Matrix	Tissue	Tissue		
Analyte		**Units**	**Results**	**Results**	**Results**	**Detection Limit**
Metals Strong Acid Extractable						
Arsenic	Strong Acid Extractable	ug/g	<0.3	<0.3		0.3
Selenium	Strong Acid Extractable	ug/g	<0.2	0.2		0.2
Metals Total						
Aluminum	Total	ug/g	111	58.4		1
Antimony	Total	ug/g	<2	<2		2
Barium	Total	ug/g	67.9	5.86		0.05
Beryllium	Total	ug/g	<0.05	0.12		0.05
Bismuth	Total	ug/g	<2	<2		2
Cadmium	Total	ug/g	<0.05	0.090		0.05
Calcium	Total	ug/g	6610	5630		1
Chromium	Total	ug/g	0.60	0.80		0.1
Cobalt	Total	ug/g	<0.1	<0.1		0.1
Copper	Total	ug/g	6.21	5.63		0.1
Iron	Total	ug/g	170	91.4		0.2
Lead	Total	ug/g	2.0	3.0		1
Lithium	Total	ug/g	<0.6	<0.6		0.6
Magnesium	Total	ug/g	2410	5940		1
Manganese	Total	ug/g	24.9	19.9		0.05
Molybdenum	Total	ug/g	2.0	1.0		1
Nickel	Total	ug/g	6.31	3.12		0.2
Phosphorus	Total	ug/g	4510	1900		5
Potassium	Total	ug/g	10000	10100		100
Silicon	Total	ug/g	97.2	49		5
Silver	Total	ug/g	<0.2	0.30		0.2
Sodium	Total	ug/g	38	24		5
Strontium	Total	ug/g	22.3	14.0		0.5
Thorium	Total	ug/g	<0.5	<0.5		0.5
Tin	Total	ug/g	<1	<1		1
Titanium	Total	ug/g	2.5	2.3		0.4
Uranium	Total	ug/g	<6	<6		6
Vanadium	Total	ug/g	<0.1	<0.1		0.1
Zinc	Total	ug/g	27.6	8.65		0.1
Zirconium	Total	ug/g	<0.5	<0.5		0.5
Mercury	Total	ug/g	<0.01	<0.01		0.01

Analytical Report

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID:
Name: Earn L Project
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **313742**
Control Number: SO 35107
Date Received: Jun 10, 2004
Date Reported: Jun 18, 2004
Report Number: 561262

Approved by:

Marie England
Consulting Scientist

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Quality Control

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project
ID:
Name: Earn L Project
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 313742
Control Number: SO 35107
Date Received: Jun 10, 2004
Date Reported: Jun 18, 2004
Report Number: 561262

Metals Total

Blanks	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Aluminum	ug/g	<1	0.00	-0.01	0.01	✓
Antimony	ug/g	<2	0.00	-0.02	0.02	✓
Arsenic	ug/g	<4	0.00	-0.04	0.04	✓
Barium	ug/g	0.05	0.0000	-0.0005	0.0005	✓
Beryllium	ug/g	<0.05	0.0000	-0.0005	0.0005	✓
Bismuth	ug/g	<2	0.00	-0.02	0.02	✓
Cadmium	ug/g	<0.05	0.0000	-0.0005	0.0005	✓
Calcium	ug/g	10.0	0.00	-0.01	0.01	✓
Chromium	ug/g	<0.1	0.000	-0.001	0.001	✓
Cobalt	ug/g	<0.1	0.000	-0.001	0.001	✓
Copper	ug/g	0.60	0.000	-0.001	0.001	✓
Iron	ug/g	4.40	0.000	-0.002	0.002	✓
Lead	ug/g	<1	0.000	-0.010	0.010	✓
Lithium	ug/g	<0.6	0.000	-0.006	0.006	✓
Magnesium	ug/g	<1	0.00	-0.01	0.01	✓
Manganese	ug/g	0.05	0.0000	-0.0005	0.0005	✓
Molybdenum	ug/g	<1	0.00	-0.01	0.01	✓
Nickel	ug/g	<0.2	0.000	-0.002	0.002	✓
Phosphorus	ug/g	<5	0.00	-0.05	0.05	✓
Potassium	ug/g	<100	0.0	-1.0	1.0	✓
Selenium	ug/g	<10	0.00	-0.10	0.10	✓
Silicon	ug/g	<5	0.00	-0.05	0.05	✓
Silver	ug/g	<0.2	0.000	-0.002	0.002	✓
Sodium	ug/g	<5	0.00	-0.05	0.05	✓
Strontium	ug/g	<0.5	0.000	-0.005	0.005	✓
Sulphur	ug/g	500	0.0	-1.0	1.0	✓
Thorium	ug/g	<0.5	0.000	-0.005	0.005	✓
Tin	ug/g	<1	0.000	-0.010	0.010	✓
Titanium	ug/g	<0.4	0.000	-0.004	0.004	✓
Uranium	ug/g	<6	0.00	-0.06	0.06	✓
Vanadium	ug/g	<0.1	0.000	-0.001	0.001	✓
Zinc	ug/g	0.20	0.0000	-0.0010	0.0010	✓
Zirconium	ug/g	4.6	0.000	-0.005	0.005	✓
Mercury	ug/g	<0.01	0.000	-0.099	0.099	✓

