BAKER CREEK REACH 7 OVERFLOW MONITORING PROGRAM - INTERIM REPORT

Submitted to: Robert Girvan, Public Works Canada Project Manager, Northern Contaminated Sites Western Region

EPORT

Report Number: 09-1427-0006 / 20000/20500



Executive Summary

In May 2011, icing in upper Baker Creek caused changes to the regular flow path of the creek near Giant Mine (the Mine). The normal flow path of Baker Creek is from little Martin Lake to Baker Pond through a series of wetlands and a waterfall upstream of the pond. Over the past winter, ice built up over a distance of approximately one kilometre upstream of Baker Pond, causing early spring flows from Martin Lake to flow northeast around the ice jam instead of the usual flow path through the ice (referred to as "the overflow event" below). The diverted flow eroded an old mine road and entered historic Jo Jo Lake, where sediments have been impacted by mine tailings during the early years of mining (SRK 2009). The flow of water through historic Jo Jo Lake resulted in re-suspension and transport of tailings impacted sediments through lower Baker Creek to Yellowknife Bay. Sediment quality in the area affected by tailings has most notably been characterized by elevated concentrations of metals and metalloids (e.g., arsenic, cadmium, aluminum, chromium) (Jacques-Whitford-Axys 2006).

The event timeline for the sediment release and subsequent monitoring was as follows:

- May 14, 2011 Spring flows from Martin Lake deviate from regular flow path and enter historic Jo Jo Lake; regulatory consultation initiated.
- May 16, 2011 Acute toxicity and water quality sampling of creek initiated.
- May 17, 2011 Continued sampling and mobilization of response team.
- May 18, 2011 Project engineers divert overflow back to the original channel; coarse fill laid in the tailings area of Reach 6 prevent flows from circulating upstream.
- May 18 onwards Continued sampling and data analysis.

The main objective of the Baker Creek overflow monitoring program was to characterize water and sediment quality at various locations in Baker Creek on several occasions during the overflow event. To address this objective, water quality data collected between May 16 and 27, 2011 were evaluated by comparing concentrations of individual parameters with water quality guidelines for the protection of aquatic life and human health (i.e., drinking water) (CCME 1999, with updates to 2011; Health Canada 2010). Concentrations were also compared to the limits outlined in the Metal Mining Effluent Regulations (MMER) (Government of Canada 2002, 2006).

The interim key findings from the Baker Creek Reach 7 overflow monitoring program include the following:

- In-stream concentrations of TSS and other parameters associated with Mine tailings (i.e., sulphate and metals) indicate that during the overflow event, sediment and tailings in historic Jo Jo Lake were resuspended and discharged through lower Baker Creek into Yellowknife Bay.
- Toxicity testing conducted during the overflow event indicated that stream water downstream of the tailings impacted area was not acutely toxic.





- TSS concentrations were high during the overflow event, but declined to levels within the typical background range in approximately 10 days.
- Levels of cyanide and ammonia, which were historically high at Giant Mine, were low during the overflow event.
- Sulphate concentrations in the lower reaches of Baker Creek were higher than typically observed in Baker Creek during spring.
- Concentrations of total metals in Baker Creek were elevated during the overflow event, and there was a strong relationship between TSS and total metal concentrations. At high concentrations, such as those observed immediately after the overflow event, only a small proportion of the total metal concentration was in the dissolved form. Post-mitigation, both the total metal concentrations and the percentage in the dissolved form approached values typically measured in Baker Creek.

Monitoring will continue until background levels in water quality are achieved. Next steps in monitoring include continued water quality monitoring in the creek and in localized areas of Yellowknife Bay as well as sediment sampling in the creek after freshet. Fish monitoring in the creek will also be initiated, in consultation with Fisheries and Oceans Canada. Water quality and sediment quality data collected after May 28, 2011 will be reported in a final report once the full set of monitoring data have been received and analyzed.





Table of Contents

1.0	INTRO	DUCTION	.1		
	1.1	Background	. 1		
	1.2	Event Timeline	. 1		
	1.3	Study Objectives	.2		
	1.4	Scope	.3		
	1.5	Report Organization	3		
2.0	METHO	DDS	.3		
	2.1	Sample Locations	.3		
	2.2	Field Program	6		
	2.3	Quality Control	6		
	2.4	Laboratory Analysis	6		
	2.5	Data Analysis	. 8		
3.0	RESUL	TS	8		
4.0	INTERI	M KEY FINDINGS SUMMARY1	17		
5.0	NEXT STEPS1				
6.0	CLOSURE1				
7.0	REFERENCES				

TABLES

Table 1:	Sampling Frequency and Parameters Analyzed for the Baker Creek Reach 7 Overflow Monitoring Program, May 2011	7
Table 2:	Baker Creek Stream Water Toxicity Characterization Results for May 16, 2011	
Table 3:	Correlations between Total Suspended Solids and Total Metal Concentrations	14

FIGURES

Figure 1:	Aerial View of Reaches 6 and 7 of Baker Creek, May 13, 2011	2
Figure 2:	Sample Stations on Baker Creek	5
Figure 3:	Total Suspended Solids Concentrations at Representative Locations in Baker Creek	10
Figure 4:	Total Suspended Solids Concentrations at All Monitored Locations in Baker Creek	12





Figure 5:	Percentage (%) of the Total Metal Concentration (mg/L) in the Dissolved Form	15
Figure 6:	Dissolved Arsenic Concentrations at All Monitored Locations in Baker Creek	16

APPENDICES

APPENDIX A Quality Assurance and Quality Control

APPENDIX B Detailed Water Quality Results

APPENDIX C Laboratory Results



1.0 INTRODUCTION

1.1 Background

In May 2011, icing in upper Baker Creek caused changes to the normal flow path of the creek near Giant Mine (the Mine). The normal flow path of upper Baker Creek is from little Martin Lake to Baker Pond through a series of wetlands and a waterfall upstream of the pond (Figure 1). Over the winter of 2010/2011, ice built up over a distance of approximately one kilometre upstream of Baker Pond, causing early spring flows from Martin Lake to flow northeast around the ice jam instead of the usual flow path through the ice (referred to as "the overflow event" below). The diverted flow eroded an old mine road and entered historic Jo Jo Lake, where sediments have been impacted by mine tailings during the early years of mining (SRK 2009). The flow of water through historic Jo Jo Lake resulted in re-suspension and transport of tailings impacted sediments through lower Baker Creek to Yellowknife Bay. Sediment quality in the in historic Jo Jo Lake has most notably been characterized by elevated concentrations of metals and metalloids (e.g., arsenic, cadmium, aluminum and chromium) (Jacques-Whitford-Axys 2006).

Golder Associates Ltd. (Golder) was retained by Public Works Government Services of Canada (PWGSC) through AECOM Engineering to complete a water quality monitoring program in Baker Creek during and after the overflow event and summarize the resulting data. Golder's scope included collecting sufficient data to characterize in-stream water quality, and using this information, in conjunction with supplemental data collected by Indian and Northern Affairs Canada (INAC) and available historical data, to determine if the sediment release negatively affected water quality in Baker Creek, from downstream of the tailings impacted area to Yellowknife Bay.

1.2 Event Timeline

The event timeline for the sediment release and subsequent monitoring was as follows:

- May 14, 2011 Spring flows from Martin Lake deviate from the normal flow path and enter historic Jo Jo Lake; regulatory consultation initiated.
- May 16, 2011 Acute toxicity and water quality sampling of creek initiated.
- May 17, 2011 Continued sampling and mobilization of response team.
- May 18, 2011 Project engineers divert overflow back to the original channel; coarse fill laid in the tailings area of Reach 6 prevent flows from circulating upstream.
- May 18 onwards Continued sampling and data analysis.





Figure 1: Aerial View of Reaches 6 and 7 of Baker Creek, May 13, 2011



Photo taken by Golder Associates Ltd., courtesy INAC Cumulative Impact Monitoring Program

1.3 Study Objectives

The main objective of the Baker Creek overflow monitoring program was to characterize water and sediment quality at various locations in Baker Creek on several occasions during the overflow event. Specifically, monitoring in Baker Creek was initiated to address the following questions:

- 1) Was stream water downstream of the tailings impacted area acutely toxic to fish and other aquatic life during the overflow event?
- 2) What was the concentration of total suspended solids (TSS) in Baker Creek from upstream of the Mine to Yellowknife Bay during the overflow event and after mitigation?
- 3) What was the detailed water chemistry in Baker Creek during the overflow event and after mitigation?
- 4) What was the composition (i.e., chemistry and particle size) of suspended sediments in Baker Creek?
- 5) In areas of visible sediment deposition in Baker Creek, what was the chemistry of the sediment?



1.4 Scope

The scope of this report is to address the first three questions listed in Section 1.3, using recently collected water quality information. The last two questions, related to sediment composition and chemistry, will be addressed at a later date, once a full set of monitoring data are available. Sediment collection has not been completed at this time, but will likely occur within the next two weeks depending on flow and ice-cover in Baker Creek. The purpose of this report is to provide an interim summary of the initial water quality results, to be submitted as part of the record on the sediment release, which will be filed with the appropriate regulators by PWGSC. The scope of this report is as follows:

- present final results from the toxicity bioassays completed on May 16, 2011;
- characterize water quality in Baker Creek from upstream of the mine to Yellowknife Bay using data collected between May 16 and May 27, 2011 (as received by May 30);
- compare water quality data to applicable background concentrations, aquatic life and drinking water guidelines (CCME 1999; with updates), and limits outlined in the Metal Mining Effluent Regulations (MMER) (Government of Canada 2002, 2006); and
- review potential spatial (i.e., with distance downstream) and temporal (i.e., through time) trends in the water quality data.

Water quality and sediment quality data collected after May 28, 2011 will be reported in a final report, to be issued once a full and final set of sampling results have been received and analyzed.

1.5 Report Organization

A description of methods, including sample collection procedures and data analysis methods are provided in Section 2. Interim study results are presented in Section 3, followed by a summary of key findings in Section 4. Quality assurance and quality control (QA/QC) information is presented in Appendix A, followed by detailed water quality results in Appendix B, and a copy of the laboratory results and supporting information in Appendix C.

2.0 METHODS

2.1 Sample Locations

Golder collected water samples and in-situ measurements from the sample stations noted on Figure 2. A description of the sampling stations is provided below:

- **Reference** Point $(SNP43-11)^1$ Baker Creek, upstream of the overflow location;
- Reach 7 Overflow, upstream (u/s) road immediately downstream of diversion, u/s of an old mine road;
- Reach 7 Overflow, downstream (d/s) road downstream of diversion and eroded road, but upstream of tailings deposit;



¹ Station numbers containing 'SNP' refer to historical sampling stations established as part of the Surveillance Network Program for Giant Mine.

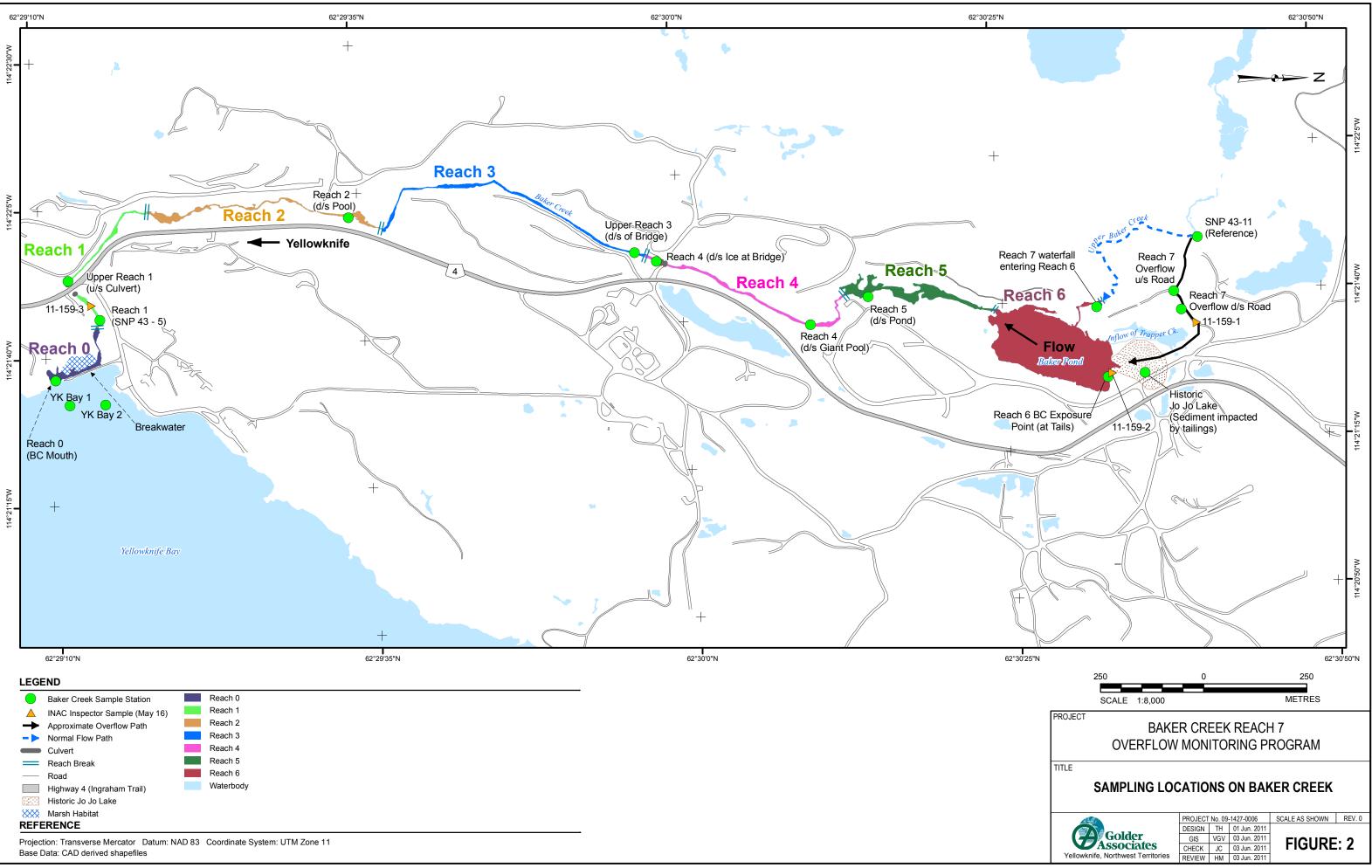


- Reach 6, Baker Creek Exposure Point near the tailings impacted area;
- Reach 5, d/s pond upper portion of Reach 5, just downstream of Baker Pond;
- Reach 4, d/s Giant Pool upper portion of Reach 4, in a pool area;
- Reach 4, d/s ice at bridge lower portion of Reach 4, taken from under ice near the bridge crossing;
- Reach 3 upper portion of Reach 3, downstream of bridge crossing;
- Reach 2 lower portion of Reach 2, downstream pool area;
- Reach 1, u/s culvert middle portion of Reach 1, upstream of culvert;
- Reach 1 (SNP43-5) downstream of the culvert at Ingraham Trail near the mouth of the creek;
- Reach 0 mouth of Baker Creek; and
- Yellowknife Bay 1 and 2 near Giant Mine public dock.

In addition to the sampling that Golder conducted, Inspectors from INAC collected samples from three locations (i.e., 11-159-1, 2 and 3) (Figure 2). Indian and Northern Affairs Canada has made these data available for this assessment; sampling locations and sample names are as follows:

- INAC sample near Golder sample "Reach 7 Overflow, d/s road" (11-159-1);
- INAC sample in Reach 6 (11-159-2); and
- INAC sample in Reach 1 (11-159-3).





2.2 Field Program

Prior to collecting water samples, water depth (m), temperature (°C), pH, dissolved oxygen (mg/L), specific conductivity (μ S/cm), and turbidity measurements were recorded. A YSI 650 MDS water quality meter connected to an YSI 600 QS multi-parameter water quality probe was used for the physico-chemical field measurements, and field turbidity measurements were obtained using a LaMotte turbidity meter. Surface water samples were collected in accordance with the Mine's Standard Operating Procedure (SOP) (INAC 2010) and specific laboratory instructions. Samples for biological toxicity testing were collected in 20-L plastic carboys, and kept cool (4°C) prior to submitting to the laboratory. All toxicity tests were initiated within five days of sample collection, as required by the SOP.

Sampling frequency and specific parameters analyzed are provided in Table 1.

2.3 Quality Control

For quality control (QC) purposes, a field blank, travel blank and a duplicate sample were prepared as part of the sampling program. The field blank (a deionized water sample prepared at a field site) was used to assess potential sample contamination during collection, handling, shipping and analysis. The travel blank (bottle pre-filled with deionized water and sealed by the laboratory) was used to detect sample contamination during shipping, storage and analysis. The results of the duplicate sample analysis were used to assess within-site variability and precision of the field sampling methods. Detailed information on QC samples is provided in Appendix A.

2.4 Laboratory Analysis

Samples collected for acute toxicity analysis were submitted to HydroQual Laboratories (HydroQual) in Calgary, Alberta. Acute toxicity testing was conducted according to the following methods:

- EPS 1/RM/13 Reference Method for Determining Acute Lethality of Effluents Using Rainbow Trout (Environment Canada 2007); and
- EPS 1/RM/14 Reference Method for Determining Acute Lethality of Effluents Using Daphnia spp. (Environment Canada 2000).

Surface water samples were submitted to ALS Laboratory Group (ALS) in Yellowknife, Northwest Territories, Edmonton, Alberta and Vancouver, British Columbia for analysis of water quality parameters listed in Table 1.





Component	Location	Frequency	Parameter	Rationale	Status	
Acute toxicity (Question 1 in Section 1.3)	lestion 1 in Reach 1 (SNP 43-5) Day 1 – May 16, 2011		Lab – Rainbow Trout and Daphnia magna (LC_{50}). Method – consistent with Reference Methods provided by Environment Canada (2000, 2007)	Characterize the acute toxicity of water near the exposure area and near the mouth of Baker Creek	Complete	
TSS-Turbidity Characterization (Question 2 in Section 1.3)	on Reach 0 to Reach 7 Weeks 1-2		Characterize extent of sediment plume; use data to establish a TSS-turbidity relationship	On-going		
Water Reach 7 overliow – d/s of road characterization Reach 6 - Baker Ck. Exposure Point (Question 3 in Reach 4, d/s Giant pool Section 1.3) Reach 1 (SNR 43.5)		May 16 to May 18, May 27 (once per station) SNP 43-5 repeated on May 20 Yellowknife Bay samples added May 24 and May 31	Lab – TSS, turbidity, major ions, nutrients, total and dissolved metals <i>Field</i> – turbidity, temperature, conductivity, dissolved oxygen, pH, water depth, UTM coordinates and photographs <i>Method</i> – surface grab samples; water quality meter and probe (in-situ parameters).	Characterize detailed water quality in Baker Creek, from upstream of the Mine to Yellowknife Bay	On-going	
Sediment monitoring (Questions 4 and 5 in Section 1.3)	Reach 4 Reach 2 Reach 0 Yellowknife Bay, localized area	TBD	Lab – particle size, TOC, total metals Field – water depth, sediment depth and photographs Method – Ekman grab	Characterize sediment quality in areas of visible deposition, if present; select locations where pre- discharge sediment data are available	Pending	

Table 1: Sampling Frequency and Parameters Analyzed for the Baker Creek Reach 7 Overflow Monitoring Program, May 2011

TBD = to be determined pending freshet flows; Ck = creek; u/s = upstream; d/s = downstream; TOC = total organic carbon; TDS = total dissolved solids; TSS = total suspended solids; LC₅₀= concentration of test water required to kill 50% of the test population.



2.5 Data Analysis

Water quality data were evaluated by comparing concentrations of individual parameters with water quality guidelines for the protection of aquatic life and human health (i.e., drinking water) (CCME 1999, with updates to 2011; Health Canada 2010). Concentrations were also compared with limits outlined in the Metal Mining Effluent Regulations (MMER) (Government of Canada 2002, 2006).

Water quality guidelines are nationally endorsed indicators of environmental quality for the protection of aquatic ecosystems and designated water uses, to identify parameters of potential concern. The aquatic life guidelines are based on the most current, scientifically defensible toxicological data and are intended to be protective of all forms and life stages of aquatic life (CCME 1999). Exceedance of a guideline does not, therefore, automatically imply unacceptable or harmful conditions.

Water quality data were also plotted spatially (i.e., with distance downstream) and temporally (i.e., through time), then visually examined to identify any potential trends.

3.0 **RESULTS**

Was stream water downstream of the tailings impacted area acutely toxic to fish and other aquatic life during the overflow event?

Water is considered to be not acutely toxic if more than 50% of the test organisms survive in full-strength (100%) test water concentration (Government of Canada 2002, 2006). Acute toxicity test results are expressed as an LC_{50} (i.e., percent concentration that is lethal to 50% of the test organisms), with non-toxic samples having an LC_{50} value of greater than 100%. No acutely toxic effects were observed in the rainbow trout (*Oncorhynchus mykiss*) or *Daphnia magna* survival tests ($LC_{50} \ge 100\%$) on the samples collected from Baker Creek on May 16, 2011 (Table 2). Therefore, water downstream of the tailings impacted area was non-acutely toxic during the period of overflow. Detailed acute toxicity results and supporting information are provided in Appendix C.

Location	Tast Species	Biological Endpoint	Statistic	Test Result	Confidence Limits ^(a)		Pass Limit ^(b)	
Location	Test Species of Test S		Statistic	(%)	Upper	Lower	Fass Linni	
Reach 6	Oncorhynchus mykiss (rainbow trout)	Survival	LC ₅₀	>100	not determined		≥100%	
	Daphnia magna (water flea)	Survival	LC ₅₀	>100	not determined		≥100%	
Reach 1 (SNP 43-5)	Oncorhynchus mykiss (rainbow trout)	Survival	LC ₅₀	>100	not dete	ermined	≥100%	
Reach 1 (SNF 43-5)	<i>Daphnia magna</i> (water flea)	Survival	LC ₅₀	>100	not dete	ermined	≥100%	

Table 2:	Baker Creek Stream Water Toxicit	y Characterization Results for May 16, 2011
	Dakei Cieek Silealli Walei Toxicil	y Characterization Results for May 10, 2011

(a) Confidence limits cannot be calculated for non-toxic stream water (refer to HydroQual report, Appendix C).

^(b) As defined by Government of Canada (2002).

Notes: LC_{50} = concentration expressed as the percentage of test water that results in a lethal effect to 50% of the test population; > = greater than; > = greater than or equal to; % = percent.





What was the concentration of total suspended solids (TSS) in Baker Creek from upstream of the Mine to Yellowknife Bay during the overflow event and after mitigation?

Temporal Trends

TSS concentrations at four representative reaches in lower Baker Creek (i.e., Reaches 6, 4, 1 and 0) are presented in Figure 3, panels (a) to (d). Concentrations from reference locations, as well as typical background concentrations are provided for comparison in the same figure. The TSS concentration in Reach 6 was 4,340 milligrams per litre (mg/L) on May 16, indicating that sediment and tailings in historic Jo Jo Lake were resuspended into the water column. Post-mitigation (i.e., after May 18), in-stream TSS concentration in Reach 6 declined to 79 mg/L. The TSS concentration then briefly increased to approximately 520 mg/L as a result of recirculation of water through the tailings. This flow was subsequently blocked with coarse fill, and as a result, TSS values declined again, reaching 5 mg/L on May 27, at the outlet of the pond entering Reach 5 (Figure 3; panel a).

In Reach 4, downstream of the pooled area, post-mitigation TSS concentrations declined from 72 mg/L on May 18 to 29 mg/L on May 19. Concentrations remained at this level for one more day, and then increased to 70 mg/L on May 24. The cause of this increase is unknown, although it may have been erosion of a stream bank by instream ice. However, on May 25 and 27, TSS concentrations declined to 5 and 7 mg/L, respectively, which was approaching the average historical background concentration of approximately 2 mg/L during spring (Figure 3; panel b).

TSS concentrations in Reaches 1 and 0 (i.e., near the mouth of Baker Creek) similarly declined after mitigation was in place. TSS concentration was approximately 160 mg/L pre-mitigation, and then decreased to approximately 10 mg/L, which is within the historical background range in Reach 0 during spring (Figure 3; panels c and d).

In summary, in-stream concentrations of TSS indicate that during the overflow event, sediment and tailings in historic Jo Jo Lake were re-suspended and discharged through lower Baker Creek into Yellowknife Bay. With mitigation in place, TSS levels declined to levels that are within or approaching typical background levels; the time to return to background levels was approximately 10 days.



BAKER CREEK REACH 7 OVERFLOW MONITORING PROGRAM

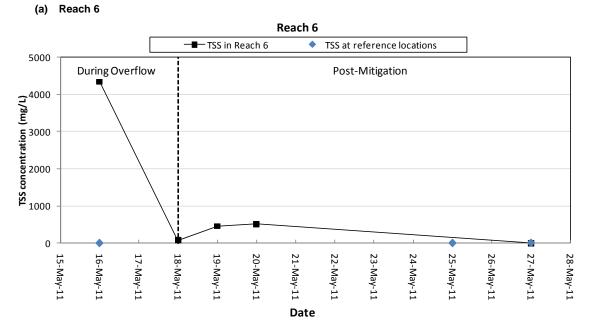
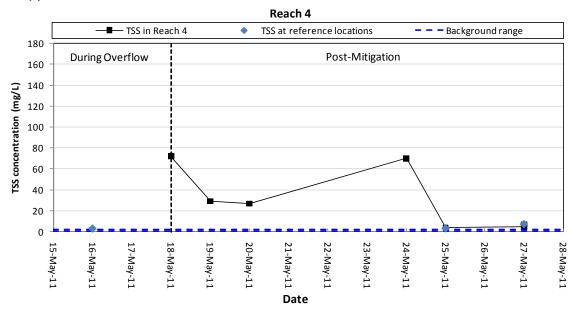


Figure 3: Total Suspended Solids Concentrations at Representative Locations in Baker Creek

Notes: TSS concentration at reference locations was defined based on samples collected from SNP 43-11 on May 16, and from Reach 7 waterfall entering Reach 6 on May 25 and May 27.

TSS data collected between May 16 and May 20, 2011 were collected from Reach 6 BC Exposure Point (at Tails); data from May 27, 2011 were collected from Reach 5 (d/s Pond).



(b) Reach 4

Notes: TSS concentration at reference locations was defined based on samples collected from SNP 43-11 on May 16, and from Reach 7 waterfall entering Reach 6 on May 25 and May 27.



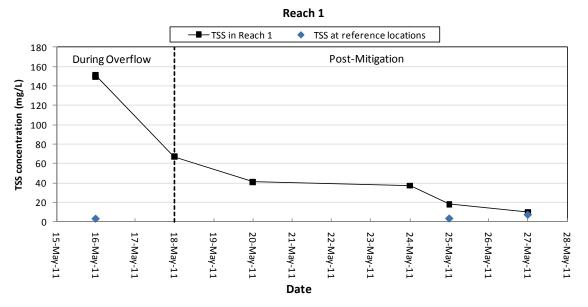
Background range defined by minimum and maximum of samples collected in from Reach 4 in May and June between 2007 and 2009 (Golder 2011).

BAKER CREEK REACH 7 OVERFLOW MONITORING PROGRAM

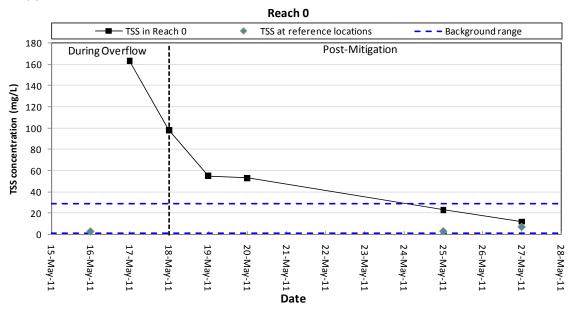
Figure 3:

Total Suspended Solids Concentrations at Representative Locations in Baker Creek (continued)

(c) Reach 1



Notes: TSS concentration at reference locations was defined based on samples collected from SNP 43-11 on May 16, and from Reach 7 waterfall entering Reach 6 on May 25 and May 27.



(d) Reach 0

Notes: TSS concentration at reference locations was defined based on samples collected from SNP 43-11 on May 16, and from Reach 7 waterfall entering Reach 6 on May 25 and May 27.

Background range defined by minimum and maximum of samples collected from Reach 4 in May and June between 2007 and 2009 (Golder 2011).



Spatial Trends

Total suspended solids concentrations at all monitored locations in Baker Creek were plotted for comparison in Figure 4. TSS concentrations were lowest at the reference locations, in Reach 7 (upstream of the old Mine road) and in Yellowknife Bay. Concentrations at these locations ranged from 3 to 7 mg/L, which is characteristic of natural spring conditions in Baker Creek. Concentrations of TSS were elevated in Reach 7 (downstream of the old Mine road) due to the re-suspension of sediments by water flowing along the old Mine road. Concentrations in Reach 6 were typically the highest, as a result of re-suspension of sediments in the tailings impacted area. In the lower reaches of Baker Creek (i.e., Reaches 4, 3, 2, 1, 0), TSS concentrations were similar and lower than in Reach 6, but slightly above the background range. By May 27, the differences in TSS concentrations among reaches were small, and concentrations at all locations declined to levels within the background range characteristic of lower Baker Creek.

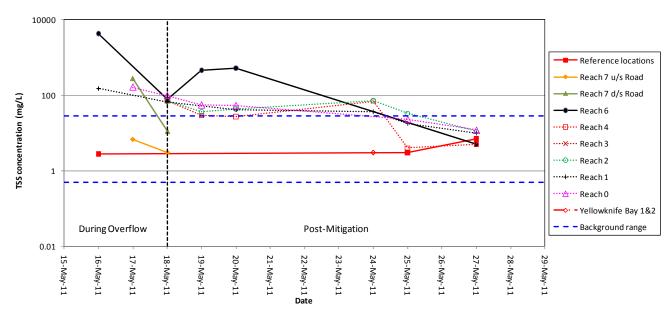


Figure 4: Total Suspended Solids Concentrations at All Monitored Locations in Baker Creek

Notes: TSS concentration at reference locations was defined based on samples collected from SNP 43-11 on May 16, and from Reach 7 waterfall entering Reach 6 on May 25 and May 27.

TSS data collected between May 16 and May 20, 2011 were collected from Reach 6 BC Exposure Point (at Tails); data from May 27, 2011 were collected from Reach 5 (d/s Pond).

The background range was defined by the minimum and maximum values for samples collected from lower Baker Creek (i.e., Reaches 4 and 0) in May and June between 2007 and 2009 (Golder 2011).

What was the detailed water chemistry in Baker Creek during the overflow event and after mitigation?

Between May 16 and 27, 2011, waters from Baker Creek were well-oxygenated and slightly alkaline (Appendix B; Table B-1). Conductivity and total dissolved solids concentrations were higher downstream of the of the tailings impacted area than in the upstream reference area, but remained within the ranges previously measured in Baker Creek (Appendix B; Tables B-1 and B-2). Ammonia and cyanide concentrations have historically been high at Giant Mine (Golder 2003, 2005). Although cyanide concentrations were above the





water quality guideline for the protection of aquatic life during this study, values were within the background range. Nutrient levels in Baker Creek were generally low during and after the overflow event.

Sulphate concentrations were elevated downstream of the tailings impacted area, which may have resulted from contact of water released during the overflow event with treatment chemical residue present in materials at the bottom of historical Jo Jo Lake. Ferric sulphate is used in the water treatment process at the Mine (INAC 2011). Levels of sulphate in the lower reaches of Baker Creek were higher than typically observed in Baker Creek during spring (Appendix B; Table B-2).

Concentrations of metals and metalloids (herein referred to as metals), were also elevated in lower Baker Creek during the overflow event (Appendix B; Table B-2). With the exception of manganese and arsenic, total metal concentrations were below guidelines in the sample collected from the upstream reference site on May 16. Downstream of the tailings impacted area, total aluminum, antimony, arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, selenium, silver and zinc were measured at concentrations above water quality guidelines for the protection of aquatic life and/or human health on May 16, indicating contact with tailings. After mitigation, concentrations of total metals decreased and approached background levels, although some were still above aquatic life and drinking water guidelines on May 27. Exceptions included total nickel, selenium and silver, which were no longer above guidelines on May 27. Levels of total metals above guidelines have historically been observed within Baker Creek (Appendix B; Table B-2).

Total metals measured at concentrations above guidelines on May 27 were primarily associated with suspended sediments, as shown by the strong correlation between TSS and total metal concentrations in stream water (Table 3). TSS concentrations in lower Baker Creek declined between May 16 and 27, and were approaching background levels (Figures 3 and 4). Total metals followed a similar trend, as expected based on the strong relationships between TSS and total metals.

The dissolved portion of metals is not associated with suspended sediments and does not settle out of the water column. Dissolved metal concentrations are bioavailable and readily taken up by aquatic organisms. Dissolved metal concentration as a percentage of total metal concentration in Baker Creek was plotted for two representative metals (i.e., arsenic and aluminum) in Figure 5, to investigate whether increases total metal concentrations also resulted in proportional increases in dissolved metal concentrations. At high concentrations, such as those observed immediately after the overflow event, only a small proportion (<5%) of the total metal concentrations were not accompanied by proportional increases in dissolved metal concentrations. Post-mitigation, both the total metal concentrations and the percentage in the dissolved form approached values typically measured in Baker Creek.

With the exception of Reach 6, dissolved arsenic concentrations in Baker Creek were within the background range, and remained similar during the overflow event and post-mitigation (Figure 6). In Reach 6, dissolved arsenic concentrations were elevated during the overflow event, but declined to levels consistent with those at stations in lower Baker Creek and with the background range.

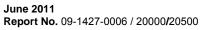




Table 3: Correlations between Total Suspended Solids and Total Metal Concentrations

Metal	Correlation Coefficient (r) ^(a)
Aluminum	0.98
Antimony	0.66
Arsenic	0.79
Cadmium	0.65
Chromium	0.82
Cobalt	0.73
Copper	0.79
Iron	0.98
Lead	0.83
Manganese	0.73
Mercury	0.64
Nickel	0.76
Zinc	0.86

Pearson correlations were run for total metals measured above water quality guidelines, after verifying that relationships were linear; n = 20 to 22. Silver and selenium were excluded from this analysis, because a high proportion of values were below method detection limits.





BAKER CREEK REACH 7 OVERFLOW MONITORING PROGRAM

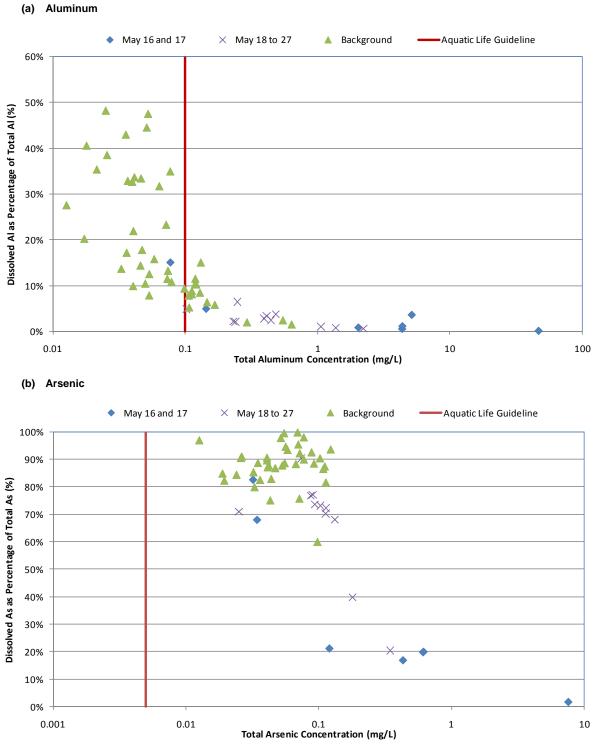
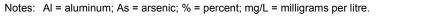


Figure 5: Percentage (%) of the Total Metal Concentration (mg/L) in the Dissolved Form



The proportion of dissolved metal was calculated as: (dissolved metal concentration / total metal concentration) × 100.



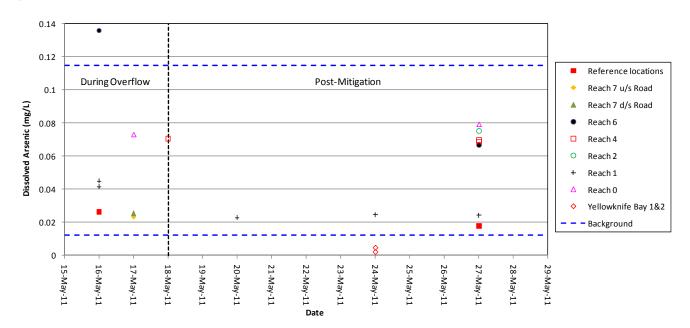


Figure 6: Dissolved Arsenic Concentrations at All Monitored Locations in Baker Creek

Notes: Dissolved arsenic concentration at reference locations was defined based on samples collected from SNP 43-11 on May 16, and from Reach 7 waterfall entering Reach 6 on May 27.

Dissolved arsenic data collected between May 16 and May 20, 2011 were collected from Reach 6 BC Exposure Point (at Tails); data from May 27, 2011 were collected from Reach 5 (d/s Pond).

The background range was defined by the minimum and maximum concentrations in samples collected from lower Baker Creek (i.e., Reaches 4 and 0) in May and June, between 2007 and 2009 (Golder 2011).





4.0 INTERIM KEY FINDINGS SUMMARY

The interim key findings from the Baker Creek Reach 7 overflow monitoring program include the following:

- In-stream concentrations of TSS and other parameters associated with Mine tailings (i.e., sulphate and metals) indicate that during the overflow event, sediment and tailings in historic Jo Jo Lake were resuspended and discharged through lower Baker Creek into Yellowknife Bay.
- Toxicity testing conducted during the overflow event indicated that stream water downstream of the tailings impacted area was not acutely toxic.
- TSS concentrations were high during the overflow event, but declined to levels within the typical background range in approximately 10 days.
- Levels of cyanide and ammonia, which were historically high at Giant Mine, were low during the overflow event.
- Sulphate concentrations in the lower reaches of Baker Creek were higher than typically observed in Baker Creek during spring.
- Concentrations of total metals in Baker Creek were elevated during the overflow event, and there was a strong relationship between TSS and total metal concentrations. At high concentrations, such as those observed immediately after the overflow event, only a small proportion of the total metal concentration was in the dissolved form. Post-mitigation, both the total metal concentrations and the percentage in the dissolved form approached values typically measured in Baker Creek.

5.0 NEXT STEPS

Monitoring will continue until concentrations of metals return to background levels. Next steps include continued water quality monitoring in Baker Creek and in localized areas of Yellowknife Bay, as well as sediment sampling in the creek after freshet. Fish monitoring in the creek will also be initiated, in consultation with Fisheries and Oceans Canada.

Water quality and sediment quality data collected after May 28, 2011 will be reported in a final report once the full set of analytical results have been received and analyzed.





6.0 CLOSURE

GOLDER ASSOCIATES LTD.

初度里江

Rie Hatsushika, B.Sc. Water Quality Specialist

S

Hilary Machtans, M.Sc. Senior Fisheries Biologist

Tasha Hall, B.Sc. Water Quality Specialist

Zsolt Kovats, M.Sc. Associate, Senior Water Quality Specialist

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.



7.0 **REFERENCES**

- CCME (Canadian Council of Ministers of the Environment). 1999 (with updates to 2011). *Canadian Environmental Quality Guidelines*. Winnipeg, MB, Canada.
- Environment Canada. 2000. *Reference Method for Determining Acute Lethality of Effluents to Daphnia magna, 2000.* Environment Canada, EPS 1/RM/14. Second Edition.
- Environment Canada. 2007. *Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000.* Environment Canada, EPS 1/RM/13. Second Edition (amended May 2007).
- Golder (Golder Associates Ltd.). 2003. *Environmental Effects Monitoring Site Characterization and Study Design*. Prepared for Miramar Giant Mine Ltd. by Golder Associates Ltd., Yellowknife, NWT, Canada.
- Golder. 2005. Environmental Effects Monitoring, Cycle 1, Final Interpretative Report. Prepared for Miramar Giant Mine Ltd., by Golder Associates Ltd., Yellowknife, NWT, Canada.
- Golder. 2011. *Gap Analysis and Sampling Plan for Baker Creek*. Document currently in preparation for AECOM/Public Works.
- Government of Canada. 2002. Metal Mining Effects Regulations. Canada Gazette Part II.