Material Used: Metals Blank - solids
Date Acquired: Jun 16, 2004
Acquired By: Burke VanderHorst

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Quality Control

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID:
Name: Earn L Project
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 313742
Control Number: SO 35107
Date Received: Jun 10, 2004
Date Reported: Jun 18, 2004
Report Number: 561262

Metals Total (Continued...)

Replicates	Units	Replicate1	Replicate2	% RSD Criteria	Absolute Criteria	Passed QC
Aluminum	ug/g	58.4	50.5	20.01	0.02	✓
Antimony	ug/g	<2	2.0	20.01	0.04	✓
Arsenic	ug/g	6.0	<4	20.01	0.08	✓
Barium	ug/g	5.86	5.38	20.0100	0.0010	✓
Beryllium	ug/g	0.12	<0.05	20.0100	0.0010	✓
Bismuth	ug/g	<2	3.0	20.01	0.04	✓
Cadmium	ug/g	0.090	<0.05	20.0100	0.0010	✓
Calcium	ug/g	5630	5250	20.01	0.02	✓
Chromium	ug/g	0.80	0.61	20.010	0.002	✓
Cobalt	ug/g	<0.1	<0.1	20.010	0.002	✓
Copper	ug/g	5.63	5.15	20.010	0.002	✓
Iron	ug/g	91.4	85.4	20.010	0.004	✓
Lead	ug/g	3.0	2.0	20.010	0.020	✓
Lithium	ug/g	<0.6	<0.6	20.010	0.012	✓
Magnesium	ug/g	5940	5450	20.01	0.02	✓
Manganese	ug/g	19.9	18.7	20.0100	0.0010	✓
Molybdenum	ug/g	1.0	1.0	20.01	0.02	✓
Nickel	ug/g	3.12	2.73	20.010	0.004	✓
Phosphorus	ug/g	1900	1790	20.01	0.10	✓
Potassium	ug/g	10100	20200	20.0	2.0	✓
Selenium	ug/g	<10	10	20.01	0.20	✓
Silicon	ug/g	49	50	20.01	0.10	✓
Silver	ug/g	0.30	<0.2	20.010	0.004	✓
Sodium	ug/g	24	21	20.01	0.10	✓
Strontium	ug/g	14.0	13.4	20.010	0.010	✓
Sulphur	ug/g	800	910	20.0	2.0	✓
Thorium	ug/g	1.3	2.8	20.010	0.010	✓
Tin	ug/g	<1	<1	20.010	0.020	✓
Titanium	ug/g	2.3	2.2	20.010	0.008	✓
Uranium	ug/g	6.0	9.1	20.01	0.12	✓
Vanadium	ug/g	<0.1	<0.1	20.010	0.002	✓
Zinc	ug/g	8.65	8.18	20.0100	0.0020	✓
Zirconium	ug/g	<0.5	<0.5	20.010	0.010	✓

Material Used: Metals Int. Duplicate - solids
Date Acquired: Jun 15, 2004
Acquired By: Marie England

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Methodology and Notes

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID:
Name: Earn L Project
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **313742**
Control Number: SO 35107
Date Received: Jun 10, 2004
Date Reported: Jun 18, 2004
Report Number: 561262

Method of Analysis:

MethodName	Reference		Method	Date Analysis Started	Location
Mercury in Tissue (Surrey)	APHA	*	Cold Vapour Atomic Absorption Spectrometric Method, 3112 B	16-Jun-04	Norwest Labs Surrey
Metals GFAAS (Strong Acid Leachable) in solids	US EPA		Atomic Absorption - Flame or Graphite Furnace, 7000A	15-Jun-04	Norwest Labs Surrey
Metals SemiTrace (Total) in tissue (Surrey)	US EPA		Metals & Trace Elements by Ultrasonic Nebulization ICP-AES, 200.15	15-Jun-04	Norwest Labs Surrey

* Norwest method(s) is based on reference method

References:

APHA	Standard Methods for the Examination of Water and Wastewater
US EPA	US Environmental Protection Agency Test Methods

Comments:

2645 Dollarton Highway
North Vancouver, BC. Canada V7H - 1B1
Phone (604) 924-2500 Fax (604) 924-2555

Environment Canada Environnement Canada

Final Analytical Results with QC data

PESC FOLDER # : 200400719

Location:	EARN LAKE YUKON
Type of Sample:	Animal Tissue / Fish (ANFI)
Submitted By:	Doug Davidge Environment Canada 91782 Alaska Hwy Whitehorse, YT Canada Y1A 5B7 Phone: 867-667-4592 Fax: 867-667-7962
Logged In:	Friday July 9, 2004
Completed:	Friday October 8, 2004 (141 results)
Client Code:	2561-101 2561-101 EP YUKON ENV ASSESSMENT
Sample Priority:	Medium

Authorized by: _____

Richard Strub
QA Officer

Notes:

SAMPLE SENT JUNE 23 ARRIVED IN PESC JULY 09,2004.