Government of Canada. 2006. Metal Mining Effects Regulations. Canada Gazette Part II.

- Health Canada. 2010. *Guidelines for Canadian Drinking Water Quality*. Federal-Provincial-Territorial Committee on Drinking Water.
- INAC (Indian and Northern Affairs Canada). 2010. *Environmental Sampling Procedures at Giant Mine*. Prepared for Deton' Cho Nuna Joint Venture, Indian and Northern Affairs Canada by Golder Associates Ltd., with updates from INAC, Yellowknife, NT. 54 p.
- INAC. 2011. *Giant Mine 2010 Annual MMER/EEM Report*. Submitted to Environment Canada, Yellowknife, NWT, Canada.
- Jacques Whitford-AXYS. 2006. Sediment Investigation of Baker Creek. Report prepared for Indian and Northern Affairs Canada, Yellowknife, NWT, Canada.
- SRK (SRK Consulting). 2009. *Baker Creek Remediation Design and Complication and Options, Draft*. Prepared for Indian and Northern Affairs Canada, Giant Mine Remediation Project. Project No. 1CI001.013.D12.06. 61 pp. plus appendices.





APPENDIX A

Quality Assurance and Quality Control



QUALITY ASSURANCE

Golder Associates Ltd. (Golder) has developed Quality Assurance (QA) protocols designed to ensure production of data of known and defensible quality. Golder's QA procedures cover three areas of internal and external management, as outlined in more detail below.

Field Staff Training and Operations

It is important that field data collected are of known, acceptable and defensible quality. Golder field staff are trained to be proficient in standardized field sampling procedures, data recording and equipment operations, and all field work is completed according to specified instructions and established technical procedures.

Surface water samples were collected in accordance with the Mine's Standard Operating Procedure (SOP) (INAC 2010) and specific laboratory instructions. Field crews also use Specific Work Instructions (SWIs), which are standardized forms that detail specific sampling instructions, equipment needs, required technical procedures, sample labelling and shipping protocols, and laboratory contacts.

Laboratory Analysis

To ensure that data of acceptable quality are generated, laboratories used for the water sample analysis are accredited by the Canadian Association for Laboratory Accreditation (CALA). Under CALA's accreditation program, laboratory procedures, methods and internal quality control are evaluated annually.

Office Operations

A data management system is in place to ensure that an organized, consistent system of data control, data analysis and filing was used for the Baker Creek Reach 7 overflow monitoring program. Relevant elements of this system included the following:

- pre-field meeting to discuss SWIs and review relevant technical procedures with field crew(s);
- field crews checking-in with task managers every 24 to 48 hours with an update on work completed;
- designation of one Golder field crew member who is responsible for managing the sample shipping process to ensure that:
 - all required samples are collected;
 - chain-of-custody/analytical request forms are completed and checked to ensure they are correct;
 - proper labelling and documentation procedures are followed;
 - samples are delivered to shipping agents in a timely manner; and
 - samples arrive at the designated laboratory(ies) within two days of being shipped;
 - checking of chain-of-custody/analytical request forms by the task manager to ensure the correct analysis package(s) had been requested;
 - reviewing laboratory data upon receipt to ensure data quality;
 - creating backup files before each major operation as data are manipulated; and

completing appropriate logic checks to ensure the accuracy of calculations.

QUALITY CONTROL

Quality Control (QC) is a specific aspect of QA that refers to the internal techniques used to measure and assess data quality. The water quality QC program consisted of the preparation and analysis of the a field blank, a travel blank and one duplicate water sample during the field program in Baker Creek.

For the purposes of this study, field blank, travel blank and duplicate samples were defined as follows:

Field Blank

A separate sample prepared in the field using laboratory-provided deionized water to fill a set of sample containers, which are then submitted to the appropriate laboratories for the same analysis as the field water samples. Field blanks are used to detect potential sample contamination during collection, handling, shipping and analysis.

Travel Blank

A separate sample prepared and sealed by the laboratory using laboratory deionized water. The containers are to be taken into the field and then submitted to the appropriate laboratory for the same analysis as the field water samples. Travel blanks are used to detect potential sample contamination during shipping, storage and analysis.

Duplicate Sample

Two samples are collected from one location using identical sampling procedures. They are labelled, preserved individually and submitted separately to the analytical laboratories for identical analyses.

Duplicate samples are used to check intra-site variation and the precision of the field sampling methods. The following sections contain a description of the assessment criteria used to determine if QC sample results were indicative of sample contamination or sampling imprecision, along with a discussion of the key finding of the water quality QC program.

Quality Control Assessment Criteria

Field Blanks and Travel Blanks

Although most parameters should not be at detectable concentrations in the field and travel blanks, concentrations were considered notable if they were greater than five times the corresponding Method Detection Limit (MDL). This threshold is based on the Practical Quantitation Limit defined by the United States Environmental Protection Agency (U.S. EPA 1985), which takes into account the potential for data accuracy errors when concentrations approach or are below MDLs.

Notable results observed in the field and travel blanks were evaluated relative to concentrations observed in field samples collected during the sampling trip to determine if sample contamination was limited to the QC sample, or apparent in other samples. If, based on this comparison, sample contamination did not appear to have been an isolated error; field data were flagged and interpreted with this limitation in mind.

Duplicate Samples

Differences between concentrations measured in duplicate water samples were considered notable if:





- they were greater than 20%; and
- they were greater than five times the relevant reported MDL.

These criteria are consistent with those used by the analytical laboratories for their internal QC procedures and take into account the potential for data accuracy error as concentrations approach MDLs.

Intra-site variability and field sampling precision was rated as:

- low and high, respectively, if less than 10% of the parameters included in the duplicate sample analysis were notably different from one another;
- moderate if 10 to 30% of the parameters included in the duplicate sample analysis were notably different from one another; or
- high and low, respectively, if more than 30% of the parameters included in the duplicate sample analysis were notably different from one another.

Quality Control Sample Results

Potential Sample Contamination

Concentrations in the field and travel blanks were all either below the MDLs or within five times of the relevant MDL (Table A-1). These results indicate that samples were free of contamination during collection, handling, shipping and analysis.

Within-Site Variability and Field Sampling Precision

Variations in turbidity and concentrations of dissolved lead and zinc reported for the duplicate water sample collected from the Reach 4, were above the assessment criteria (Table A-2). These differences were associated with less than 3% of the parameters included in the duplicate sample analysis. Within-site variation and sampling precision were, therefore, rated as low and high, respectively.





Parameter	Units	Method Detection Limit	Field Blank	Travel Blank
Conventional Parameters				
Total Suspended Solids	mg/L	1	<1	<1
Total Dissolved Solids	mg/L	3	<3	<3
Turbidity	NTU	0.1	0.34	0.27
Major lons				
Acidity (to pH 8.3; as calcium carbonate)	mg/L	1.0	1.8	2.9
Total Alkalinity (as calcium carbonate)	mg/L	1.0	1.1	<1
Bicarbonate Alkalinity (as calcium carbonate)	mg/L	1.0	<1	<1
Bromide	mg/L	0.05	<0.05	<0.05
Carbonate Alkalinity (as calcium carbonate)	mg/L	1.0	<1	<1
Chloride	mg/L	0.5	<0.5	<0.5
Fluoride	mg/L	0.02	<0.02	<0.02
Hardness (as calcium carbonate)	mg/L	0.5	0.57	<0.5
Hydroxide Alkalinity (as calcium carbonate)	mg/L	1.0	<1	<1
Sulphate	mg/L	0.5	<0.5	<0.5
Nutrients	Ű			
Ammonia (as nitrogen)	mg/L	0.005	<0.005	<0.005
Nitrate and Nitrite (as nitrogen)	mg/L	0.0051	<0.0051	<0.0051
Nitrate (as nitrogen)	mg/L	0.005	<0.005	<0.005
Nitrite (as nitrogen)	mg/L	0.001	<0.001	<0.001
Total Kjeldahl Nitrogen	mg/L	0.05	<0.05	<0.05
Total Dissolved Phosphorus	mg/L	0.002	<0.002	<0.002
Total Phosphorus	mg/L	0.002	<0.002	< 0.002
Cyanides	iiig/E	0.002	-0.002	-0.002
Total Cyanide	mg/L	0.005	<0.005	<0.005
Organic / Inorganic Carbon	iiig/E	0.000	-0.000	-0.000
Dissolved Organic Carbon	mg/L	0.5	<0.5	<0.5
Total Organic Carbon	mg/L	0.5	0.59	0.6
Total Metals	iiig/L	0.0	0.59	0.0
Aluminum	ma/l	0.003	<0.003	<0.003
Antimony	mg/L	0.0001	<0.003	<0.000
	mg/L			<0.0001
Arsenic Barium	mg/L	0.0001 0.01	<0.0001 <0.01	<0.0001
	mg/L	0.005	<0.001	<0.01
Beryllium	mg/L			
Bismuth	mg/L	0.2	<0.2	<0.2
Boron	mg/L	0.1	<0.1	<0.1
Cadmium	mg/L	0.00005	< 0.00005	< 0.00005
Calcium	mg/L	0.1	< 0.05	< 0.05
Chromium	mg/L	0.01	< 0.01	<0.01
Cobalt	mg/L	0.01	<0.01	< 0.01
Copper	mg/L	0.0005	<0.0005	<0.0005
Iron	mg/L	0.01	<0.01	<0.01
Lead	mg/L	0.00005	<0.00005	<0.00005
Magnesium	mg/L	0.1	<0.1	<0.1
Manganese	mg/L	0.005	<0.005	<0.005
Mercury	mg/L	0.00001	<0.00001	<0.00001

Table A-1: Baker Creek Quality Control Results – Field and Travel Blank Samples





Parameter	Units	Method Detection Limit	Field Blank	Travel Blank
Molybdenum	mg/L	0.0005	<0.00005	<0.00005
Nickel	mg/L	0.0005	<0.0005	<0.0005
Potassium	mg/L	2	<2	<2
Selenium	mg/L	0.0001	<0.0001	<0.0001
Silver	mg/L	0.01	<0.01	<0.01
Sodium	mg/L	2	<2	<2
Strontium	mg/L	0.005	<0.005	<0.005
Thallium	mg/L	0.2	<0.2	<0.2
Tin	mg/L	0.03	<0.03	<0.03
Titanium	mg/L	0.01	<0.01	<0.01
Uranium	mg/L	0.00001	<0.00001	<0.00001
Vanadium	mg/L	0.03	<0.03	<0.03
Zinc	mg/L	0.004	<0.004	<0.004
Dissolved Metals		· · · · · ·		
Aluminum	mg/L	0.003	<0.003	<0.003
Antimony	mg/L	0.0001	<0.0001	<0.0001
Arsenic	mg/L	0.0001	<0.0001	<0.0001
Barium	mg/L	0.01	<0.01	<0.01
Beryllium	mg/L	0.005	<0.005	<0.005
Bismuth	mg/L	0.2	<0.2	<0.2
Boron	mg/L	0.1	<0.1	<0.1
Cadmium	mg/L	0.00005	<0.00005	<0.00005
Calcium	mg/L	0.05	0.229	<0.05
Chromium	mg/L	0.01	<0.01	<0.01
Cobalt	mg/L	0.01	<0.01	<0.01
Copper	mg/L	0.0005	<0.0005	<0.0005
Iron	mg/L	0.01	<0.01	<0.01
Lead	mg/L	0.00005	<0.00005	<0.00005
Magnesium	mg/L	0.1	<0.1	<0.1
Manganese	mg/L	0.005	<0.005	< 0.005
Molybdenum	mg/L	0.00005	<0.00005	<0.00005
Mercury	mg/L	0.00001	<0.00001	<0.00001
Nickel	mg/L	0.00005	<0.0005	< 0.0005
Potassium	mg/L	2	<2	<2
Selenium	mg/L	0.0001	<0.0001	<0.0001
Silver	mg/L	0.01	<0.01	<0.01
Sodium	mg/L	2	<2	<2
Strontium	mg/L	0.005	<0.005	<0.005
Thallium	mg/L	0.2	<0.2	<0.2
Tin	mg/L	0.03	<0.03	<0.03
Titanium	mg/L	0.01	<0.01	<0.01
Uranium	mg/L	0.00001	<0.00001	<0.00001
Vanadium	mg/L	0.03	<0.03	<0.03
Zinc	mg/L	0.004	< 0.004	<0.004

Note: mg/L = milligrams per litre; μg/L = micrograms per litre; NTU = nephelometric turbidity units; < = concentration of analyte was less than the method detection limit.



Table A-2: Baker Creek Quality Control Results – Duplicate Samples

Parameter	Units	Method Detection Limit	nit Duplicate Samples Collected at Reach 4 [d/s Giant Pool] Sample 1 Sample 2		Relative Percent Difference	
Conventional Parameters						
Total Suspended Solids	mg/L	3.0	5	7	-	
Turbidity	NTU	0.10	9	7	22.5%	
Total Metals						
Aluminum	mg/L	0.02	0.24	0.25	3.3%	
Antimony	mg/L	0.0004	0.0219	0.0221	0.9%	
Arsenic	mg/L	0.0004	0.0905	0.0935	3.3%	
Barium	mg/L	0.0002	0.0104	0.0108	3.8%	
Beryllium	mg/L	0.001	0.001	0.0011	-	
Bismuth	mg/L	0.0002	<0.0002	<0.0002	-	
Boron	mg/L	0.02	<0.02	<0.02	-	
Cadmium	mg/L	0.0002	<0.0002	<0.0002	-	
Calcium	mg/L	0.5	12.9	12.9	0%	
Chromium	mg/L	0.0008	<0.0008	<0.0008	-	
Cobalt	mg/L	0.0002	0.0009	0.0010	-	
Copper	mg/L	0.001	0.0095	0.0096	1.1%	
Iron	mg/L	0.01	0.433	0.423	2.4%	
Lead	mg/L	0.0001	0.0028	0.0030	6.9%	
Magnesium	mg/L	0.1	3.69	3.64	1.4%	
Manganese	mg/L	0.002	0.15	0.149	0.7%	
Mercury	mg/L	0.00002	<0.00002	<0.00002	-	
Molybdenum	mg/L	0.0001	0.0012	0.0014	12.2%	
Nickel	mg/L	0.0002	0.0060	0.0063	5.9%	
Potassium	mg/L	0.1	1.3	1.2	0.8%	
Selenium	mg/L	0.0004	<0.0004	<0.0004	-	
Silver	mg/L	0.0004	<0.0004	<0.0004	-	
Sodium	mg/L	1.0	3.3	3.2	-	
Strontium	mg/L	0.0002	0.0577	0.0595	3.1%	
Thallium	mg/L	0.0001	<0.0001	<0.0001	-	
Tin	mg/L	0.0004	<0.0004	<0.0004	-	
Titanium	mg/L	0.005	0.0078	0.0084	-	
Uranium	mg/L	0.0001	0.0004	0.0004	-	
Vanadium	mg/L	0.0005	0.0009	0.0009	-	
Zinc	mg/L	0.004	0.0087	0.0101	-	
Dissolved Metals	Ŭ	1	1	1		
Aluminum	mg/L	0.01	<0.01	0.016	-	
Antimony	mg/L	0.0004	0.0199	0.0193	3.1%	
Arsenic	mg/L	0.0004	0.0697	0.0687	1.5%	
Barium	mg/L	0.0001	0.0092	0.0088	5.6%	
Beryllium	mg/L	0.0005	<0.0005	<0.0005	-	
Bismuth	mg/L	0.00005	0.00007	0.00005	-	
Boron	mg/L	0.002	0.0168	0.0166	1.2%	
Cadmium	mg/L	0.0001	0.0001	0.00025	-	



Parameter	Units	Method Detection Limit	Duplicate Samples [d/s Gia	Relative Percent Differenc				
			Sample 1	Sample 2				
Calcium	mg/L	0.5	14.1	14.2	0.7%			
Chromium	mg/L	0.0004	0.0005	0.0006	-			
Cobalt	mg/L	0.0001	0.0008	0.0008	10.5%			
Copper	mg/L	0.0006	0.0057	0.0059	3.1%			
Iron	mg/L	0.01	0.071	0.091	28.2%			
Lead	mg/L	0.0001	0.00125	0.00102	22.5%			
Magnesium	mg/L	0.1	3.96	3.93	0.8%			
Manganese	mg/L	0.002	0.152	0.147	3.4%			
Molybdenum	mg/L	0.0001	0.00139	0.00135	3.0%			
Mercury	mg/l	0.00002	<0.00002	<0.00002	-			
Nickel	mg/L	0.0001	0.0058	0.0056	2.7%			
Potassium	mg/L	0.1	1.34	1.26	6.3%			
Selenium	mg/L	0.0004	<0.0004	0.00049	-			
Silver	mg/L	0.0002	<0.0002	<0.0002	-			
Sodium	mg/L	0.5	3.47	3.46	0.3%			
Strontium	mg/L	0.0001	0.059	0.0567	4.1%			
Thallium	mg/L	0.00005	0.00012	0.00010	-			
Tin	mg/L	0.0002	<0.0002	<0.0002	-			
Titanium	mg/L	0.0003	0.0023	0.0025	6.1%			
Uranium	mg/L	0.0001	0.0004	0.0004	-			
Vanadium	mg/L	0.0001	0.0005	0.0006	9.8%			
Zinc	mg/L	0.001	0.009	0.007	28.6%			

Table A-2: Baker Creek Reach 7 Water Quality Control – Duplicate Samples (continued)

Notes: mg/L = milligrams per litre; μg/L = micrograms per litre; NTU = nephelometric turbidity units; < = concentration of analyte was less than the method detection limit.

Percent difference was calculated using the following formula: (maximum concentration - minimum concentration)/average concentration.

Notable sample results are in **bold**.

- = not applicable, no data, or the percent difference was not calculated, because concentration in one or both of the duplicate samples was <5 times the method detection limit.



REFERENCES

- INAC (Indian and Northern Affairs Canada). 2010. *Environmental Sampling Procedures at Giant Mine*. Prepared for Deton' Cho Nuna Joint Venture, Indian and Northern Affairs Canada by Golder Associates Ltd., with updates from INAC, Yellowknife, NT. 54 p.
- U.S. EPA (United States Environmental Protection Agency). 1985. National Primary Drinking Water Regulations; Volatile Synthetic Organic Chemicals; Proposed Rule; Recommendations for and Documentation of Biological Values for Use in Risk Assessment. U.S. EPA, Environmental Criteria and Assessment Office. Federal Register: 50;EPA/600/6-87/008. Volume 50. Cincinnati, OH. Submitted November 13, 1985.





APPENDIX B

Detailed Water Quality Results



Table B-1. Field Measured and Ph	ysical Test Results for the Bake	r Creek Reach 7 Overflow I	Monitoring Program, May 2011

						Field	Measured Parar	neters		Physical Tests							
				Parameter	рН	Specific Conductivity	Temperature	Dissolved Oxygen	Turbidity	Total Suspended Solids	Total Dissolved Solids	Turbidity					
				Units	-	(µS/cm)	(°C)	(mg/L)	(NTU)	(mg/L)	(mg/L)	(NTU)					
	Canadian Wat	ter Quality Guidelines for	the Protection o	f Aquatic Life ^(a)	6.5-9.0	-	-	< 6.5	-	-	-	-					
			king Water Quality		6.5-8.5	-	-	-	1 ^(c)	-	≤ 500 ^(d)	1 ^(c)					
		Maxin	num Authorized C	Concentration (e)	6.0-9.0	-	-	-	-	30	-	-					
							1	Baker Creek	Background C			W					
				Median	-		-	-	-	2.0	78	2.3 ^W					
				Minimum Maximum	-	-	-		-	<1 29	55 179	0.69 8 ^w					
				n	-	-	-	-	-	44	26	26					
			n les	s than the MDL	-	-	-	-	-	4	0	0					
	Sample ID	Date Sampled	Lab Sample ID	Collected by			•										
	SNP 43-11	16-May-11	L1005341-3	DCNJV	-	-	-	-	-	3	68	3 ^W					
	Reach 7 Overflow u/s Road	16-May-11	11-159-1(Taiga)	INAC	-	-	-	-	- - W	288 ^M	84	97 ^W					
	Reach 6 BC Exposure Point (at Tails)	16-May-11	L100576-1	Golder	7.8	165	1.9	12.8	834 ^W	4,340 ^M	148	2740 ^W					
During Overflow	Reach 6 BC Exposure Point (in pond) SNP 43-5	16-May-11 16-May-11	11-159-2(Taiga) L1005341-1	INAC DCNJV	<u> </u>		-	-	-	374 ^M 149 ^M	184 151	- 219 ^W					
Event	SNP 43-5 SNP 43-5	16-May-11 16-May-11	L1005341-1 L1005341-2	DCNJV DCNJV	-	-	-	-	-	149 ^m 151 ^M	151	219 ^W					
	Reach 7 overflow u/s Road	17-May-11	L1008285-1	Golder	7.4	61	0.7	14.0	2 ^W	7	60	3 ^W					
	Reach 7 Overflow d/s Road	17-May-11	L1008285-2	Golder	7.4	61	0.9	14.0	118 ^w	279 ^M	-	95 ^w					
	Reach 0- Baker BC Mouth	17-May-11	L1008285-3	Golder	7.6	176	0.9	12.3	214 ^w	163 ^M	-	134 ^w					
	Reach 7 Overflow u/s Road	18-May-11	L1006655-1	Golder	7.3	63	4.5	12.4	3 ^W	< 3	-	8 ^W					
	Reach 7 Overflow d/s Road	18-May-11	L1006655-2	Golder	7.4	64	4.5	12.9	29 ^W	11	-	31 ^W					
	Reach 6 BC Exposure Point (at Tails)	18-May-11	L1006655-3	Golder	7.7	140	2.6	12.2	1100 ^w	79 ^M	-	491 ^W					
	Reach 4 (d/s Giant Pool)	18-May-11	L1006658-1	Golder	7.8	126	0.8	12.4	636 ^W	72 ^M	123	142 ^W					
	Reach 3 (d/s of Bridge)	18-May-11	L1006655-4	Golder	7.8	128	0.7	13.2	359 ^W	72 ^M	-	130 ^W					
	Reach 2 (d/s Pool)	18-May-11	L1006655-5	Golder	7.7	152	0.4	12.6	243 ^W	72 ^M	-	129 ^W					
	Reach 1 (u/s Culvert) SNP 43-5	18-May-11 18-May-11	L1006655-6 L1006655-7	Golder Golder	7.7 7.7	148 153	0.2	12.8 13.3	169 ^W 187 ^W	66 ^M 67 ^M	-	117 ^w 149 ^w					
	Reach 0 (BC Mouth)	18-May-11	L1006655-8	Golder	7.6	153	1.0	13.3	235 ^W	98 ^M	-	149 160 ^W					
	Reach 6 BC Exposure Point (at Tails)	19-May-11	L1007648-3	Golder	7.5	421	3.4	11.1	583 ^W	460 ^M	-	468 ^W					
	Reach 2 (d/s Pool)	19-May-11	L1007648-1	Golder	7.6	134	0.4	12.6	67 ^W	36 ^M	-	64 ^W					
	Reach 2 (d/s Pool) Reach 4 (d/s Giant Pool)	19-May-11	L1007648-2	Golder	7.6	129	1.5	12.1	49 ^W	29	-	53 ^W					
	Reach 0 (BC Mouth)	19-May-11	L1007648-4	Golder	7.6	158	0.9	12.8	70 ^w	55™	-	68 ^W					
	Reach 6 BC Exposure Point (at Tails)	20-May-11	L1007649-7	Golder	7.5	220	3.0	11.8	529 ^W	517 [™]	-	349 ^W					
	Reach 4 (d/s Giant Pool)	20-May-11	L1007649-5	Golder	7.4	146	2.4	11.1	39 ^W	27	-	30 ^W					
	Reach 2 (d/s Pool)	20-May-11	L1007649-6	Golder	7.5	141	0.6	12.3	81 ^w	44 [™]	-	44 ^w					
	Reach 0 (BC Mouth)	20-May-11	L1007649-4	Golder	7.5	153	2.1	12.3	90 ^w	53 ^M	-	48 ^W					
	SNP 43-5	20-May-11 21-May-11	L1007649-1	Golder -	7.6 7.2	143	0.2 4.7	12.8	93 ^W 73 ^W	41 ^M	125	47 ^W					
	Reach 6 BC Exposure Point (at Tails) Reach 4 (d/s Giant Pool)	21-May-11 21-May-11	-	-	7.2	-	4.7	-	9 ^W	-	-	-					
	Reach 2 (d/s Pool)	21-May-11 21-May-11	-	_	7.4	-	1.3	-	54 ^w	-	-	-					
	Reach 0 (BC Mouth)	21-May-11	-	-	7.5	-	5.5	-	33 ^w	-	-	-					
Post-Mitigation	Reach 6 BC Exposure Point (at Tails)	22-May-11	-	-	7.5	-	5.8	-	415 ^w	-	-	-					
	Reach 4 (d/s Giant Pool)	22-May-11	-	-	7.3	-	2.9	-	14 ^w	-	-	-					
	Reach 2 (d/s Pool)	22-May-11	-	-	7.3	-	1.2	-	29 ^W	-	-	-					
	Reach 0 (BC Mouth)	22-May-11	-	-	8.7 ^w	-	6.6	-	33 ^W	-	-	-					
	Reach 4 (d/s Giant Pool)	24-May-11	L1008512-4	Golder	7.4	-	3.6	-	57 ^W	70 ^M	-	53 ^W					
	Reach 2 (d/s Pool)	24-May-11	L1008512-5	Golder	7.4	-	2.2	-	58 ^w	72 ^M	-	51 ^w					
	SNP 43-5	24-May-11	L1008512-3	Golder	7.5	-	1.6	-	40 ^W 8 ^W	37 ^M	-	38 ^W 6 ^W					
	YK Bay 1 YK Bay 2	24-May-11 24-May-11	L1008512-1 L1008512-2	Golder Golder	7.5	68 67	7.3 7.8	12.5 12.5	8 7 ^w	< 3	-	6" 5 ^W					
	Reach 7 waterfall entering Reach 6	25-May-11	L1008512-2 L1009010-1	Golder	7.6	86	8.8	12.5	4 ^W	< 3	-	3 ^W					
	Reach 4 (d/s Giant Pool)	25-May-11	L1009010-1	Golder	7.4	124	3.6	9.9	4 13 ^W	4	-	9 ^W					
	Reach 2 (d/s Pool)	25-May-11	L1009010-3	Golder	-	168	1.9	10.8	70 ^w	33 ^M	-	40 ^W					
	Reach 0 (BC Mouth)	25-May-11	L1009010-5	Golder	7.5	164	1.5	11.8	43 ^W	23	-	33 ^W					
	SNP 43-5 (above)	25-May-11	L1009010-4	Golder	7.5	-	1.6		40 ^w	18	-	33 ^W					
	Reach 7 waterfall entering Reach 6	27-May-11	L1010143-1	Golder	7.5	87	10.6	11.0	0.3	7	-	2 ^W					
	Reach 5 (d/s Pond)	27-May-11	L1010143-2	Golder	7.3	110	6.5	9.6	6 ^w	5	-	9 ^w					
	Reach 4 (d/s Giant Pool)	27-May-11	L1010143-3	Golder	7.3	119	4.8	9.1	10 ^w	5	-	9 ^W					
	Reach 4 (d/s Giant Pool) dup	27-May-11	L1010143-4	Golder	-	-	-	-	-	7	-	7 ^W					
	Reach 4 (d/s Ice at Bridge) Reach 2 (d/s Pool)	27-May-11 27-May-11	L1010143-5 L1010143-6	Golder Golder	7.3	120	2.6	9.7	22 ^W	20	-	17 ^w					
	SNP 43-5	27-May-11 27-May-11	L1010143-6 L1010143-7	Golder	-	131	3.7	10.2	12 ^W	11 10	-	11 10 ^W					
	Reach 0 (BC Mouth)	27-May-11 27-May-11	L1010143-7	Golder	7.4	116	3.3	- 11.1	11 ^w	10	-	10 11 ^w					
	iteacii u (Do Wouli)	21-iviay-11	LIUIUI4J-0	Guidei			0.0		••			••					

Notes: u/s = upstream; d/s= downstream; mg/L = milligrams per litre; NTU = nephelometric turbidity units; MDL = method detection limit; < = less than; less than or equal to;

- = no data or guideline available; min = minimum; max = maximum; n = sample size

(a) Source: Canadian Council of Ministers of the Environment (CCME) 2011.

(b) Source: Health Canada (2010).

(c) Aesthetic objective.

(d) Maximum acceptable concentration (Health Canada 2010)

⁶⁴ Maximum acception of thermation (recent contract core)
 ⁶⁵ Source: MMER (Government of Canada)
 ⁶⁶ Background concentrations were calculated using data collected from Baker Creek in May and June between 2007 and 2010 (Golder 2011).
 ⁶⁶ acceptional concentration is higher than the relevant maximum authorized concentration.
 ⁸⁷ e concentration is higher than the relevant drinking water guideline.