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
Order No: 106063 - V-4				**Arrival Temperature: 0°C**
Start Date: 08/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM				
General				
Moisture				
Moisture Content	ANFI	75.2	0.1	% (W/W)
Metals				
ICP total block dig.				
Aluminum (Al)	ANFI	34	4	ug/g(dry)
Boron (B)	ANFI	15.3	0.8	ug/g(dry)
Calcium (Ca)	ANFI	6260	8	ug/g(dry)
Iron (Fe)	ANFI	165	0.4	ug/g(dry)
Magnesium (Mg)	ANFI	3460	8	ug/g(dry)
Phosphorus (P)	ANFI	2420	20	ug/g(dry)
Potassium (K)	ANFI	23200	20	ug/g(dry)
Silicon (Si)	ANFI	92	4	ug/g(dry)
Sodium (Na)	ANFI	65	8	ug/g(dry)
Sulfur (S)	ANFI	2730	4	ug/g(dry)
Titanium (Ti)	ANFI	0.6	0.2	ug/g(dry)
ICPMS Total blockdig				
Antimony (Sb)	ANFI	0.078	0.005	ug/g (dry)
Arsenic (As)	ANFI	0.3	0.1	ug/g (dry)
Barium (Ba)	ANFI	22.6	0.02	ug/g (dry)
Berylium (Be)	ANFI	0.008	0.002	ug/g (dry)
Bismuth (Bi)	ANFI	< 0.02	0.02	ug/g (dry)
Cadmium (Cd)	ANFI	0.04	0.01	ug/g (dry)
Chromium (Cr)	ANFI	1.9	0.2	ug/g (dry)
Cobalt (Co)	ANFI	0.192	0.005	ug/g (dry)
Copper (Cu)	ANFI	13.2	0.05	ug/g (dry)
Lead (Pb)	ANFI	0.16	0.01	ug/g (dry)
Lithium (Li)	ANFI	0.07	0.05	ug/g (dry)
Manganese (Mn)	ANFI	51.1	0.005	ug/g (dry)
Molybdenum (Mo)	ANFI	0.82	0.05	ug/g (dry)
Nickel (Ni)	ANFI	9.49	0.05	ug/g (dry)
Selenium (Se)	ANFI	2.5	0.2	ug/g (dry)
Silver (Ag)	ANFI	0.10	0.02	ug/g (dry)
Strontium (Sr)	ANFI	18.2	0.005	ug/g (dry)
Thallium (Tl)	ANFI	< 0.002	0.002	ug/g (dry)
Tin (Sn)	ANFI	< 0.01	0.01	ug/g (dry)
Uranium (U)	ANFI	0.005	0.002	ug/g (dry)
Vanadium (V)	ANFI	0.54	0.05	ug/g (dry)
Zinc (Zn)	ANFI	17.3	0.1	ug/g (dry)
Mercury -total				
Mercury (Hg)	ANFI	0.029	0.002	ug/g(dry)