												Reach 6 BC	Reach 6 BC		erflow Event		D (-								Reach 7	Reach 7	Post-Mitigatio Reach 6			B			
		Canadian Water	Canadian Drinking	Maximum		Baker Creel	k Background	Conditions ^(d)		SNP 43-11 (Reference)	Reach 7 Overflow u/s	Evenouuro	Exposure Point (in	SNP 43-5	SNP 43-5	SNP 43-5		Reach 7 Overflow d/s	Reach 0 (BC Mouth)	Reach 4 (d/s Giant Pool)	SNP 43-5	SNP 43-5	YK Bay 1	YK Bay 2	waterfall entering	waterfall entering	Exposure Point (at	Reach 5 (d/s Pond)	Reach 4 (d/s Giant Pool)	Giant Pool)	Reach 4 (d/s Ice at Bridge)	Reach 2 (d/s Pool)	SNP 43-5
Parameter		Quality Guidelines for the Protection	Water Quality Guidelines (b)	Authorized Concentration (c)			*				Road	Tails)	pond)				Road	Road							Reach 6	Reach 6	Tails)			Duplicate			
		of Aquatic Life ^(a)	ouldelineo	oonoonnation	Median	Minimum	Maximum	n	n less than	16-May-11 L1005341-3	11-159-	16-May-11	16-May-11 11-159-	16-May-11	16-May-11 L1005341-2	16-May-11 11-159-3	17-May-11	17-May-11 L1008285-2	17-May-11 L1008285-3	18-MAY-11 L1006658-1	20-May-11 L1007649-1	24-May-11	24-May-11 L1008512-1	24-May-11 L1008512-2	25-May-11	27-May-11	27-May-11	27-May-11 L1010143-2	27-May-11	27-May-11		27-May-11	27-May-11 L1010143-7
					wedian	Winningin	Maximum		MDL	DCNJV	1(Taiga) INAC	Golder	2(Taiga) INAC	DCNJV	DCNJV	(Taiga) INAC	Golder	Golder	Golder	Golder	Golder	Golder	Golder	Golder	Golder	Golder	Golder	Golder	Golder	Golder	Golder	Golder	Golder
Measured		6.5 to 9.0	6.5 to 8.5	6.0 to 9.5	-	-	-	-	-	-	-	78	-	-	-	-	74	74	7.6	7.8	7.6	7.5	7.5	7.6	7.5	7.5	-	73	7.3	-	7.3	-	-
fic Conductivity	µS/cm	-	-	-	-	-	-	-	-	-	-	165	-	-	-	-	61	61	176	126	143	- 1.6	68	67	86	87	-	110	119	-	120	131	-
oerature olved Oxygen	mg/L	- < 6.5	-	-	-	-	-	-	-	-	-	13	-	-	-	-	14	14	12	12	13	-	13	13	12	11	-	9.6	9.1	-	9.7	10	-
dity ventional Parameters	NTU	-		-	-	-	-	-	-	-	-	834	-	-	-	-	2.4	118	214	636	93	40	7.5	7.0	4.3	0.29	-	6.4	9.7	-	22	12	-
ity (to pH 8.3; as calcium carbonate) Iness (as calcium carbonate)	mg/L mg/L	-	-	-	3.1 51	<1 37	12 134	31 67	2	- 38	-	4.0 106	-	- 105	- 104	-	3.4	3.3	2.3	<5 65	3.2	-	-	-	- 40	-	-	-	-	-	-	-	-
(laboratory) ecific Conductivity	_ μS/cm	6.5 to 9.0	6.5 to 8.5 ^(e)	6.5 to 9.5	7.6 110	5.2 ^{C,W,M} 87	8.7 ^w 269	34 52	0	7.9	7.8 87	7.9 204	8.0 221	7.8 230	7.8	7.9	-	-	-	7.9 160	-	-	-	-	-	-	-	-	-	-	-	-	-
I Alkalinity (as calcium carbonate) Il Dissolved Solids	mg/L mg/L		- ≤ 500 ^(f)	-	42 78	<1 55	80 179	31 26	4	- 68	34 84	57 148	57 184	- 151	- 158	50	32 60	34	53	46	46	-	-	-	-	-	-	-	-	-	-	-	-
(Calculated)	mg/L	-	≤ 500 ^(f)	-	-	-	-	-	-	-	-	148	-	-	-	-	-		-	84 72 ^M	- 67 ^M	-	- < 3	- < 3	- <3	-	-	-	- 5	- 7	- 20	- 11	- 10
al Suspended Solids bidity	mg/L mg/L	-	- 1 ^(e)	- 30	2.3 2.3 ^w	<1 0.69	29 8.0 ^w	44 26	4	3 3 ^W	288 ^M 97 ^W	4,340 ^M 2740 ^W	374 ^M	149 ^M 219 ^W	151 ^M 213 ^W	-	7 3 ^W	279 ^M 95 ^W	163 ^M 134 ^W	8 ^W	47 ^W	37 38 ^W	< 3 6 ^W	5 ^w	< 3 3 ^W	2 ^w	-	9 ^W	9 ^W	7 ^w	17 ^W	11 ^w	10 ^W
s mide	mg/L	-	-	-	<0.05	<0.05	<0.05	2	2	-	-	<0.05	-	-	-	-	<0.05	<0.05	<0.05	<0.1	<0.05	-	-	-	-	-	-	-	-	-	-	-	-
ium ride	mg/L mg/L	-	- ≤ 250 ^(e)	-	14 3.5	9.6 2.4	36 14	68 31	0	- 10	- 2.2	31 6.6	- 7.5	- 30	- 30	- 8.0	9.1 2.1	9.5 2.1	29 11	19 5.3	21 8.8	- 19	7.3	6.9	- 11	8.9	-	- 12	- 14	- 14	- 12	-	17
nesium	mg/L mg/L	-	1.5 ^(f)	-	0.077	0.065	0.09	4 68	0	- 3.2	<0.1	0.29	<0.1	- 7.3	- 7.2	<0.1	0.075	0.076	0.075	<0.05 4.5	0.074	- 4.9	- 2.5	- 2.3	- 3.2	- 2.7	-	- 3.5	- 4.0	- 3.9	- 3.4	- 4.0	- 4.4
um	mg/L	-	- ≤ 200 ^(e)	-	<2 3.4	1.5	2.8	53 68	49	<2 2.6	-	<2 4.8	-	<2	<2 5.0	-	<2	<2	2.1	1.5	<2 5.2	1.5	1.1	1.0	1.0	0.86	-	1.2	1.3	1.3	1.0	1.2	1.3
hate	mg/L mg/L	-	≤ 200 ^(e)	-	4.4	3.8	5.2	4	0	-	4.0	4.8	43	-	-	44	3.2	3.3	39	23	29	-	-	-	-	-	-	-	-	-	-	-	-
ients nonia (as nitrogen)	mg/L	5.86, 3.87 ^(g)		-	0.022	<0.005	0.4	37	9	0.091	-	-	-	0.11	0.11	-	0.11	0.1	0.12	0.15	0.092	-	-	-	-		-	-	-	-	-	-	-
ate and Nitrite (as nitrogen) ate (as nitrogen)	mg/L mg/L	- 1.3	- 45 ^(f)	-	0.021 0.012	<0.005 <0.001	0.75	31 3	2	-	- 0.08	0.072	- 0.16	-	-	- 0.15	0.035	0.035	0.14 0.13	0.05	0.046	-	-		-		-	-	-			-	
te (as nitrogen) Il Kjeldahl Nitrogen	mg/L mg/L	0.06		-	<0.001 0.63	- 0.5	- 0.73	1 5	1	-	<0.01	<0.001	<0.01	-	-	<0.01	<0.001	<0.001	0.0034	0.0028	<0.001 0.85	-	-	-	-	-	-	-	-	-	-	-	-
Il Dissolved Phosphorus	mg/L	-	-	-	0.0062	0.006	0.011 0.046	5	0	-	-	-	-	-	-	-	-	-	-	0.008	0.0083	-	-	-	-	-	-	-	-	-	-	-	-
nides	mg/L	- 	10	-						1		1				-	1	1	-				-	-	· - · ·	-	1 -			1		-	-
al Cyanide rbon	mg/L	0.005 ^(h)	0.2(1)	2	0.0061 ^c			26	10	0.007 ^c	-	0.085 ^c		0.014	0.015					0.008	0.0059	-	-	-	-	-			-		- 	-	-
solved Organic Carbon al Organic Carbon	mg/L mg/L	-	-	-	12 12	10 10	14 14	5 5	0	-	-	-	-	-	-	-	-	-	-	12 13	11 12	-	-	-	-	-	-	-	-	-	-	-	-
al Metals minum	mg/L	0.100 ^(I)	0.2(0)	-	0.056	0.013	0.634 ^{C,W}	44	0	0.077	4.54 ^{C,W}	46.5 ^{C,W}	6.37 ^{C,W}	4.34 ^{C,W}	4.36 ^{C,W}	2.87 ^{C,W}	0.144 ^{C,W}	5.13 ^{C,W}	2.03 ^{C,W}	2.21 ^{C,W}	1.37 ^{C,W}	1.06 ^{C,W}	0.172 ^{C,W}	0.161 ^{C,W}		0.102 ^{C,W}	1.76 ^{c.w}	0.231 ^{C,W}		0.247 ^{C.W}		0.412 ^{C,W}	0.446 ^{C,W}
imony enic	mg/L mg/L	- 0.005	0.006 ^(k) 0.01 ^(e)	- 1	0.0033 0.054 ^{C,W}	0.0006 0.013 ^{C,W}	0.0196 ^W 0.12 ^{C,W}	47 46	0	0.0018 0.032 ^{C,W}	0.0021 0.046 ^{C,W}	1.53 ^W 7.55 ^{M,C,W}	0.449 ^W 3.77 ^{M,C,W}	0.199 ^W 0.609 ^{C,W}	0.201 ^W 0.614 ^{C,W}	0.166 ^W 0.541 ^{C,W}	0.0017 0.0343 ^{C,W}	0.0042 0.12 ^{C,W}	0.124 ^W 0.43 ^{C,W}	0.124 ^W 0.346 ^{C.W}	0.0554 ^W 0.18 ^{C.W}	0.0314 ^W 0.133 ^{C,W}	0.0008	0.0007	-	0.0018 0.0251 ^{C,W}	0.127 ^W 0.445 ^{C,W}	0.0178 ^W 0.0869 ^{C,W}		0.0221 ^W 0.0935 ^{C,W}	0.0186 ^W 0.0741 ^{C,W}	0.024 ^W 0.103 ^{C,W}	0.0279 ^W 0.114 ^{C,W}
ium	mg/L	-	1.0 ^(f)	-	0.01	<0.01	0.024	54	27	0.013	0.054	0.087	0.021	0.026	0.026	0.021	0.012	0.064	0.022	0.018	0.021	0.019	0.0084	0.0088	-	0.0098	0.041	0.011	0.01	0.011	0.011	0.013	0.013
nuth	mg/L mg/L	-	-	-	<0.2	<0.005 <0.2	<0.005 <0.2	54 54	54	<0.2	0.0001	<0.2	0.0001	<0.005 <0.2	<0.2	0.0001	<0.005 <0.2	<0.2	<0.005 <0.2	<0.0002	<0.2	<0.0002	<0.0002	<0.0002	-	<0.0002	< 0.0002	< 0.0002	< 0.0002	<0.0002	< 0.0002	< 0.0002	<0.0002
on Imium	mg/L mg/L	1.5 0.000033 ^(I)	5 ^(k) 0.005 ^(f)	-	<0.1 <0.00005 ^{D>C}	<0.1 <0.00005 ^{D>C}	<0.1 <0.00005 ^{D>C}	54 44	54 44	<0.1 <0.00005 ^{D>C}	- <0.0001 ^{D>C}	<0.1 0.0108 ^{C,W}	- 0.0017 ^C	<0.1 0.000843 ^C	<0.1 0.000831 ^C	- 0.0006 ^C	<0.1 <0.00005 ^{D>C}	<0.1 <0.00005 ^{D>C}	<0.1 0.000569 ^C	<0.02 0.00052 ^C	<0.1 0.000167 ^C	<0.02 <0.0002 ^{D>C}	<0.02 <0.0002 ^{D>C}	<0.02 <0.0002 ^{D>C}	-	<0.02 <0.0002 ^{D>C}	0.15 0.00038 ^C	<0.02 <0.0002 ^{D>C}	<0.02 <0.0002 ^{D>C}	<0.02 <0.0002 ^{D>C}	<0.02 <0.0002 ^{D+C}	<0.02 <0.0002 ^{D>C}	<0.02 0.00021 ^C
omium alt	mg/L mg/L	0.001 ^(m)	0.05(7)	-	<0.01 ^{D>C} <0.01	<0.01 ^{D>C} <0.01	<0.01 ^{D>C} <0.01	54 54	54 54	<0.01 ^{D>C} <0.01	0.0099 ^C 0.0026	0.115 ^{C,W} 0.045	0.0179 ^c 0.0095	<0.01 ^{D>C} <0.01	<0.01 ^{D>C} <0.01	0.0074 ^C 0.0074	<0.01 ^{D>C} <0.01	0.012 ^C <0.01	<0.01 ^{D+C} <0.01	0.0052 ^C 0.0032	<0.01 ^{D>C} <0.01	<0.0008 0.0019	<0.0008 <0.0002	<0.0008 <0.0002	-	<0.0008 <0.0002	0.0044 ^C 0.007	<0.0008 0.00089	<0.0008 0.00094	<0.0008 0.00099	0.0011 ^C 0.001	0.0009	0.001
per	mg/L mg/L	0.002 ⁽ⁿ⁾ 0.3	≤ 1.0 ^(e) ≤ 0.3 ^(e)	0.6	0.0034 ^C 0.17	0.0004 0.06	0.0084 ^C 1.03 ^{C,W}	47 44	2	0.0007	0.0077 ^C 5.04 ^{C,W}	0.647 ^{M,C} 99.9 ^{C,W}	0.101 ^C 15 ^{C,W}	0.0617 ^C 7.59 ^{C,W}	0.0621 ^C 7.63 ^{C,W}	0.0504 ^C 5.61 ^{C,W}	0.0007 0.41 ^{C,W}	0.0076 ^C 6.02 ^{C,W}	0.0413 ^C 3.82 ^{C,W}	0.0342 ^C 4.17 ^{C,W}	0.0181 ^C 2.1 ^{C,W}	0.0125 ^C 1.57 ^{C,W}	0.0012	0.0012	- 0.21	<0.001 0.18	0.0242 ^C 3.65 ^{C.W}	0.0092 ^C 0.42 ^{C,W}	0.0095 ^C 0.43 ^{C,W}	0.0096 ^C 0.42 ^{C,W}	0.0089 ^C 0.69 ^{C,W}	0.0105 ^C 0.54 ^{C,W}	0.01 ^C 0.73 ^{C,W}
d nganese	mg/L	0.002 ^(o)	0.01 ^(f) ≤ 0.05 ^(e)	0.4	0.0002	<0.00005 0.0052	0.0048 ^C	44 54	4	0.00008 0.39 ^W	0.0023 ^C 0.402 ^W	1.62 ^{M,C,W} 3.27 ^W	0.257 ^{C.W} 0.534 ^W	0.0995 ^{C.W}	0.101 ^{C,W}	0.0841 ^{C,W} 0.377 ^W	0.0002 0.479 ^W	0.0052 ^C	0.0729 ^{C.W}	0.066 ^{C.W}	0.0206 ^{C,W} 0.335 ^W	0.0073 ^C 0.267 ^W	0.0002	0.0002	- 0.048	0.0003	0.0497 ^{C,W} 0.613 ^W	0.0048 ^c 0.122 ^w	0.0028 ^c 0.15 ^w	0.003 ^c 0.149 ^w	0.0034 ^c 0.155 ^w	0.0037 ^c 0.152 ^w	0.0033 ^C 0.232 ^W
rcury	mg/L mg/L	0.000026	0.000001 ^(f)	-	<0.00001	<0.00001	<0.0002 ^{D+C}	67	67	<0.00001	-	0.000331 ^C	-	0.000051 ^C	0.000049 ^c	-	<0.00001	<0.00001	0.000028 ^C	0.0	0.000011	< 0.00002	0.000057 ^C	<0.00002	<0.00002	<0.0002	0.000038 ^C	< 0.00002	< 0.00002	<0.00002	<0.00002	<0.00002	<0.00002
lybdenum kel	mg/L mg/L	0.073 0.065 ^(p)	-	- 1	0.0005	0.0002	0.0009 0.0043	44 47	1	0.0005	0.0004	0.0026 0.126 ^{M,C}	0.002	0.0015	0.0016	0.0012	0.0004	0.0005	0.0011 0.0096	0.0011 0.0097	0.0009	0.0012	0.0001	0.0001 <0.0002	-	0.0009	0.0028	0.0009	0.0012	0.0014 0.0063	0.0012 0.0063	0.0015 0.0075	0.0017 0.0082
enium /er	mg/L mg/L	0.001 0.0001	0.01 (f)	-	<0.001 <0.01 ^{D>C}	<0.001 <0.00001	<0.001 <0.01 ^{D>C}	42 53	42 53	<0.0001 <0.01 ^{D>C}	<0.0005 <0.0001	0.0013 ^C <0.01 ^{D>C}	0.0006 0.0008 ^c	0.0002 <0.01 ^{D>C}	0.0002 <0.01 ^{D>C}	<0.0005 0.0003 ^C	<0.0001 <0.01 ^{D>C}	<0.0001 <0.01 ^{D>C}	0.0002 <0.01 ^{D>C}	<0.0004 <0.0004 ^{D>C}	0.0001 <0.01 ^{D>C}	<0.0004 <0.0004 ^{D>C}	<0.0004 <0.0004 ^{D>C}	<0.0004 <0.0004 ^{D>C}	-	<0.002 ^{D>C} <0.0004 ^{D>C}	0.0008 <0.0004 ^{D>C}	<0.0004 <0.0004 ^{D>C}	<0.0004 <0.0004 ^{D>C}	<0.0004 <0.0004 ^{D>C}	<0.0004 <0.0004 ^{D>C}	<0.0004 <0.0004 ^{D>C}	<0.0004 <0.0004 ^{D>C}
ontium allium	mg/L mg/L	- 0.0008	-	-	0.048 <0.2 ^{D>C}	0.038	0.13 <0.2 ^{D>C}	53 52	0	0.037 <0.2 ^{D+C}	0.042	0.019 <0.2 ^{D>C}	0.12 0.0001	0.087 <0.2 ^{D>C}	0.087 <0.2 ^{D>C}	0.075	0.033 <0.2 ^{D>C}	0.048 <0.2 ^{D>C}	0.082 <0.2 ^{D>C}	0.062	0.078 <0.2 ^{D>C}	0.075	0.03	0.031	-	0.037	0.22	0.053	0.058	0.06	0.049	0.064	0.071
anium	mg/L mg/L	-		-	<0.03 <0.01	<0.0001 <0.01	<0.03	53 54	53 51	<0.03 <0.01	- 0.18	<0.03	- 0.056	<0.03 0.075	<0.03	- 0.052	<0.03 <0.01	<0.03 0.2	<0.03	<0.0004 0.043	<0.03 0.037	<0.0004 0.033	0.00072	<0.0004 0.0052	-	<0.0004 <0.005	<0.0004 0.021	<0.0004 0.0079	<0.0004 0.0078	<0.0004 0.0084	<0.0004 0.017	<0.0004 0.014	<0.0004 0.014
no data or guideline available; min =	mg/L	0.015	0.02 (f)	-	0.00024	0.00016	0.00068	44	0	0.00034	0.0007	0.0012	0.0009	0.00069	0.0007	0.0006	0.00033	0.00067	0.00072														
nimum; max = maximum; n = sample size nadium	mg/L	-		-	< 0.03	<0.001	<0.03	53	53	<0.03	0.0096	0.18	0.02	<0.03	<0.03	0.0082	<0.03	<0.03	< 0.03	0.00048	0.0006	0.0006	0.00026	0.00028	-	0.00026	0.002	0.00029	0.00036	0.00041 0.00092	0.00036 0.0014	0.00044 0.0012	0.00045 0.0014
c ssolved Metals	mg/L	0.03	≤ 5.0 ^(e)	1	<0.004	0.001	0.018	47	38	<0.004	0.013	2.04 ^{M,C}			0.18 ^{M,C}	0.138 ^{M,C}	<0.004	0.017	0.122 ^{M,C}	0.094 ^C	0.038 ^C	0.018	<0.004	<0.004	-	0.004	0.065 ^C	0.015	0.009	0.01	0.015	0.012	0.011
iminum	mg/L	-	-	-	0.0098	0.0042	0.035	68	4	0.012	-	0.024	-	0.021	0.047	-	0.007	0.18	0.016	0.014	0.012	0.011	0.016	0.013	-	<0.01 0.0015	-	<0.01 0.016	<0.01 0.02	0.016	0.018	0.014	0.011
timony senic	mg/L mg/L	-	-	-	0.052	0.00061	0.018	68 66	0	0.026	-	0.072	-	0.042	0.045	-	0.0016	0.026	0.073	0.071	0.072	0.091	0.002	0.0045	-	0.018	-	0.067	0.07	0.069	0.067	0.075	0.082
ryllium	mg/L mg/L	-	-	-	<0.01 <0.005	<0.01 <0.005	0.077	68 68	46 68	0.01	-	<0.01 <0.005	-	<0.01 <0.005	<0.01 <0.005	-	<0.01 <0.005	0.013	<0.01 <0.005	0.0053			0.0068	0.0072 <0.0005	-	<0.0005	-	0.0098	-0.0000	0.0088	0.0088		0.0097
ron	mg/L mg/L	-	-	-	<0.2	<0.2	<0.2	68 68	68 68	<0.2	-	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.00005 0.013	<0.2 <0.1	<0.00005	<0.00005 0.0035	<0.00005 0.0039	-	0.00008	-	0.0001	0.00007	0.00005	0.000075 0.019	<0.00005 0.019	<0.00005 0.019
dmium romium	mg/L mg/L	-	-	-	<0.00005 <0.01	<0.00005 <0.01	<0.00005 <0.01	68 68	68 68	<0.00005 <0.01	-	0.00025	-	0.00019	0.00021 <0.01	-	<0.00005 <0.01	<0.00005 <0.01	0.00016	0.00015	0.000081 <0.01	<0.0001 0.0016	<0.0001 0.0018	<0.0001 0.0018	-	0.00023	-	0.00025	0.0001 0.00051	0.00025 0.00062	0.00024 0.00083	0.00021 0.00099	0.00023 0.0012
balt	mg/L	-	-	-	<0.01	<0.01	<0.01	68 68	68	<0.01	-	<0.01	-	<0.01	<0.01 0.017	-	<0.01	<0.01	<0.01	0.0011	<0.01	0.0011	<0.0001 0.00077	<0.0001	-	0.00013	-	0.0007	0.00084	0.00076	0.00076	0.00089	0.0012
n	mg/L mg/L	-	-	-	0.044	<0.01	0.2	68	1	0.12	-	0.028	-	0.039	0.049	-	0.086	0.25	0.041	0.045	0.059	0.065	0.014	<0.01	0.051	0.03	-	0.059	0.071	0.091	0.054	0.072	0.093
ad Inganese	mg/L mg/L	-	•	-	0.000056	<0.00005 <0.005		68 68	31 34	<0.00005 0.19	-	0.00076	-	0.00062	0.0012	-	<0.00005 <0.005	0.078	0.00084	0.00092	0.00074	0.27	<0.0001 0.0026	<0.0001 0.0031	- 0.039		-	0.00079	0.0013		0.0008	0.00061	0.00073
lybdenum rcury	mg/L mg/L	-		-	0.00043	0.00023	0.00079 <0.0002	68 68	0 64	0.0004	-	0.0013	-	0.0014	0.0015	-	0.00035	0.00039	0.0012	0.00098	0.00087 <0.00001	0.0011 <0.00002	<0.0001 <0.00002	0.00011 <0.00002	- <0.00002	0.00079 <0.00002	-	0.0012	0.0014	0.0014	0.0016	0.0016 <0.00002	0.0016
kel lenium	mg/L mg/L	-		-	0.00076	<0.0005 <0.001	0.003	68 64	16 64	<0.0005 <0.0001	-	0.0021 <0.0002	-	0.0029 0.00016	0.0028	-	<0.0005 <0.0001	<0.0005 <0.0001	0.0026	0.0032	0.0034	0.0063	<0.0001 <0.0004	<0.0001 <0.0004	-	0.00074 <0.002	-	0.003	0.0058	0.0056 0.00049	0.0065 0.00059	0.0069 <0.0004	0.0071 <0.0004
ver	mg/L	-		-	<0.01	<0.0001 <0.00001 0.036	<0.01 0.13	68 68	-	<0.01 0.036	-	<0.01	-	<0.01	<0.01	-	<0.01 0.033	<0.01	<0.01	<0.0002		<0.0002	<0.0002 0.031	<0.0002	-	<0.0002	-	<0.0002	<0.0002 0.059	<0.0002	<0.0002	<0.0002 0.064	<0.0002
	mg/L mg/L	-	-	-	<0.2	< 0.0001	<0.2	68	68	<0.2	-	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.00005	<0.2	< 0.00005	<0.0005	<0.00005	-	0.00027	-	0.00014	0.00012	0.000095	0.0009	0.000065	0.000065
allium	mg/L mg/L	-	-	-	<0.03	<0.0001	<0.03 <0.01	68 68	68 68	<0.03	-	<0.03	-	<0.03	<0.03	-	<0.03 <0.01	0.015	<0.03	0.00045	< 0.01	<0.0003	0.00032	<0.0003	-	0.0018	-	0.0021	0.0023	0.0025	0.0022	0.0022	0.0014
allium anium anium	mg/L	-	-	-	0.00022	0.00014	0.00063	68 68	0 68	0.00028 <0.03	-	0.00052 <0.03	-	0.00059 <0.03	0.00059 <0.03	-	0.00021 <0.03	0.00023	0.00058	0.0004 0.00021 0.015	0.00053 <0.03 0.0088	0.00055 0.00023 0.0051	0.00024 <0.0001 0.0073	0.00024 <0.0001 <0.001	-	0.00022 0.00049 0.0034	-	0.00032 0.00056 0.0058	0.00041 0.00051 0.009	0.00056		0.0004 0.00052 0.0088	





Laboratory Results





DETON'CHO \ NUNA JOINT VENTURE ATTN: KATRINA NOKLEBY GIANT MINESITE PO BOX 2951 Yellowknife NT X1A 2R2 Date Received:16-MAY-11Report Date:20-MAY-11 18:18 (MT)Version:FINAL

Client Phone: 604-253-4188

Certificate of Analysis

Lab Work Order #:

Project P.O. #: Job Reference: Legal Site Desc: C of C Numbers:

G2011-119

L1005341

606927

Can Dang Senior Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700 ALS CANADA LTD Part of the ALS Group A Campbell Brothers Limited Company

Environmental 🐊

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

ALS ENVIRONMENTAL ANALYTICAL REPORT

L1005341 CONTD.... PAGE 2 of 6 20-MAY-11 18:18 (MT) Version: FINAL

	Sample ID	L1005341-1	L1005341-2	L1005341-3	L1005341-4	L1005341-5
	Description Sampled Date Sampled Time Client ID	16-MAY-11 08:00 G2011-119-01	16-MAY-11 08:10 G2011-119-02	16-MAY-11 08:20 G2011-119-03	16-MAY-11 08:30 G2011-119-04	16-MAY-11 08:40 G2011-119-05
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	230	230	85.8	219	348
	Hardness (as CaCO3) (mg/L)	105	104	38.2	94.2	160
	рН (рН)	7.82	7.83	7.89	7.66	7.77
	Total Suspended Solids (mg/L)	149	151	2.8	9.4	10.2
	Total Dissolved Solids (mg/L)	151	158	67.8	145	233
	Turbidity (NTU)	219	213	2.65	7.34	13.8
Anions and Nutrients	Ammonia (as N) (mg/L)	0.114	0.111	0.0908	0.0972	0.214
Cyanides	Cyanide, Total (mg/L)	0.0137	0.0148	0.0070	0.0078	0.0056
Total Metals	Aluminum (Al)-Total (mg/L)	4.34	4.36	0.0774	0.377	0.459
	Antimony (Sb)-Total (mg/L)	0.199	0.201	0.00175	0.00446	0.00453
	Arsenic (As)-Total (mg/L)	0.609	0.614	0.0320	0.101	0.109
	Barium (Ba)-Total (mg/L)	0.026	0.026	0.013	0.027	0.043
	Beryllium (Be)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Bismuth (Bi)-Total (mg/L)	<0.20	<0.20	<0.20	<0.20	<0.20
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	0.000843	0.000831	<0.000050	<0.000050	<0.000050
	Calcium (Ca)-Total (mg/L)	33.5	33.5	10.3	26.0	42.9
	Chromium (Cr)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cobalt (Co)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Copper (Cu)-Total (mg/L)	0.0617	0.0621	0.00073	0.00165	0.00180
	Iron (Fe)-Total (mg/L)	7.59	7.63	0.270	0.761	0.902
	Lead (Pb)-Total (mg/L)	0.0995	0.101	0.000076	0.000366	0.000350
	Lithium (Li)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Magnesium (Mg)-Total (mg/L)	10.3	10.3	3.29	8.62	14.2
	Manganese (Mn)-Total (mg/L)	0.434	0.434	0.390	0.284	0.344
	Mercury (Hg)-Total (mg/L)	0.000051	0.000049	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Total (mg/L)	0.00150	0.00155	0.000451	0.000662	0.000952
	Nickel (Ni)-Total (mg/L)	0.0144	0.0145	<0.00050	0.00139	0.00148
	Phosphorus (P)-Total (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)	2.7	2.7	<2.0	3.7	3.2
	Selenium (Se)-Total (mg/L)	0.00020	0.00020	<0.00010	<0.00010	<0.00010
	Silicon (Si)-Total (mg/L)	6.43	6.34	0.517	2.49	3.58
	Silver (Ag)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Sodium (Na)-Total (mg/L)	5.4	5.4	2.4	6.6	11.1
	Strontium (Sr)-Total (mg/L)	0.0865	0.0867	0.0371	0.0884	0.148
	Thallium (TI)-Total (mg/L)	<0.20	<0.20	<0.20	<0.20	<0.20

ALS ENVIRONMENTAL ANALYTICAL REPORT

L1005341 CONTD.... PAGE 3 of 6 20-MAY-11 18:18 (MT) Version: FINAL

		1				
	Sample ID Description	L1005341-1	L1005341-2	L1005341-3	L1005341-4	L1005341-5
	Sampled Date Sampled Time Client ID	16-MAY-11 08:00 G2011-119-01	16-MAY-11 08:10 G2011-119-02	16-MAY-11 08:20 G2011-119-03	16-MAY-11 08:30 G2011-119-04	16-MAY-11 08:40 G2011-119-05
Grouping	Analyte					
WATER						
Total Metals	Tin (Sn)-Total (mg/L)	<0.030	<0.030	<0.030	<0.030	<0.030
	Titanium (Ti)-Total (mg/L)	0.075	0.073	<0.010	0.018	0.024
	Uranium (U)-Total (mg/L)	0.000686	0.000703	0.000342	0.000625	0.00309
	Vanadium (V)-Total (mg/L)	<0.030	< 0.030	<0.030	<0.030	< 0.030
	Zinc (Zn)-Total (mg/L)	0.181	0.180	<0.0040	0.0218	<0.0040
Dissolved Metals	Aluminum (AI)-Dissolved (mg/L)	0.0206	0.0469	0.0116	0.0041	0.0075
	Antimony (Sb)-Dissolved (mg/L)	0.0416	0.0449	0.00168	0.00416	0.00440
	Arsenic (As)-Dissolved (mg/L)	0.121	0.123	0.0264	0.0729	0.0726
	Barium (Ba)-Dissolved (mg/L)	<0.010	<0.010	0.010	0.022	0.033
	Beryllium (Be)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Bismuth (Bi)-Dissolved (mg/L)	<0.20	<0.20	<0.20	<0.20	<0.20
	Boron (B)-Dissolved (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Dissolved (mg/L)	0.000191	0.000209	<0.000050	<0.000050	<0.000050
	Calcium (Ca)-Dissolved (mg/L)	29.9	30.0	10.1	24.6	41.5
	Chromium (Cr)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cobalt (Co)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Copper (Cu)-Dissolved (mg/L)	0.0153	0.0166	<0.00050	0.00071	0.00110
	Iron (Fe)-Dissolved (mg/L)	0.039	0.049	0.122	0.156	0.161
	Lead (Pb)-Dissolved (mg/L)	0.000617	0.00118	<0.000050	0.000054	<0.000050
	Lithium (Li)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Magnesium (Mg)-Dissolved (mg/L)	7.25	7.16	3.16	7.97	13.6
	Manganese (Mn)-Dissolved (mg/L)	0.312	0.304	0.191	0.236	0.123
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Dissolved (mg/L)	0.00139	0.00145	0.000398	0.000579	0.000872
	Nickel (Ni)-Dissolved (mg/L)	0.00291	0.00284	<0.00050	0.00072	0.00100
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	< 0.30
	Potassium (K)-Dissolved (mg/L)	<2.0	<2.0	<2.0	3.4	2.9
	Selenium (Se)-Dissolved (mg/L)	0.00016	0.00014	<0.00010	<0.00010	<0.00010
	Silicon (Si)-Dissolved (mg/L)	0.680	0.743	0.385	1.58	2.22
	Silver (Ag)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Sodium (Na)-Dissolved (mg/L)	5.1	5.0	2.6	6.2	10.5
	Strontium (Sr)-Dissolved (mg/L)	0.0784	0.0776	0.0355	0.0824	0.138
	Thallium (TI)-Dissolved (mg/L)	<0.20	<0.20	<0.20	<0.20	<0.20
	Tin (Sn)-Dissolved (mg/L)	<0.030	<0.030	<0.030	<0.030	<0.030
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.000587	0.000586	0.000276	0.000511	0.00296
	Vanadium (V)-Dissolved (mg/L)	<0.030	<0.030	<0.030	< 0.030	<0.030

ALS ENVIRONMENTAL ANALYTICAL REPORT

L1005341 CONTD.... PAGE 4 of 6 20-MAY-11 18:18 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L1005341-1 16-MAY-11 08:00 G2011-119-01	L1005341-2 16-MAY-11 08:10 G2011-119-02	L1005341-3 16-MAY-11 08:20 G2011-119-03	L1005341-4 16-MAY-11 08:30 G2011-119-04	L1005341-5 16-MAY-11 08:40 G2011-119-05
Grouping	Analyte						
WATER							
Dissolved Metals	Zinc (Zn)-Dissolved (mg/L)		0.0203	0.0173	<0.0040	0.0153	<0.0040

Reference Information

LS Test Code	Matrix	Test Description	Method Reference**
S-DIS-GRAPH-YL	Water	Dissolved Arsenic by Graphite Furnance	APHA 3111 B
A discrete sample volume	is dispensed	into the graphite sample tube and determinations are m	nade by heating in three or more stages.
S-TOT-GRAPH-YL	Water	Total Arsenic by Graphite Furnance	APHA 3111 B
N-T-MID-HH-COL-VA	Water	Total Cyanide by HH Distillation	APHA 4500-CN Cyanide
		ures adapted from APHA Method 4500-CN "Cyanide". alysis using the chloramine-T colourimetric method.	Total or strong acid dissociable (SAD) cyanide are
C-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
This analysis is carried out	using proced	ures adapted from APHA Method 2510 "Conductivity".	Conductivity is determined using a conductivity electrode.
ARDNESS-CALC-VA	Water	Hardness	APHA 2340B
Hardness (also known as ⁻ Dissolved Calcium and Ma	Total Hardnes agnesium con	s) is calculated from the sum of Calcium and Magnesiu centrations are preferentially used for the hardness calc	m concentrations, expressed in CaCO3 equivalents. culation.
G-DIS-LOW-CVAFS-VA	Water	Dissolved Mercury in Water by CVAFS(Low)	EPA SW-846 3005A & EPA 245.7
Public Health Association, Environmental Protection / oxidation of the acidified s	and with proc Agency (EPA) ample using b	edures adapted from "Test Methods for Evaluating Soli	ment by filtration (EPA Method 3005A) and involves a cold-
G-TOT-LOW-CVAFS-VA	Water	Total Mercury in Water by CVAFS(Low)	EPA 245.7
Public Health Association, Environmental Protection	and with proc Agency (EPA)	edures adapted from "Test Methods for Evaluating Soli	ed sample using bromine monochloride prior to reduction c
ET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A
Public Health Association, Environmental Protection	and with proc Agency (EPA)	edures adapted from "Test Methods for Evaluating Soli	ment by acid digestion, using hotblock, or filtration (APHA
ET-DIS-ICP-VA	Water	Dissolved Metals in Water by ICPOES	EPA SW-846 3005A/6010B
Public Health Association,	and with proc Agency (EPA)	edures adapted from "Test Methods for Evaluating Soli . The procedure involves filtration (EPA Method 3005A	
ET-DIS-LOW-ICP-VA	Water	Dissolved Metals in Water by ICPOES	EPA 3005A/6010B
Public Health Association,	and with proc Agency (EPA)	edures adapted from "Test Methods for Evaluating Soli . The procedure involves filtration (EPA Method 3005A	
ET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A
Public Health Association, Environmental Protection	and with proc Agency (EPA)	edures adapted from "Test Methods for Evaluating Soli	ment by acid digestion, using hotblock, or filtration (APHA
ET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B
Public Health Association, Environmental Protection	and with proc Agency (EPA)	edures adapted from "Test Methods for Evaluating Soli	ment by acid digestion, using either hotblock or microwave
ET-TOT-LOW-ICP-VA	Water	Total Metals in Water by ICPOES	EPA 3005A/6010B
Public Health Association, Environmental Protection	and with proc Agency (EPA)	edures adapted from "Test Methods for Evaluating Soli	ment by acid digestion, using either hotblock or microwave
oven (EPA Method 3005A			
	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
H3-F-VA This analysis is carried out	t, on sulfuric a	cid preserved samples, using procedures modified fror	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC n J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of vels of ammonium in seawater", Roslyn J. Waston et al.

Reference Information

This analysis is carried out	t using proced	ures adapted from APHA Method 450	00-H "pH Value". The pH is determined in the laboratory using a pH electrode
It is recommended that thi	s analysis be o	conducted in the field.	
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value
This analysis is carried out	t using proced	ures adapted from APHA Method 450	00-H "pH Value". The pH is determined in the laboratory using a pH electrode
It is recommended that thi	s analysis be (conducted in the field.	
TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravi	metric APHA 2540 Gravimetric
			40 "Solids". Solids are determined gravimetrically. Total dissolved solids determined by evaporating the filtrate to dryness at 180 degrees celsius.
TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L) APHA 2540 Gravimetric
	0.	•	40 "Solids". Solids are determined gravimetrically. Total suspended solids determined by drying the filter at 104 degrees celsius.
TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 "Turbidity"
This analysis is carried out	t using proced	ures adapted from APHA Method 213	30 "Turbidity". Turbidity is determined by the nephelometric method.
TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity
This analysis is carried out	t using proced	ures adapted from APHA Method 213	30 "Turbidity". Turbidity is determined by the nephelometric method.
** ALS test methods may inc	orporate modi	fications from specified reference me	thods to improve performance.
The last two letters of the al	bove test code	e(s) indicate the laboratory that perform	ned analytical analysis for that test. Refer to the list below:
Laboratory Definition Code	e Labora	atory Location	
VA	ALS E	NVIRONMENTAL - VANCOUVER, B	C, CANADA

Chain of Custody Numbers:

G2011-119

YL

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

ALS ENVIRONMENTAL - YELLOWKNIFE, NW, CANADA

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Lab Copy				Cł	nain-of		c c st	Forn	1							<u>. </u>		<u>. </u>	C	CoC#: (Created 7:50:21	ł: 5/1		.1
Deton Cho-Nuna J Address: PO Box Yellowknife, NT XJ Teleohone: (867) Fax: (867) 669-33 Contact: Katrina N Email: Katrina N@r	2951 IA 2R2 669-3725 701 Jokleby	is Sa	ALS Group, ` Address: PO Yellowknife, Phone: (867 Fax: (867) 9 Contact: Email:	Box 2801 NT X1A 2R2) 873-5593		o:	ers@inac.gc.ca			Original ed Lab Repo ed Na	one: (86 :: (867) o: Katrij	O Box 2 NT X1. 7) 669-3 669-370 a Nokie	951, A 2R2 3725			nd Invoice	Addres Edmon Phone: Fax: (7	Cho\Nur ss: 9839- nton, AB : (780) 4 780) 408 Brenda K	-31 Ave, T6N 1C 108-289 3-5472	CS			
			FIELD .	SAMPLE 1	NFORMATIO	N	<u></u>					REQ	UESTE	D LAE	SUIT	TES (s	;ee re	verse	side	for de	tails)		
Fields Notes	: at there is only one COC per rep	oort X	43 ota	·5 1 1 M	Rush . etalo	on TSS. analyses		√= Fi	Preser eld Filte 1-Day Ri	red :													
P.O Number		*	43-	11 r	ush all	analyses		c = Composite	Containers	& pH			Imeters	Low Detection Total Metals Total Metals	Detection Dissolved Metals		*	,	tia 	enic by GFAA by GFAA			Pb, Nì, Zn u, Pb, Ni, Zn
Giant Sample Control Number	Lab Sample ID , بر محمد المحمد الم	Sample Date (dd-mmm-yy)	Sample Time (hh:mm)	Matrix	Lab	oratory Comments	Sampler Comments	G = Grab or (Number of C	Conductivity	ents	Major Ions	Physical Parameters	Low Detectio Total Metals	Low Detectio	Dissolved Metals	Oil and Grease	Total Cyanide	Total Ammonia	Dissolved Arsenic by Total Arsenic by GFA	Speciation	Ra226	Total As, Cu, Pb, Ni, Zn Dissolved As, Cu, Pb, Ni, Zn
G2011-119-01	SNP 43-5 GRUINOT S.	11-May-16	8:00	SW				G	6	<u>X</u> .	-	-	<u> </u>	<u>x -</u>	X	-	┢───┼	X	<u>x -</u>	<u></u>	-		- -
G2011-119-02	SNP 43-5	11-May-16	8:10	sw	· · · · · · · · · · · · · · · · · · ·			G	6	<u>x</u>	-	-	X	<u>× -</u>	X	-	-	X	<u>x -</u>		-		
G2011-119-03	SNP 43-11 Rug 1+	11-May-16	8:20	sw				G	6	X ·		-	X	x -	x	-	-	X	<u>x -</u>		_	-	
G2011-119-04	SNP 43-15	11-May-16	8:30	św			<u> </u>	G	6	x		-	X	<u>x -</u>	X	-	-	X	x -	- -	-		
G2011-119-05	SNP 43-16	11-May-16	8:40	sw				G	6	X	-	-	X	x -	x		-	X	x -		_	-	
		-					-	-	-	- -	-	-	-		-	-	-	-			-	-	
-		-		-				-	_						-	-	-	-		- -	-	_	
			-			· · · · · · · · · · · · · · · · · · ·	· _	_	-		-		-		-	_	-	-			-	-	
_				_			_	-	-		1_		-		<u> </u>		- 1		_	<u></u>		_	
	······································		<u> </u>					_	_		<u> </u>		_+		_			7_					
	Sampler Signature):	<u> </u>	<u> </u>		Date/Time:	Company:				Received	by (Sig	pature)	<u>-</u> - : -M-		b	1/	1		ompany	A ["]	<u> </u>		<u> </u>
Relinquished by (S	Signature):				Date/Time:	Company:					by (\$19	hature)		υľ.	5	47		iti-R))))			
Sampler (Printed M	Name):				Sample Storage 1 (deg. C):	emperature prior to Shipping	Sample Receipt Temperature (deg. C):	Sample	s Recei	SAI ved in G				lab use	only)	rovide	details		<u> </u>			<u>i</u>	<u> </u>



Taiga Batch No.: 110196

4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3 Tel: (867)-669-2788 Fax: (867)-669-2718

- FINAL REPORT -

Prepared For: South MacKenzie District DIAND Address: 140 Bristol Ave.

> Yellowknife, NT X1A 3T2

Attn: Michael Martin

Facsimile: (867) 669-2720

Final report has been reviewed and approved by:

Judy Mah Client Service Officer

NOTES:

- Test methods and data are validated by the laboratory's Quality Assurance Program. Taiga Environmental Laboratory is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) as a testing laboratory for specific tests registered with CALA.
- > Routine methods are based on recognized procedures from sources such as
 - o Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF;
 - o Environment Canada
 - o USEPA
- Samples shall be kept for thirty (30) days after the final report is issued. All microbiological samples shall be disposed of immediately upon completion of analysis to minimize biohazardous risks to laboratory personnel. Please contact the laboratory if you have any special requirements.
- Final results are based on the specific tests at the time of analysis and do not represent the conditions during sampling.



Taiga Batch No.: 110196

4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3 Tel: (867)-669-2788 Fax: (867)-669-2718

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 11-159-1

Taiga Sample ID: 001

Client Project:11-159Sample Type:Unknown WaterReceived Date:16-May-11Sampling Date:16-May-11Sampling Time:15:00Location:Giant Mine-Baker Creek

Report Status: Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	33.8	0.4	mg/L	16-May-11	SM2320:B	
Colour, Apparent	430	5	CU	17-May-11	SM2120:B	
Conductivity, Specific (@ 25°C)	87.2	0.4	μS/cm	16-May-11	SM2510:B	
рН	7.78		pH units	16-May-11	SM4500-H:B	
Solids, Total Dissolved	84	10	mg/L	19-May-11	SM2540:C	
Solids, Total Suspended	288	3	mg/L	19-May-11	SM2540:D	
Turbidity	96.9	0.05	NTU	17-May-11	SM2130:B	
<u>Major Ions</u>						
Calcium	10.5	0.1	mg/L	17-May-11	SM4110:B	
Chloride	2.2	0.7	mg/L	17-May-11	SM4110:B	
Fluoride	< 0.1	0.1	mg/L	17-May-11	SM4110:B	
Magnesium	3.1	0.1	mg/L	17-May-11	SM4110:B	
Nitrate as Nitrogen	0.08	0.01	mg/L	17-May-11	SM4110:B	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	17-May-11	SM4110:B	



Taiga Batch No.: 110196

4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3 Tel: (867)-669-2788 Fax: (867)-669-2718

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 11-159-1 Taiga Sample ID: 001 Potassium 1.1 0.1 17-May-11 SM4110:B mg/L Sodium 2.3 0.1 mg/L 17-May-11 SM4110:B 4 Sulphate 1 mg/L 17-May-11 SM4110:B **Trace Metals, Total** Aluminum 4540 5 μg/L 17-May-11 EPA200.8 Antimony 2.1 0.1 17-May-11 EPA200.8 µg/L 46.5 Arsenic 0.2 µg/L 17-May-11 EPA200.8 54.2 Barium 0.1 μg/L 17-May-11 EPA200.8 0.1 Beryllium 0.117-May-11 EPA200.8 μg/L < 0.1 Cadmium 0.1 μg/L 17-May-11 EPA200.8 Cesium 0.5 0.1 μg/L 17-May-11 EPA200.8 Chromium 9.9 0.1µg/L 17-May-11 EPA200.8 Cobalt 2.6 0.1 μg/L 17-May-11 EPA200.8 Copper 7.70.2 μg/L 17-May-11 EPA200.8 Iron 5040 5 17-May-11 EPA200.8 μg/L 2.3 Lead 0.1 μg/L 17-May-11 EPA200.8 Lithium 9.3 0.2 μg/L 17-May-11 EPA200.8 402 0.1 Manganese μg/L 17-May-11 EPA200.8 Molybdenum 0.4 0.1 17-May-11 EPA200.8 μg/L Nickel 7.0 0.1 μg/L 17-May-11 EPA200.8 9.9 Rubidium 0.1 μg/L 17-May-11 EPA200.8 Selenium < 0.5 0.5 17-May-11 EPA200.8 μg/L Silver < 0.1 0.1 μg/L 17-May-11 EPA200.8 Strontium 42.2 0.1 μg/L 17-May-11 EPA200.8

ReportDate: Tuesday, May 24, 2011 Print Date: Tuesday, May 24, 2011



Taiga Batch No.: 110196

4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3 Tel: (867)-669-2788 Fax: (867)-669-2718

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 11-159-1	Taiga Sample ID: 001								
Thallium	< 0.1	0.1	μg/L	17-May-11 EPA200.8					
Titanium	181	0.1	µg/L	17-May-11 EPA200.8					
Uranium	0.7	0.1	µg/L	17-May-11 EPA200.8					
Vanadium	9.6	0.1	µg/L	17-May-11 EPA200.8					
Zinc	13	5	μg/L	17-May-11 EPA200.8					



Taiga Batch No.: 110196

4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3 Tel: (867)-669-2788 Fax: (867)-669-2718

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 11-159-2

Taiga Sample ID: 002

Client Project:11-159Sample Type:Unknown WaterReceived Date:16-May-11Sampling Date:16-May-11Sampling Time:15:00Location:Giant Mine-Baker Creek

Report Status: Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	57.1	0.4	mg/L	16-May-11	SM2320:B	
Colour, Apparent	1130	50	CU	17-May-11	SM2120:B	
Conductivity, Specific (@ 25°C)	221	0.4	μS/cm	16-May-11	SM2510:B	
pН	7.99		pH units	16-May-11	SM4500-H:B	
Solids, Total Dissolved	184	10	mg/L	19-May-11	SM2540:C	
Solids, Total Suspended	374	3	mg/L	19-May-11	SM2540:D	
<u>Major Ions</u>						
Calcium	28.5	0.1	mg/L	17-May-11	SM4110:B	
Chloride	7.5	0.7	mg/L	17-May-11	SM4110:B	
Fluoride	< 0.1	0.1	mg/L	17-May-11	SM4110:B	
Magnesium	6.4	0.1	mg/L	17-May-11	SM4110:B	
Nitrate as Nitrogen	0.16	0.01	mg/L	17-May-11	SM4110:B	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	17-May-11	SM4110:B	
Potassium	1.9	0.1	mg/L	17-May-11	SM4110:B	
Sodium	4.9	0.1	mg/L	17-May-11	SM4110:B	

ReportDate:Tuesday, May 24, 2011Print Date:Tuesday, May 24, 2011



Taiga Batch No.: 110196

4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3 Tel: (867)-669-2788 Fax: (867)-669-2718