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
Order No: 106064 - V-5				
Start Date: 08/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM				
General				
Moisture				
Moisture Content	ANFI	84.1	0.1	% (W/W)
Metals				
ICP total block dig.				
Aluminum (Al)	ANFI	< 4	4	ug/g(dry)
Boron (B)	ANFI	21.4	0.8	ug/g(dry)
Calcium (Ca)	ANFI	7680	8	ug/g(dry)
Iron (Fe)	ANFI	87.5	0.4	ug/g(dry)
Magnesium (Mg)	ANFI	4060	8	ug/g(dry)
Phosphorus (P)	ANFI	3560	20	ug/g(dry)
Potassium (K)	ANFI	31400	20	ug/g(dry)
Silicon (Si)	ANFI	53	4	ug/g(dry)
Sodium (Na)	ANFI	19	8	ug/g(dry)
Sulfur (S)	ANFI	3410	4	ug/g(dry)
Titanium (Ti)	ANFI	< 0.2	0.2	ug/g(dry)
ICPMS Total blockdig				
Antimony (Sb)	ANFI	0.049	0.005	ug/g (dry)
Arsenic (As)	ANFI	0.3	0.1	ug/g (dry)
Barium (Ba)	ANFI	6.36	0.02	ug/g (dry)
Berylium (Be)	ANFI	< 0.002	0.002	ug/g (dry)
Bismuth (Bi)	ANFI	< 0.02	0.02	ug/g (dry)
Cadmium (Cd)	ANFI	0.04	0.01	ug/g (dry)
Chromium (Cr)	ANFI	1.3	0.2	ug/g (dry)
Cobalt (Co)	ANFI	0.096	0.005	ug/g (dry)
Copper (Cu)	ANFI	4.65	0.05	ug/g (dry)
Lead (Pb)	ANFI	0.21	0.01	ug/g (dry)
Lithium (Li)	ANFI	< 0.05	0.05	ug/g (dry)
Manganese (Mn)	ANFI	37	0.005	ug/g (dry)
Molybdenum (Mo)	ANFI	2.83	0.05	ug/g (dry)
Nickel (Ni)	ANFI	7.30	0.05	ug/g (dry)
Selenium (Se)	ANFI	6.4	0.2	ug/g (dry)
Silver (Ag)	ANFI	< 0.02	0.02	ug/g (dry)
Strontium (Sr)	ANFI	15.7	0.005	ug/g (dry)
Thallium (Tl)	ANFI	< 0.002	0.002	ug/g (dry)
Tin (Sn)	ANFI	< 0.01	0.01	ug/g (dry)
Uranium (U)	ANFI	< 0.002	0.002	ug/g (dry)
Vanadium (V)	ANFI	0.51	0.05	ug/g (dry)
Zinc (Zn)	ANFI	51.3	0.1	ug/g (dry)
Mercury -total				
Mercury (Hg)	ANFI	0.013	0.002	ug/g(dry)

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
Order No: 106065 - V-6				
Start Date: 08/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM				
General				
Moisture				
Moisture Content	ANFI	73.8	0.1	% (W/W)
Metals				
ICP total block dig.				
Aluminum (Al)	ANFI	310	4	ug/g(dry)
Boron (B)	ANFI	21.3	0.8	ug/g(dry)
Calcium (Ca)	ANFI	6000	8	ug/g(dry)
Iron (Fe)	ANFI	40.7	0.4	ug/g(dry)
Magnesium (Mg)	ANFI	2530	8	ug/g(dry)
Phosphorus (P)	ANFI	3690	20	ug/g(dry)
Potassium (K)	ANFI	14600	8	ug/g(dry)
Silicon (Si)	ANFI	75	4	ug/g(dry)
Sodium (Na)	ANFI	23	8	ug/g(dry)
Sulfur (S)	ANFI	2630	4	ug/g(dry)
Titanium (Ti)	ANFI	< 0.2	0.2	ug/g(dry)
ICPMS Total blockdig				
Antimony (Sb)	ANFI	0.030	0.005	ug/g (dry)
Arsenic (As)	ANFI	< 0.1	0.1	ug/g (dry)
Barium (Ba)	ANFI	3.32	0.02	ug/g (dry)
Berylium (Be)	ANFI	0.003	0.002	ug/g (dry)
Bismuth (Bi)	ANFI	< 0.02	0.02	ug/g (dry)
Cadmium (Cd)	ANFI	1.24	0.01	ug/g (dry)
Chromium (Cr)	ANFI	1.4	0.2	ug/g (dry)
Cobalt (Co)	ANFI	0.392	0.005	ug/g (dry)
Copper (Cu)	ANFI	6.17	0.05	ug/g (dry)
Lead (Pb)	ANFI	0.06	0.01	ug/g (dry)
Lithium (Li)	ANFI	0.06	0.05	ug/g (dry)
Manganese (Mn)	ANFI	113	0.005	ug/g (dry)
Molybdenum (Mo)	ANFI	0.11	0.05	ug/g (dry)
Nickel (Ni)	ANFI	1.31	0.05	ug/g (dry)
Selenium (Se)	ANFI	0.3	0.2	ug/g (dry)
Silver (Ag)	ANFI	< 0.02	0.02	ug/g (dry)
Strontium (Sr)	ANFI	18.8	0.005	ug/g (dry)
Thallium (Tl)	ANFI	< 0.002	0.002	ug/g (dry)
Tin (Sn)	ANFI	< 0.01	0.01	ug/g (dry)
Uranium (U)	ANFI	0.005	0.002	ug/g (dry)
Vanadium (V)	ANFI	0.53	0.05	ug/g (dry)
Zinc (Zn)	ANFI	148	0.1	ug/g (dry)
Mercury -total				
Mercury (Hg)	ANFI	0.012	0.002	ug/g(dry)

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
Order No: 106066 - V-7				
Start Date: 08/06/2004 12:00:00AM End Date: 10/06/2004 12:00:00AM				
General				
Moisture				
Moisture Content	ANFI	86.9	0.1	% (W/W)
Metals				
ICP total block dig.				
Aluminum (Al)	ANFI	115	4	ug/g(dry)
Boron (B)	ANFI	15.5	0.8	ug/g(dry)
Calcium (Ca)	ANFI	13300	8	ug/g(dry)
Iron (Fe)	ANFI	762	0.4	ug/g(dry)
Magnesium (Mg)	ANFI	4010	8	ug/g(dry)
Phosphorus (P)	ANFI	3470	20	ug/g(dry)
Potassium (K)	ANFI	26600	20	ug/g(dry)
Silicon (Si)	ANFI	171	4	ug/g(dry)
Sodium (Na)	ANFI	35	8	ug/g(dry)
Sulfur (S)	ANFI	3620	4	ug/g(dry)
Titanium (Ti)	ANFI	1.8	0.2	ug/g(dry)
ICPMS Total blockdig				
Antimony (Sb)	ANFI	0.189	0.005	ug/g (dry)
Arsenic (As)	ANFI	1.0	0.1	ug/g (dry)
Barium (Ba)	ANFI	76.4	0.02	ug/g (dry)
Berylium (Be)	ANFI	0.012	0.002	ug/g (dry)
Bismuth (Bi)	ANFI	0.05	0.02	ug/g (dry)
Cadmium (Cd)	ANFI	0.19	0.01	ug/g (dry)
Chromium (Cr)	ANFI	6.3	0.2	ug/g (dry)
Cobalt (Co)	ANFI	0.410	0.005	ug/g (dry)
Copper (Cu)	ANFI	8.06	0.05	ug/g (dry)
Lead (Pb)	ANFI	0.54	0.01	ug/g (dry)
Lithium (Li)	ANFI	0.34	0.05	ug/g (dry)
Manganese (Mn)	ANFI	62.9	0.005	ug/g (dry)
Molybdenum (Mo)	ANFI	11.5	0.05	ug/g (dry)
Nickel (Ni)	ANFI	25.1	0.05	ug/g (dry)
Selenium (Se)	ANFI	2.5	0.2	ug/g (dry)
Silver (Ag)	ANFI	0.03	0.02	ug/g (dry)
Strontium (Sr)	ANFI	48.1	0.005	ug/g (dry)
Thallium (Tl)	ANFI	0.006	0.002	ug/g (dry)
Tin (Sn)	ANFI	< 0.01	0.01	ug/g (dry)
Uranium (U)	ANFI	0.042	0.002	ug/g (dry)
Vanadium (V)	ANFI	1.45	0.05	ug/g (dry)
Zinc (Zn)	ANFI	50.1	0.1	ug/g (dry)
Mercury -total				
Mercury (Hg)	ANFI	0.022	0.002	ug/g(dry)

QC Information:

ANALYTE	ALIQ#	EXPECTED	RESULT	% REC	DIL'N	MDL	QC TYPE

ICP total block dig. **UNITS:** ug/g(dry) **MATRIX:** ANFI

ANALYTE	ALIQ#	EXPECTED	RESULT	% REC	DIL'N	MDL	QC TYPE
Aluminum (Al)	107349-1		< 4		1	4	REP

ICPMS Total blockdig **UNITS:** ug/g (dry) **MATRIX:** ANFI

ANALYTE	ALIQ#	EXPECTED	RESULT	% REC	DIL'N	MDL	QC TYPE
Antimony (Sb)	106064-1		0.030	61.3	1	0.005	REP
Antimony (Sb)	107913-1		0.305	99.1	1	0.005	REP
Antimony (Sb)	107923-1		0.173	95.8	1	0.005	REP
Antimony (Sb)	108570-1		0.030	60.1	1	0.005	REP
Antimony (Sb)	108572-1		0.306	99.5	1	0.005	REP
Antimony (Sb)	108573-1		0.171	94.7	1	0.005	REP
Arsenic (As)	108570-1		0.4	131.1	1	0.1	REP
Arsenic (As)	108572-1		5.9	97.7	1	0.1	REP
Arsenic (As)	108573-1		20.5	100.5	1	0.1	REP
Barium (Ba)	106064-1		6.52	102.5	1	0.02	REP
Barium (Ba)	107913-1		1080	97.4	1.1	0.02	REP
Barium (Ba)	107923-1		139	103.0	1.1	0.02	REP
Barium (Ba)	108570-1		6.48	101.9	1	0.02	REP
Barium (Ba)	108572-1		1012	100.2	1.1	0.02	REP
Barium (Ba)	108573-1		143	105.9	1.1	0.02	REP
Berylium (Be)	108570-1		< 0.002		1	0.002	REP
Berylium (Be)	108572-1		0.370	95.5	1	0.002	REP
Berylium (Be)	108573-1		0.785	95.7	1	0.002	REP
Bismuth (Bi)	108570-1		< 0.02		1	0.02	REP
Bismuth (Bi)	108572-1		0.13	101.5	1.1	0.02	REP
Bismuth (Bi)	108573-1		0.36	102.8	1.1	0.02	REP
Cadmium (Cd)	106064-1		0.04	100.0	1	0.01	REP
Cadmium (Cd)	107913-1		0.63	98.2	1	0.01	REP
Cadmium (Cd)	107923-1		0.58	97.6	1	0.01	REP
Cadmium (Cd)	108570-1		0.04	107.9	1	0.01	REP
Cadmium (Cd)	108572-1		0.92	144.3	1	0.01	REP
Cadmium (Cd)	108573-1		0.93	158.4	1	0.01	REP
Chromium (Cr)	106064-1		1.3	100.0	1	0.2	REP
Chromium (Cr)	107913-1		50.7	100.0	1	0.2	REP
Chromium (Cr)	107923-1		35.3	100.0	1	0.2	REP
Chromium (Cr)	108570-1		1.2	90.0	1	0.2	REP
Chromium (Cr)	108572-1		49.5	97.6	1	0.2	REP
Chromium (Cr)	108573-1		34.6	98.1	1	0.2	REP
Cobalt (Co)	108570-1		0.105	109.7	1	0.005	REP
Cobalt (Co)	108572-1		11.3	99.4	1	0.005	REP
Cobalt (Co)	108573-1		11.9	98.1	1	0.005	REP
Copper (Cu)	106064-1		4.72	101.6	1	0.05	REP
Copper (Cu)	107913-1		23.4	103.4	1	0.05	REP
Copper (Cu)	107923-1		30.4	103.4	1	0.05	REP
Copper (Cu)	108570-1		4.67	100.5	1	0.05	REP
Copper (Cu)	108572-1		22.5	99.4	1	0.05	REP
Copper (Cu)	108573-1		29.1	98.9	1	0.05	REP
Lead (Pb)	108570-1		0.21	99.0	1	0.01	REP
Lead (Pb)	108572-1		12.3	99.7	1.1	0.01	REP
Lead (Pb)	108573-1		9.68	106.3	1.1	0.01	REP

QC Information:

ANALYTE	ALIQ#	EXPECTED	RESULT	% REC	DIL'N	MDL	QC TYPE
Lithium (Li)	108570-1		< 0.05		1	0.05	REP
Lithium (Li)	108572-1		11.1	99.9	1	0.05	REP
Lithium (Li)	108573-1		12	100.9	1	0.05	REP
Manganese (Mn)	108570-1		36	97.2	1	0.005	REP
Manganese (Mn)	108572-1		564	95.8	1	0.005	REP
Manganese (Mn)	108573-1		464	100.3	1	0.005	REP
Molybdenum (Mo)	108570-1		2.89	102.3	1	0.05	REP
Molybdenum (Mo)	108572-1		0.69	95.1	1	0.05	REP
Molybdenum (Mo)	108573-1		0.99	103.0	1	0.05	REP
Nickel (Ni)	108570-1		7.21	98.7	1	0.05	REP
Nickel (Ni)	108572-1		66.6	97.3	1	0.05	REP
Nickel (Ni)	108573-1		34.5	96.5	1	0.05	REP
Selenium (Se)	106064-1		6.4	100.0	1	0.2	REP
Selenium (Se)	107913-1		0.7	92.6	1	0.2	REP
Selenium (Se)	107923-1		0.5	99.9	1	0.2	REP
Selenium (Se)	108570-1		6.4	100.0	1	0.2	REP
Selenium (Se)	108572-1		0.7	92.6	1	0.2	REP
Selenium (Se)	108573-1		0.5	99.9	1	0.2	REP
Silver (Ag)	108570-1		< 0.02		1	0.02	REP
Silver (Ag)	108572-1		0.18	92.5	1	0.02	REP
Silver (Ag)	108573-1		0.15	89.7	1	0.02	REP
Strontium (Sr)	108570-1		15.6	99.1	1	0.005	REP
Strontium (Sr)	108572-1		49.4	104.9	1	0.005	REP
Strontium (Sr)	108573-1		27.1	102.3	1	0.005	REP
Thallium (Tl)	108570-1		< 0.002		1	0.002	REP
Thallium (Tl)	108572-1		0.216	99.8	1.1	0.002	REP
Thallium (Tl)	108573-1		0.102	107.1	1.1	0.002	REP
Tin (Sn)	108570-1		52.9		1	0.01	REP
Tin (Sn)	108572-1		0.40	136.1	1	0.05	REP
Tin (Sn)	108573-1		0.52	98.0	1	0.05	REP
Uranium (U)	108570-1		0.003	169.2	1	0.002	REP
Uranium (U)	108572-1		0.837	97.3	1.1	0.002	REP
Uranium (U)	108573-1		3.97	106.0	1.1	0.002	REP
Vanadium (V)	108570-1		0.50	97.9	1	0.05	REP
Vanadium (V)	108572-1		23.5	97.1	1	0.05	REP
Vanadium (V)	108573-1		42.7	99.6	1	0.05	REP
Zinc (Zn)	106064-1		53.9	105.2	1	0.1	REP
Zinc (Zn)	107913-1		168	149.0	1	0.1	REP
Zinc (Zn)	107923-1		83.6	100.6	1	0.1	REP
Zinc (Zn)	108570-1		53.3	103.9	1	0.1	REP
Zinc (Zn)	108572-1		114	100.9	1	0.1	REP
Zinc (Zn)	108573-1		82.5	99.3	1	0.1	REP