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 11-159-2 Taiga Sample ID: 002 43 Sulphate 1 mg/L 17-May-11 SM4110:B **Trace Metals, Total** Aluminum 6370 5 17-May-11 EPA200.8 µg/L 449 0.1 Antimony μg/L 17-May-11 EPA200.8 Arsenic 3770 0.2 μg/L 17-May-11 EPA200.8 Barium 21.0 0.1 17-May-11 EPA200.8 µg/L Beryllium 0.1 0.1μg/L 17-May-11 EPA200.8 1.7 Cadmium 0.1 μg/L 17-May-11 EPA200.8 Cesium 0.40.117-May-11 EPA200.8 μg/L 17.9 Chromium 0.1 μg/L 17-May-11 EPA200.8 Cobalt 9.5 0.1μg/L 17-May-11 EPA200.8 Copper 101 0.2 µg/L 17-May-11 EPA200.8 Iron 15000 5 μg/L 17-May-11 EPA200.8 Lead 257 0.1μg/L 17-May-11 EPA200.8 Lithium 12.1 0.2 17-May-11 EPA200.8 μg/L 534 Manganese 0.1 μg/L 17-May-11 EPA200.8 Molybdenum 2.0 0.1 μg/L 17-May-11 EPA200.8 Nickel 26.3 0.1 µg/L 17-May-11 EPA200.8 Rubidium 6.1 0.117-May-11 EPA200.8 μg/L 0.5 Selenium 0.6 μg/L 17-May-11 EPA200.8 Silver 0.8 0.1μg/L 17-May-11 EPA200.8 Strontium 115 0.1 17-May-11 EPA200.8 μg/L Thallium 0.1 0.1 μg/L 17-May-11 EPA200.8 Titanium 56.0 0.1 μg/L 17-May-11 EPA200.8

ReportDate: Tuesday, May 24, 2011 Print Date: Tuesday, May 24, 2011



Taiga Batch No.: 110196

4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3 Tel: (867)-669-2788 Fax: (867)-669-2718

- CERTIFICATE OF ANALYSIS -

Client Sample ID:	11-159-2	Taiga Sample ID: 002					
Uranium	0	.9 0.1	μg/L	17-May-11	EPA200.8		
Vanadium	19	0.8 0.1	μg/L	17-May-11	EPA200.8		
Zinc	30	51 5	μg/L	17-May-11	EPA200.8		

ReportDate:Tuesday, May 24, 2011Print Date:Tuesday, May 24, 2011



Taiga Batch No.: 110196

4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3 Tel: (867)-669-2788 Fax: (867)-669-2718

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 11-159-3

Taiga Sample ID: 003

Client Project:	11-159
Sample Type:	Unknown Water
Received Date:	16-May-11
Sampling Date:	16-May-11
Sampling Time:	15:00
Location:	Giant Mine-Baker Creek

Report Status: Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	49.5	0.4	mg/L	16-May-11	SM2320:B	
Conductivity, Specific (@ 25°C)	222	0.4	μS/cm	16-May-11	SM2510:B	
pН	7.93		pH units	16-May-11	SM4500-H:B	
<u>Major Ions</u>						
Calcium	27.3	0.1	mg/L	17-May-11	SM4110:B	
Chloride	8.0	0.7	mg/L	17-May-11	SM4110:B	
Fluoride	< 0.1	0.1	mg/L	17-May-11	SM4110:B	
Magnesium	6.6	0.1	mg/L	17-May-11	SM4110:B	
Nitrate as Nitrogen	0.15	0.01	mg/L	17-May-11	SM4110:B	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	17-May-11	SM4110:B	
Potassium	1.7	0.1	mg/L	17-May-11	SM4110:B	
Sodium	5.0	0.1	mg/L	17-May-11	SM4110:B	
Sulphate	44	1	mg/L	17-May-11	SM4110:B	
Trace Metals, Total						
Aluminum	2870	5	μg/L	17-May-11	EPA200.8	
ReportDate: Tuesday, May 24, 201 Print Date: Tuesday, May 24, 201						Page 8 of 10

Print Date: Tuesday, May 24, 2011



Taiga Batch No.: 110196

4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3 Tel: (867)-669-2788 Fax: (867)-669-2718

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 11-159-3

Taiga Sample ID: 003

Antimony	166	0.1	μg/L	17-May-11 EPA200.8
Arsenic	541	0.2	μg/L	17-May-11 EPA200.8
Barium	20.5	0.1	μg/L	17-May-11 EPA200.8
Beryllium	< 0.1	0.1	μg/L	17-May-11 EPA200.8
Cadmium	0.6	0.1	μg/L	17-May-11 EPA200.8
Cesium	0.3	0.1	μg/L	17-May-11 EPA200.8
Chromium	7.4	0.1	μg/L	17-May-11 EPA200.8
Cobalt	4.5	0.1	μg/L	17-May-11 EPA200.8
Copper	50.4	0.2	μg/L	17-May-11 EPA200.8
Iron	5610	5	μg/L	17-May-11 EPA200.8
Lead	84.1	0.1	μg/L	17-May-11 EPA200.8
Lithium	6.6	0.2	μg/L	17-May-11 EPA200.8
Manganese	377	0.1	μg/L	17-May-11 EPA200.8
Molybdenum	1.2	0.1	μg/L	17-May-11 EPA200.8
Nickel	11.8	0.1	μg/L	17-May-11 EPA200.8
Rubidium	4.6	0.1	μg/L	17-May-11 EPA200.8
Selenium	< 0.5	0.5	μg/L	17-May-11 EPA200.8
Silver	0.3	0.1	μg/L	17-May-11 EPA200.8
Strontium	75.2	0.1	μg/L	17-May-11 EPA200.8
Thallium	< 0.1	0.1	μg/L	17-May-11 EPA200.8
Titanium	51.5	0.1	μg/L	17-May-11 EPA200.8
Uranium	0.6	0.1	μg/L	17-May-11 EPA200.8
Vanadium	8.2	0.1	μg/L	17-May-11 EPA200.8
Zinc	138	5	μg/L	17-May-11 EPA200.8



Taiga Batch No.: 110196

4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3 Tel: (867)-669-2788 Fax: (867)-669-2718

- CERTIFICATE OF ANALYSIS -

Client Sample ID: 11-159-3

Taiga Sample ID: 003

* Taiga analytical methods are based on the following standard analytical methods

SM - Standard Methods for the Examination of Water and Wastewater EPA - United States Environmental Protection Agency

ReportDate:Tuesday, May 24, 2011Print Date:Tuesday, May 24, 2011

Page 10 of 10



			Result Summary	Client: GAL100 Reference: 11-0847-01-TRD
Client:	Golder Associa	tes Ltd.;	operation Yellowknife	Contents
Collection: Receipt: Containers: Description:	received on 20 received 2 x 20 seals and no in type: water, co	11/05/18 L pails a itials illection n	at 1530 by J. Crowe/ N. Sweetmar at 0830 by C. Quinteros at 16 °C, in good condition with no nethod: grab ended on 2011/05/22	Result Summary1 Test Conditions2 Test Data3 Comments/Statistics5 QA/QC6
Kesuit.	Endpoint (96-hour)	Value (%)	Confidence Limits (95%) lower upper	Method Calculated
Acute: (mortality)	LC50 LC25	>100 >100		could not be calculated could not be calculated
	Notes: LC25 & LC	50, concen	trations lethal to 25% and 50% of the test p	opulation
	Mortality (%)	100 - 75 - 50 - 25 - 0 -	control 6.3 13 25 Concentration (50 100 %)

The test data and results are authorized and verified correct.

Technical Lead

Quality Coordinator

Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results.



Test Conditions

Client: GAL100 Reference: 11-0847-01-TRD

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (amended May 2007).

Test type: Trout 96-h Static Acute Test (WTR-ME-041) Species: Oncorhynchus mykiss Organism source: Miracle Springs Inc. (Batch 20110503TR) Acclimation: 15 days (must be ≥2 weeks) Stock mortality: 0.61% (seven days preceding testing)

Sample initial chemistry: pH: 7.3; EC: 217 (μS/cm @ 25°C); DO: 8.1 (mg/L); temperature: 17 °C hardness (mg CaC03/L): 88; colour: brown; odour: odourless Sample holding time: 2 days (must be ≤ 5 days) Sample storage: 4 ± 2°C in darkness

Test volume:	The test was conducted in 22 L plastic pails with polyethylene liners 16 Litres (depth of solution in each test vessel ≥15cm) All test solutions and controls were pre-aerated for 30 minutes at 6.5 ±1 mL/min/L Dissolved oxygen in 100 % sample was 7.4 mg/L after pre-aeration The sample was not filtered or plu adjusted prior to or during testing
Loading donsity	The sample was not filtered or pH adjusted prior to or during testing 0.329 g/Litre (must be \leq 0.5 g/Litre)
• •	
	Dechlorinated City of Calgary water acclimated to test conditions
	5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)
-	One replicate per treatment; 10 fish per replicate
	Fish are not fed 24 hours before test initiation and no feeding during test
	pH, conductivity, dissolved oxygen and temperature measured daily
Aeration:	All treatments aerated at 6.5 ±1 mL/min/L by oil-free compressed air
	passed through airline tubes connected to disposable air stones
Lighting:	Overhead full spectrum fluorescent lights; 100-500 lux at surface
Photoperiod:	16h light:8h dark
Test temperature:	15 ± 1°C
Endpoint:	Mortality, 96-h LC50 (with 95% confidence limits)
	The control had 100% survival (must \geq 90%)
	The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)
Reference toxicant:	96-h test with Phenol (C_6H_60) initiated May 12, 2011; current results

(96-h LC50 and 95% confidence limits) = 1.04 (0.98-1.09) log (mg/L Phenol)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume

Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or In part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results.



Test Data

Client: GAL100 Reference: 11-0847-01-TRD

Test Log:								
D	ate	Day	Time		Technician		Comment	/Observation
2011	/05/18	0	1440	E.F	Petho/ N. Tu	rner	test fish loaded at 1440 h	
2011	/05/19	1	1050		Turner/ E. B		all test fish a	
2011	/05/20	2	0950	C. V	elasco/ N. T	urner	all test fish a	
2011	/05/21	3	1105	R. 6	Bradley/ E. E	Blais	all test fish a	
2011	/05/22	4	1130	R. E	Bradley/ E. E	Blais	all test fish a	opear normal
Chemistry	/:							
Conc. (%)	control	6.3	13	25	50	100		
		,						
Day			<u></u>	pH (units)				
0	7.3	7.2	7.1	7.2	7.2	7.4		
1	7.7	7.7	7.7	7.7	7.6	7.6		
2	7.7	7.7	7.7	7.7	7.7	7.6		
3	7.7	7.8	7.8	7.7	7.6	7.6		
4	7.7	7.8	7.8	7.7	7.7	7.6		
			Conduct	ivity (µS/cm	@ 25°C)			
0	422	413	404	381	<u>(4) 23 C)</u> 340	249		
ĭ 1	410	398	390	372	329	245		
2	404	399	390	373	328	240		
3	422	415	401	387	343	260		
4	424	416	406	390	346	260		
		L				I		
			Dissol	ved Oxygen	(mg/L)			
0	7.4	7.6	7.9	8.0	8.1	7.4		
1	7.7	7.7	7.7	7.7	7.7	7.7		
2	7.8	7.7	7.8	7.8	7.7	7.7		
3	7.8	7.8	7.8	7.8	7.7	7.7		
4	7.7	7.8	7.8	7.8	7.7	7.6		
			-					
0		4.4		emperature (
0	14	14	14	14	14	16		
1	15	15	15	15	15	15		
2 3	15 14	15 14	15	15	15	15		
· 4	14	14	14 14	15	15	15		
4	15	14	14	14	14	15		

Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data ar results.



Test Data

Client: GAL100 Reference: 11-0847-01-TRD

Number Ali	ve (In brac	kets numb	er stressed	l):			
Conc. (%)	control	6.3	13	25	50	100	
Day _							
0	10	10	10	10	10	10	
1	10	10	10	10	10	10	
2	10	10	10	10	10	10	
3 [10	10	10	10	10	10	
4 [10	10	10	10	10	10	
				Mortality (%)			
4	0	0	0	0	0	0	
				Stressed (%)			
4	0	0	0	0	0	0	

Biology Summary Tables:

Control	Length	Wet
Fish	(cm)	Weight(g)
1	3.5	0.3
2	3.7	0.5
3	3.7	0.5
4	4.1	0.6
5	4.0	0.7
6	4.0	0.5
7	4.6	0.8
8	4.2	0.5
9	3.8	0.5
10	3.6	0.5

sd	0.3	0.1
cv(%)	8.4	25.8

Notes: nd, not done; na, not applicable; sd, standard deviation; cv(%), coefficient of variation

Conc. (%)	Group Wet
Conc. (78)	Weight (g)
control	5.3
6.3	4.5
13	4.4
25	5.2
50	6.1
100	6.1

144 1

Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results.



Comments/Statistics

Client: GAL100 Reference: 11-0847-01-TRD

Test Result Comments: None

Data Analysis: Endpoints for mortality could not be calculated. No effect occurred.

Protocol Deviations: None

> Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results.



Warning Chart Trout

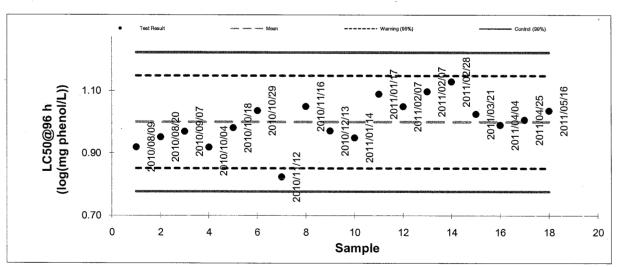
 Test Method: Trout 96h Static Acute Test. (LC50, 5 treatments plus a control) HydroQual Test Method: WTR-ME-042
 Reference: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 1990. Environment Canada, EPS 1/RM/13.

including May 1996 and December 2000 amendments.

Test Organism: test species: culture source: temperature (°C): dissolved oxygen: stock mortality (last 7d): batch number:	Oncorhyncus Miracle Sprin 15 ± 1 70-100% sate 0.71%	gs	vol. of t test replicates fish load tem	Test Design: est vessel (L): volume depth: per treatment: per replicate: ding (g fish/L): perature (°C): photoperiod: vater surface): dilution water:	>15 cm 1 10 ≤0.5 15 <u>+</u> 1 16h light: 8 100-500 lu	ıx (full-spectrum)
Current Test						
toxicant	phenol (C ₆ H ₅	OH)				
	2011/05/12	ended on	2011/05/16			
Result (LC50 @ 96h)	1.04	log (mg phen	ol/L); geometr	ic mean		
Confidence Limits (95%)	lower	0.98	upper	1.09		
		Histori	cal Values			
mean	1.00	sd	0.07	cv(%):	.7	

lowerupperwarning limits (±2 sd)0.851.15(95% confidence limits)control limits (±3 sd)0.781.22(99% confidence limits)

notes: sd, standard deviation; cv, coefficient of variance



The data and results are authorized and verified correct.



Technical Lead

Quality Coordinator

Our liability is limited to the cost of the test requested on the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results in part or in whole.



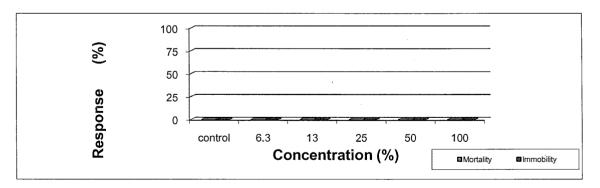
Client: GAL100

Reference: 11-0847-01-DAD

Client: (Golder Associat	es Ltd.; ope	eration Yellowknife	Contents
Collection: c Receipt: r Containers: r S Description: t	Giant Mine collected on 20 ⁻ received on 201 received 2 x 20 seals and no ini ype: water, col	1/05/18 at 0 L pails at 1 tials lection metl	1530 by J. Crowe/ N. Sweetman 0830 by C. Quinteros 6 °C, in good condition with no hod: grab ded on 2011/05/20	Result Summary1 Test Conditions2 Test Data4 Comments/Statistics5 QA/QC6
Result:				
	Endpoint (48-hour)	Value (%)	Confidence Limits (95%) lower upper	Method Calculated
Acute: (mortality)	LC50 LC25	>100 >100		could not be calculated could not be calculated
Acute: (immobility) _	EC50 EC25	>100 >100		could not be calculated could not be calculated

Result Summary

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.

Technical Lead

Quality Coordinator

Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or In part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results.



Test Conditions

Client: GAL100 Reference: 11-0847-01-DAD

Method: Biological Test method: Reference Method for Determining Acute Lethality of
Effluents to Daphnia magna, 2000. Environ. Can., EPS 1/RM/14.
Second Edition.

Species: Age: Organism source: Stock mortality:	
Sample holding time:	pH: 7.3; EC: 217 (μ S/cm @ 25°C); DO: 8.1 (mg/L); temperature: 17 °C hardness (mg CaC03/L): 88; colour: brown; odour: odourless 2 days (must be \leq 5 days) 4 ± 2°C in darkness
Test volume:	385 mL plastic vessels 150 mL The sample was not filtered or pH adjusted prior to or during testing The sample was pre-aerated for 0 minutes (rate of $37.5 \pm 12.5 \text{ mL/min.L}^{-1}$) The hardness of the sample was not adjusted (mg CaCO ₃ /L) prior to or during testing
	One daphnid/15 mL (must \leq 1 organism/15 mL) Dechlorinated City of Calgary water acclimated to test conditions The hardness of the control/dilution water was 135 mg CaCO ₃ /L
Lighting:	pH, conductivity, dissolved oxygen and temperature at test initiation and termination Cool white fluorescent lights; 400-800 lux at surface 16h light:8h dark 20 ± 2°C

Note: Outlined sections are protocol deviations explained on the comment page

Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results.



Test Conditions

Client: GAL100 Reference: 11-0847-01-DAD

 Endpoint: Mortality, 48-h LC50 (95% confidence limits) Immobility, 48-h EC50 (95% confidence limits)
 Test validity: The control had 100% survival (must ≥ 90%) Control had 0 percent (%) abnormal behaviour (must ≤ 10%, immobility)

Reference toxicant: 48-h test with NaCl initiated May 9, 2011; current results (48-h LC50 and 95% confidence limits) = 0.74 (0.71-0.77) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No ilability in whole or In part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results.



Test Data

Client: GAL100 Reference: 11-0847-01-DAD

Test Log:									
Date	Day	Time		Technician		Comment/Observation			
2011/05/18	0	1230		E. Petho		test l	test Daphnia appear normal		
2011/05/19	1	0910		E. Petho			Daphnia appear normal		
2011/05/20	2	1005	H. Stev	wart/ H. Carc	-Riano	test Daphnia appear normal			
Chemistry:			10	05	50	400	· · · · · · · · · · · · · · · · · · ·		
Conc. (%)	control	6.3	13	25	50	100			
Day				pH (units)					
0	7.9	7.9	7.9	7.8	7.8	7.7			
2	8.2	8.2	8.1	8.1	8.0	7.9			
			Conduct	ivity (µS/cm	@ 25°C)				
0	408	404	395	372	325	238			
2	417	418	408	383	341	258			
			Dissol	ved Oxygen	(mg/L)				
0	7.6	7.6	7.6	7.6	7.6	7.7			
2	7.6	6.7	6.7	6.7	6.6	6.6			
			Te	emperature (^c	°C)				
0	21	21	21	21	21	22			
2	21	21	21	22	22	22			
Biology:									
Conc. (%)	control	6.3	13	25	50	100			
Day			Number A	live and Beh	avior (beha	vior is in bra			
1	10	10	10	10	10	10			
2	10	10	10	10	10	10			
	Notes: F, floa	ting; I, immobi	le; B, stuck on	bubble; D, cau	ght in debris; n	d, not done; na	a, not applicable;		
				Ма	ortality (%)				
2	0	0	0	0	0	0			
				Imr	nobility (%)				
2	0	0	0	0	0	0			
		• • • • • • • •	A	• <u></u>		•	_h		

Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results.



Comments/Statistics

Client: GAL100 Reference: 11-0847-01-DAD

Test Result Comments: None

Data Analysis:

Endpoints for mortality could not be calculated. No effect occurred.

Endpoints for immobility could not be calculated. No effect occurred.

Protocol Deviations: None

> Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results.



Warning Chart Daphnia

Quality Assurance Information

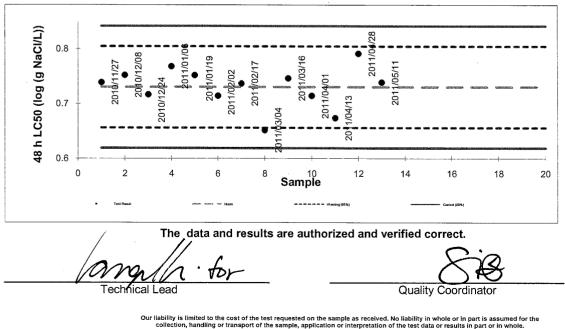
 Test Method: Daphnia Static Acute Test (LC50, 5 treatments plus a control) HydroQual Test Method: WTR-ME-016
 Reference: Biological Test Method: Reference Method for Determining the Acute Lethality of Effluents to Daphnia magna, 1990. Environment Canada, EPS 1/RM/14. including May 1996 and December 2000 ammendments.

-	<u> </u>	
1 oct	Organism:	
ICOL	Organism.	

test species:	Daphnia magna	vol. of test vessel (mL):	500
culture source:	in-house	toxicant:	sodium chloride
original culture source:	Environment Canada	test volume (mL):	150
days to first brood:	10	replicates per treatment:	1
mean brood size:	26	neonates per replicate:	10
ephippia in stock culture:	no	volume per neonate (mL):	15
age of test organisms:	<24 hours old	samples preaerated:	no
culture mortality (%):	7%	hardness adjustment:	no
dissolved oxygen:	40-100% saturation	temperature (°C):	20
		photoperiod:	16h light:8h dark
		light level (water surface):	400-800 lux (cool white)

control/dilution water: dechlorinated tap water **Current Test** toxicant Sodium chloride (NaCl) started on 2011/05/09 ended on 2011/05/11 Result (LC50 @ 48h) 0.74 log (g NaCl/L); geometric mean Confidence Limits (95%) .71 upper Historical Values lower 0.71 0.77 0.73 0.04 mean sd cv(%): 5 lower upper warning limits (±2 sd) 0.66 0.80 (95% confidence limits) control limits (±3 sd) 0.62 (99% confidence limits) 0.84

notes: sd, standard deviation; cv, coefficient of variance Comments:





Client: GAL100

Reference: 11-0848-01-DAD

Contents

Result Summary.....1 Test Conditions......2 Test Data.....4 Comments/Statistics..5 QA/QC.....6

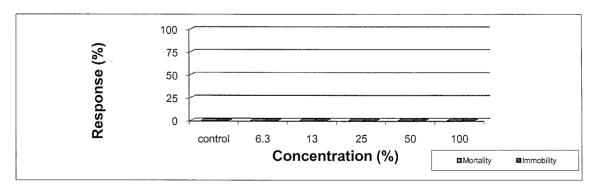
Result Summary	
-----------------------	--

Client: Golder Associates Ltd.; operation Yellowknife

Sample:	Baker Ck Exposure Point
	Giant Mine
Collection:	collected on 2011/05/16 at 1645 by J. Crowe/N. Sweetman
Receipt:	received on 2011/05/18 at 0830 by C. Quinteros
Containers:	received 2 x 20 L pails at 16 °C, in good condition with no
	seals and no initials

Result: _				
	Endpoint (48-hour)	Value (%)	Confidence Limits (95%) lower upper	Method Calculated
- Acute:	LC50	>100	· ·	could not be calculated
mortality)	LC25	>100		could not be calculated
Acute:	EC50	>100		could not be calculated
nmobility)	EC25	>100		could not be calculated

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.

Technical Lead

Quality Coordinator

Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results.



Test Conditions

Client: GAL100 Reference: 11-0848-01-DAD

Method:	Biological Test method: Reference Method for Determining Acute Lethality of Effluents to <i>Daphnia magna</i> , 2000. Environ. Can., EPS 1/RM/14. Second Edition.
Species: Age: Organism source: Stock mortality:	
	pH: 7.3; EC: 315 (µS/cm @ 25°C); DO: 8.0 (mg/L); temperature: 17 °C hardness (mg CaC03/L): 116; colour: brown; odour: odourless
	2 days (must be ≤ 5 days) 4 ± 2°C in darkness
	385 mL plastic vessels
Test volume:	
Sample pre-treatment:	The sample was not filtered or pH adjusted prior to or during testing The sample was pre-aerated for 0 minutes (rate of $37.5 \pm 12.5 \text{ mL/min.L}^{-1}$) The hardness of the sample was not adjusted (mg CaCO ₃ /L) prior to or during testing
Loading density:	One daphnid/15 mL (must ≤ 1 organism/15 mL)
Control/dilution water:	Dechlorinated City of Calgary water acclimated to test conditions The hardness of the control/dilution water was 135 mg CaCO ₃ /L
	5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)
Test replicates:	One replicate per treatment, 10 daphnids per replicate
Feeding:	None
Aeration:	None
	pH, conductivity, dissolved oxygen and temperature at test initiation and termination
	Cool white fluorescent lights; 400-800 lux at surface
	16h light:8h dark
Test temperature:	20 ± 2°C

Note: Outlined sections are protocol deviations explained on the comment page

Our liability is limited to the cast of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results.



Test Conditions

Client: GAL100 Reference: 11-0848-01-DAD

Endpoint: Mortality, 48-h LC50 (95% confidence limits) Immobility, 48-h EC50 (95% confidence limits) Test validity: The control had 100% survival (must ≥ 90%) Control had 0 percent (%) abnormal behaviour (must ≤ 10%, immobility)

Reference toxicant: 48-h test with NaCl initiated May 9, 2011; current results (48-h LC50 and 95% confidence limits) = 0.74 (0.71-0.77) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results.



Test Data

Client: GAL100 Reference: 11-0848-01-DAD

Test Log:									
Date	Day	Time Technician					Comment/Observation		
2011/05/18	0	1230		E. Petho		test Daphnia appear normal			
2011/05/19	1	0910	E. Petho			test Daphnia appear normal			
2011/05/20	2	1010		H. Stewart		test Daphnia appear normal			
Chemistry:			10	05	50	400			
Conc. (%)	control	6.3	13	25	50	100			
Day				pH (units)					
0	7.9	7.9	7.9	7.9	7.8	7.7			
2	7.9	8.0	8.0	8.0	8.0	8.0			
			Conduct	tivity (µS/cm (@ 25°C)				
0	425	412	407	396	373	331			
2	418	424	418	411	389	348			
			Dissol	ved Oxygen	(mg/L)				
0	7.6	7.6	7.6	7.6	7.6	7.6			
2	6.7	6.7	6.7	6.7	6.7	6.7			
			Τe	emperature (°	C)				
0	21	21	21	21	21	22			
2	21	21	21	21	21	21			
Biology:									
Conc. (%)	control	6.3	13	25	50	100			
Day			Number A	Nive and Beh	avior (beha	vior is in bra	ckets)		
1	10	10	10	10	10	10			
2	10	10	10	10	10	10			
	Notes: F, floa	ting; I, immob	le; B, stuck on		ght in debris; n ortality (%)	d, not done; na	, not applicable;		
2	0	0	0	0	0	0			
				Imn	nobility (%)				
2	0	0	0	0	0	0	·		

Our liability is limited to the cast of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results.



Comments/Statistics

Client: GAL100 Reference: 11-0848-01-DAD

Test Result Comments: None

Data Analysis:

Endpoints for mortality could not be calculated. No effect occurred.

Endpoints for immobility could not be calculated. No effect occurred.

Protocol Deviations: None

> Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results.



Quality Assurance Information

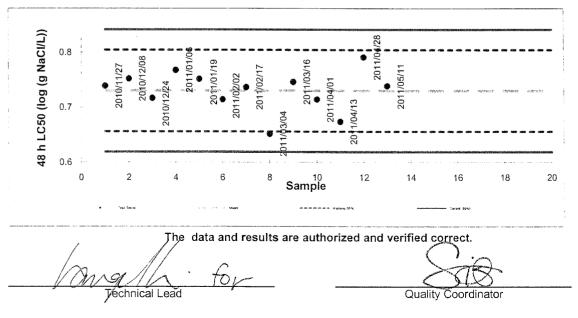
Test Method: Daphnia Static Acute Test (LC50, 5 treatments plus a control) HydroQual Test Method: WTR-ME-016 Reference: Biological Test Method: Reference Method for Determining the Acute Lethality of Effluents to Daphnia magna, 1990. Environment Canada, EPS 1/RM/14.

including May 1996 and December 2000 ammendments.

Test Organism:		Test Design:	
test species:	Daphnia magna	vol. of test vessel (mL):	500
culture source:	in-house	toxicant:	sodium chloride
original culture source:	Environment Canada	test volume (mL):	150
days to first brood:	10	replicates per treatment:	1
mean brood size:	26	neonates per replicate:	10
ephippia in stock culture:	no ·	volume per neonate (mL):	15
age of test organisms:	<24 hours old	samples preaerated:	no
culture mortality (%):	7%	hardness adjustment:	no
dissolved oxygen:	40-100% saturation	temperature (°C):	20
		photoperiod:	16h light:8h dark
		light level (water surface):	400-800 lux (cool white)
		control/dilution water:	dechlorinated tap water

			<u></u>	onuoranauo	n water. u	contonnated tap wa	ator	
		Cu	rrent Test					
toxicant Sodium chloride (NaCl)								
started on 2	011/05/09	ended on	2011/05/11					
Result (LC50 @ 48h)	0.74	log (g NaC	l/L); geometri	ic mean				
Confidence Limits (95%)	lower	0.71	upper	0.77				
	Historical Values							
mean	0.73	sd	0.04	cv(%):	5			
	lower	upper		• •				
warning limits (±2 sd)	0.66	0.80	(95% confid	lence limits)				
control limits (±3 sd)	0.62	0.84	(99% confid	lence limits)				

notes: sd, standard deviation; cv, coefficient of variance Comments:



Our liability is limited to the cost of the test requested on the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results in part or in whole.



			Result Summary	Client: GAL100 Reference: 11-0848-01-TRD
Client:	Golder Associa	tes Ltd.;	operation Yellowknife	Contents
Collection: Receipt: Containers: Description:	received on 20 ^o received 2 x 20 seals and no in type: water, co	11/05/16 11/05/18 L pails a itials llection m	at 1645 by J. Crowe/N. Sweetman at 0830 by C. Quinteros It 16 °C, in good condition with no	Result Summary1 Test Conditions2 Test Data3 Comments/Statistics5 QA/QC6
Result:				
	Endpoint (96-hour)	Value (%)	Confidence Limits (95%) lower upper	Method Calculated
Acute: (mortality)	LC50 LC25	>100 >100		could not be calculated could not be calculated
	Notes: LC25 & LC5	50, concent	rations lethal to 25% and 50% of the test pop	ulation
	Mortality (%)	100 75 50 25 0	control 6.3 13 25 Concentration (%	50 100

The test data and results are authorized and verified correct.

no Technical Lead

 $\mathbf{\sigma}$

Quality Coordinator

Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results.

HydroQual Laboratories Ltd., #4, 6125 12th Street SE, Calgary, Alberta, Canada T2H 2K1 Tel (403) 253-7121 fax (403) 252-9363 <u>www.hydroqual.ca</u>



Test Conditions

Client: GAL100 Reference: 11-0848-01-TRD

Method:	Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (amended May 2007).
Species: Organism source: Acclimation:	Trout 96-h Static Acute Test (WTR-ME-041) <i>Oncorhynchus mykiss</i> Miracle Springs Inc. (Batch 20110503TR) 15 days (must be ≥2 weeks) 0.61% (seven days preceding testing)
Sample holding time:	pH: 7.3; EC: 315 (μ S/cm @ 25°C); DO: 8.0 (mg/L); temperature: 17 °C hardness (mg CaC03/L): 116; colour: brown; odour: odourless 2 days (must be \leq 5 days) 4 ± 2°C in darkness
Testwassel	
Test volume:	The test was conducted in 22 L plastic pails with polyethylene liners 16 Litres (depth of solution in each test vessel ≥15cm) All test solutions and controls were pre-aerated for 30 minutes at 6.5 ±1 mL/min/L Dissolved oxygen in 100 % sample was 7.9 mg/L after pre-aeration The sample was not filtered or pH adjusted prior to or during testing
Test volume: Sample pre-treatment:	16 Litres (depth of solution in each test vessel ≥15cm) All test solutions and controls were pre-aerated for 30 minutes at 6.5 ±1 mL/min/L Dissolved oxygen in 100 % sample was 7.9 mg/L after pre-aeration The sample was not filtered or pH adjusted prior to or during testing
Test volume: Sample pre-treatment: Loading density:	16 Litres (depth of solution in each test vessel ≥15cm) All test solutions and controls were pre-aerated for 30 minutes at 6.5 ±1 mL/min/L Dissolved oxygen in 100 % sample was 7.9 mg/L after pre-aeration
Test volume: Sample pre-treatment: Loading density: Control/dilution water:	16 Litres (depth of solution in each test vessel \geq 15cm) All test solutions and controls were pre-aerated for 30 minutes at 6.5 ±1 mL/min/L Dissolved oxygen in 100 % sample was 7.9 mg/L after pre-aeration The sample was not filtered or pH adjusted prior to or during testing 0.368 g/Litre (must be \leq 0.5 g/Litre)
Test volume: Sample pre-treatment: Loading density: Control/dilution water: Test concentrations: Test replicates:	16 Litres (depth of solution in each test vessel \geq 15cm) All test solutions and controls were pre-aerated for 30 minutes at 6.5 ±1 mL/min/L Dissolved oxygen in 100 % sample was 7.9 mg/L after pre-aeration The sample was not filtered or pH adjusted prior to or during testing 0.368 g/Litre (must be \leq 0.5 g/Litre) Dechlorinated City of Calgary water acclimated to test conditions 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control) One replicate per treatment; 10 fish per replicate
Test volume: Sample pre-treatment: Loading density: Control/dilution water: Test concentrations: Test replicates: Feeding:	16 Litres (depth of solution in each test vessel \geq 15cm) All test solutions and controls were pre-aerated for 30 minutes at 6.5 ±1 mL/min/L Dissolved oxygen in 100 % sample was 7.9 mg/L after pre-aeration The sample was not filtered or pH adjusted prior to or during testing 0.368 g/Litre (must be \leq 0.5 g/Litre) Dechlorinated City of Calgary water acclimated to test conditions 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control) One replicate per treatment; 10 fish per replicate Fish are not fed 24 hours before test initiation and no feeding during test
Test volume: Sample pre-treatment: Loading density: Control/dilution water: Test concentrations: Test replicates: Feeding: Measurements:	16 Litres (depth of solution in each test vessel \geq 15cm) All test solutions and controls were pre-aerated for 30 minutes at 6.5 ±1 mL/min/L Dissolved oxygen in 100 % sample was 7.9 mg/L after pre-aeration The sample was not filtered or pH adjusted prior to or during testing 0.368 g/Litre (must be \leq 0.5 g/Litre) Dechlorinated City of Calgary water acclimated to test conditions 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control) One replicate per treatment; 10 fish per replicate Fish are not fed 24 hours before test initiation and no feeding during test pH, conductivity, dissolved oxygen and temperature measured daily
Test volume: Sample pre-treatment: Loading density: Control/dilution water: Test concentrations: Test replicates: Feeding: Measurements:	16 Litres (depth of solution in each test vessel \geq 15cm) All test solutions and controls were pre-aerated for 30 minutes at 6.5 ±1 mL/min/L Dissolved oxygen in 100 % sample was 7.9 mg/L after pre-aeration The sample was not filtered or pH adjusted prior to or during testing 0.368 g/Litre (must be \leq 0.5 g/Litre) Dechlorinated City of Calgary water acclimated to test conditions 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control) One replicate per treatment; 10 fish per replicate Fish are not fed 24 hours before test initiation and no feeding during test pH, conductivity, dissolved oxygen and temperature measured daily All treatments aerated at 6.5 ±1 mL/min/L by oil-free compressed air
Test volume: Sample pre-treatment: Loading density: Control/dilution water: Test concentrations: Test replicates: Feeding: Measurements: Aeration:	16 Litres (depth of solution in each test vessel ≥15cm) All test solutions and controls were pre-aerated for 30 minutes at 6.5 ±1 mL/min/L Dissolved oxygen in 100 % sample was 7.9 mg/L after pre-aeration The sample was not filtered or pH adjusted prior to or during testing 0.368 g/Litre (must be ≤ 0.5 g/Litre) Dechlorinated City of Calgary water acclimated to test conditions 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control) One replicate per treatment; 10 fish per replicate Fish are not fed 24 hours before test initiation and no feeding during test pH, conductivity, dissolved oxygen and temperature measured daily All treatments aerated at 6.5 ±1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones
Test volume: Sample pre-treatment: Loading density: Control/dilution water: Test concentrations: Test replicates: Feeding: Measurements: Aeration: Lighting:	16 Litres (depth of solution in each test vessel \geq 15cm) All test solutions and controls were pre-aerated for 30 minutes at 6.5 ±1 mL/min/L Dissolved oxygen in 100 % sample was 7.9 mg/L after pre-aeration The sample was not filtered or pH adjusted prior to or during testing 0.368 g/Litre (must be \leq 0.5 g/Litre) Dechlorinated City of Calgary water acclimated to test conditions 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control) One replicate per treatment; 10 fish per replicate Fish are not fed 24 hours before test initiation and no feeding during test pH, conductivity, dissolved oxygen and temperature measured daily All treatments aerated at 6.5 ±1 mL/min/L by oil-free compressed air

Test temperature: 15 ± 1°C

Endpoint:Mortality, 96-h LC50 (with 95% confidence limits)Test validity:The control had 90% survival (must \geq 90%)The control had 0 percent (%) stressed behaviour (must \leq 10%)Reference toxicant:96-h test with Phenol (C₆H₆0) initiated May 12, 2011; current results
(96-h LC50 and 95% confidence limits) = 1.04 (0.98-1.09) log (mg/L Phenol)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume

Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results.



Test Data

Client: GAL100 Reference: 11-0848-01-TRD

Test Log:								
Da	ate	Day	Time	Technician		Comment	/Observation	
2011	/05/18	0	1440	E. F	Petho/N. Tu	rner	test fish loade	ed at 1440 h
	/05/19	1	1050		Turner/E. B		all test fish ap	
2011	/05/20	2	1000	C. V	elasco/N. T	urner	all test fish ap	
2011	/05/21	3	1110	R. 1	Bradley/E. E	Blais	all test fish an	
2011	/05/22	4	1130	R.	Bradley/E. E	Blais	all test fish ap	
Chemistry	Chemistry:							
Conc. (%)	control	6.3	13	25	50	100		
Day				nH (unita)				
0	7.2	7.1	7.1	pH (units) 7.2	7.3	7.4		
1	7.6	7.6	7.6	7.6	7.6	7.4	-	
2	7.5	7.6	7.7	7.0	7.6	7.6		
3	7.7	7.7	7.7	7.7	7.7	7.6		
4	7.7	7.7	7.8	7.7	7.7	7.6		
0 1 2 3 4	422 391 404 422 414	421 401 407 422 424	Conduct 414 398 393 416 417	ivity (μS/cm 398 383 385 401 401	@ 25°C) 367 353 355 369 371	299 290 293 309 313		
			Dissol	ved Oxygen	(ma/L)			
0	8.2	8.5	8.5	8.5	8.4	7.9		T
1	7.6	7.7	7.7	7.7	7.7	7.6		
2	7.7	7.8	7.7	7.7	7.7	7.7		
3	7.8	7.7	7.7	7.7	7.7	7.7		
4	7.8	7.8	7.8	7.8	7.7	7.7		
			Тс	emperature (°C)	· · · · · ·		
0	14	14	14	14	15	16		
1	15	14	15	15	15	15		
2	15	15	15	15	15	15		
3	15	10	14	15	15	15		
4	15	14	14	14	15	15		

Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results.

HydroQual Laboratories Ltd., #4, 6125 12th Street SE, Calgary, Alberta, Canada T2H 2K1 Tel (403) 253-7121 fax (403) 252-9363 <u>www.hydroqual.ca</u>



Test Data

Client: GAL100 Reference: 11-0848-01-TRD

Number Alive (In brackets number stressed):								
Conc. (%)	control	6.3	13	25	50	100		
Day								
0	10	10	10	10	10	10		
1 [10	10	10	10	10	10		
2	10	10	10	10	10	10		
3 [10	10	10	10	10	10		
4 [9	10	10	10	10	10		
_				Mortality (%)				
4	10	0	0	0	0	0		
				Stressed (%))			
4	0	0	0	0	0	0		

Biology Summary Tables:

Control	Length	Wet
Fish	(cm)	Weight(g)
1	3.9	0.5
2	4.3	0.7
3	3.6	0.4
4	3.5	0.4
5	4.0	0.7
6	3.8	0.5
7	4.4	0.8
8	4.7	1.1
9	3.2	0.4
10	4.0	0.5

average	3.9	0.6
sd	0.4	0.2
cv(%)	11.4	35.6

Notes: nd, not done; na, not applicable; sd, standard deviation; cv(%), coefficient of variation

Conc. (%)	Group Wet
	Weight (g)
control	5.9
6.3	5.5
13	5.3
25	5.6
50	5.7
100	5.0

Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results.



Comments/Statistics

Client: GAL100 Reference: 11-0848-01-TRD

Test Result Comments: None

Data Analysis:

.

Endpoints for mortality could not be calculated. No effect occurred.

Protocol Deviations: None

> Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results.



Warning Chart Trout

Test Method: Trout 96h Static Acute Test. (LC50, 5 treatments plus a control) HydroQual Test Method: WTR-ME-042

Reference: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 1990. Environment Canada, EPS 1/RM/13. including May 1996 and December 2000 amendments.

Test Organism: test species: culture source: temperature (°C): dissolved oxygen: stock mortality (last 7d): batch number:	15 ± 1 70-100% sate 0.71%	gs	vol. of te test v replicates p fish load temp light level (wa	ater surface):	>15 cm 1 10 ≤0.5	. ,
		Curre	ent Test			
started on Result (LC50 @ 96h)	phenol (C ₆ H ₅ 2011/05/12 1.04	ended on	2011/05/16 nol/L); geometric	c mean		
Confidence Limits (95%)	lower	0.98	upper	1.09	<u>.</u>	
mean	1.00 lower	Histori sd upper	cal Values 0.07	cv(%):	7	

1.15

1.22

(95% confidence limits)

(99% confidence limits)

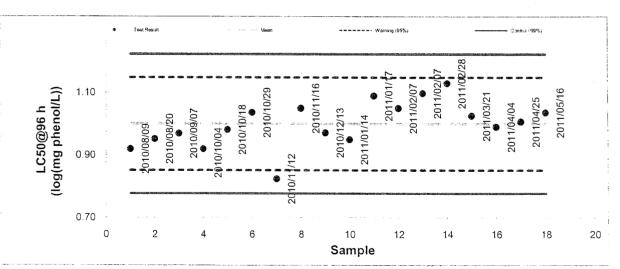
notes: sd, standard deviation; cv, coefficient of variance

0.85

0.78

warning limits (±2 sd)

control limits (±3 sd)



The data and results are authorized and verified correct.

Téchnical Lead

Sit

Quality Coordinator

Our liability is limited to the cost of the test requested on the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results in part or in whole.

HydroQual Laboratories Ltd., #4, 6125 12th Street SE, Calgary, Alberta, Canada T2H 2K1 tel (403) 253-7121 fax (403) 252-9363 www.hydroqual.ca



DETON'CHO \ NUNA JOINT VENTURE ATTN: KATRINA NOKLEBY GIANT MINESITE PO BOX 2951 Yellowknife NT X1A 2R2 Date Received:17-MAY-11Report Date:20-MAY-11 16:40 (MT)Version:DRAFT

Client Phone: 604-253-4188

Certificate of Analysis

Lab Work Order #: Project P.O. #: Job Reference: Legal Site Desc: C of C Numbers:

L1005761 606989 09-1427-0006



Can Dang Senior Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700 ALS CANADA LTD Part of the ALS Group A Campbell Brothers Limited Company



www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

L1005761 CONTD.... PAGE 2 of 6 20-MAY-11 16:40 (MT) Version: DRAFT

	Sample ID Descriptior Sampled Date Sampled Time Client ID	WATER 16-MAY-11 16:45		
Grouping	Analyte	(,		
WATER				
Physical Tests	Hardness (as CaCO3) (mg/L)	- 106		
	Total Suspended Solids (mg/L)	4340		
	Turbidity (NTU)	2740		
Anions and Nutrients	Bromide (Br) (mg/L)	<0.050		
	Chloride (Cl) (mg/L)	6.64		
	Fluoride (F) (mg/L)	0.285		
	Nitrate and Nitrite (as N) (mg/L)	0.0722		
	Nitrate (as N) (mg/L)	0.0722		
	Nitrite (as N) (mg/L)	<0.0010		
	Sulfate (SO4) (mg/L)	41.0		
Total Metals	Aluminum (Al)-Total (mg/L)	46.5		
	Antimony (Sb)-Total (mg/L)	1.53		
	Arsenic (As)-Total (mg/L)	7.55		
	Barium (Ba)-Total (mg/L)	0.087		
	Beryllium (Be)-Total (mg/L)	<0.0050		
	Bismuth (Bi)-Total (mg/L)	<0.20		
	Boron (B)-Total (mg/L)	<0.10		
	Cadmium (Cd)-Total (mg/L)	0.0108		
	Calcium (Ca)-Total (mg/L)	182		
	Chromium (Cr)-Total (mg/L)	0.115		
	Cobalt (Co)-Total (mg/L)	0.045		
	Copper (Cu)-Total (mg/L)	0.647		
	Iron (Fe)-Total (mg/L)	99.9		
	Lead (Pb)-Total (mg/L)	1.62		
	Lithium (Li)-Total (mg/L)	0.068		
	Magnesium (Mg)-Total (mg/L)	66.8		
	Manganese (Mn)-Total (mg/L)	3.27		
	Mercury (Hg)-Total (mg/L)	DLM 0.000331		
	Molybdenum (Mo)-Total (mg/L)	0.00259		
	Nickel (Ni)-Total (mg/L)	0.126		
	Phosphorus (P)-Total (mg/L)	1.29		
	Potassium (K)-Total (mg/L)	5.4		
	Selenium (Se)-Total (mg/L)	0.00128		
	Silicon (Si)-Total (mg/L)	44.0		
	Silver (Ag)-Total (mg/L)	<0.010		
	Sodium (Na)-Total (mg/L)	6.6		

L1005761 CONTD.... PAGE 3 of 6 20-MAY-11 16:40 (MT) Version: DRAFT

	Sample ID Description Sampled Date Sampled Time Client ID	L1005761-1 WATER 16-MAY-11 16:45 BAKER CREEK EXPOSURE POINT (ABOVE)		
Grouping	Analyte			
WATER				
Total Metals	Strontium (Sr)-Total (mg/L)	0.193		
	Thallium (TI)-Total (mg/L)	<0.20		
	Tin (Sn)-Total (mg/L)	<0.030		
	Titanium (Ti)-Total (mg/L)	0.238		
	Uranium (U)-Total (mg/L)	0.00122		
	Vanadium (V)-Total (mg/L)	0.117		
	Zinc (Zn)-Total (mg/L)	2.04		
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	0.0240		
	Antimony (Sb)-Dissolved (mg/L)	0.0716		
	Arsenic (As)-Dissolved (mg/L)	0.136		
	Barium (Ba)-Dissolved (mg/L)	<0.010		
	Beryllium (Be)-Dissolved (mg/L)	<0.0050		
	Bismuth (Bi)-Dissolved (mg/L)	<0.20		
	Boron (B)-Dissolved (mg/L)	<0.10		
	Cadmium (Cd)-Dissolved (mg/L)	0.00025		
	Calcium (Ca)-Dissolved (mg/L)	30.9		
	Chromium (Cr)-Dissolved (mg/L)	<0.010		
	Cobalt (Co)-Dissolved (mg/L)	<0.010		
	Copper (Cu)-Dissolved (mg/L)	0.0210		
	Iron (Fe)-Dissolved (mg/L)	0.028		
	Lead (Pb)-Dissolved (mg/L)	0.00076		
	Lithium (Li)-Dissolved (mg/L)	<0.010		
	Magnesium (Mg)-Dissolved (mg/L)	7.05		
	Manganese (Mn)-Dissolved (mg/L)	0.261		
	Mercury (Hg)-Dissolved (mg/L)	ol.000050		
	Molybdenum (Mo)-Dissolved (mg/L)	0.00134		
	Nickel (Ni)-Dissolved (mg/L)	0.0021		
	Phosphorus (P)-Dissolved (mg/L)	<0.30		
	Potassium (K)-Dissolved (mg/L)	<2.0		
	Selenium (Se)-Dissolved (mg/L)	DLA <0.00020		
	Silicon (Si)-Dissolved (mg/L)	0.649		
	Silver (Ag)-Dissolved (mg/L)	<0.010		
	Sodium (Na)-Dissolved (mg/L)	4.8		
	Strontium (Sr)-Dissolved (mg/L)	0.0689		
	Thallium (TI)-Dissolved (mg/L)	<0.20		
	Tin (Sn)-Dissolved (mg/L)	<0.030		
	Titanium (Ti)-Dissolved (mg/L)	<0.010		

L1005761 CONTD.... PAGE 4 of 6 20-MAY-11 16:40 (MT) Version: DRAFT

	Sampl Descrip Sampled Sampled T Clier	tion WATER Date 16-MAY-11 Time 16:45		
Grouping	Analyte			
WATER				
Dissolved Metals	Uranium (U)-Dissolved (mg/L)	0.000524		
	Vanadium (V)-Dissolved (mg/L)	<0.030		
	Zinc (Zn)-Dissolved (mg/L)	0.0197		

Qualifiers for Individual Parameters Listed:

	arameters L	3154.	
Qualifier Descript	ion		
DLA Detectio	n Limit Adjust	ed For required dilution	
DLM Detectio	on Limit Adjust	ed For Sample Matrix Effects	
Fest Method References	s:		
ALS Test Code	Matrix	Test Description	Method Reference**
ANIONS-BR-IC-VA	Water	Bromide by Ion Chromatography	APHA 4110 B.
		dures adapted from APHA Method 4110 B. "Ion Chr of Inorganic Anions by Ion Chromatography".	romatography with Chemical Suppression of Eluent Conductivity"
ANIONS-CL-IC-VA	Water	Chloride by Ion Chromatography	APHA 4110 B.
		dures adapted from APHA Method 4110 B. "Ion Chr of Inorganic Anions by Ion Chromatography".	romatography with Chemical Suppression of Eluent Conductivity"
ANIONS-F-IC-VA	Water	Fluoride by Ion Chromatography	APHA 4110 B.
		dures adapted from APHA Method 4110 B. "Ion Chr of Inorganic Anions by Ion Chromatography".	romatography with Chemical Suppression of Eluent Conductivity"
ANIONS-N+N-CALC-VA	Water	Nitrite & Nitrate in Water (Calculation)	EPA 300.0
Nitrate and Nitrite (as N) is	s a calculated	parameter. Nitrate and Nitrite (as N) = Nitrite (as N)) + Nitrate (as N).
ANIONS-NO2-IC-VA	Water	Nitrite in Water by Ion Chromatography	EPA 300.0
This analysis is carried ou detected by UV absorban		dures adapted from EPA Method 300.0 "Determinat	ion of Inorganic Anions by Ion Chromatography". Nitrite is
ANIONS-NO3-IC-VA	Water	Nitrate in Water by Ion Chromatography	EPA 300.0
This analysis is carried ou detected by UV absorban		dures adapted from EPA Method 300.0 "Determinat	ion of Inorganic Anions by Ion Chromatography". Nitrate is
ANIONS-SO4-IC-VA	Water	Sulfate by Ion Chromatography	APHA 4110 B.
		dures adapted from APHA Method 4110 B. "Ion Chr of Inorganic Anions by Ion Chromatography".	romatography with Chemical Suppression of Eluent Conductivity
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
		ss) is calculated from the sum of Calcium and Magne centrations are preferentially used for the hardness	esium concentrations, expressed in CaCO3 equivalents. calculation.
HG-DIS-LOW-CVAFS-VA	Water	Dissolved Mercury in Water by CVAFS(Low)	EPA SW-846 3005A & EPA 245.7
Public Health Association, Environmental Protection oxidation of the acidified s	, and with prod Agency (EPA sample using b	cedures adapted from "Test Methods for Evaluating). The procedures may involve preliminary sample t	nination of Water and Wastewater" published by the American Solid Waste" SW-846 published by the United States treatment by filtration (EPA Method 3005A) and involves a cold- ole with stannous chloride. Instrumental analysis is by cold
HG-TOT-LOW-CVAFS-VA	Water	Total Mercury in Water by CVAFS(Low)	EPA 245.7
Public Health Association Environmental Protection	, and with proc Agency (EPA	cedures adapted from "Test Methods for Evaluating	nination of Water and Wastewater" published by the American Solid Waste" SW-846 published by the United States cidified sample using bromine monochloride prior to reduction of ence spectrophotometry (EPA Method 245.7).
MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A
Public Health Association Environmental Protection	, and with proc Agency (EPA	cedures adapted from "Test Methods for Evaluating	nination of Water and Wastewater" published by the American Solid Waste" SW-846 published by the United States treatment by acid digestion, using hotblock, or filtration (APHA ctrometry (modifed from EPA Method 6020A).
MET-DIS-ICP-VA	Water	Dissolved Metals in Water by ICPOES	EPA SW-846 3005A/6010B
Public Health Association,	, and with prod Agency (EPA	cedures adapted from "Test Methods for Evaluating). The procedure involves filtration (EPA Method 30	nination of Water and Wastewater" published by the American Solid Waste" SW-846 published by the United States 005A) and analysis by inductively coupled plasma - optical
MET-DIS-LOW-ICP-VA	Water	Dissolved Metals in Water by ICPOES	EPA 3005A/6010B
Public Health Association,	, and with prod Agency (EPA	cedures adapted from "Test Methods for Evaluating). The procedure involves filtration (EPA Method 30	nination of Water and Wastewater" published by the American Solid Waste" SW-846 published by the United States 005A) and analysis by inductively coupled plasma - optical
	Weter	,	

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS

APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modifed from EPA Method 6020A).

MET-TOT-ICP-VA Water Total Metals in Water by ICPOES

EPA SW-846 3005A/6010B

EPA 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MET-TOT-LOW-ICP-VA Water Total Metals in Water by ICPOES

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

TSS-LOW-VA Water Total Suspended Solids by Grav. (1 mg/L)

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.

TURBIDITY-VA Water Turbidity by Meter

APHA 2130 "Turbidity"

APHA 2130 Turbidity

APHA 2540 Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

TURBIDITY-VA Water Turbidity by Meter

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code Laboratory Location

VA A

ALS ENVIRONMENTAL - VANCOUVER, BC, CANADA

Chain of Custody Numbers:

1

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

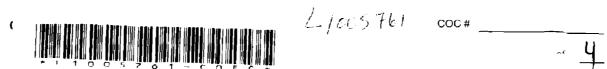
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION. Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



•



eport To		Repc				Servio	e Re	questec	(Rush	for rou	utine a	inalysis	subjec	ct to a	vailabili	ity)
	Deton'Cho/Nuna Joint Venture AND Golder As. Ltd.	✓ Standard	Other			🖲 Reg	ular (St	andard Tu	rnarour	nd Time	s · Bus	iness ();	ays)			
	DCNJV: Katrina Nokleby; Golder: Justine Crowe		✓ Exce	Digital		O Prio	rity (2-4	Business	Days) -	50% S	urchar	ge - Cor	ntact AL	S to Co	onfirm T	AT
ddress:		Email 1:	jcrowe@golder.	cóm		S Eme	ergency	(1-2 Bus.	Days) -	100%	Surcha	rge - Cc	ontact A	LS to C	Confirm 1	TAT
			hmachtans@go			🔿 Sarr	ie Day (or Weeker	d Emer	gency -	Contac	t ALS t	o Confir	m 1AT		
hone:	867 669 6735 Fax:		KatrinaN@nuna			<u> </u>				Analys	sis Re	eques	t			
	Same as Report ? Yes Vo	_	oject Informatio			Plea	se inc	licate\be	low Fi	Itered	, Pres	served	or bol	th (F,	P, F/F	2)
	voice with Report? Yes 7 No	Job #:	09-1427-0006					5 P	R	8	$\hat{\mathbf{v}}$	9	P	PT		21
	Deton'Cho/Nuna Joint Venture	PO / AFE:	606989								-		Part 1	T	S	
ontact:	Brenda Kalis	LSD:				1								<i>"</i>	leta	
ddress:	9838-31st Avenue., Edmonton AB, T6N 1C5	+				<u>ب</u>							8	Metals	≥ ס	ers
hone:	780 408 2897 Fax: 780 408 5472	Quote #:				ete	1			1			5	ž	ě	tain
	/ork Order #	ALS		1							Grease		Reputed	Level Total	Level Dissolved Metals	Containers
and a	use only)	Contact:	Can Dang	Sampler:	Justine Crowe	Pa	S	200	í "	Ş	e e		2	⊡	- G	<u> </u>
	Sample Identification		Dete	Time		<u>i</u>	2	nide	ient	F	р Ц		×	Le	Le L	hide
Sample #	(This description will appear on the report)		Date (dd-mmm-yy)	(hh:mm)	Sample Type	Physical	Major Ions	Cyanide	Nutrients	NH3 / TKN	Oil and	P	ğ	Š	ð,	Sulphide Number c
#			- <u> </u>		Surface Water	x		x x	_	X	x	x		x		X 10
	Baker Creek Exposure Point		16-May-11	16:45	Surface water	⊢^ +	<u> </u>	<u>^ </u>	 ^	<u> ^</u>	^	 ^	<u> </u>	<u>^</u>		<u>^ ''</u>
										<u> </u>						
								l			l					
										+		┼──╁		-+		
						+			+			┢──┦	-+	+	_+	+
						$ \downarrow \downarrow $				<u> </u>	L	\square	<u> </u>			\rightarrow
]													
												\square				
						++		-	+		- 1	+ +		\neg	-+	
						┼╌┥			+			╉┯╼┥	┝╌╋			
			ļ			+					 	<u> </u>	\vdash			-+
•																
i i									1							
	Special Instructions / Regulations with water or la	nd use (CCN	E-Freshwater	Aquatic Life/BC	CSR - Commerce	ial/AB	Tier 1	- Natu	al, et	c) / Ha	zard	ous D	etails	<u> </u>		
1 4 Meg-	25 + TSS Analysis = BUSH	<u>,</u>													-	
	alyze As and Se by Hydride****. Note - This water might conta	ain high amo	unts of metals.													
	Failure to complete a	Il portions o	f this form may													
	Try the resk of this form stresser ach															
	Also provided on another Excel tab are the ALS location					ervatio	n/ho									
	SHIPMENT RELEASE (client use)		T	ION (lab use on							FICA		(lab us			tion:
Released by		ld by:	Date:	Time:	Temperature:	Verif	fied by		Da	te:		Time	e:		Obser Yes / I	vations No ?

r.



COC #

Page	of	\$3

AU	Delarity processing		──┤┤┇┨╎┼┇╎┤╶┱╂ ┥╸╬┇║┥╌ ┛ ┇║┥╴	╈┺┿┺╋┥┑┇╗╗╗╴╎╢┫╝┝╼┥╝╫╫╋╼╽╢┹╷╼	ann an thairtean an t	<u>) </u>					F	age _		4-
Report	Priority processing	Report F	* L 1 0	0 8 2 8 2			rice Reque	sted (F	Rush for ro	utine a	natysis sul	bject to avai	lability)	
Company:	Deton'Cho/Nuna Joint Venture AND Golder As. Ltd.	Standard	U Other		·		egular (Standa							
Contact:	DCNJV: Katrina Nokleby; Golder: Justine Crowe	PDF	Excel	Digital	Fax	OPr	iority (2-4 Bu	siness Da	ays) • 50% :	Surcharg	e - Contac	t ALS to Confi	irm TAT	
Address:		Email 1:	jcrowe@golder	.com		🖲 Er	nergency (1-2	2 Bus. Da	ys) - 100%	Surchar	ge - Contac	t ALS to Con	firm TAT	-
·		Email 2:	hmachtans@g	older.com		O Sa	ame Day or W	eekend E	Emergency	- Contac	t ALS to Co	nfirm TAT		
Phone:	867 669 6735 Fax:	Email 3:	KatrinaN@nun	alogistics.com					Analy	sis Re	quest			
Invoice To	Same as Report ? 💭 Yes 🗹 No	Client / Pr	roject Informati	on		Pl€	ease indica	te belo	w Filtered	l, Pres	erved or	both (F, P,	F/P)	
Hardcopy of I	Invoice with Report? Ves No	Job #:	09-1427-0006-	5000-5500										
Company:		PO / AFE:	606989				luid Level		S				1	
Contact:	Brenda Kalis	LSD:				a		ġ	ЩД					
Address:	9838-31st Avenue., Edmonton AB, T6N 1C5					Ê		e foi	臣姫					ers
Phone:	780 408 2897 Fax: 780 408 5472	Quote #:				r Sa	nbin ze f als (bin S	S AR		1			Containers
1346600000000000000000000000000000000000	Vork Order # o use only)	ALS Contact:	Can Dang	Sampler:	Justine Crowe	p: Filter Sample	id ⊳	p: Combine solids er - analyze for	MOISTURE, PARTICLE SIZE, and TOTAL METALS (Low Level DLs)					r of Col
Sample #	Sample Identification (This description will appear on the report)		Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	1st Step:	2nd Step Filtrate - Dissolver DLs)	3rd Step: from filter	MOISTI SIZE, a Low Le					Number of
	Baker Creek Exposure Point (Above)		17-May-11	146:00	Surface Water	X	X		<u>x</u>	╞──┤		+		3
					Surface Water							┥┩		\uparrow
ilet estative estati Stationer also estationers	Reach 0 - Baker BC Mouth		17-May-11	(6:00	Surface Water	x	X		x					3
			;			-						┥╴_┥		<u> </u>
1												+ +	—	_
				<u> </u>						╞──┼				<u> </u>
						I								
			. <u> </u>											
						, <u> </u>								
,sidde sefent				<u> </u>										·
2000 Alter Spall	L										-]		<u> </u>
	Special Instructions / Regulations with water or land													<u></u>
Please refer ti ext. 226.	o special instructions in the Analysis Requested Section. All Sa	amples are	RUSH / EMERG	ENCY!!!!! If the	re are any questio	ons re	garding an	alysis p	lease co	ntact J	ustine Ci	owe at 86	7 873 6	6319
	Failure to complete all	portions of	f this form may	delay analysis.	Please fill in this	s forn	LEGIBLY					<u> </u>		
	By the use of this form the user ackno Also provided on another Excel tab are the ALS location	wiedges a	nd agrees with	the Terms and	Conditions as pri	ovide	d on a ser	parate l	Excel tat).	100 10-	110.0.0		
spaniskomper i sik	SHIPMENT RELEASE (client use) in a set of the set of th	SHIP	MENT RECEPTI	ON (lab use only	at a transmission of a first state of the	Tar::						yses. Jse only)	Manta	
Released by:		6)	Date: May 241	Time:	Temperature:		ied by:		Date:		Time:	Obs	ervatio / No ?	
J. <u></u>			L INY T	<u> </u>	<u> </u>							If Ye	es add	SIF



DETON'CHO \ NUNA JOINT VENTURE ATTN: KATRINA NOKLEBY GIANT MINESITE PO BOX 2951 Yellowknife NT X1A 2R2 Date Received:24-MAY-11Report Date:25-MAY-11 16:53 (MT)Version:DRAFT

Client Phone: 604-253-4188

Certificate of Analysis

Lab Work Order #: Project P.O. #: Job Reference: Legal Site Desc: C of C Numbers:

L1008285 606989 09-1427-0006

Can Dang Senior Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700 ALS CANADA LTD Part of the ALS Group A Campbell Brothers Limited Company



www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

L1008285 CONTD.... PAGE 2 of 7 25-MAY-11 16:53 (MT) Version: DRAFT

	Sample ID Description Sampled Date Sampled Time Client ID	L1008285-1 17-MAY-11 15:15 REACH 7 OVERFLOW U/S ROAD	L1008285-2 17-MAY-11 15:00 REACH 7 OVERFLOW D/S ROAD	L1008285-3 17-MAY-11 14:15 REACH 0- BAKER BC MOUTH	
Grouping	Analyte	ROAD	NOAD		
WATER					
Physical Tests	Total Suspended Solids (mg/L)	6.7	279	163	
-	Total Dissolved Solids (mg/L)	59.5	215	105	
	Turbidity (NTU)	3.05	94.9	134	
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	3.4	3.3	2.3	
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	32.4	33.6	53.2	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	
	Alkalinity, Total (as CaCO3) (mg/L)	32.4	33.6	53.2	
	Ammonia (as N) (mg/L)	0.105	0.104	0.123	
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	
	Chloride (Cl) (mg/L)	2.07	2.06	10.6	
	Fluoride (F) (mg/L)	0.075	0.076	0.075	
	Nitrate and Nitrite (as N) (mg/L)	0.0345	0.0352	0.136	
	Nitrate (as N) (mg/L)	0.0345	0.0352	0.133	
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	0.0034	
	Sulfate (SO4) (mg/L)	3.21	3.26	39.3	
	Sulphide as S (mg/L)	<0.020	<0.020	0.025	
Total Metals	Aluminum (Al)-Total (mg/L)	0.144	5.13	2.03	
	Antimony (Sb)-Total (mg/L)	0.00168	0.00420	0.124	
	Arsenic (As)-Total (mg/L)	0.0343	0.120	0.430	
	Barium (Ba)-Total (mg/L)	0.012	0.064	0.022	
	Beryllium (Be)-Total (mg/L)	<0.0050	<0.0050	<0.0050	
	Bismuth (Bi)-Total (mg/L)	<0.20	<0.20	<0.20	
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	
	Cadmium (Cd)-Total (mg/L)	<0.000050	<0.000050	0.000569	
	Calcium (Ca)-Total (mg/L)	8.93	11.2	30.2	
	Chromium (Cr)-Total (mg/L)	<0.010	0.012	<0.010	
	Cobalt (Co)-Total (mg/L)	<0.010	<0.010	<0.010	
	Copper (Cu)-Total (mg/L)	0.00068	0.00763	0.0413	
	Iron (Fe)-Total (mg/L)	0.405	6.02	3.82	
	Lead (Pb)-Total (mg/L)	0.000186	0.00519	0.0729	
	Lithium (Li)-Total (mg/L)	<0.010	0.011	<0.010	
	Magnesium (Mg)-Total (mg/L)	2.81	5.05	7.98	
	Manganese (Mn)-Total (mg/L)	0.479	0.584	0.401	
	Mercury (Hg)-Total (mg/L)	<0.000010	<0.000010	0.000028	
	Molybdenum (Mo)-Total (mg/L)	0.000405	0.000481	0.00108	

L1008285 CONTD.... PAGE 3 of 7 25-MAY-11 16:53 (MT) Version: DRAFT

	Sample ID	L1008285-1	L1008285-2	L1008285-3	
	Sample ID Description	L 1000200-1	L 1000200-2	L1000200-0	
	Sampled Date	17-MAY-11	17-MAY-11	17-MAY-11	
	Sampled Time Client ID	15:15 REACH 7	15:00 REACH 7	14:15 REACH 0- BAKER	
		OVERFLOW U/S ROAD	OVERFLOW D/S ROAD	BC MOUTH	
Grouping	Analyte				
WATER					
Total Metals	Nickel (Ni)-Total (mg/L)	<0.00050	0.00738	0.00961	
	Phosphorus (P)-Total (mg/L)	<0.30	<0.30	<0.30	
	Potassium (K)-Total (mg/L)	<2.0	2.5	2.4	
	Selenium (Se)-Total (mg/L)	<0.00010	<0.00010	0.00015	
	Silicon (Si)-Total (mg/L)	0.544	9.40	3.31	
	Silver (Ag)-Total (mg/L)	<0.010	<0.010	<0.010	
	Sodium (Na)-Total (mg/L)	2.0	2.7	6.6	
	Strontium (Sr)-Total (mg/L)	0.0327	0.0484	0.0820	
	Thallium (TI)-Total (mg/L)	<0.20	<0.20	<0.20	
	Tin (Sn)-Total (mg/L)	<0.030	<0.030	<0.030	
	Titanium (Ti)-Total (mg/L)	<0.010	0.199	0.039	
	Uranium (U)-Total (mg/L)	0.000329	0.000673	0.000723	
	Vanadium (V)-Total (mg/L)	<0.030	<0.030	<0.030	
	Zinc (Zn)-Total (mg/L)	<0.0040	0.0174	0.122	
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	0.0070	0.182	0.0157	
	Antimony (Sb)-Dissolved (mg/L)	0.00156	0.00166	0.0359	
	Arsenic (As)-Dissolved (mg/L)	0.0233	0.0255	0.0729	
	Barium (Ba)-Dissolved (mg/L)	<0.010	0.013	<0.010	
	Beryllium (Be)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050	
	Bismuth (Bi)-Dissolved (mg/L)	<0.20	<0.20	<0.20	
	Boron (B)-Dissolved (mg/L)	<0.10	<0.10	<0.10	
	Cadmium (Cd)-Dissolved (mg/L)	<0.000050	<0.000050	0.000164	
	Calcium (Ca)-Dissolved (mg/L)	9.08	9.45	29.0	
	Chromium (Cr)-Dissolved (mg/L)	<0.010	<0.010	<0.010	
	Cobalt (Co)-Dissolved (mg/L)	<0.010	<0.010	<0.010	
	Copper (Cu)-Dissolved (mg/L)	<0.00050	0.00086	0.0118	
	Iron (Fe)-Dissolved (mg/L)	0.086	0.252	0.041	
	Lead (Pb)-Dissolved (mg/L)	<0.000050	0.000177	0.000840	
	Lithium (Li)-Dissolved (mg/L)	<0.010	<0.010	<0.010	
	Magnesium (Mg)-Dissolved (mg/L)	2.86	2.93	6.58	
	Manganese (Mn)-Dissolved (mg/L)	<0.0050	0.0776	0.296	
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	
	Molybdenum (Mo)-Dissolved (mg/L)	0.000350	0.000390	0.00117	
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	0.00264	
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	
	Potassium (K)-Dissolved (mg/L)	<2.0	<2.0	2.1	
	Selenium (Se)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	

L1008285 CONTD.... PAGE 4 of 7 25-MAY-11 16:53 (MT) Version: DRAFT

	Sample ID Description Sampled Date Sampled Time Client ID	L1008285-1 17-MAY-11 15:15 REACH 7 OVERFLOW U/S ROAD	L1008285-2 17-MAY-11 15:00 REACH 7 OVERFLOW D/S ROAD	L1008285-3 17-MAY-11 14:15 REACH 0- BAKER BC MOUTH	
Grouping	Analyte				
WATER					
Dissolved Metals	Silicon (Si)-Dissolved (mg/L)	0.326	1.08	0.702	
	Silver (Ag)-Dissolved (mg/L)	<0.010	<0.010	<0.010	
	Sodium (Na)-Dissolved (mg/L)	2.1	2.1	6.7	
	Strontium (Sr)-Dissolved (mg/L)	0.0327	0.0357	0.0786	
	Thallium (Tl)-Dissolved (mg/L)	<0.20	<0.20	<0.20	
	Tin (Sn)-Dissolved (mg/L)	<0.030	<0.030	<0.030	
	Titanium (Ti)-Dissolved (mg/L)	<0.010	0.015	<0.010	
	Uranium (U)-Dissolved (mg/L)	0.000211	0.000231	0.000579	
	Vanadium (V)-Dissolved (mg/L)	<0.030	<0.030	<0.030	
	Zinc (Zn)-Dissolved (mg/L)	<0.0040	<0.0040	0.0174	

Qualifiers for Sample Submission Listed:

Qualifier	Description		
SFPL	Sample was Fi	Itered and Preserved at the laboratory -	dissolved metals
Fest Method Reference	es:		
ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 "Acidity"
This analysis is carried o endpoint.	ut using proced	ures adapted from APHA Method 2310	"Acidity". Acidity is determined by potentiometric titration to a specified
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity
This analysis is carried o endpoint.	ut using proced	ures adapted from APHA Method 2310	"Acidity". Acidity is determined by potentiometric titration to a specified
ALK-PCT-VA	Water	Alkalinity by Auto. Titration	APHA 2320 "Alkalinity"
			"Alkalinity". Total alkalinity is determined by potentiometric titration to a pH phenolphthalein alkalinity and total alkalinity values.
ALK-PCT-VA	Water	Alkalinity by Auto. Titration	APHA 2320 Alkalinity
			"Alkalinity". Total alkalinity is determined by potentiometric titration to a pH phenolphthalein alkalinity and total alkalinity values.
ANIONS-BR-IC-VA	Water	Bromide by Ion Chromatography	APHA 4110 B.
		ures adapted from APHA Method 4110 of Inorganic Anions by Ion Chromatogra	B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" phy".
ANIONS-CL-IC-VA	Water	Chloride by Ion Chromatography	APHA 4110 B.
		ures adapted from APHA Method 4110 of Inorganic Anions by Ion Chromatogra	B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" phy".
ANIONS-F-IC-VA	Water	Fluoride by Ion Chromatography	APHA 4110 B.
		ures adapted from APHA Method 4110 of Inorganic Anions by Ion Chromatogra	B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" phy".
ANIONS-N+N-CALC-VA	Water	Nitrite & Nitrate in Water (Calculation)	EPA 300.0
Nitrate and Nitrite (as N)	is a calculated	parameter. Nitrate and Nitrite (as N) = N	itrite (as N) + Nitrate (as N).
ANIONS-NO2-IC-VA	Water	Nitrite in Water by Ion Chromatograph	ny EPA 300.0
This analysis is carried o detected by UV absorbar		ures adapted from EPA Method 300.0 "I	Determination of Inorganic Anions by Ion Chromatography". Nitrite is
ANIONS-NO3-IC-VA	Water	Nitrate in Water by Ion Chromatograp	hy EPA 300.0
This analysis is carried o detected by UV absorbar	01	ures adapted from EPA Method 300.0 "I	Determination of Inorganic Anions by Ion Chromatography". Nitrate is
ANIONS-SO4-IC-VA	Water	Sulfate by Ion Chromatography	APHA 4110 B.
This analysis is carried o and EPA Method 300.0 "	ut using proced Determination o	ures adapted from APHA Method 4110 of Inorganic Anions by Ion Chromatogra	B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" phy".
HG-DIS-LOW-CVAFS-VA	Water	Dissolved Mercury in Water by CVAF	S(Low) EPA SW-846 3005A & EPA 245.7
Public Health Association Environmental Protection oxidation of the acidified	n, and with proc Agency (EPA) sample using b	edures adapted from "Test Methods for . The procedures may involve prelimina	or the Examination of Water and Wastewater" published by the American Evaluating Solid Waste" SW-846 published by the United States ry sample treatment by filtration (EPA Method 3005A) and involves a cold- of the sample with stannous chloride. Instrumental analysis is by cold
HG-TOT-LOW-CVAFS-V	A Water	Total Mercury in Water by CVAFS(Lo	w) EPA 245.7
Public Health Association Environmental Protection	n, and with proc Agency (EPA)	edures adapted from "Test Methods for . The procedure involves a cold-oxidation	or the Examination of Water and Wastewater" published by the American Evaluating Solid Waste" SW-846 published by the United States on of the acidified sample using bromine monochloride prior to reduction of c fluorescence spectrophotometry (EPA Method 245.7).
MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC IC	PMS APHA 3030 B&E / EPA SW-846 6020A
Public Health Association Environmental Protection	n, and with proc Agency (EPA)	edures adapted from "Test Methods for . The procedures may involve prelimina	or the Examination of Water and Wastewater" published by the American Evaluating Solid Waste" SW-846 published by the United States ry sample treatment by acid digestion, using hotblock, or filtration (APHA mass spectrometry (modifed from EPA Method 6020A).
MET-DIS-ICP-VA	Water	Dissolved Metals in Water by ICPOE	S EPA SW-846 3005A/6010B
			or the Examination of Water and Wastewater" published by the American

Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical

emission spectrophotometry (EPA Method 6010B).

emission specirophotometry		Ju 6010B).	
MET-DIS-LOW-ICP-VA	Water	Dissolved Metals in Water by ICPOES	EPA 3005A/6010B
Public Health Association, a	and with proce gency (EPA).	edures adapted from "Test Methods for Evaluating The procedure involves filtration (EPA Method 30	nination of Water and Wastewater" published by the American Solid Waste" SW-846 published by the United States 005A) and analysis by inductively coupled plasma - optical
MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A
Public Health Association, a Environmental Protection A	and with proce gency (EPA).	edures adapted from "Test Methods for Evaluating	nination of Water and Wastewater" published by the American Solid Waste" SW-846 published by the United States reatment by acid digestion, using hotblock, or filtration (APHA trometry (modifed from EPA Method 6020A).
MET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B
Public Health Association, a Environmental Protection A	and with proce gency (EPA).	edures adapted from "Test Methods for Evaluating The procedures may involve preliminary sample to	nination of Water and Wastewater" published by the American Solid Waste" SW-846 published by the United States reatment by acid digestion, using either hotblock or microwave emission spectrophotometry (EPA Method 6010B).
MET-TOT-LOW-ICP-VA	Water	Total Metals in Water by ICPOES	EPA 3005A/6010B
Public Health Association, a Environmental Protection A	and with proce gency (EPA).	edures adapted from "Test Methods for Evaluating The procedures may involve preliminary sample to	nination of Water and Wastewater" published by the American Solid Waste" SW-846 published by the United States reatment by acid digestion, using either hotblock or microwave emission spectrophotometry (EPA Method 6010B).
NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
			from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of e levels of ammonium in seawater", Roslyn J. Waston et al.
OGG-LL-SF-VA	Water	Oil & Grease by Gravimetric	BCMOE GRAVIMETRIC
United States Environmenta published by the American F Biological Materials," 5th ed sample with hexane. This e detection limit, or Limit of R	al Protection A Public Health I., published b xtract is then eporting (LOI	Agency (EPA), "Standard Methods for the Examina Association, and "BC Environmental Laboratory M by the B.C. Ministry of Environment, Lands & Parks evaporated to dryness, and the residue weighed to R), for this method is 2 mg/L for a 1L sample volum	blid Waste" SW-846, Methods 3510 & 9071, published by the tition of Water and Wastewater", 20th ed., Method 5520, anual for the Analysis of Water, Wastewater, Sediment and a, 1994. The procedure involves an extraction of the entire water determine Oil and Grease. ALS Environmental's routine he. By request, a LOR of 1 mg/L is sometimes applied for this efined by the US EPA. A higher degree of variability is expected
S2-T-COL-VA	Water	Total Sulphide by Colorimetric	APHA 4500-S2 Sulphide
This analysis is carried out u colourimetric method.	using procedu	res adapted from APHA Method 4500-S2 "Sulphic	de". Sulphide is determined using the methlyene blue
TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540 Gravimetric
	01	•	olids are determined gravimetrically. Total dissolved solids v evaporating the filtrate to dryness at 180 degrees celsius.
TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540 Gravimetric
		rres adapted from APHA Method 2540 "Solids". So le through a glass fibre filter, TSS is determined by	olids are determined gravimetrically. Total suspended solids drying the filter at 104 degrees celsius.
TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 "Turbidity"
This analysis is carried out u	using procedu	ures adapted from APHA Method 2130 "Turbidity".	Turbidity is determined by the nephelometric method.
TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity
This analysis is carried out u	using procedu	ures adapted from APHA Method 2130 "Turbidity".	Turbidity is determined by the nephelometric method.
** ALC toot mothedo mou inco	rna rata madil	insting from apositing reference methods to impr	
	•	fications from specified reference methods to impro	
I he last two letters of the abo	ove test code	(s) indicate the laboratory that performed analytical	I analysis for that test. Refer to the list below:
Laboratory Definition Code	Labora	tory Location	
VA	ALS EN	VIRONMENTAL - VANCOUVER, BC, CANADA	
Chain of Custody Numbers:			

L1008285 CONTD.... PAGE 7 of 7 25-MAY-11 16:53 (MT) Version: DRAFT

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. mg/kg - milligrams per kilogram based on dry weight of sample. mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample. mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory. UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION. Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