Mercury -total **UNITS:** ug/g(dry) **MATRIX:** ANFI

ANALYTE	ALIQ#	EXPECTED	RESULT	% REC	DIL'N	MDL	QC TYPE
Mercury (Hg)	109580-1	< MDL	< 0.002		1	0.002	BLL
Mercury (Hg)	109581-1	1.99	1.84	92.3	10	0.02	REF
Mercury (Hg)	109582-1	0.27	0.217	80.3	1	0.002	REF
Mercury (Hg)	109583-1	4.64	3.90	84.0	10	0.02	REF
Mercury (Hg)	109584-1		0.008	67.2	1	0.002	REP

Note: **All QC information is batch associated. Duplicate analysis are not necessarily those of this report. Percent recovery for duplicate analysis represents the percent recovery of REP2 as compared to REP1 of a sample duplicate.**

BLE - Blank, Equipment	BLL - Blank, Method	BLX - Blank, Extraction
REA - Replicate Spike, Known Addition	REF - Reference Material	REG - Regular Sample
RRF - Replicate Reference Material	REK - Replicate, Spike	REP - Replicate, Regular
RTS - Replicate Test Sample	SPA - Spike, Known Addition	SPK - Spike
TST - Test Sample 1=Present 2=Absent	MDL - Method Detection Limit	

Environment Canada Environnement Canada

Billing Estimate

PESC FOLDER # : 200400719

Invoice: 74023

------- Not an Invoice Do not Pay -------

EP YUKON ENV ASSESSMENT

Location: EARN LAKE YUKON

TEST DESCRIPTION	MATRIX	QTY	UNITPRICE	PENALTY	SURCHARGE	NETPRICE
PESC - Inorganics						
ICP total block dig.	ANFI	4	$52.50			$210.00
ICPMS Total blockdig	ANFI	4	$90.00			$360.00
Mercury -total	ANFI	4	$52.50			$210.00
Moisture	ANFI	4	$15.00			$60.00
					PESC - Inorganics Charges	**$840.00**
					Total Charged To: 2561-101 EP YUKON ENV ASSESSMENT	**$840.00**

Penalty - A charge that is removed from the price due to a test performed after a certian penalty time.
Surcharge - A service charge that is applied when tests are performed by a contract Lab.

Printed On: 8-Oct-2004

APPENDIX J

ANALYTICAL RESULTS FOR MOUSE TISSUES

NORWEST LABS

Analytical Report

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID: Barn Lake
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 358845
Control Number:
Date Received: Jan 21, 2005
Date Reported: Feb 01, 2005
Report Number: 654631

		NWL Number	358845-1	358845-4	358845-5	
		Sample Description	2004 - EL - 001 / Mouse Kidney	2004 - EL - 001 / Mouse Liver	2004 - EL - 002 / Mouse Liver	
		Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**	**Results**	**Results**	**Results**	**Detection Limi**
Metals Total						
Aluminum	Total (wet weight)	ug/g	4.4	<0.5	<0.8	2.5
Antimony	Total (wet weight)	ug/g	<0.02	<0.02	<0.03	0.1
Arsenic	Total (wet weight)	ug/g	0.07	0.05	0.07	0.1
Barium	Total (wet weight)	ug/g	15.7	0.18	0.18	0.5
Beryllium	Total (wet weight)	ug/g	<0.01	<0.01	<0.02	0.05
Bismuth	Total (wet weight)	ug/g	<0.06	<0.05	<0.08	0.2
Cadmium	Total (wet weight)	ug/g	1.29	0.0475	0.0669	0.005
Calcium	Total (wet weight)	ug/g	790	250	<300	100
Chromium	Total (wet weight)	ug/g	0.24	0.43	0.45	0.3
Cobalt	Total (wet weight)	ug/g	0.071	0.034	0.050	0.05
Copper	Total (wet weight)	ug/g	6.75	4.31	5.54	0.5
Iron	Total (wet weight)	ug/g	138	263	326	5
Lead	Total (wet weight)	ug/g	0.176	0.042	0.11	0.05
Lithium	Total (wet weight)	ug/g	0.19	<0.1	<0.2	0.5
Magnesium	Total (wet weight)	ug/g	330	300	350	100
Manganese	Total (wet weight)	ug/g	<6	<5	<8	2.5
Molybdenum	Total (wet weight)	ug/g	0.73	1.18	1.5	0.5
Nickel	Total (wet weight)	ug/g	0.28	0.19	0.22	0.3
Phosphorus	Total (wet weight)	ug/g	4070	3360	4110	15
Potassium	Total (wet weight)	ug/g	4200	4000	4900	200
Selenium	Total (wet weight)	ug/g	1.96	1.34	1.73	0.1
Silicon	Total (wet weight)	ug/g	<60	<50	<80	25
Silver	Total (wet weight)	ug/g	0.018	<0.01	<0.02	0.05
Sodium	Total (wet weight)	ug/g	1900	1200	1400	200
Strontium	Total (wet weight)	ug/g	7.66	0.19	<0.2	0.5
Tin	Total (wet weight)	ug/g	4.64	3.67	5.92	0.5
Titanium	Total (wet weight)	ug/g	0.43	0.22	0.23	0.3
Uranium	Total (wet weight)	ug/g	<0.06	<0.05	<0.08	0.3
Vanadium	Total (wet weight)	ug/g	0.069	0.039	0.072	0.05
Zinc	Total (wet weight)	ug/g	33.4	25.6	33.4	0.5
Zirconium	Total (wet weight)	ug/g	<0.1	<0.1	<0.2	0.5