1		RUSH	Chai	n r							·		cod	C#					
	A														Pag	ge _	<u>م</u>	of 2	, と
	(MLS) t	Priority processing				- 10	 												7
	Report To	<u>{</u>	Report Fo		0828	5 - C O F C	*.				_	_			_	ect to a		<u>aity)</u>	
	Company:	Deton'Cho/Nuna Joint Venture AND Golder As. Ltd.	Standard				l i	-			around	_			<u> </u>]
	Contact:	DCNJV: Katrina Nokleby; Golder: Justine Crowe	PDF	Excel	Digital	Fax						_				LS to C			
	Address:	· · · · · · · · · · · · · · · · · · ·	Email 1:	jcrowe@golder.	<u>com</u>				· · _		. ,		-			ALS to C			
			Email 2:	hmachtans@gc	Ider.com	·	() Sai	me Day	y or We	ekend	_		_	-		irm TAT			
	Phone:	867 669 6735 Fax:	Email 3:	KatrinaN@nuna				<u> </u>					sis Re						
	Invoice To	Same as Report ? . Ses Solution	Client / Pr	oject Informatio	on	· · · · · ·	Ple	ase in		e belo		lered.			t or bo	oth (F			
	Hardcopy of I	nvoice with Report?	Job #:	09-1427-0006					9		<u>r</u>	<u>r</u>	9	P+		<u> </u>	\rightarrow	<u>P</u>	
	Company:	Deton'Cho/Nuna Joint Venture	PO / AFE:	606989													als		
с ж	Contact:	Brenda Kalis	LSD:													<u>s</u>	Met		
۰.	Address:	9838-31st Ayenue., Edmonton AB, T6N 1C5					្ព									leta	- g	ļ	Jers
	Phone:	B0 408 2897 Fax: 780 408 5472	Quote #:				meter				9 - E		a			N N			Containers
	20000000000000000000000000000000000000	Vork Order # b use only)	ALS Contact:	Can Dang	Sampler:	Justine Crowe	Para	suo	Ψ.	-228-	ŝ	IKN	Grease			Low Level Total Metals	Level Dissolved Metal	e	5
in a start and a start	Sample #	Sample Identification (This description will appear on the report)		Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Physical	Major lons	Cyanide	Rediun	Nutrients	NH3 / TKN	Oil and	TOC	200	Low Le	Low Le	Sulphid	Number
		Reach 7 Overflow u/s Road (TOC not preserver	11	17-May-11	13:15	Surface Water	x	х	х		X	Х	Х	Х	x	x	x	x	9
# _		Reach 7 Overflow d/s Road		17-May-11	15:00	Surface Water	X	x	X		X	X	X	X	X	x	x	X	9
	An	Reach 0 - Baker BC Mouth		17-May-11	14:15	Surface Water	x	X	X		x	Х	Х	Х	x	x	x	x	9
																\rightarrow		-+	
-				h	+												\rightarrow		
	AND A DOUGLASS		<u> </u>				ļ											$ \rightarrow $	
		I conclus i and i alt	EN .																
		Samples 1 teres plat	<u> </u>	here .															
	IN MARKING STATE	n - hu - ant	NU	<u> </u>	<u> </u>											-+	-+		
	AND REPORT OF THE PROPERTY OF	- A HALLAN	<u>-</u> \}_	<u> </u>															
		Deen V Chilles ALLES			<u> </u>		-												
		1, KIN O												-					
		Special Instructions / Regulations with water or land	d use (CCM	IE-Freshwater A	Aquatic Life/BC	CSR - Commerci	al/AB	Tier	1 - Na		etc)	/ Har	rardo	us D	etails		<u> </u>		
·	·		<u>`</u>	·							,,	7 110							
,	***Please An	alyze_As and Se by Hydride****. Note - This water might contai	in high amou	unts of metals. A	All Samples are I	RUSH / EMERGEI	NCY!!	111											
1		Failure to complete all	portions of	f this form may	delay analysis.	Please fill in this	s form	n LEG										·	
		By the use of this form the user ackno	owledges a	nd agrees with	the Terms and	Conditions as pr	ovide	d on	a sep	arate	Exce	el tab	l.						
		Also provided on another Excel tab are the ALS location	n addresses	s, phone numbe	ers and sample	container / prese	rvatio	on / h	oldin	g tim	e tabl	e for	com	mon	analy	ses.			
	and the state of the	SHIPMENT RELEASE (client use)		MENT RECEPT	ON (lab use onl		e de la composition.	p.02.	SH	IIPME	INT V	ERIF	ICAT	ION (lab us	se onl	y)::::	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	979."
	Released by	$\frac{1}{10000000000000000000000000000000000$	T i	Date:		Temperature:		ied by	y:		Date	;		Time	9:		Obser Yes / I		าร:
6). Croue	(100-1-11 11 - 30 1 - 11	<u> </u>	May 24/1	11	<u> </u>										l	f Yes	add	SIF
				١											(GENF	18.01	Front	_

5



Golder Associates Ltd. ATTN: Hilary Machtans 9 - 4905 48 Street Yellowknife NT X1A 3S3 Date Received:18-MAY-11Report Date:21-MAY-11 14:16 (MT)Version:FINAL

Client Phone: 867-873-6319

Certificate of Analysis

Lab Work Order #:

Project P.O. #: Job Reference: Legal Site Desc: C of C Numbers: L1006655 606989 09-1427-0006

1

Shannon Luchka Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 9936-67 Avenue, Edmonton, AB T6E 0P5 Canada | Phone: +1 780 413 5227 | Fax: +1 780 437 2311 ALS CANADA LTD Part of the ALS Group A Campbell Brothers Limited Company



www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

L1006655 CONTD.... PAGE 2 of 4 21-MAY-11 14:16 (MT) Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L1006655-1 WATER 18-MAY-11 REACH 7 OVERFLOW U/S ROAD	L1006655-2 WATER 18-MAY-11 REACH 7 OVERFLOW D/S ROAD	L1006655-3 WATER 18-MAY-11 REACH 6 BC EXPOSURE POINT (ABOVE)	L1006655-4 WATER 18-MAY-11 UPPER REACH 3 (D/S OF BRIDGE)	L1006655-5 WATER 18-MAY-11 UPPER REACH: (POOL)
Grouping	Analyte	KOAD	ROAD	(ABOVE)		
WATER	·					
Physical Tests	Total Suspended Solids (mg/L)	<3.0	11.0	79.0	72.0	72.0
	Turbidity (NTU)	7.69	30.7	491	130	129
						120

L1006655 CONTD.... PAGE 3 of 4 21-MAY-11 14:16 (MT) Version: FINAL

Description Sampled Trins Citerriti VATER WATER 183/W-11 SPP 455 WATER WATER 183/W-11 SPP 455 Prysical Tests Total Supported Solids (mgL) Turbidity (MTL) 66.0 67.0 98.0 117 149 160 160 160 160		Sample ID	L1006655-6	L1006655-7	L1006655-8	
Sampled Time Client ID UPPER REACH 1 (U/S CULVERT) SNP 43-5 REACH 0 (BC MOUTH) Grouping Analyte WATER Physical Tests Total Suspended Solids (mg/L) 66.0 67.0 98.0		Description	WATER	WATER	WATER	
Client ID UPPER REACH 1 (U/S CULVERT) SNP 43-5 REACH 0 (BC MOUTH) Grouping Analyte MOUTH) WATER 66.0 67.0 98.0		Sampled Date		18-MAY-11	18-MAY-11	
WATER Physical Tests Total Suspended Solids (mg/L) 66.0 67.0 98.0		Client ID	UPPER REACH 1 (U/S CULVERT)	SNP 43-5	REACH 0 (BC MOUTH)	
Physical Tests Total Suspended Solids (mg/L) 66.0 67.0 98.0	Grouping	Analyte				
	WATER					
	Physical Tests	Total Suspended Solids (mg/L)	66.0	67.0	98.0	
		Turbidity (NTU)				

Test Method References:

APHA 2540 D-Gravimetric APHA 2130 B-Nephelometer e methods to improve performance. erformed analysis for that test. Refer to the list below:
e methods to improve performance.
rformed analytical analysis for that test. Refer to the list below:
ALBERTA, CANADA

1

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

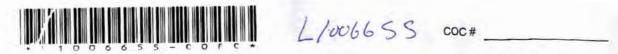
mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory. UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION. Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



Environmental

Page	of	
-		

Report To		Report F	ormat / Distribu	tion		Serv	ice Rea	ques	ted (F	Rush f	or rou	tine an	nalysi	s subje	ect to a	availab	ility)	-
Company:	Deton'Cho/Nuna Joint Venture AND Golder As. Ltd.	Standar	d 🗌 Other			_	gular (St	-	_	-	_	_	-	-				
Contact:	DCNJV: Katrina Nokleby; Golder: Justine Crowe	PDF	Exce)	🛄 Digital	Fax	O Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TA					TAT							
Address:		Email 1:	jcrowe@golder	.com		● En	nergency	(1-2 E	Bus. Da	rys) - 1	.00%	Surchar	ge - C	ontact	ALS to	Confirm	TAT	
		Email 2:	Email 2: <u>hmachtans@golder.com</u> O Same Day or Weekend Emergency -						- Contact ALS to Confirm TAT									
Phone:	867 669 6735 Fax:	Email 3:	KatrinaN@nun	alogistics.com								is Re		-				
Invoice To	Same as Report ? Yes Vo	Client / P	roject Informati	ion		Ple	ase ind	icate	belo	w Filt	ered,	Pres	erved	or be	oth (F	, P, F/	'P)	
Hardcopy of	Invoice with Report? Yes Vo	Job #:	09-1427-0006						_									
Company:	Deton'Cho/Nuna Joint Venture		: 606989													als.		
Contact:	Brenda Kalis	LSD:								- 1					s	Meta	. 1	
Address:	9838-31st Avenue., Edmonton AB, T6N 1C5	-				eters									Metals	ba		Containers
Phone:	780 408 2897 Fax: 780 408 5472	Quote #:				nete			dity							Dissolved Metals		lair
	Work Order # b use only)	ALS Contact:	Can Dang	Sampler:	Justine Crowe	al Parar	lons	0	d Turbi	ts	NN	Grease			vel Total	vel Dist		
Sample #	Sample Identification (This description will appear on the repo	rt)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Physical	Major I	Cyanide	TSS and Turbidity	Nutrients	NH3 / TKN	Oil and	TOC	DOC	Low Level	Low Le	Sulphide	Number of
	Reach 7 Overflow u/s Road		18-May-11	1.	Surface Water			T	X									1
	Reach 7 Overflow d/s Road		18-May-11		Surface Water				x							-	1	1
	Reach 6 BC Exposure Point (Above)		18-May-11		Surface Water				x								1	1
	Parch (Gamer Doi)		10.11, 11		Suddeo Water	*	X		*	×	*	~	x	*	X	×	×	-
	Upper Reach 3 (d/s of bridge)		18-May-11		Surface Water				X									1
	Upper Reach 2 (pool)		18-May-11		Surface Water				X									1
	Upper Reach 1 (u/s culvert)		18-May-11		Surface Water				X		1							1
	SNP43-5		18-May-11		Surface Water				X		E D	T.I		17 1				1
	Reach 0 (BC Mouth)		18-May-11		Surface Water				X									1
	SNP43-11		18-May-11		Surface Water	-			X	-							-	1
								-						-11	10			
			1												1			
	Special Instructions / Regulations with water	or land use (CC	ME-Freshwater	Aquatic Life/BC	CSR - Commerci	ial/AB	Tier 1	- Na	tural,	, etc)	/ Ha:	zardo	us D	etalls	-	-	-	-
Please A	nalyze As and Se by Hydride*. Note - This water might				the second se	_												
	Failure to compl									Free	1.1.1							
-	By the use of this form the user Also provided on another Excel tab are the ALS lo												mon	analy	2921			
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	SHIPMENT RELEASE (client use)	the second se	the second se	TION (lab use onl					IPME	_	-		_	-	_	ly)	To Line	-iche
Released b	y: Date (dd-mmm-yy) Time (hh-mm) Red	ceived by: RUS	Date: 18-mAy-	Time: 11 16:00	Temperature:	-	fied by	And in case of the		Date	Cardon Streeting		Time			Obse Yes / If Yes	No ?	
0-10			A . /			-		-	-	-	-	-		-	-	18.01		



GOLDER ASSOCIATES LTD ATTN: JUSTINE CROWE 9 - 4905 48 Street Yellowknife NT X1A 3S3 Date Received:18-MAY-11Report Date:25-MAY-11 15:35 (MT)Version:FINAL

Client Phone: 897-669-6735

Certificate of Analysis

Lab Work Order #:

Project P.O. #: Job Reference: Legal Site Desc: C of C Numbers: L1006658 606989 09-1427-0006

1

Shannon Luchka Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 9936-67 Avenue, Edmonton, AB T6E 0P5 Canada | Phone: +1 780 413 5227 | Fax: +1 780 437 2311 ALS CANADA LTD Part of the ALS Group A Campbell Brothers Limited Company

Environmental 🕽

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

L1006658 CONTD.... PAGE 2 of 6 25-MAY-11 15:35 (MT) Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L1006658-1 WATER 18-MAY-11 REACH 4 (GIANT POOL)		
Grouping	Analyte			
WATER				
Physical Tests	Total Suspended Solids (mg/L)	72.0		
	Total Dissolved Solids (mg/L)	123		
	Turbidity (NTU)	142		
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	<5.0		
	Alkalinity, Total (as CaCO3) (mg/L)	45.8		
	Ammonia (as N) (mg/L)	0.145		
	Bicarbonate (HCO3) (mg/L)	55.9		
	Bromide (Br) (mg/L)	<0.10		
	Carbonate (CO3) (mg/L)	<5.0		
	Chloride (CI) (mg/L)	5.34		
	Conductivity (EC) (uS/cm)	160		
	Fluoride (F) (mg/L)	<0.050		
	Hardness (as CaCO3) (mg/L)	64.9		
	Hydroxide (OH) (mg/L)	<5.0		
	Ion Balance (%)	97.4		
	Nitrate and Nitrite (as N) (mg/L)	0.0503		
	Nitrate (as N) (mg/L)	0.0475		
	Nitrite (as N) (mg/L)	0.0028		
	Total Kjeldahl Nitrogen (mg/L)	1.03		
	рН (рН)	7.89		
	Phosphorus (P)-Total Dissolved (mg/L)	0.0080		
	Phosphorus (P)-Total (mg/L)	0.0995		
	TDS (Calculated) (mg/L)	84.2		
	Sulfate (SO4) (mg/L)	22.9		
	Sulphide (mg/L)	0.0027		
Cyanides	Cyanide, Total (mg/L)	0.0080		
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	11.8		
	Total Organic Carbon (mg/L)	12.5		
Total Metals	Aluminum (Al)-Total (mg/L)	2.21		
	Antimony (Sb)-Total (mg/L)	0.124		
	Arsenic (As)-Total (mg/L)	0.346		
	Barium (Ba)-Total (mg/L)	0.0177		
	Beryllium (Be)-Total (mg/L)	<0.0010		
	Bismuth (Bi)-Total (mg/L)	<0.00020		
	Boron (B)-Total (mg/L)	<0.020		
	Cadmium (Cd)-Total (mg/L)	0.00052		

L1006658 CONTD.... PAGE 3 of 6 25-MAY-11 15:35 (MT) Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L1006658-1 WATER 18-MAY-11 REACH 4 (GIANT POOL)		
Grouping	Analyte			
WATER				
Total Metals	Calcium (Ca)-Total (mg/L)	22.0		
	Chromium (Cr)-Total (mg/L)	0.00524		
	Cobalt (Co)-Total (mg/L)	0.00318		
	Copper (Cu)-Total (mg/L)	0.0342		
	Iron (Fe)-Total (mg/L)	4.17		
	Lead (Pb)-Total (mg/L)	0.0660		
	Magnesium (Mg)-Total (mg/L)	6.22		
	Manganese (Mn)-Total (mg/L)	0.447		
	Mercury (Hg)-Total (mg/L)	0.000030		
	Molybdenum (Mo)-Total (mg/L)	0.00111		
	Nickel (Ni)-Total (mg/L)	0.00969		
	Potassium (K)-Total (mg/L)	1.89		
	Selenium (Se)-Total (mg/L)	<0.00040		
	Silver (Ag)-Total (mg/L)	<0.00040		
	Sodium (Na)-Total (mg/L)	4.0		
	Strontium (Sr)-Total (mg/L)	0.0624		
	Thallium (TI)-Total (mg/L)	<0.00010		
	Tin (Sn)-Total (mg/L)	<0.00040		
	Titanium (Ti)-Total (mg/L)	0.0430		
	Uranium (U)-Total (mg/L)	0.00048		
	Vanadium (V)-Total (mg/L)	0.00583		
	Zinc (Zn)-Total (mg/L)	0.0936		
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	0.014		
	Antimony (Sb)-Dissolved (mg/L)	0.0233		
	Arsenic (As)-Dissolved (mg/L)	0.0707		
	Barium (Ba)-Dissolved (mg/L)	0.00526		
	Beryllium (Be)-Dissolved (mg/L)	<0.00050		
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050		
	Boron (B)-Dissolved (mg/L)	0.0131		
	Cadmium (Cd)-Dissolved (mg/L)	0.00015		
	Calcium (Ca)-Dissolved (mg/L)	18.6		
	Chromium (Cr)-Dissolved (mg/L)	<0.00040		
	Cobalt (Co)-Dissolved (mg/L)	0.00109		
	Copper (Cu)-Dissolved (mg/L)	0.00929		
	Iron (Fe)-Dissolved (mg/L)	0.045		
	Lead (Pb)-Dissolved (mg/L)	0.00092		
	Magnesium (Mg)-Dissolved (mg/L)	4.48		

L1006658 CONTD.... PAGE 4 of 6 25-MAY-11 15:35 (MT) Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L1006658-1 WATER 18-MAY-11 REACH 4 (GIANT POOL)		
Grouping	Analyte			
WATER				
Dissolved Metals	Manganese (Mn)-Dissolved (mg/L)	0.344		
	Mercury (Hg)-Dissolved (mg/L)	<0.000020		
	Molybdenum (Mo)-Dissolved (mg/L)	0.00098		
	Nickel (Ni)-Dissolved (mg/L)	0.00318		
	Potassium (K)-Dissolved (mg/L)	1.50		
	Selenium (Se)-Dissolved (mg/L)	<0.00040		
	Silver (Ag)-Dissolved (mg/L)	<0.00020		
	Sodium (Na)-Dissolved (mg/L)	3.7		
	Strontium (Sr)-Dissolved (mg/L)	0.0541		
	Thallium (TI)-Dissolved (mg/L)	<0.000050		
	Tin (Sn)-Dissolved (mg/L)	<0.00020		
	Titanium (Ti)-Dissolved (mg/L)	0.00045		
	Uranium (U)-Dissolved (mg/L)	0.00040		
	Vanadium (V)-Dissolved (mg/L)	0.00021		
	Zinc (Zn)-Dissolved (mg/L)	0.0150		
Aggregate Organics	Oil and Grease (mg/L)	<1.0		

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLM	Detection Limit Adjusted For Sample Matrix Effects
E	Matrix Spike recovery outside ALS DQO due to analyte background in sample.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACIDITY-ED	Water	Acidity (as CaCO3)	APHA 2310 B - Potentiometric Titration
BR-IC-ED	Water	Bromide by IC	APHA 4110 B-ION CHROMATOGRAPHY
C-DIS-ORG-ED	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental
C-TOT-ORG-ED	Water	Total Organic Carbon	APHA 5310 B-Instrumental
CL-IC-ED	Water	Chloride by IC	APHA 4110 B-ION CHROMATOGRAPHY
CN-TOT-YL	Water	Cyanide, Total	APHA 4500 CN-O

Total Cyanide in Water: Simple cyanides are converted to hydrogen cyanide (HCN) by distillation. Complex cyanides are not easily decomposed. Low power UV radiation is used to break down organic, metallic and alkali complexed compounds to free cyanide. The dislillation step isolates HCN from simple cyanides under specific acidic conditions. The liberated HCN is converted to cyanogen chloride with chloramine-T. This further reacts with barbituric acid and isonicotinic acid to form a highly coloured complex.

HG-D-L-CVAA-ED Water Mercury (Hg) - Dissolved EPA 245.7 / EPA 245.1
HG-T-L-CVAA-ED Water Mercury (Hg) EPA 245.7 / EPA 245.1
IONBALANCE-ED Water Ion Balance Calculation APHA 1030E
MET-D-L-ICP-ED Water Diss. Metals in Water by ICPOES (Low) APHA 3120 B-ICP-OES
MET-D-L-MS-ED Water Diss. Metals in Water by ICPMS (Low) SW 846 - 6020-ICPMS
MET-T-L-ICP-ED Water Total Metals in Water by ICPOES (Low) APHA 3120 B-ICP-OES
MET-T-L-MS-ED Water Total Metals in Water by ICPMS (Low) SW 846 - 6020-ICPMS
NH3-L-CFA-ED Water Ammonia in Water by Colour APHA 4500 NH3-NITROGEN (AMMONIA)

This analysis is carried out using procedures adapted from APHA Method 4500 NH3 "NITROGEN (AMMONIA)". Ammonia is determined using the automated phenate colourimetric method.

NO2+NO3-L-CFA-EDWaterNitrite & Nitrate in Water by ColourAPHA 4500 NO3-F

Nitrate in Water (Calculation)

This analysis is carried out using procedures adapted from APHA Method 4500 NO3-F "Automated Cadmium Reduction Method".

NO2-L-CFA-ED Water Nitrite in Water by Colour

This analysis is carried out using procedures adapted from APHA Method 4500 NO3-F "Automated Cadmium Reduction Method", omitting the Cu-Cd reduction step to be selective for nitrite.

Nitrate (as N) is a calculated parameter. Nitrate (as N)

Water

= [Nitrate and Nitrite (as N)] - Nitrite (as N).

OGG-ED	Water	Oil and Grease-Gravimetric	APHA 5520 G HEXANE MTBE EXT. GRAVIME
P-T-L-COL-ED	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS
This analysis is carried ou after persulphate digestion	01	dures adapted from APHA Method 4500-P "Phosphorus le.	s". Total Phosphorous is determined colourimetrically
P-TD-L-COL-ED	Water	Total Dissolved P in Water by Colour	APHA 4500-P PHOSPHORUS
		dures adapted from APHA Method 4500-P "Phosphorus stion of a sample that has been lab or field filtered throu	
PH/EC/ALK-ED	Water	pH, Conductivity and Total Alkalinity	APHA 4500-H, 2510, 2320
SO4-L-IC-ED	Water	Sulfate by IC (Low Level)	APHA 4110 B-ION CHROMATOGRAPHY
SOLIDS-TDS-ED	Water	Total Dissolved Solids	APHA 2540 C
SOLIDS-TOTSUS-ED	Water	Total Suspended Solids	APHA 2540 D-Gravimetric
SULPHIDE-ED	Water	Sulphide	APHA 4500 -S E-Auto-Colorimetry
TKN-L-CFA-ED	Water	TKN in Water by Colour	APHA 4500-NORG (TKN)
This analysis is carried or	t using proce	dures adapted from APHA Method 4500-Norg "Nitroger	(Organic)" Total Kieldahl Nitrogen is determined by

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 celcius with analysis using an automated colourimetric finish.

TURBIDITY-ED

APHA 4500 NO2-A and NO3-F

APHA 4500 NO3-F

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
YL	ALS ENVIRONMENTAL - YELLOWKNIFE, NW, CANADA

Chain of Custody Numbers:

1

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory. UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION. Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.





L/00665 Page _____

(lab use only) Contact: Contac	Sulphide Number of Containers
Address: Email 1: jcrowe@@golder.com @ Emergency (1-2 Bus. Days) 100% Surcharge Contact ALS to Confirm TAT Phone: 867 669 6735 Fax: Email 3: Marchins@@golder.com Same Day or Weekend Emergency - Contact ALS to Confirm TAT Phone: 867 669 6735 Fax: Email 3: Katrins@@nunelogistics.com Please indicate below Filtered, Preserved or both (F, F Invoice To Same Bax Report ? Yes No Client / Project Information Please indicate below Filtered, Preserved or both (F, F Hardcopy of Invoice with Report? Yes No Job #: 09-1427-0006 Please indicate below Filtered, Preserved or both (F, F Company: Deton'Chol/Nuna Joint Vanture PO / AFE: 606989 Vistore	Sulphide Number of Containers
Email 2: hmachtans@golder.com O Same Day or Weekend Emergercy - Contact AI S to Confirm TAT Phone: 867 669 6735 Fax: Email 3: KatrinaN@nunalogistics.com Please indicate below Filtered, Preserved or both (F, F Invoice To Same as Report ? Yes No Client / Project Information Please indicate below Filtered, Preserved or both (F, F Hardcoop of Invoice with Report ? Yes No Job #: 09-1427-0006 Please indicate below Filtered, Preserved or both (F, F Company: Defor/Ch/Nuna Joint Venture PO / AFE: 6069899 Image: Contact: Brenda Kalis LSD: Image: Contact: Sampler Justime Crowe Image: Contact: Sample / Sample / Sample Identification Sample / Sample Identification Sample / Sample Identification Image: Contact: Can Dang / Contact: Sample / Sample / Sample / Sample Identification Sample / Sample / Sudaw / Sample	Sulphide (d/1 /
Email 2: Imachtans@golder.com O Same Day or Weekend Emergency - Contact ALS to Confirm TAT Phone: 867 669 6735 Fax: Email 3: KathinaN@nunalogistics.com Please indicate below Filtered. Preserved or both (F, F Invoice To Same Bay or Weekend Emergency - Contact ALS to Confirm TAT Please indicate below Filtered. Preserved or both (F, F Hardcopy of Invoice with Report? Yes No Op/14FE: 606989 Please indicate below Filtered. Preserved or both (F, F Company: Detor/ChONuna Joint Venture PO / AFE: 606989 Image: Contact: Brenda Kalis LSD: Address: 9838-31st Avenue., Edmonton AB, T6N 1C5 LSD: Image: Contact: Sampler Justine Crowe Suffice Crowe Suf	Sulphide Sulphide Normans
Invoice To Same as Report? Yes No Client / Project Information Please indicate below Filtered. Preserved or both (F, F Hardcopy of Invoice with Report? Yes No Job #: 09-1427-0006 Image: 100 - 1	Sulphide Sulphide Normans
Hardcopy of Invoice with Report? res No Job #: 09-1427-0006 Company: Deton'Chol/Nuna Joint Venture PO / AFE: 606989 Contact: Brenda Kalis LSD: Address: 9838-31st Avenue, Edmonton AB, T6N 1C5	Sulphide Sulphide Normans
Company: Deton'Chol/Nuna Joint Venture PO / AFE: 606989 Contact: Brenda Kalis LSD: Address: 9838-31st Avenue, Edmonton AB, T6N 1C5 Phone: 780 408 2897 Fax: 780 408 5472 Quote #: ALS Lab Work Order # ALS (lab use only) Sample Sample Sample Identification (This description will appear on the report) Date (dd-mmm-yy) (th:mm) Bender 3OD Sposule Tome(Max) 18-May-11 Reach 4 (Giant Pool) 18-May-11 Upper Bool 2 (real) 70 May 11 Surface Water X	Sulphide Number of
Contact: Brenda Kalis LSD: Address: 9838-31st Avenue., Edmonton AB, T6N 1C5	Sulphide Number of
(lab use only)Contact:	Sulphide Number of
(lab use only)Contact:	Sulphide Number of
(lab use only)Contact:	Sulphide Number of
(lab use only)Contact:	Sulphide Number of
Book 2 Confirmed Front 18-May-11 2 Control Vision X <td< td=""><td></td></td<>	
Best 2 Control of Load 18-Mav-11 Surface Water Y V<	X 9
Becard Boot (March 1) 49 May 11 Surface Water X </td <td>X 9</td>	X 9
Best or BO Exposure Form (Muse) 49 May 11 Surface Water V	X 9
Reach 4 (Giant Pool) 18-May-11 Surface Water X <td>X 9</td>	X 9
Lipper Deach 2 (#6 67 bridge) -10 Midy 11 -2 6 free Water -12 Uleger Deach 2 (gool) -10 Midy 11 -2 6 free Water -12	
Upper Derech 2 (nogl)	
Upper Dereb 2 (peal) 19 May 11 Sundor Mider Yes Herri Russin r (uis curvent) 18 May 11 Surface Water Xes	<u> </u>
Negen Rought I (uis cuivert)	/
	1
OVD WO CONTRACT Y	
	+-+-
	┽╼╂╾
Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details	
Please Analyze As and Se by Hydride*. Note - This water might contain high amounts of metals. All Samples are RUSH / EMERGENCY!!!!!	
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.	
By the use of this form the user acknowledges and agrees with the Terras and Conditions as provided on a separate Excel tab.	
Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.	
SHIPMENT RELEASE (client use) SHIPMENT RECEPTION (lab use only) SHIPMENT VERIFICATION (lab use only)	
Y Aland USA Republic Product Research	oservations: es / No ? Yes add SIF
$\frac{1}{100000} + \frac{1}{1000000} + \frac{1}{10000000} + \frac{1}{10000000000000000000000000000000000$	



Golder Associates Ltd. ATTN: Justine Crowe 9 - 4905 48 Street Yellowknife NT X1A 3S3 Date Received:20-MAY-11Report Date:21-MAY-11 14:17 (MT)Version:FINAL

Client Phone: 867-873-6319

Certificate of Analysis

Lab Work Order #:

Project P.O. #: Job Reference: Legal Site Desc: C of C Numbers: L1007648 606989 09-1427-0006

Shannon Luchka Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 9936-67 Avenue, Edmonton, AB T6E 0P5 Canada | Phone: +1 780 413 5227 | Fax: +1 780 437 2311 ALS CANADA LTD Part of the ALS Group A Campbell Brothers Limited Company

Environmental 🕽

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

L1007648 CONTD.... PAGE 2 of 3 21-MAY-11 14:17 (MT) Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L1007648-1 SURFACE WATE 19-MAY-11 11:05 REACH 2 (POOL)	L1007648-2 SURFACE WATE 19-MAY-11 10:40 REACH 4 (GIANT POOL)	L1007648-3 SURFACE WATE 19-MAY-11 10:25 REACH 6 BC EXPOSURE POINT (ABOVE)	L1007648-4 SURFACE WATE 19-MAY-11 11:40 REACH 0 (BC MOUTH)	
Grouping	Analyte					
WATER						
Physical Tests	Total Suspended Solids (mg/L)	36.0	29.0	460	55.0	
	Turbidity (NTU)	63.8	53.0	468	67.9	

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
SOLIDS-TOTSUS-ED	Water	Total Suspended Solids	APHA 2540 D-Gravimetric
URBIDITY-ED	Water	Turbidity	APHA 2130 B-Nephelometer
,	ove test cod	ifications from specified reference method e(s) indicate the laboratory that performed a	s to improve performance. analytical analysis for that test. Refer to the list below:
ED		NVIRONMENTAL - EDMONTON, ALBER	FA, CANADA
Chain of Custody Numbers:			
	EDMS		

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS

Chain of Custody / Ana Canada Toll Free: <u>www.alsgl</u>



Page _1_of _1__

COC #

Report To		Report Fo	rmat / Distribut	tion	~ r o 4	0~	сc		C *		for ro	uline a	nalysi	is subj	ect to a	availat	pility)	
Company:	Deton'Cho/Nuna Joint Venture AND Golder As. Ltd.	Standard	Other		-		gular (S	stanua	tu iun				-					
Contact:	DCNJV: Katrina Nokleby; Golder: Justine Crowe	PDF	Excel	Digital	Fax		iority (2								LS to C	Confirm	TAT	
Address:		Email 1:	jcrowe@golder.	.com		🖲 En	nergeno	:y (1-2	Bus, D	ays) -	100%	Surcha	rge - C	ontact	ALS to	Confirm	n TAT	
		Email 2:	hmachtans@gc	older.com		🔾 Sa	O Same Day or Weekend Emergency - Contact ALS to Confirm TAT											
Phone:	867 669 6735 Fax:	Email 3:	KatrinaN@nuna	alogistics.com						A	nalys	sis Re	ques	st				
Invoice To	Same as Report ? 🗌 Yes 🔽 No	Client / Pr	oject Informati	on		Ple	ase in	dicat	e belo	ow Fil	tered	, Pres	erve	d or b	oth (F.	, P, F/	(P)	
Hardcopy of I	nvoice with Report? Yes No		09-1427-0006															
Company:	Deton'Cho/Nuna Joint Venture	PO / AFE:	606989													Ś		
Contact:	Brenda Kalis	LSD:														leta		
Address:	9838-31st Avenue., Edmonton AB, T6N 1C5					5									etale	≥ p		ers
Phone:	780 408 2897 Fax: 780 408 5472	Quote #:	_			nete			dit						Σ	- Second		tain
	vork Order # Duse only) LIGU7648	ALS Contact:	Can Dang	Sampler:	Justine Crowe	al Parameters	suo	e	and Turbidity	ots	TKN	Grease			Low Level Total Metais	Level Dissolved Metals	e	Number of Containers
Sample #	Sample Identification (This description will appear on the report)		Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Physical	Major lons	Cyanide	TSS at	Nutrients	NH3 / TKN	Oil and	T0C	DOC	Low Le	Low Le	Sulphide	Numbe
·	Reach 2 (Pool)		19-May-11	11:05	Surface Water	· · · · ·			х				-					1
	Reach 4 (Giant Pr	208)	19-May-11	10:40	Surface Water		-		x									1
	Reach 6 BC Exposure Point (Above)		19-May-11	10:25	Surface Water				x									1
	Reach 0 (BC Mouth)		19-May-11	(1:4D	Surface Water				х					-		-+		1
	таранананананананананананананананананана							_									-†	
											-						+	
									-									-
				<u> </u>	<u> </u>		-+									\rightarrow		
			<u> - </u>															
:																		
																	-+	
							†	_									-+	-
	Special Instructions / Regulations with water or land	d use (CCN	IE-Freshwater A	Aquatic Life/BC	CSR - Commerci	al/AB	 Tier 1	! I - Na	itural.	, etc)	/ Haz	ardo	us De	tails				_
				- <u> </u>														\neg
Please An	alyze As and Se by Hydride*. Note - This water might contain								_									
	Failure to complete all																	
	By the bod of the ^{Barra} Discussion again																	
	Also provided on another Excel tab are the ALS location SHIPMENT RELEASE (client use)		s, phone number MENT RECEPT			rvatio	n / nc							-				
Released by			Date:	Time:	y) Temperature:	Verif	ied by		‼PM≝ ∣	Date			ION (I Time				vatio-	
AULIA	Jun Jer May-11 K:05 Received		19-may-1,	3pm	B3.°C	veill			Í			ĺ	inte		Y)bserv 'es / N 'Yes /	No ?	
USA	<u> </u>			7								L			ENF 1			



DETON'CHO \ NUNA JOINT VENTURE ATTN: KATRINA NOKLEBY AND GOLDER GIANT MINESITE PO BOX 2951 Yellowknife NT X1A 2R2 Date Received:20-MAY-11Report Date:26-MAY-11 18:24 (MT)Version:FINAL

Client Phone: 604-253-4188

Certificate of Analysis

Lab Work Order #:

Project P.O. #: Job Reference: Legal Site Desc: C of C Numbers: L1007649 606989 09-1427-0006

1

Comments:

Can Dang Senior Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700 ALS CANADA LTD Part of the ALS Group A Campbell Brothers Limited Company

Environmental 🕽

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

L1007649 CONTD.... PAGE 2 of 10 26-MAY-11 18:24 (MT) Version: FINAL

	Sample ID Description	L1007649-1 WATER	L1007649-2	L1007649-3	L1007649-4	L1007649-5
	Sampled Date Sampled Time	20-MAY-11	20-MAY-11	20-MAY-11	20-MAY-11	20-MAY-11
	Client ID	SNP 43-5	FIELD BLANK	TRAVEL BLANK	REACH 0 (BC MOUTH)	REACH 4 (GIAN POOL)
Grouping	Analyte					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	74.0	0.57	<0.50		
-	Total Suspended Solids (mg/L)	41.1	<1.0	<1.0	53.2	26.8
	Total Dissolved Solids (mg/L)	125	<3.0	<3.0	00.2	20.0
	Turbidity (NTU)	47.1	0.34	0.27	48.4	30.3
Anions and Nutrients	Acidity (as CaCO3) (mg/L)	3.2	1.8	2.9	-10.1	00.0
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	45.6	1.1	<1.0		
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0		
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0		
	Alkalinity, Total (as CaCO3) (mg/L)	45.6	1.1	<1.0		
	Ammonia (as N) (mg/L)	0.0922	<0.0050	<0.0050		
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050		
	Chloride (Cl) (mg/L)	8.80	<0.50	<0.50		
	Fluoride (F) (mg/L)	0.074	<0.020	<0.020		
	Nitrate and Nitrite (as N) (mg/L)	0.0458	<0.0051	<0.0051		
	Nitrate (as N) (mg/L)	0.0458	<0.0050	<0.0050		
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010		
	Total Kjeldahl Nitrogen (mg/L)	0.852	<0.050	<0.050		
	Phosphorus (P)-Total Dissolved (mg/L)	0.0083	<0.0020	<0.0020		
	Phosphorus (P)-Total (mg/L)	0.0677	<0.0020	<0.0020		
	Sulfate (SO4) (mg/L)	28.7	<0.50	<0.50		
	Sulphide as S (mg/L)	<0.020	<0.020	<0.020		
Cyanides	Cyanide, Total (mg/L)	0.0059	<0.0050	<0.0050		
	Dissolved Organic Carbon (mg/L)	11.0	<0.50	<0.50		
Carbon	Total Organic Carbon (mg/L)	12.2	0.59	0.60 RRV		
Total Metals	Aluminum (Al)-Total (mg/L)	1.37	<0.0030	<0.0030		
	Antimony (Sb)-Total (mg/L)	0.0554	<0.00010	<0.00010		
	Arsenic (As)-Total (mg/L)	0.180	<0.00010	<0.00010		
	Barium (Ba)-Total (mg/L)	0.021	<0.010	<0.010		
	Beryllium (Be)-Total (mg/L)	<0.0050	<0.0050	<0.0050		
	Bismuth (Bi)-Total (mg/L)	<0.20	<0.20	<0.20		
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10		
	Cadmium (Cd)-Total (mg/L)	0.000167	<0.000050	<0.000050		
	Calcium (Ca)-Total (mg/L)	21.9	<0.050	<0.050		
	Chromium (Cr)-Total (mg/L)	<0.010	<0.010	<0.010		
	Cobalt (Co)-Total (mg/L)	<0.010	<0.010	<0.010		
	Copper (Cu)-Total (mg/L)	0.0181	<0.00050	<0.00050		

L1007649 CONTD.... PAGE 3 of 10 26-MAY-11 18:24 (MT) Version: FINAL

	Sample ID	L1007649-6	L1007649-7		
	Description	20-MAY-11	20-MAY-11		
	Sampled Date Sampled Time				
	Client ID	REACH 2 (POOL)	REACH 6 EXPOSURE POINT (ABOVE)		
Grouping	Analyte				
WATER					
Physical Tests	Hardness (as CaCO3) (mg/L)				
	Total Suspended Solids (mg/L)	43.6	517		
	Total Dissolved Solids (mg/L)				
	Turbidity (NTU)	44.2	349		
Anions and Nutrients	Acidity (as CaCO3) (mg/L)				
	Alkalinity, Bicarbonate (as CaCO3) (mg/L)				
	Alkalinity, Carbonate (as CaCO3) (mg/L)				
	Alkalinity, Hydroxide (as CaCO3) (mg/L)				
	Alkalinity, Total (as CaCO3) (mg/L)				
	Ammonia (as N) (mg/L)				
	Bromide (Br) (mg/L)				
	Chloride (Cl) (mg/L)				
	Fluoride (F) (mg/L)				
	Nitrate and Nitrite (as N) (mg/L)				
	Nitrate (as N) (mg/L)				
	Nitrite (as N) (mg/L)				
	Total Kjeldahl Nitrogen (mg/L)				
	Phosphorus (P)-Total Dissolved (mg/L)				
	Phosphorus (P)-Total (mg/L)				
	Sulfate (SO4) (mg/L)				
	Sulphide as S (mg/L)				
Cyanides	Cyanide, Total (mg/L)				
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)				
	Total Organic Carbon (mg/L)				
Total Metals	Aluminum (Al)-Total (mg/L)				
	Antimony (Sb)-Total (mg/L)				
	Arsenic (As)-Total (mg/L)				
	Barium (Ba)-Total (mg/L)				
	Beryllium (Be)-Total (mg/L)				
	Bismuth (Bi)-Total (mg/L)				
	Boron (B)-Total (mg/L)				
	Cadmium (Cd)-Total (mg/L)				
	Calcium (Ca)-Total (mg/L)				
	Chromium (Cr)-Total (mg/L)				
	Cobalt (Co)-Total (mg/L)				
	Copper (Cu)-Total (mg/L)				

L1007649 CONTD.... PAGE 4 of 10 26-MAY-11 18:24 (MT) Version: FINAL

	Sample ID Description	L1007649-1 WATER	L1007649-2	L1007649-3	L1007649-4	L1007649-5
	Sampled Date Sampled Time	20-MAY-11	20-MAY-11	20-MAY-11	20-MAY-11	20-MAY-11
	Client ID	SNP 43-5	FIELD BLANK	TRAVEL BLANK	REACH 0 (BC MOUTH)	REACH 4 (GIAN POOL)
Grouping	Analyte					
WATER						
Total Metals	Iron (Fe)-Total (mg/L)	2.10	<0.010	<0.010		
	Lead (Pb)-Total (mg/L)	0.0206	<0.000050	<0.000050		
	Lithium (Li)-Total (mg/L)	<0.010	<0.010	<0.010		
	Magnesium (Mg)-Total (mg/L)	6.04	<0.10	<0.10		
	Manganese (Mn)-Total (mg/L)	0.335	<0.0050	<0.0050		
	Mercury (Hg)-Total (mg/L)	0.000011	<0.000010	<0.000010		
	Molybdenum (Mo)-Total (mg/L)	0.000932	<0.000050	<0.000050		
	Nickel (Ni)-Total (mg/L)	0.000332	<0.00050	<0.00050		
	Phosphorus (P)-Total (mg/L)	<0.30	<0.30	<0.30		
	Potassium (K)-Total (mg/L)	<2.0	<2.0	<2.0		
	Selenium (Se)-Total (mg/L)	0.00010	<0.00010	<0.00010		
	Silicon (Si)-Total (mg/L)	2.73	<0.050	< 0.050		
	Silver (Ag)-Total (mg/L)	<0.010	<0.010	<0.030		
	Sodium (Na)-Total (mg/L)	5.5	<2.0	<2.0		
	Strontium (Sr)-Total (mg/L)	0.0784	<0.0050	<0.0050		
	Thallium (TI)-Total (mg/L)	<0.20	<0.20	<0.20		
	Tin (Sn)-Total (mg/L)	<0.030	<0.20	<0.030		
	Titanium (Ti)-Total (mg/L)	0.037	<0.030	<0.030		
	Uranium (U)-Total (mg/L)	0.000597	<0.00010	<0.00010		
	Vanadium (V)-Total (mg/L)	<0.030	<0.030	<0.030		
	Zinc (Zn)-Total (mg/L)	0.0379	<0.0040	<0.0040		
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	0.0116	<0.0040	<0.0040		
	Antimony (Sb)-Dissolved (mg/L)	0.0228	<0.00010	<0.00010		
	Arsenic (As)-Dissolved (mg/L)	0.0228	<0.00010	<0.00010		
	Barium (Ba)-Dissolved (mg/L)	0.010	<0.010	<0.010		
	Beryllium (Be)-Dissolved (mg/L)	<0.0050	<0.0050	<0.0050		
	Bismuth (Bi)-Dissolved (mg/L)	<0.20	<0.20	<0.20		
	Boron (B)-Dissolved (mg/L)	<0.20	<0.20	<0.20		
	Cadmium (Cd)-Dissolved (mg/L)	0.000081	<0.000050	<0.000050		
	Calcium (Ca)-Dissolved (mg/L)	21.0	0.229	<0.050		
	Chromium (Cr)-Dissolved (mg/L)	<0.010	<0.010	<0.050		
	Cobalt (Co)-Dissolved (mg/L)	<0.010	<0.010	<0.010		
	Copper (Cu)-Dissolved (mg/L)	0.00722	<0.00050	<0.00050		
	Iron (Fe)-Dissolved (mg/L)	0.059	<0.00050	<0.00050		
	Lead (Pb)-Dissolved (mg/L)	0.009	<0.00050	<0.00050		
	Lithium (Li)-Dissolved (mg/L)	<0.000741	<0.000050	<0.00050		
	Magnesium (Mg)-Dissolved (mg/L)	<0.010 5.23	<0.010	<0.010		

L1007649 CONTD.... PAGE 5 of 10 26-MAY-11 18:24 (MT) Version: FINAL

	Sample ID Description Sampled Date Sampled Time	L1007649-6 20-MAY-11	L1007649-7 20-MAY-11		
	Client ID	REACH 2 (POOL)	REACH 6 EXPOSURE POINT (ABOVE)		
Grouping	Analyte				
WATER					
Total Metals	Iron (Fe)-Total (mg/L)				
	Lead (Pb)-Total (mg/L)				
	Lithium (Li)-Total (mg/L)				
	Magnesium (Mg)-Total (mg/L)				
	Manganese (Mn)-Total (mg/L)				
	Mercury (Hg)-Total (mg/L)				
	Molybdenum (Mo)-Total (mg/L)				
	Nickel (Ni)-Total (mg/L)				
	Phosphorus (P)-Total (mg/L)				
	Potassium (K)-Total (mg/L)				
	Selenium (Se)-Total (mg/L)				
	Silicon (Si)-Total (mg/L)				
	Silver (Ag)-Total (mg/L)				
	Sodium (Na)-Total (mg/L)				
	Strontium (Sr)-Total (mg/L)				
	Thallium (Tl)-Total (mg/L)				
	Tin (Sn)-Total (mg/L)				
	Titanium (Ti)-Total (mg/L)				
	Uranium (U)-Total (mg/L)				
	Vanadium (V)-Total (mg/L)				
	Zinc (Zn)-Total (mg/L)				
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)				
	Antimony (Sb)-Dissolved (mg/L)				
	Arsenic (As)-Dissolved (mg/L)				
	Barium (Ba)-Dissolved (mg/L)				
	Beryllium (Be)-Dissolved (mg/L)				
	Bismuth (Bi)-Dissolved (mg/L)				
	Boron (B)-Dissolved (mg/L)				
	Cadmium (Cd)-Dissolved (mg/L)				
	Calcium (Ca)-Dissolved (mg/L)				
	Chromium (Cr)-Dissolved (mg/L)				
	Cobalt (Co)-Dissolved (mg/L)				
	Copper (Cu)-Dissolved (mg/L)				
	Iron (Fe)-Dissolved (mg/L)				
	Lead (Pb)-Dissolved (mg/L)				
	Lithium (Li)-Dissolved (mg/L)				
	Magnesium (Mg)-Dissolved (mg/L)				

L1007649 CONTD.... PAGE 6 of 10 26-MAY-11 18:24 (MT) Version: FINAL

			1	1	1	1
	Sample ID	L1007649-1	L1007649-2	L1007649-3	L1007649-4	L1007649-5
	Description Sampled Date Somelad Time	WATER 20-MAY-11	20-MAY-11	20-MAY-11	20-MAY-11	20-MAY-11
	Sampled Time Client ID	SNP 43-5	FIELD BLANK	TRAVEL BLANK	REACH 0 (BC MOUTH)	REACH 4 (GIAI POOL)
Grouping	Analyte					
WATER						
Dissolved Metals	Manganese (Mn)-Dissolved (mg/L)	0.300	<0.0050	<0.0050		
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010		
	Molybdenum (Mo)-Dissolved (mg/L)	0.000865	<0.000050	<0.000050		
	Nickel (Ni)-Dissolved (mg/L)	0.00341	<0.00050	<0.00050		
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30		
	Potassium (K)-Dissolved (mg/L)	<2.0	<2.0	<2.0		
	Selenium (Se)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		
	Silicon (Si)-Dissolved (mg/L)	0.550	<0.050	<0.050		
	Silver (Ag)-Dissolved (mg/L)	<0.010	<0.050	<0.050		
	Sodium (Na)-Dissolved (mg/L)	<0.010 5.2	<0.010	<0.010		
	Strontium (Sr)-Dissolved (mg/L)	0.0736	<0.0050	<0.0050		
	Thallium (TI)-Dissolved (mg/L)	<0.20	<0.0050	<0.0050		
	Tin (Sn)-Dissolved (mg/L)					
	Titanium (Ti)-Dissolved (mg/L)	<0.030	<0.030	<0.030		
	Uranium (U)-Dissolved (mg/L)	<0.010	<0.010	<0.010		
	Vanadium (V)-Dissolved (mg/L)	0.000530	<0.000010	<0.000010		
	Zinc (Zn)-Dissolved (mg/L)	<0.030	<0.030	<0.030		
		0.0088	<0.0040	<0.0040		

L1007649 CONTD.... PAGE 7 of 10 26-MAY-11 18:24 (MT) Version: FINAL

	0-m-1- ID	L1007649-6	L1007649-7		
	Sample ID Description	L100/049-0			
	Sampled Date Sampled Time	20-MAY-11	20-MAY-11		
	Client ID	REACH 2 (POOL)	REACH 6 EXPOSURE POINT		
Grouping	Analyte		(ABOVE)		
WATER					
Dissolved Metals	Manganese (Mn)-Dissolved (mg/L)				
	Mercury (Hg)-Dissolved (mg/L)				
	Molybdenum (Mo)-Dissolved (mg/L)				
	Nickel (Ni)-Dissolved (mg/L)				
	Phosphorus (P)-Dissolved (mg/L)				
	Potassium (K)-Dissolved (mg/L)				
	Selenium (Se)-Dissolved (mg/L)				
	Silicon (Si)-Dissolved (mg/L)				
	Silver (Ag)-Dissolved (mg/L)				
	Sodium (Na)-Dissolved (mg/L)				
	Strontium (Sr)-Dissolved (mg/L)				
	Thallium (TI)-Dissolved (mg/L)				
	Tin (Sn)-Dissolved (mg/L)				
	Titanium (Ti)-Dissolved (mg/L)				
	Uranium (U)-Dissolved (mg/L)				
	Vanadium (V)-Dissolved (mg/L)				
	Zinc (Zn)-Dissolved (mg/L)				

Qualifiers for Individual Parameters Listed:

Qualifier	Description		
RRV	Reported Result Verifie	ed By Repeat Analysis	
est Method R	eferences:		
ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 "Acidity"
This analysis is endpoint.	carried out using proced	ures adapted from APHA Method 2310 "Ad	cidity". Acidity is determined by potentiometric titration to a specified
CY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity
This analysis is endpoint.	carried out using proced	ures adapted from APHA Method 2310 "Ad	cidity". Acidity is determined by potentiometric titration to a specified
LK-PCT-VA	Water	Alkalinity by Auto. Titration	APHA 2320 "Alkalinity"
			kalinity". Total alkalinity is determined by potentiometric titration to a pH henolphthalein alkalinity and total alkalinity values.
LK-PCT-VA	Water	Alkalinity by Auto. Titration	APHA 2320 Alkalinity
			kalinity". Total alkalinity is determined by potentiometric titration to a pH henolphthalein alkalinity and total alkalinity values.
NIONS-BR-IC-	VA Water	Bromide by Ion Chromatography	APHA 4110 B.
This analysis is and EPA Metho	carried out using proced od 300.0 "Determination of	ures adapted from APHA Method 4110 B. of Inorganic Anions by Ion Chromatography	"Ion Chromatography with Chemical Suppression of Eluent Conductivity /".
NIONS-CL-IC-	VA Water	Chloride by Ion Chromatography	APHA 4110 B.
This analysis is and EPA Metho	carried out using proced od 300.0 "Determination of	ures adapted from APHA Method 4110 B. of Inorganic Anions by Ion Chromatography	"Ion Chromatography with Chemical Suppression of Eluent Conductivity /".
NIONS-F-IC-V	A Water	Fluoride by Ion Chromatography	APHA 4110 B.
		ures adapted from APHA Method 4110 B. of Inorganic Anions by Ion Chromatography	"Ion Chromatography with Chemical Suppression of Eluent Conductivity /".
NIONS-N+N-C	ALC-VA Water	Nitrite & Nitrate in Water (Calculation)	EPA 300.0
Nitrate and Nitr	ite (as N) is a calculated p	parameter. Nitrate and Nitrite (as N) = Nitrit	te (as N) + Nitrate (as N).
NIONS-NO2-IC	-VA Water	Nitrite in Water by Ion Chromatography	EPA 300.0
This analysis is detected by UV		, , , , ,	termination of Inorganic Anions by Ion Chromatography". Nitrite is
NIONS-NO3-IC	-VA Water	Nitrate in Water by Ion Chromatography	EPA 300.0
This analysis is detected by UV	01	ures adapted from EPA Method 300.0 "De	termination of Inorganic Anions by Ion Chromatography". Nitrate is
NIONS-SO4-IC	-VA Water	Sulfate by Ion Chromatography	APHA 4110 B.
		ures adapted from APHA Method 4110 B. of Inorganic Anions by Ion Chromatography	"Ion Chromatography with Chemical Suppression of Eluent Conductivity /".
S-D-CCMS-VA	Water	Dissolved Arsenic in Water by CRC ICP	MS APHA 3030 B&E / EPA SW-846 6020A
Public Health A Environmental I	ssociation, and with proc Protection Agency (EPA)	edures adapted from "Test Methods for Ev . The procedures may involve preliminary s	the Examination of Water and Wastewater" published by the American valuating Solid Waste" SW-846 published by the United States sample treatment by acid digestion, using hotblock, or filtration (APHA ass spectrometry (modifed from EPA Method 6020A).
S-T-CCMS-VA	Water	Total Arsenic in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A
Public Health A Environmental I	ssociation, and with proc Protection Agency (EPA)	edures adapted from "Test Methods for Ex. . The procedures may involve preliminary	the Examination of Water and Wastewater" published by the American valuating Solid Waste" SW-846 published by the United States sample treatment by acid digestion, using hotblock, or filtration (APHA ass spectrometry (modifed from EPA Method 6020A).
ARBONS-DOC		Dissolved organic carbon by combustion	
		ures adapted from APHA Method 5310 "To h a 0.45 micron membrane filter prior to ar	otal Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are alysis.
ARBONS-TOC	C-VA Water	Total organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)
This analysis is	carried out using proced	ures adapted from APHA Method 5310 "To	otal Organic Carbon (TOC)".
N-T-MID-HH-C	OL-VA Water	Total Cyanide by HH Distillation	APHA 4500-CN Cyanide
		ures adapted from APHA Method 4500-CN alysis using the chloramine-T colourimetric	N "Cyanide". Total or strong acid dissociable (SAD) cyanide are method.

L1007649 CONTD PAGE 9 of 10 26-MAY-11 18:24 (MT) FINAI

HARDNESS-CALC-VA Water Hardness APHA 2340B Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation. Dissolved Mercury in Water by CVAFS(Low) HG-DIS-LOW-CVAFS-VA Water EPA SW-846 3005A & EPA 245.7 This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a coldoxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7). HG-TOT-LOW-CVAFS-VA Total Mercury in Water by CVAFS(Low) EPA 245.7 Water This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7). MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030 B&E / EPA SW-846 6020A This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modifed from EPA Method 6020A). MET-DIS-ICP-VA Water **Dissolved Metals in Water by ICPOES** EPA SW-846 3005A/6010B This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B). **MET-DIS-LOW-ICP-VA** Water **Dissolved Metals in Water by ICPOES** EPA 3005A/6010B This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B). Total Metals in Water by CRC ICPMS APHA 3030 B&E / EPA SW-846 6020A MET-T-CCMS-VA Water This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modifed from EPA Method 6020A). MET-TOT-ICP-VA Water Total Metals in Water by ICPOES EPA SW-846 3005A/6010B This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B). MET-TOT-LOW-ICP-VA Water Total Metals in Water by ICPOES EPA 3005A/6010B This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B). Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC NH3-F-VA Water This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al. OGG-LL-SF-VA Water Oil & Grease by Gravimetric BCMOE GRAVIMETRIC This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3510 & 9071, published by the United States Environmental Protection Agency (EPA), "Standard Methods for the Examination of Water and Wastewater", 20th ed., Method 5520, published by the American Public Health Association, and "BC Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials," 5th ed., published by the B.C. Ministry of Environment, Lands & Parks, 1994. The procedure involves an extraction of the entire water sample with hexane. This extract is then evaporated to dryness, and the residue weighed to determine Oil and Grease. ALS Environmental's routine detection limit, or Limit of Reporting (LOR), for this method is 2 mg/L for a 1L sample volume. By request, a LOR of 1 mg/L is sometimes applied for this method. The 1 mg/L LOR is equal to the 99% confidence limit Method Detection Limit as defined by the US EPA. A higher degree of variability is expected at levels below 2 mg/L. P-T-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorous This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorous is determined colourimetrically after persulphate digestion of the sample. P-TD-COL-VA Water Total Dissolved P in Water by Colour APHA 4500-P Phosphorous

Version:

S2-T-COL-VA	Water	Total Sulphide by Colorimetric	APHA 4500-S2 Sulphide
This analysis is carried ou colourimetric method.	t using proce	dures adapted from APHA Method 4500-S2 "Sulphide"	. Sulphide is determined using the methlyene blue
SE-D-CCMS-VA	Water	Dissolved Selenium in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A
Public Health Association Environmental Protection	, and with pro Agency (EPA	cedures adapted from "Test Methods for Evaluating So	atment by acid digestion, using hotblock, or filtration (APHA
SE-T-CCMS-VA	Water	Total Selenium in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A
Public Health Association Environmental Protection	, and with pro Agency (EPA	cedures adapted from "Test Methods for Evaluating So	atment by acid digestion, using hotblock, or filtration (APHA
TDS-LOW-VA	Water	Low Level TDS (3.0mg/L) by Gravimetric	APHA 2540 Gravimetric
			ds are determined gravimetrically. Total dissolved solids vaporating the filtrate to dryness at 180 degrees celsius.
TKN-SIE-VA	Water	TKN in Water by SIE	APHA 4500-NORG (TKN)
This analysis is carried ou ammonia selective electro		dures adapted from APHA Method 4500-Norg "Nitroge	en (Organic)". Total Kjeldahl Nitrogen is determined using a
TSS-LOW-VA	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540 Gravimetric
		dures adapted from APHA Method 2540 "Solids". Solid ple through a glass fibre filter, TSS is determined by dr	ds are determined gravimetrically. Total suspended solids rying the filter at 104 degrees celsius.
FURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 "Turbidity"
This analysis is carried ou	t using proce	dures adapted from APHA Method 2130 "Turbidity". Tu	urbidity is determined by the nephelometric method.
TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity
This analysis is carried ou	t using proce	dures adapted from APHA Method 2130 "Turbidity". Tu	urbidity is determined by the nephelometric method.
ALS test methods may inc	orporate mo	difications from specified reference methods to improve	e performance.
The last two letters of the a	bove test coo	le(s) indicate the laboratory that performed analytical a	nalysis for that test. Refer to the list below:
	e Labo	ratory Location	
Laboratory Definition Cod			
Laboratory Definition Cod		ENVIRONMENTAL - VANCOUVER, BC, CANADA	

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.





COC #

Page ____of

Lab Work Order # (lab use only) U/C/C7/C/U/C7 ALS Contact: Can Dany Sampler: Justine Crowe End C Sample Sample Sample Sample Identification Date Time Time Time Time	(X X 9
Lab Work Order # (lab use only) U1C07464 G ALS Contact: Can Dang Contact: Sampler: Justine Crowe Suffice Value Sufface Value S	Image: Second
Lab Work Order # (lab use only) U1C0740409 ALS Contact: Contact: Can Dang Contact: Can Dang Sampler: Time (bh mm) Justine Crowe Soft Soft Soft Soft Soft Soft Soft Soft	x X X X Low Level Ictal Metals x X X X X X
Lab Work Order # (lab use only) U1C0740409 ALS Contact: Contact: Can Dang Contact: Can Dang Sampler: Time (bh mm) Justine Crowe Soft Soft Soft Soft Soft Soft Soft Soft	X X X X X X Low Level Ictal Metals X X Sulphide w w Number of Containers
Lab Work Order # (lab use only) U1C0740409 ALS Contact: Contact: Can Dang Contact: Can Dang Sampler: Time (bh mm) Justine Crowe Soft Soft Soft Soft Soft Soft Soft Soft	X X X X X X Low Level Ictal Metals X X Sulphide w w Number of Containers
Lab Work Order # (lab use only) U1C0740409 ALS Contact: Contact: Can Dang Contact: Can Dang Sampler: Time (bh mm) Justine Crowe Soft Soft Soft Soft Soft Soft Soft Soft	 A X Sulphide B Number of
Lab Work Order # (lab use only) U1CU7464 G ALS Contact: Con	 A X Sulphide B Number of
Lab Work Order # (lab use only) U1C0740409 ALS Contact: Contact: Can Dang Contact: Can Dang Sampler: Time (bh mm) Justine Crowe Soft Soft Soft Soft Soft Soft Soft Soft	 A X Sulphide B Number of
Lab Work Order # (lab use only) U1CC7464 G ALS Contact: Con	 A X Sulphide B Number of
Lab Work Order # (lab use only) U1CU7464G ALS Contact: Can Dang Contact: Sampler: Justine Crowe Suffice Crowe Sufface Water X <	 A X Sulphide B Number of
(lab use only) UIUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU	 A X Sulphide B Number of
SampleSample IdentificationDate idd-aunit_wyTime (bh mm)Sample Type $\frac{5}{2}$	(XX9 (XX9)
Subscription X <t< td=""><td>(XX9 (XX9)</td></t<>	(XX9 (XX9)
Field Blank 20-May-11 Surface Water X	(X X 9
Travel Blank 20-May-11 Surface Water X	
	(X X 9
	1
	1
	1
	-
3 Tier 1 - Natural, etc) / Hazardous Details	
Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyse	
SHIPMENT RELEASE (client use) SHIPMENT RECEPTION (lab use only) SHIPMENT VERIFICATION (lab use	
Released by. Date (ds. converts): Time (httrum) Received by: Date: Time. Temperature: Verified by. Date: Time. T. Crout May by (11350) TLB Zont (Act-1) TB 1350 5 oc 0 0 0	IC INCOMPTIONS .
I. Crowe (May 20 11 13:50 TLB 2:1444-11 #13:50 5 00 00	Observations Yes / No ? If Yes add SIF



GOLDER ASSOCIATES LTD ATTN: Justine Crowe 9 - 4905 48 Street Yellowknife NT X1A 3S3 Date Received:24-MAY-11Report Date:27-MAY-11 20:37 (MT)Version:FINAL

Client Phone: 867-873-6319

Certificate of Analysis

Lab Work Order #:

Project P.O. #: Job Reference: Legal Site Desc: C of C Numbers: L1008512 606989 09-1427-0006-20000-20500

1

Shannon Luchka Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 9936-67 Avenue, Edmonton, AB T6E 0P5 Canada | Phone: +1 780 413 5227 | Fax: +1 780 437 2311 ALS CANADA LTD Part of the ALS Group A Campbell Brothers Limited Company

Environmental 🕽

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

L1008512 CONTD.... PAGE 2 of 4 27-MAY-11 20:37 (MT) Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L1008512-1 WATER 24-MAY-11 YK BACK BAY 1	L1008512-2 WATER 24-MAY-11 YK BACK BAY 2	L1008512-3 WATER 24-MAY-11 SNP 43-5 (ABOVE)	L1008512-4 WATER 24-MAY-11 REACH 4 (D/S GIANT POOL)	L1008512-5 WATER 24-MAY-11 REACH 2 (POOL
Grouping	Analyte					
WATER	-					
Physical Tests	Hardness (as CaCO3) (mg/L)	28.4	26.8	68.1		
-	Total Suspended Solids (mg/L)	<3.0	<3.0	37.0	70.0	72.0
	Turbidity (NTU)	5.78	5.48	37.7	53.1	51.4
Total Metals	Aluminum (Al)-Total (mg/L)	0.172	0.161	1.06	00.1	01.4
	Antimony (Sb)-Total (mg/L)	0.00080	0.00068	0.0314		
	Arsenic (As)-Total (mg/L)	0.00294	0.00299	0.133		
	Barium (Ba)-Total (mg/L)	0.00843	0.00880	0.0194		
	Beryllium (Be)-Total (mg/L)	<0.0010	<0.0010	<0.0010		
	Bismuth (Bi)-Total (mg/L)	<0.00020	<0.00020	<0.00020		
	Boron (B)-Total (mg/L)	<0.00020	<0.020	<0.020		
	Cadmium (Cd)-Total (mg/L)	<0.0020	<0.0020	<0.020		
	Calcium (Ca)-Total (mg/L)	7.28	5.08	18.2		
	Chromium (Cr)-Total (mg/L)	<0.00080	<0.00080	<0.00080		
	Cobalt (Co)-Total (mg/L)	<0.00020	<0.00020	0.00191		
	Copper (Cu)-Total (mg/L)	0.0012	0.0012	0.0125		
	Iron (Fe)-Total (mg/L)	0.182	0.123	1.57		
	Lead (Pb)-Total (mg/L)	0.00020	0.00024	0.00734		
	Magnesium (Mg)-Total (mg/L)	2.54	1.74	4.99		
	Manganese (Mn)-Total (mg/L)	0.0060	0.0052	0.267		
	Mercury (Hg)-Total (mg/L)	0.000057	< 0.00020	<0.00020		
	Molybdenum (Mo)-Total (mg/L)	0.00014	0.00013	0.00116		
	Nickel (Ni)-Total (mg/L)	0.00069	<0.00020	0.00703		
	Potassium (K)-Total (mg/L)	1.10	0.74	1.54		
	Selenium (Se)-Total (mg/L)	<0.00040	<0.00040	<0.00040		
	Silver (Ag)-Total (mg/L)	<0.00040	<0.00040	<0.00040		
	Sodium (Na)-Total (mg/L)	2.5	1.8	4.5		
	Strontium (Sr)-Total (mg/L)	0.0295	0.0307	0.0745		
	Thallium (TI)-Total (mg/L)	<0.00010	<0.00010	<0.00010		
	Tin (Sn)-Total (mg/L)	0.00072	<0.00040	<0.00040		
	Titanium (Ti)-Total (mg/L)	<0.0050	0.0052	0.0333		
	Uranium (U)-Total (mg/L)	0.00026	0.00028	0.00060		
	Vanadium (V)-Total (mg/L)	< 0.00050	< 0.00050	0.00260		
	Zinc (Zn)-Total (mg/L)	<0.00000	<0.0040	0.0179		
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	0.016	0.013	0.0179		
	Antimony (Sb)-Dissolved (mg/L)	0.00047	<0.00040	0.0246		
	Arsenic (As)-Dissolved (mg/L)	0.00201	0.00454	0.0905		
	Barium (Ba)-Dissolved (mg/L)	0.00201	0.00716	0.0303		

L1008512 CONTD.... PAGE 3 of 4 27-MAY-11 20:37 (MT) Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L1008512-1 WATER 24-MAY-11 YK BACK BAY 1	L1008512-2 WATER 24-MAY-11 YK BACK BAY 2	L1008512-3 WATER 24-MAY-11 SNP 43-5 (ABOVE)	L1008512-4 WATER 24-MAY-11 REACH 4 (D/S GIANT POOL)	L1008512-5 WATER 24-MAY-11 REACH 2 (POOI
Grouping	Analyte	-				
WATER						
Dissolved Metals	Beryllium (Be)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050		
	Bismuth (Bi)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050		
	Boron (B)-Dissolved (mg/L)	0.0035	0.0039	0.0120		
	Cadmium (Cd)-Dissolved (mg/L)	<0.0035	<0.0039	<0.00120		
	Calcium (Ca)-Dissolved (mg/L)	7.28	6.94	19.2		
	Chromium (Cr)-Dissolved (mg/L)	0.00177	0.00177	0.00157		
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00177	0.00108		
	Copper (Cu)-Dissolved (mg/L)	0.00077	0.00078	0.00108		
	Iron (Fe)-Dissolved (mg/L)	0.00077	<0.010	0.065		
	Lead (Pb)-Dissolved (mg/L)	<0.00010	<0.00010	0.00055		
	Magnesium (Mg)-Dissolved (mg/L)	2.49	2.31	4.90		
	Manganese (Mn)-Dissolved (mg/L)	0.0026	0.0031	0.267		
	Mercury (Hg)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020		
	Molybdenum (Mo)-Dissolved (mg/L)	<0.00010	0.00011	0.00111		
	Nickel (Ni)-Dissolved (mg/L)	<0.00010	<0.0001	0.00630		
	Potassium (K)-Dissolved (mg/L)	1.08	1.03	1.48		
	Selenium (Se)-Dissolved (mg/L)	<0.00040	<0.00040	<0.00040		
	Silver (Ag)-Dissolved (mg/L)	<0.00040	<0.00040	<0.00040		
	Sodium (Na)-Dissolved (mg/L)	2.55	2.42	4.70		
	Strontium (Sr)-Dissolved (mg/L)	0.0306	0.0315	0.0806		
	Thallium (TI)-Dissolved (mg/L)	<0.000050	<0.000050	< 0.000050		
	Tin (Sn)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020		
	Titanium (Ti)-Dissolved (mg/L)	0.00032	<0.00030	<0.00020		
	Uranium (U)-Dissolved (mg/L)	0.00032	0.00024	0.00055		
	Vanadium (V)-Dissolved (mg/L)	<0.00010	<0.00010	0.00023		
	Zinc (Zn)-Dissolved (mg/L)	0.0073	<0.0010	0.0051		
		0.0075	<0.0010	0.0051		

Qualifiers for Individual Parameters Listed:

Qualifier	Description
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ETL-HARDNESS-DIS-ED	Water	Hardness (from Dissolved Ca and Mg)	APHA 2340 B-Calculation
HG-D-L-CVAA-ED	Water	Mercury (Hg) - Dissolved	EPA 245.7 / EPA 245.1
HG-T-L-CVAA-ED	Water	Mercury (Hg)	EPA 245.7 / EPA 245.1
MET-D-ICP-ED	Water	Dissolved Metals in Water by ICPOES	APHA 3120 B-ICP-OES
MET-D-L-ICP-ED	Water	Diss. Metals in Water by ICPOES (Low)	APHA 3120 B-ICP-OES
MET-D-L-MS-ED	Water	Diss. Metals in Water by ICPMS (Low)	SW 846 - 6020-ICPMS
MET-T-L-ICP-ED	Water	Total Metals in Water by ICPOES (Low)	APHA 3120 B-ICP-OES
MET-T-L-MS-ED	Water	Total Metals in Water by ICPMS (Low)	SW 846 - 6020-ICPMS
SOLIDS-TOTSUS-ED	Water	Total Suspended Solids	APHA 2540 D-Gravimetric
TURBIDITY-ED	Water	Turbidity	APHA 2130 B-Nephelometer

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA

Chain of Custody Numbers:

1

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. mg/kg - milligrams per kilogram based on dry weight of sample. mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory. UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Released by:				***Please Ar													Sample	(la		Phone:	Contact:	Company:	Hardcopy of	Invoice To	Phone:	2	Address:	Contact:	Company:	Report To	ALS	>
Y: J. UPCWC Date (dd-mmm-yy) Time (hh-mm) Received by: A4 May (1 4:45 1/1	10	Also provided on another Excel tab are the ALS location addresses, phone numbers and sample con	Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab	**Please Analyze As and Se by Hydride****. Please include Mercury in	Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR -					Reach 2 (Pool)		Boach A (Als Giant Bool)	SNP43-5 (above)	Reach u (BC Wouth)	YK Back Bay 2	YK Back Bay 1	Sample Identification (This description will appear on the report)	F		9836-31St Avenue., Edmonton AB, 16N 1C5 780 408 2897 Fax: 780 408 5472	Brenda Kalis	Deton'Cho/Nuna Joint Venture	Hardcopy of Invoice with Report?	Yes] Fax:			DCNJV: Katrina Nokleby; Golder: Justine Crowe	Deton'Cho/Nuna Joint Venture AND Golder As. Ltd.		Environmentel	
N	SHIP	tion addresse	all portions of the second sec	the metals ana	land use (CCI													Contact:	AIS	2.555 #	LSD:	PO / AFE	Job #:	Client / F	Email 3:	Email 2:	Email 1:	< PDF	✓ Standard	hanner	*	
24 there 16:50	MENT RECEP	s, phone numb	of this form ma	alysis. Note - Th	ME-Freshwater					24-May-11	24-May-11		24-Mav-11	24-May-11	24-May-11	24-May-11	Date (dd-mmm-yy)	Can Dang				PO / AFE: 606989	09-1427-0006	Client / Project Information	KatrinaN@nu	hmachtans@golder.com	jcrowe@golder.com	Excel	d Other			
Time:	SHIPMENT RECEPTION (lab use only)	pers and sample	y delay analysis h the Terms and	nis water might c	Aquatic Life/B(Time (hh:mm)	Sampler:					09-1427-0006-20000-20500	tion	KatrinaN@nunalogistics.com	golder.com	er.com	Digital			512-0	
Temperature:	ly)	container / preservation / holding time table for common analyses	 Please fill in the Conditions as in 	ontain high amou	CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details					Surface Water	Surface Water		Surface Water	Surface Water	Surface Water	Surface Water	Sample Type	Justine Crowe										I Fax			0 F C *	
		servatio	his for	nts of n	cial/AE				iii)		-	-	-	-	-		Physic	al Pa	rame	eters/	Majo	or la		Pl		s O	Ø	() P	OR	Ser		
Verified by:		on / ho	n LEG	ietals.	Tier									-	1		Cyanic	le						ease ir		ame Da	mergen	riority (2	egular (/ice R		
	SH	a sep.	IBLY.	Alls	1 - Na							>	<		×	×	Hardn	ess						Idicate		y or We	cy (1-2	-4 Busi	Standar	eques		
	PME	time	14 A	ample	tural,	-	1			×	×	>	<	*	×	×	TSS a	nd Tu	rbidil	y				Please indicate below Filtered, Preserved or both (F, P,		O Same Day or Weekend Emergency - Contact ALS to Confirm TAT	Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT	Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT	O Regular (Standard Turnaround Times - Business Days)	Service Requested (Rush for routine analysis subject to availability)		
Date:	VT VE	table		s are	etc) /	-							+				Nutrie	nts		_				w Filte	An	merge	ys) - 1(iys) - 5	around	Rush fc		
	RIFIC	for c	Ŭ J	RUSH	Haza	2		-		_		-			_		NH3 /	TKN	1	_	-			pred, I	Analysis Request	ncy - C	00% Su	0% Sur	Times -	or routi		
	ATIC	ommo		H/EN	rdous	à	-					-		4	-	1	Oil and	d Grea	ise	-				rese	s Req	ontact ,	Ircharge	charge	- Busine	ne ana		000 #
T	Ž	on an		1ERG	Deta	-	-				-	+		-	-	-	тос			_				ved o	uest	ALS to I	2 - Con	- Conta	ess Day	alysis s		ŧ
Time:	lat	alys		ENCY	iils		-			 	-	>		H	~	0	DOC			-			-	r both		Confirm	lact ALS	act ALS	s)	ubject	Page	
Time:	lab use	Ð		EI.		<u></u>	-	-			-	>		+			Low Le			-	23			(F, P		TAT	5 to Cor	to Con		to ava	Ĩ	
Time: Ob. Yes	SHIPMENT VERIFICATION (lab use only)	es.		=							1	1.5	2.1	1.11	2	5.24	Low Le	vei D	ISSO	ved	vieta	IS	100	-	1.1		In	Î		iii iii		
Time: Observations: Yes / No ?	lab use only)	es.		Ξ						1		1					Sulphic	le						F/P)			n Ti	n TA		bility	q	

Ī



GOLDER ASSOCIATES LTD ATTN: Justine Crowe 9 - 4905 48 Street Yellowknife NT X1A 3S3 Date Received:25-MAY-11Report Date:28-MAY-11 17:01 (MT)Version:DRAFT REV. 2

Client Phone: 867-873-6319

Certificate of Analysis

Lab Work Order #:

Project P.O. #: Job Reference: Legal Site Desc: C of C Numbers: L1009010 606989 09-1427-0006-20000-20500

Shannon Luchka Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 9936-67 Avenue, Edmonton, AB T6E 0P5 Canada | Phone: +1 780 413 5227 | Fax: +1 780 437 2311 ALS CANADA LTD Part of the ALS Group A Campbell Brothers Limited Company

Environmental 🕽

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1009010-1 REACH 6 (GIANT FALLS)							
Sampled By: JC on 25-MAY-11							
Matrix: WATER							
Hardness							
Dissolved Metals in Water by ICPOES							
Calcium (Ca)-Dissolved	10.6		0.50	mg/L		27-MAY-11	R2194912
Magnesium (Mg)-Dissolved	3.22		0.10	mg/L		27-MAY-11	R2194912
Hardness (from Dissolved Ca and Mg)							
Hardness (as CaCO3)	39.7		1.3	mg/L		27-MAY-11	
Dissolved Metals							
Diss. Metals in Water by ICPOES (Low)	10.0					07.14114.44	
Calcium (Ca)-Dissolved	10.6		0.50	mg/L		27-MAY-11	R2194912
Iron (Fe)-Dissolved Magnesium (Mg)-Dissolved	0.051		0.010	mg/L		27-MAY-11	R2194912
Magnesium (Mg)-Dissolved Manganese (Mn)-Dissolved	3.22 0.0392		0.10 0.0020	mg/L mg/L		27-MAY-11 27-MAY-11	R2194912 R2194912
Potassium (K)-Dissolved	1.04		0.0020	mg/L		27-MAY-11	R2194912 R2194912
Sodium (Na)-Dissolved	2.52		0.10	mg/L		27-MAY-11	R2194912 R2194912
Total Metals	2.02		0.00	ing/E		27 100/11 11	112134312
Total Metals in Water by ICPOES (Low)							
Calcium (Ca)-Total	10.7		0.50	mg/L		27-MAY-11	R2194913
Iron (Fe)-Total	0.211		0.010	mg/L		27-MAY-11	R2194913
Magnesium (Mg)-Total	3.17		0.10	mg/L		27-MAY-11	R2194913
Manganese (Mn)-Total	0.0481		0.0020	mg/L		27-MAY-11	R2194913
Potassium (K)-Total	1.11		0.10	mg/L		27-MAY-11	R2194913
Sodium (Na)-Total	2.8		1.0	mg/L		27-MAY-11	R2194913
Miscellaneous Parameters							
Mercury (Hg)-Total	<0.000020	Ĭ	0.000020	mg/L		28-MAY-11	R2195281
Mercury (Hg)-Dissolved	<0.000020		0.000020	mg/L		28-MAY-11	R2195281
Total Suspended Solids	<3.0		3.0	mg/L		27-MAY-11	R2194886
Turbidity	2.56		0.10	NTU		27-MAY-11	R2194859
L1009010-2 REACH 4 (D/S GIANT POOL)							
Sampled By: JC on 25-MAY-11	Ť						
Matrix: WATER							
Miscellaneous Parameters							
Total Suspended Solids	4.0		3.0	mg/L		27-MAY-11	R2194886
Turbidity	9.02		0.10	NTU		27-MAY-11	R2194859
L1009010-3 REACH 2 (POOL)							
Sampled By: JC on 25-MAY-11							
Matrix: WATER							
Miscellaneous Parameters							
Total Suspended Solids	33.0		3.0	mg/L		27-MAY-11	R2194886
Turbidity	40.3		0.10	NTU		27-MAY-11	R2194859
· · · · · · · · · · · · · · · · · · ·	40.0		0.10				112104003
Sampled By: JC on 25-MAY-11							
Matrix: WATER							
Miscellaneous Parameters	10.0		2.0	m~//		27-MAY-11	D0104000
Total Suspended Solids	18.0		3.0	mg/L			R2194886
Turbidity	32.7		0.10	NTU		27-MAY-11	R2194859
L1009010-5 REACH 0 (BC MOUTH)							
Sampled By: JC on 25-MAY-11							
Matrix: WATER							
Miscellaneous Parameters							
Total Suspended Solids	23.0		3.0	mg/L		27-MAY-11	R2194886

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1009010-5 REACH 0 (BC MOUTH) Sampled By: JC on 25-MAY-11 Matrix: WATER Turbidity	32.9		0.10	NTU		27-MAY-11	R2194859
Matrix: WATER Turbidity			0.10	NTU		27-MAY-11	R2194859

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ETL-HARDNESS-DIS-ED	Water	Hardness (from Dissolved Ca and Mg)	APHA 2340 B-Calculation
HG-D-L-CVAA-ED	Water	Mercury (Hg) - Dissolved	EPA 245.7 / EPA 245.1
HG-T-L-CVAA-ED	Water	Mercury (Hg)	EPA 245.7 / EPA 245.1
MET-D-ICP-ED	Water	Dissolved Metals in Water by ICPOES	APHA 3120 B-ICP-OES
MET-D-L-ICP-ED	Water	Diss. Metals in Water by ICPOES (Low)	APHA 3120 B-ICP-OES
MET-D-L-MS-ED	Water	Diss. Metals in Water by ICPMS (Low)	SW 846 - 6020-ICPMS
MET-T-L-ICP-ED	Water	Total Metals in Water by ICPOES (Low)	APHA 3120 B-ICP-OES
MET-T-L-MS-ED	Water	Total Metals in Water by ICPMS (Low)	SW 846 - 6020-ICPMS
SOLIDS-TOTSUS-ED	Water	Total Suspended Solids	APHA 2540 D-Gravimetric
TURBIDITY-ED	Water	Turbidity	APHA 2130 B-Nephelometer

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
Chain of Custody Numbers:	
1	

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory. UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION. Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.