NORWEST LABS

Analytical Report

Norwest Labs
#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Bill to: Indian & Northern Affairs Canada
Report to: Indian & Northern Affairs Canada
300, 300 Main Street
Whitehorse, YT, Canada
Y1A 2B5
Attn: Pat Roach
Sampled By:
Company:

Project ID: Earn Lake
Name:
Location:
LSD:
P.O.:
Acct. Code:

NWL Lot ID: 358845
Control Number:
Date Received: Jan 21, 2005
Date Reported: Feb 01, 2005
Report Number: 654631

		NWL Number	358845-6			
		Sample Description	2004 - EL - 003 / Mouse Liver			
		Matrix	Tissue			
Analyte		Units	Results	Results	Results	Detection Limit
Metals Total						
Aluminum	Total (wet weight)	ug/g	0.6			2.5
Antimony	Total (wet weight)	ug/g	<0.02			0.1
Arsenic	Total (wet weight)	ug/g	0.04			0.1
Barium	Total (wet weight)	ug/g	0.16			0.5
Beryllium	Total (wet weight)	ug/g	<0.01			0.05
Bismuth	Total (wet weight)	ug/g	<0.05			0.3
Cadmium	Total (wet weight)	ug/g	0.0459			0.005
Calcium	Total (wet weight)	ug/g	<200			100
Chromium	Total (wet weight)	ug/g	0.20			0.3
Cobalt	Total (wet weight)	ug/g	0.033			0.05
Copper	Total (wet weight)	ug/g	5.75			0.5
Iron	Total (wet weight)	ug/g	134			5
Lead	Total (wet weight)	ug/g	0.076			0.05
Lithium	Total (wet weight)	ug/g	<0.1			0.5
Magnesium	Total (wet weight)	ug/g	310			100
Manganese	Total (wet weight)	ug/g	<5			2.5
Molybdenum	Total (wet weight)	ug/g	1.38			0.5
Nickel	Total (wet weight)	ug/g	0.16			0.3
Phosphorus	Total (wet weight)	ug/g	3640			15
Potassium	Total (wet weight)	ug/g	4030			200
Selenium	Total (wet weight)	ug/g	1.32			0.1
Silicon	Total (wet weight)	ug/g	<50			25
Silver	Total (wet weight)	ug/g	<0.01			0.05
Sodium	Total (wet weight)	ug/g	1100			200
Strontium	Total (wet weight)	ug/g	<0.1			0.5
Tin	Total (wet weight)	ug/g	3.71			0.5
Titanium	Total (wet weight)	ug/g	0.28			0.3
Uranium	Total (wet weight)	ug/g	<0.05			0.3
Vanadium	Total (wet weight)	ug/g	0.066			0.05
Zinc	Total (wet weight)	ug/g	25.2			0.5
Zirconium	Total (wet weight)	ug/g	<0.1			0.5

NORWEST LABS

Methodology and Notes

Norwest Labs
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Method of Analysis:

MethodName	Reference	Method	Date Analysis Started	Location
Metals SemiTrace (Total) in tissue (Surrey)	US EPA	Metals & Trace Elements by Ultrasonic Nebulization ICP-AES, 200.15	27-Jan-05	Norwest Labs Surrey

* Norwest method(s) is based on reference method

References:

US EPA — US Environmental Protection Agency Test Methods

Comments:

Sample #1,2,3 (kidney) combined for 1 sample. jtJan24/05