COC # _

Page ____ol ___

Report To				Report	onnact mistion	uuon			-										
Company:	Deton'Cho/Nuna Jor	nt Venture AND	Golder As, Ltd.	🖂 Stanslard	1 Other										mess Oa y				-
Contact:	DCNJV: Katrina No	kleby; Golder: J	Instine Crowe		[2] Excel	Diqit.	al <u>É</u> Eux	● Pi	ionty (2 4 Bus	gress (ыγч)	50% SC	irchari	je conti	act ALS to	Confirm	- 1AT	
Address:				Email 1;	jcrowe@gold	a duu	_	Qы	nender	icy (1-2	Bus D	ays) - (100% 5	urchai	qe tan	tact ACS 1:	a Canfin	n IAT	
				Email 2:	hmachtans@	golder.com		C.P.S	nne Da	iy ar Wi	erkennd -					Confirm 3	VI.		
Phone:	867 669 6735	Fax		Email 3.	KatrinaN@nu	nalogistics com				_					quest	-			
Invoice To		Yes	No No	Client / P	roject Informa			Ple	ase i	ndicat	e belo	ow Eil	lered,	Pres	erved c	я both (I	<u>, P. F</u>	/P)	
Hardcopy c	of Invoice with Report?	Yes	√] No	Job #:	09-1427-0006	20000-20500		-									ļ.	ļ	
	-		-		· · · • • -			2	}				- 1				S E.		
			_					meters/Major	}]						<u>v</u>	<u>e</u>		
	<u> </u>		<u> </u>	ŧ				ers']		Metal	С Ш		- ers
								Tet			ŝ			a l		<u>~</u>	\ C\$\$		Containers
	Work Order #	1 Inn	9010	ALS	Can Dang	Sampler:	Justine Crowe	Phys cal Para	ĺ		14 14	1	[Grease		To'al			
<u> (</u> t	ab use only)		UIU	Contact:				- <u>10</u>	<u>a</u>	SSS	and	SIL	N X X	ပ်		evel		P D	ю а
ļ	_					ĺ		λs C	Cyanide	-arcress	o V	Nutrients		Oil and	100			Ē	Number
					ļ			<u> </u>	_		rss	ź	문	ō	<u> </u>		Low	ပိ	Ž
					1					X	X					X	X		3
					1	Γ		1 -	T .			ı ı	I	ľ	I	[1 1		
								_											
	-1						1					ĺ							
					· · · · · · · · · · · · · · · · · · ·			·	·									1	
	_		. <u> </u>		,		 	_+		+-		; 					+	⊢ -	
- <u></u>																			Ļ
																			1
							· · · · · · · · · · · · · · · · · · ·	-		1			• •		-			u	
l						-		-										<u> </u>	
	_	· · ·			· · · -			_						.	-				
								ł	·						_	- 1	+	 	ł
	1																	<u> </u>	
_																			
ļ																			
<u> </u>																			
I																			
}																			
								·					-						-
								,									1		
	LOL			LB								l							



GOLDER ASSOCIATES LTD ATTN: JUSTINE CROWE 9 - 4905 48 Street Yellowknife NT X1A 3S3 Date Received:27-MAY-11Report Date:30-MAY-11 16:00 (MT)Version:FINAL

Client Phone: 897-669-6735

Certificate of Analysis

Lab Work Order #:

Project P.O. #: Job Reference: Legal Site Desc: C of C Numbers: L1010143 606989 09-1427-0006-20000-20500

1

Shannon Luchka Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 9936-67 Avenue, Edmonton, AB T6E 0P5 Canada | Phone: +1 780 413 5227 | Fax: +1 780 437 2311 ALS CANADA LTD Part of the ALS Group A Campbell Brothers Limited Company

Environmental 🕽

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

L1010143 CONTD.... PAGE 2 of 6 30-MAY-11 16:00 (MT) Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L1010143-1 WATER 27-MAY-11 REACH 6 (GIANT FALLS)	L1010143-2 WATER 27-MAY-11 REACH 5 (D/S POND)	L1010143-3 WATER 27-MAY-11 REACH 4 (D/S GIANT POOL)	L1010143-4 WATER 27-MAY-11 REACH 4 (D/S GIANT POOL) DUP	L1010143-5 WATER 27-MAY-11 REACH 4 (UNDER ICE)
Grouping	Analyte					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	33.1	45.4	51.4	51.6	44.5
	Total Suspended Solids (mg/L)	7.0	5.0	5.0	7.0	20.0
	Turbidity (NTU)	2.33	8.76	8.54	6.97	17.3
Total Metals	Aluminum (Al)-Total (mg/L)	0.102	0.231	0.239	0.247	0.481
	Antimony (Sb)-Total (mg/L)	0.00176	0.0178	0.0219	0.0221	0.0186
	Arsenic (As)-Total (mg/L)	0.0251	0.0869	0.0905	0.0935	0.0741
	Barium (Ba)-Total (mg/L)	0.00976	0.0110	0.0104	0.0108	0.0108
	Beryllium (Be)-Total (mg/L)	0.0012	0.0013	0.0010	0.0011	0.0017
	Bismuth (Bi)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Boron (B)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Cadmium (Cd)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Calcium (Ca)-Total (mg/L)	9.47	11.7	12.9	12.9	12.0
	Chromium (Cr)-Total (mg/L)	<0.00080	<0.00080	<0.00080	<0.00080	0.00110
	Cobalt (Co)-Total (mg/L)	<0.00020	0.00089	0.00094	0.00099	0.00100
	Copper (Cu)-Total (mg/L)	<0.0010	0.0092	0.0095	0.0096	0.0089
	Iron (Fe)-Total (mg/L)	0.183	0.421	0.433	0.423	0.691
	Lead (Pb)-Total (mg/L)	0.00026	0.00483	0.00276	0.00295	0.00341
	Magnesium (Mg)-Total (mg/L)	2.94	3.48	3.69	3.64	3.46
	Manganese (Mn)-Total (mg/L)	0.0427	0.122	0.150	0.149	0.155
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
	Molybdenum (Mo)-Total (mg/L)	0.00065	0.00093	0.00123	0.00138	0.00116
	Nickel (Ni)-Total (mg/L)	0.00087	0.00324	0.00595	0.00630	0.00632
	Potassium (K)-Total (mg/L)	0.99	1.18	1.25	1.24	1.19
	Selenium (Se)-Total (mg/L)	<0.0020	<0.00040	<0.00040	<0.00040	<0.00040
	Silver (Ag)-Total (mg/L)	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
	Sodium (Na)-Total (mg/L)	2.1	2.9	3.3	3.2	3.0
	Strontium (Sr)-Total (mg/L)	0.0370	0.0525	0.0577	0.0595	0.0493
	Thallium (TI)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Tin (Sn)-Total (mg/L)	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
	Titanium (Ti)-Total (mg/L)	<0.0050	0.0079	0.0078	0.0084	0.0169
	Uranium (U)-Total (mg/L)	0.00026	0.00029	0.00036	0.00041	0.00036
	Vanadium (V)-Total (mg/L)	0.00057	0.00087	0.00093	0.00092	0.00138
	Zinc (Zn)-Total (mg/L)	0.0044	0.0147	0.0087	0.0101	0.0149
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	<0.010	<0.010	<0.010	0.016	0.018
	Antimony (Sb)-Dissolved (mg/L)	0.00151	0.0159	0.0199	0.0193	0.0210
	Arsenic (As)-Dissolved (mg/L)	0.0178	0.0667	0.0697	0.0687	0.0669
	Barium (Ba)-Dissolved (mg/L)	0.00768	0.00978	0.00924	0.00875	0.00876

L1010143 CONTD.... PAGE 3 of 6 30-MAY-11 16:00 (MT) Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L1010143-6 WATER 27-MAY-11 REACH 2 (POOL)	L1010143-7 WATER 27-MAY-11 SNP 43-5 (ABOVE)	L1010143-8 WATER 27-MAY-11 REACH 0 (BC MOUTH)	L1010143-9 WATER 21-MAY-11 REACH 6 EXPOSURE POINT (ABOVE)
Grouping	Analyte				
WATER					
Physical Tests	Hardness (as CaCO3) (mg/L)	53.1	59.6	55.3	
	Total Suspended Solids (mg/L)	11.0	10.0	12.0	
	Turbidity (NTU)	11.2	9.88	10.9	
Total Metals	Aluminum (Al)-Total (mg/L)	0.412	0.446	0.395	1.76
	Antimony (Sb)-Total (mg/L)	0.0240	0.0279	0.0261	0.127
	Arsenic (As)-Total (mg/L)	0.103	0.114	0.113	0.445
	Barium (Ba)-Total (mg/L)	0.0127	0.0128	0.0126	0.0408
	Beryllium (Be)-Total (mg/L)	<0.0010	0.0018	0.0017	0.0011
	Bismuth (Bi)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020
	Boron (B)-Total (mg/L)	<0.020	<0.020	<0.020	0.146
	Cadmium (Cd)-Total (mg/L)	<0.00020	0.00021	<0.00020	0.00038
	Calcium (Ca)-Total (mg/L)	12.5	16.1	14.8	50.0
	Chromium (Cr)-Total (mg/L)	0.00088	0.00097	0.00097	0.00435
	Cobalt (Co)-Total (mg/L)	0.00117	0.00151	0.00150	0.00698
	Copper (Cu)-Total (mg/L)	0.0105	0.0100	0.0118	0.0242
	Iron (Fe)-Total (mg/L)	0.541	0.733	0.604	3.65
	Lead (Pb)-Total (mg/L)	0.00374	0.00334	0.00299	0.0497
	Magnesium (Mg)-Total (mg/L)	3.45	4.29	3.94	16.5
	Manganese (Mn)-Total (mg/L)	0.152	0.232	0.217	0.613
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020	0.000038
	Molybdenum (Mo)-Total (mg/L)	0.00146	0.00167	0.00156	0.00280
	Nickel (Ni)-Total (mg/L)	0.00753	0.00820	0.00810	0.0160
	Potassium (K)-Total (mg/L)	1.09	1.20	1.29	3.74
	Selenium (Se)-Total (mg/L)	<0.00040	<0.00040	0.00079	0.00079
	Silver (Ag)-Total (mg/L)	<0.00040	<0.00040	<0.00040	<0.00040
	Sodium (Na)-Total (mg/L)	3.2	3.8	3.8	15.9
	Strontium (Sr)-Total (mg/L)	0.0640	0.0711	0.0715	0.215
	Thallium (TI)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Tin (Sn)-Total (mg/L)	<0.00040	<0.00040	<0.00040	<0.00040
	Titanium (Ti)-Total (mg/L)	0.0141	0.0143	0.0138	0.0208
	Uranium (U)-Total (mg/L)	0.00044	0.00045	0.00048	0.00204
	Vanadium (V)-Total (mg/L)	0.00123	0.00144	0.00124	0.00546
	Zinc (Zn)-Total (mg/L)	0.0122	0.0108	0.0113	0.0646
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	0.014	0.011	0.011	
	Antimony (Sb)-Dissolved (mg/L)	0.0220	0.0242	0.0240	
	Arsenic (As)-Dissolved (mg/L)	0.0753	0.0824	0.0793	
	Barium (Ba)-Dissolved (mg/L)	0.00882	0.00968	0.00928	

L1010143 CONTD.... PAGE 4 of 6 30-MAY-11 16:00 (MT) Version: FINAL

	Sample ID Description Sampled Date Sampled Time	L1010143-1 WATER 27-MAY-11	L1010143-2 WATER 27-MAY-11	L1010143-3 WATER 27-MAY-11	L1010143-4 WATER 27-MAY-11	L1010143-5 WATER 27-MAY-11
	Client ID	REACH 6 (GIANT FALLS)	REACH 5 (D/S POND)	REACH 4 (D/S GIANT POOL)	REACH 4 (D/S GIANT POOL) DUP	REACH 4 (UNDE ICE)
Grouping	Analyte					
WATER						
Dissolved Metals	Beryllium (Be)-Dissolved (mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Bismuth (Bi)-Dissolved (mg/L)	0.000080	0.000100	0.000070	0.000050	0.000075
	Boron (B)-Dissolved (mg/L)	0.0114	0.0158	0.0168	0.0166	0.0186
	Cadmium (Cd)-Dissolved (mg/L)	0.00023	0.00025	0.00010	0.00025	0.00024
	Calcium (Ca)-Dissolved (mg/L)	8.86	12.4	14.1	14.2	12.3
	Chromium (Cr)-Dissolved (mg/L)	<0.00040	0.00046	0.00051	0.00062	0.00083
	Cobalt (Co)-Dissolved (mg/L)	0.00013	0.00070	0.00084	0.00076	0.00076
	Copper (Cu)-Dissolved (mg/L)	0.00061	0.00529	0.00572	0.00590	0.00595
	Iron (Fe)-Dissolved (mg/L)	0.030	0.059	0.071	0.091	0.054
	Lead (Pb)-Dissolved (mg/L)	0.00027	0.00079	0.00125	0.00102	0.00080
	Magnesium (Mg)-Dissolved (mg/L)	2.66	3.52	3.96	3.93	3.38
	Manganese (Mn)-Dissolved (mg/L)	0.0084	0.106	0.152	0.147	0.140
	Mercury (Hg)-Dissolved (mg/L)	<0.000020	<0.00020	<0.000020	<0.000020	<0.000020
	Molybdenum (Mo)-Dissolved (mg/L)	0.00079	0.00115	0.00139	0.00135	0.00160
	Nickel (Ni)-Dissolved (mg/L)	0.00074	0.00296	0.00579	0.00564	0.00652
	Potassium (K)-Dissolved (mg/L)	0.86	1.21	1.34	1.26	1.04
	Selenium (Se)-Dissolved (mg/L)	O.0020	<0.00040	<0.00040	0.00049	0.00059
	Silver (Ag)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Sodium (Na)-Dissolved (mg/L)	1.92	3.03	3.47	3.46	2.88
	Strontium (Sr)-Dissolved (mg/L)	0.0315	0.0528	0.0590	0.0567	0.0599
	Thallium (TI)-Dissolved (mg/L)	0.000265	0.000135	0.000120	0.000095	0.000090
	Tin (Sn)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Titanium (Ti)-Dissolved (mg/L)	0.00181	0.00206	0.00231	0.00245	0.00220
	Uranium (U)-Dissolved (mg/L)	0.00022	0.00032	0.00041	0.00039	0.00041
	Vanadium (V)-Dissolved (mg/L)	0.00049	0.00056	0.00051	0.00056	0.00057
	Zinc (Zn)-Dissolved (mg/L)	0.0034	0.0058	0.0090	0.0070	0.0045
		1	1	1	1	1

L1010143 CONTD.... PAGE 5 of 6 30-MAY-11 16:00 (MT) Version: FINAL

Sample ID Description Sampled Time Client ID L1010143-6 WATER Z7MAV:11 L1010143-6 WATER Z7MAV:11 L1010143-6 WATER Z7MAV:11 L1010143-6 WATER Z7MAV:11 Grouping Analyte Z7MAV:11 BEACH 2 (2004) SNP 436 (ABOVE) BEACH 2 (2004) BEACH 2 (2004) Grouping Analyte 0.00224 0.00204 0.00205 EBCACH 2 (2004) BEACH 2 (2004) COD0000 COD00000 COD00000 COD00000 COD00000 COD00000 COD00000 COD000000 COD00100 COD00120 COD00120 COD00120 COD00120 COD00120 COD00120 COD0							
GroupingAnalyteIIIWATER0.002340.002050.0000500.000050Bismuth (Bi)-Dissolved (mg/L)0.002340.002040.00020Boron (B)-Dissolved (mg/L)0.01890.01860.0192Cadimirn (Ca)-Dissolved (mg/L)0.000210.000230.00023Calcimirn (Ca)-Dissolved (mg/L)0.000990.001240.00126Chromiurn (Cr)-Dissolved (mg/L)0.000890.001240.00126Cobalt (Ca)-Dissolved (mg/L)0.000890.001210.00023Cobalt (Ca)-Dissolved (mg/L)0.000890.001210.00126Cobalt (Ca)-Dissolved (mg/L)0.000810.000730.00052Iron (Fe)-Dissolved (mg/L)0.000810.000730.00062Iron (Fe)-Dissolved (mg/L)0.000810.000730.00062Magnesium (Mg)-Dissolved (mg/L)0.001580.001630.00173Marganese (Mh)-Dissolved (mg/L)0.005850.001630.00173Mickel (Ni)-Dissolved (mg/L)0.005810.001730.00020Molybdenum (Mo)-Dissolved (mg/L)0.006910.007080.000716Potassium (K)-Dissolved (mg/L)0.006410.00020<0.00020Solum (Na)-Dissolved (mg/L)0.006430.006730.00640Sitror (Ag)-Dissolved (mg/L)0.006430.006740.00020Solum (Na)-Dissolved (mg/L)0.006400.00020<0.00020Solum (Na)-Dissolved (mg/L)0.006400.000651.000204Sitror (G)-Dissolved (mg/L)0.006400.000651.		Description Sampled Date Sampled Time	WATER 27-MAY-11	WATER 27-MAY-11	WATER 27-MAY-11 REACH 0 (BC	WATER 21-MAY-11 REACH 6 EXPOSURE POINT	
WATER 0.00234 0.00234 0.00204 0.00205 Dissolved Metals Beryllium (Be)-Dissolved (mg/L) 0.00234 0.00050 <0.000050 <0.000050 Boron (B)-Dissolved (mg/L) 0.0188 0.0186 0.0192 Cadmium (Cd)-Dissolved (mg/L) 0.00021 0.00023 0.00023 Catcium (Ca)-Dissolved (mg/L) 0.00099 0.00124 0.00126 Cobatt (Co)-Dissolved (mg/L) 0.00089 0.00121 0.00126 Cobatt (Co)-Dissolved (mg/L) 0.00089 0.00121 0.00027 Iron (Fe)-Dissolved (mg/L) 0.00089 0.00121 0.00062 Magnesium (Mg)-Dissolved (mg/L) 0.00061 0.00073 0.00062 Magnesiem (Mg)-Dissolved (mg/L) 0.00158 0.00163 0.00173 Magnesium (Mg)-Dissolved (mg/L) 0.00158 0.00163 0.00173 Motodenum (Mo)-Dissolved (mg/L) 0.00168 0.000163	Grouping	Analyte				(ABOVE)	
Dissolved Metals Beryllium (Be)-Dissolved (mg/L) 0.00224 0.00204 0.00205 Bismuth (Bi)-Dissolved (mg/L) <0.000050						-	
Bismuth (Bi)-Dissolved (mg/L) COUCLAT COUCLAT COUCLAT Bismuth (Bi)-Dissolved (mg/L) 0.0189 0.0188 0.0192 Cadmium (Cd)-Dissolved (mg/L) 0.00021 0.00023 0.00023 Calcium (Cd)-Dissolved (mg/L) 14.7 16.7 15.5 Chromium (Cr)-Dissolved (mg/L) 0.00089 0.00124 0.00126 Cobatt (Co)-Dissolved (mg/L) 0.00585 0.00540 0.00527 Iron (Fe)-Dissolved (mg/L) 0.00061 0.00073 0.00062 Magnesium (Mg)-Dissolved (mg/L) 0.00585 0.00123 0.00162 Marganese (Mn)-Dissolved (mg/L) 0.00661 0.00073 0.00062 Manganese (Mn)-Dissolved (mg/L) 0.168 0.230 0.216 Mercury (Hg)-Dissolved (mg/L) 0.0158 0.00163 0.00173 Nickel (Ni)-Dissolved (mg/L) 0.00691 0.00708 0.00716 Pottassint (K)-Dissolved (mg/L) 0.00641 0.00020 <0.00020	Dissolved Metals	Beryllium (Be)-Dissolved (mg/L)	0.00234	0.00204	0.00205		
Boron (B)-Dissolved (mg/L) 0.0189 0.0186 0.0192 Cadmium (Cd)-Dissolved (mg/L) 0.00021 0.00023 0.00023 Calcium (Ca)-Dissolved (mg/L) 14.7 16.7 15.5 Chromium (Cr)-Dissolved (mg/L) 0.00089 0.00124 0.00126 Cobatt (Co)-Dissolved (mg/L) 0.00585 0.00540 0.00527 Iron (Fe)-Dissolved (mg/L) 0.00061 0.00073 0.00062 Magnesium (Mg)-Dissolved (mg/L) 0.00128 0.00120 4.36 4.02 Marganese (Mn)-Dissolved (mg/L) 0.168 0.230 0.216 Mercury (Hg)-Dissolved (mg/L) 0.00158 0.001020 <0.00020							
Cadmium (Cd)-Dissolved (mg/L) 0.00021 0.00023 0.00023 Calcium (Ca)-Dissolved (mg/L) 14.7 16.7 15.5 Chromium (Cr)-Dissolved (mg/L) 0.00099 0.00124 0.00126 Cobalt (Co)-Dissolved (mg/L) 0.00585 0.00540 0.00527 Iron (Fe)-Dissolved (mg/L) 0.0061 0.00073 0.00062 Magnesium (Mg)-Dissolved (mg/L) 0.168 0.203 0.216 Magnese (Mn)-Dissolved (mg/L) 0.168 0.2000 <0.000020							
Calcium (Ca)-Dissolved (mg/L) 14.7 16.7 15.5 Chromium (Cr)-Dissolved (mg/L) 0.00099 0.00124 0.00126 Cobalt (Co)-Dissolved (mg/L) 0.00898 0.00121 0.0018 Copper (Cu)-Dissolved (mg/L) 0.00585 0.00540 0.00527 Iron (Fe)-Dissolved (mg/L) 0.00061 0.00073 0.00062 Magnesium (Mg)-Dissolved (mg/L) 3.96 4.36 4.02 Marganese (Mn)-Dissolved (mg/L) 0.0158 0.00163 0.00173 Mercury (Hg)-Dissolved (mg/L) 0.00158 0.00163 0.00173 Molybdenum (Mo)-Dissolved (mg/L) 0.00691 0.00708 0.00173 Nickel (Ni)-Dissolved (mg/L) 0.00691 0.00163 0.00173 Selenium (Se)-Dissolved (mg/L) 4.000040 <0.00040		Cadmium (Cd)-Dissolved (mg/L)					
Chromium (Cr)-Dissolved (mg/L) 0.00099 0.00124 0.00126 Cobalt (Co)-Dissolved (mg/L) 0.00089 0.00121 0.0018 Copper (Cu)-Dissolved (mg/L) 0.00585 0.00033 0.073 Lead (Pb)-Dissolved (mg/L) 0.00061 0.00073 0.00062 Magnesium (Mg)-Dissolved (mg/L) 0.168 0.230 0.216 Mercury (Hg)-Dissolved (mg/L) 0.00158 0.00163 0.00173 Molybdenum (Mo)-Dissolved (mg/L) 0.00691 0.00708 0.00173 Nickel (Ni)-Dissolved (mg/L) 0.00020 <0.000020		Calcium (Ca)-Dissolved (mg/L)					
Cobalt (Co)-Dissolved (mg/L) 0.00089 0.00121 0.00118 Copper (Cu)-Dissolved (mg/L) 0.00585 0.00540 0.00527 Iron (Fe)-Dissolved (mg/L) 0.0072 0.0933 0.0733 Lead (Pb)-Dissolved (mg/L) 0.00061 0.00073 0.00062 Magnesium (Mg)-Dissolved (mg/L) 3.96 4.36 4.02 Manganese (Mn)-Dissolved (mg/L) 0.168 0.230 0.216 Mercury (Hg)-Dissolved (mg/L) 0.00158 0.00163 0.00173 Nickel (Ni)-Dissolved (mg/L) 0.00158 0.00163 0.00176 Potassium (K)-Dissolved (mg/L) 0.00163 0.00173 1.23 Selenium (Se)-Dissolved (mg/L) 1.24 1.33 1.23 Selenium (Se)-Dissolved (mg/L) 3.52 3.91 3.74 Strontium (Sr)-Dissolved (mg/L) 0.00020 <0.00020		Chromium (Cr)-Dissolved (mg/L)					
Copper (Cu)-Dissolved (mg/L) 0.00585 0.00540 0.00527 Iron (Fe)-Dissolved (mg/L) 0.072 0.093 0.073 Lead (Pb)-Dissolved (mg/L) 0.00061 0.00073 0.00062 Magnesium (Mg)-Dissolved (mg/L) 3.96 4.36 4.02 Marganese (Mn)-Dissolved (mg/L) 0.168 0.230 0.216 Mercury (Hg)-Dissolved (mg/L) <0.00020		Cobalt (Co)-Dissolved (mg/L)					
Iron (Fe)-Dissolved (mg/L) 0.072 0.093 0.073 Lead (Pb)-Dissolved (mg/L) 0.00061 0.00073 0.00062 Magnesium (Mg)-Dissolved (mg/L) 3.96 4.36 4.02 Marganese (Mn)-Dissolved (mg/L) 0.188 0.230 0.216 Mercury (Hg)-Dissolved (mg/L) 0.0061 0.00708 0.00173 Molybdenum (Mo)-Dissolved (mg/L) 0.00158 0.00163 0.00173 Nickel (Ni)-Dissolved (mg/L) 0.00691 0.00708 0.00716 Potassium (K)-Dissolved (mg/L) 1.24 1.33 1.23 Selenium (Se)-Dissolved (mg/L) <0.00020							
Lead (Pb)-Dissolved (mg/L) 0.00061 0.00073 0.00062 Magnesium (Mg)-Dissolved (mg/L) 3.96 4.36 4.02 Manganese (Mn)-Dissolved (mg/L) 0.168 0.230 0.216 Mercury (Hg)-Dissolved (mg/L) 0.00053 0.00020 <0.000020							
Magnesium (Mg)-Dissolved (mg/L) 3.96 4.36 4.02 Manganese (Mn)-Dissolved (mg/L) 0.168 0.230 0.216 Mercury (Hg)-Dissolved (mg/L) <0.00020							
Manganese (Mn)-Dissolved (mg/L) 0.168 0.230 0.216 Mercury (Hg)-Dissolved (mg/L) <0.000020		Magnesium (Mg)-Dissolved (mg/L)					
Mercury (Hg)-Dissolved (mg/L) <0.000020							
Molybdenum (Mo)-Dissolved (mg/L) 0.00158 0.00163 0.00173 Nickel (Ni)-Dissolved (mg/L) 0.00691 0.00708 0.00716 Potassium (K)-Dissolved (mg/L) 1.24 1.33 1.23 Selenium (Se)-Dissolved (mg/L) <0.00040							
Nickel (Ni)-Dissolved (mg/L) 0.00691 0.00708 0.00716 Potassium (K)-Dissolved (mg/L) 1.24 1.33 1.23 Selenium (Se)-Dissolved (mg/L) <0.00040		Molybdenum (Mo)-Dissolved (mg/L)					
Potassium (K)-Dissolved (mg/L) 1.24 1.33 1.23 Selenium (Se)-Dissolved (mg/L) <0.00040							
Selenium (Se)-Dissolved (mg/L) <0.00040		Potassium (K)-Dissolved (mg/L)					
Silver (Ag)-Dissolved (mg/L) <0.00020		Selenium (Se)-Dissolved (mg/L)					
Sodium (Na)-Dissolved (mg/L) 3.52 3.91 3.74 Strontium (Sr)-Dissolved (mg/L) 0.0643 0.0697 0.0698 Thallium (Tl)-Dissolved (mg/L) 0.000065 0.000055 0.000055 Tin (Sn)-Dissolved (mg/L) <0.00220		Silver (Ag)-Dissolved (mg/L)					
Strontium (Sr)-Dissolved (mg/L) 0.0643 0.0697 0.0698 Thallium (Tl)-Dissolved (mg/L) 0.000065 0.000065 0.000055 Tin (Sn)-Dissolved (mg/L) <0.00220							
Thallium (TI)-Dissolved (mg/L) 0.000065 0.000065 0.000055 Tin (Sn)-Dissolved (mg/L) <0.00020		Strontium (Sr)-Dissolved (mg/L)					
Tin (Sn)-Dissolved (mg/L) <0.00020		Thallium (TI)-Dissolved (mg/L)					
Titanium (Ti)-Dissolved (mg/L) 0.00220 0.00141 0.00208 Uranium (U)-Dissolved (mg/L) 0.00040 0.00046 0.00045 Vanadium (V)-Dissolved (mg/L) 0.00052 0.00055 0.00051							
Uranium (U)-Dissolved (mg/L) 0.00040 0.00046 0.00045 Vanadium (V)-Dissolved (mg/L) 0.00052 0.00055 0.00051							
Vanadium (V)-Dissolved (mg/L) 0.00052 0.00055 0.00051		Uranium (U)-Dissolved (mg/L)					
Zing (Zr) Disselved (meth)							
		Zinc (Zn)-Dissolved (mg/L)					
			0.0000	0.0000	0.00330		
			1	1	1		

Qualifiers for Sample Submission Listed:

Qualifier	Description
SRUL	Sample Received Unpreserved. Results may be biased low for indicated parameter(s) - dissolved metal
SFPL	Sample was Filtered and Preserved at the laboratory - dissolved metal

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLM	Detection Limit Adjusted For Sample Matrix Effects

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ETL-HARDNESS-DIS-ED	Water	Hardness (from Dissolved Ca and Mg)	APHA 2340 B-Calculation
HG-D-L-CVAA-ED	Water	Mercury (Hg) - Dissolved	EPA 245.7 / EPA 245.1
HG-T-L-CVAA-ED	Water	Mercury (Hg)	EPA 245.7 / EPA 245.1
MET-D-L-ICP-ED	Water	Diss. Metals in Water by ICPOES (Low)	APHA 3120 B-ICP-OES
MET-D-L-MS-ED	Water	Diss. Metals in Water by ICPMS (Low)	SW 846 - 6020-ICPMS
MET-T-L-ICP-ED	Water	Total Metals in Water by ICPOES (Low)	APHA 3120 B-ICP-OES
MET-T-L-MS-ED	Water	Total Metals in Water by ICPMS (Low)	SW 846 - 6020-ICPMS
SOLIDS-TOTSUS-ED	Water	Total Suspended Solids	APHA 2540 D-Gravimetric
TURBIDITY-ED	Water	Turbidity	APHA 2130 B-Nephelometer

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
Chain of Custody Numbers:	

1

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory. UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION. Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.





Contact: DCNJV: Katrina Nokleby; Golder: Justine Crowe Image: PDF Image: Excel Image: Digital Image: Fax Address: Email 1: jcrowe@golder.com	MILLUU Steal) i00 MILLUU Steal) r: Justine Crowe P Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat	○ Regular (Standard Turnaround Times - Business Days) ○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm ● Emergency (1-2 Bus, Days) - 100% Surcharge - Contact ALS to Confirm ○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT Analysis Request Please indicate below Filtered, Preserved or both (F, P, F) ○	m TAT
Address: Email 1: jcrowe@golder.com Email 2: hmad.titans@golder.com Phone: 867 669 6735 Fax: Email 3: KatrinaN@nunalogistics.com Invoice To Same as Report ? Yes No Client / Project Information Hardcopy of Invoice with Report ? Yes Deton'Cho/Nuna Joint Venture PO / AFE: 606989 Contact: Brenda Kalis Lob Work Order # LODOJQAS (lab use only) LODOJQAS Sample Sample Identification # (This description will appear on the report) Reach 6 (Giant Falls) 27-May-11 Reach 4 (d/s Giant Pool) 27-May-11 Reach 4 (Under loc) 27-May-11 Surface Water Reach 4 (Under loc)	MILLUU Steal) i00 MILLUU Steal) r: Justine Crowe P Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat	Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm Same Day or Weekend Emergency - Contact ALS to Confirm TAT Analysis Request Please indicate below Filtered, Preserved or both (F, P, F)	m TAT
Entern Entern Entern Email 2: hmachtans@uolder.com Phone: 867 669 6735 Fax: Email 3: KatrinaN@nunalogistics.com nvoice To Same as Report ? Yes No Client / Project Information 1ardcopy of Invoice with Report? Yes No Client / Project Information 1ardcopy of Invoice with Report? Yes No Job #: 09-1427-0006-20000-20500 Company: Deton'Cho/Nuna Joint Venture PO / AFE: 606989	MILIUC Steac) MILIUC Steac) Purity Justine Crower PV Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat	O Same Day or Weekend Emergency - Contact ALS to Confirm TAT Analysis Request Please indicate below Filtered, Preserved or both (F, P, F	
Phone: 867 669 6735 Fax: Email 3: KatrinaM@nunalogistics.com nvoice To Same as Report ? Yes No Client / Project Information Hardcopy of Invoice with Report? Yes No Job #: 09-1427-0006-20000-20500 Company: Deton'Cho/Nuna Joint Venture PO / AFE: 606989 Contact: Brenda Kalis LSD: Address: 9838-31st Avenue., Edmonton AB, T6N 1C5 Phone: 780 408 2897 Fax: 780 408 5472 Quote #: Lab Work Order # LIOLOIOI43 Can Dang MILLe 4: Stewer) (lab use only) Sample Identification Date Time Justime Growree % (This description will appear on the report) Quote #: Sample Type Ketter Reach 6 (Giant Falls) 27-May-11 Surface Water Reach 5 (d/s Pond) 27-May-11 Surface Water Reach 4 (d/s Giant Pool) DUP 27-May-11 Surface Water Reach 4 (d/s Giant Pool) DUP 27-May-11 Surface Water Reach 4 (d/s Giant Pool) DUP 27-May-11 Surface Water Reach 4 (Under Ice) 27-May-11 S	MILIUC Steac) MILIUC Steac) Purity Justine Crower PV Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat	Analysis Request Please indicate below Filtered, Preserved or both (F, P, F	-/P)
Invoice To Same as Report ? Yes No Client / Project Information Hardcopy of Invoice with Report? Yes No Job #: 09-1427-0006-20000-20500 Company: Deton'Cho/Nuna Joint Venture PO / AFE: 606989 Important of the state of the	MILIUC Steac) MILIUC Steac) Purity Justine Crower PV Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat	Please indicate below Filtered, Preserved or both (F, P, F	-/P)
Hardcopy of Invoice with Report? Yes No Job #: 09-1427-0006-20000-20500 Company: Deton'Cho/Nuna Joint Venture PO / AFE: 606989 ISD: Contact: Brenda Kalis LSD: Address: 9838-31st Avenue., Edmonton AB, T6N 1C5 ISD: Phone: 780 408 2897 Fax: 780 408 5472 Quote #: Lab Work Order # (lab use only) LIOLOOIUS ALS Contact: Can Dang MILLUCU Streactory good Sample Sample Identification Date (Ithis description will appear on the report) Date (dd-mmm-yy) Time (httmm) Sample Type Reach 6 (Giant Falls) 27-May-111 Surface Water Reach 4 (d/s Giant Pool) 27-May-111 Surface Water Reach 4 (d/s Giant Pool) DUP 27-May-111 Surface Water Reach 4 (Under ice) 27-May-111 Surface Water	MILLA Stead r: Justine Growd P Surface Wat Surface Wat		=/P)
Company: Deton'Cho/Nuna Joint Venture PO / AFE: 606989 Contact: Brenda Kalis LSD: Address: 9838-31st Avenue., Edmonton AB, T6N 1C5 LSD: Phone: 780 408 2897 Fax: 780 408 5472 Quote #: Lab Work Order # (lab use only) LIOLOOI43 ALS contact: Can Dang MILtact Straction Point (dd.mmm-yy) Sample Mark Contact: Date (dd.mmm-yy) Time (hturm) Sample Type # (This description will appear on the report) 27-May-11 Surface Water Reach 6 (Giant Falls) 27-May-11 Surface Water Reach 4 (d/s Giant Pool) 27-May-11 Surface Water Reach 4 (d/s Giant Pool) 27-May-11 Surface Water Reach 4 (Under Ice) 27-May-11 Surface Water	MILLA Stead r: Justine Growd P Surface Wat Surface Wat	ajor lo	
Contact: Brenda Kalis LSD: Address: 9838-31st Avenue., Edmonton AB, T6N 1C5 Quote #: Phone: 780 408 2897 Fax: 780 408 5472 Quote #: Lab Work Order # (lab use only) LIDIOIU3 ALS Contact: Can Dang MILLeu Stear) Justine Growte Sample Sample Identification (This description will appear on the report) Date (dd-mmm-yy) Time (htmm) Sample Type Reach 6 (Giant Falls) 27-May-11 Surface Water Reach 5 (d/s Pond) 27-May-11 Surface Water Reach 4 (d/s Giant Pool) DUP 27-May-11 Surface Water Reach 4 (d/s Giant Pool) DUP 27-May-11 Surface Water Reach 4 (Under ice) 27-May-11 Surface Water	r: Justine Crowe P ne Sample Typ Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat		
Address: 9838-31st Avenue., Edmonton AB, T6N 1C5 Phone: 780 408 2897 Fax: 780 408 5472 Quote #: Lab Work Order # (lab use only) LIOLOIAGS ALS Contact: Can Dang Contact: Mitter Straction Sample Sample Identification (This description will appear on the report) Date (dd-mmm-yy) Time (htmm) Sample Type Reach 6 (Giant Falls) 27-May-11 Surface Water Reach 5 (d/s Pond) 27-May-11 Surface Water Reach 4 (d/s Giant Pool) DUP 27-May-11 Surface Water Reach 4 (Under ice) 27-May-11 Surface Water	r: Justine Crowe P ne Sample Typ Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat		
Phone: 780 408 2897 Fax: 780 408 5472 Quote #: Lab Work Order # (lab use only) LIOIOI43 ALS Contact: Can Dang Mittle 4 Stews) Sample Sample Identification (This description will appear on the report) Date (dd-mmm-yy) Time (hturm) Sample Type Reach 6 (Giant Falls) 27-May-11 Surface Water Reach 5 (d/s Pond) 27-May-11 Surface Water Reach 4 (d/s Giant Pool) 27-May-11 Surface Water Reach 4 (d/s Giant Pool) 27-May-11 Surface Water Reach 4 (Under ice) 27-May-11 Surface Water	r: Justine Crowe P ne Sample Typ Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat		
Lab Work Order # (lab use only)LIOLOIGASALS Contact:Can DangMitture Strue) Justine Growe QVSampleSample Identification (This description will appear on the report)Date (dd-mmm-yy)Time (htumm)Sample Type#(This description will appear on the report)27-May-11Surface WaterReach 6 (Giant Falls)27-May-11Surface WaterReach 5 (d/s Pond)27-May-11Surface WaterReach 4 (d/s Giant Pool)27-May-11Surface WaterReach 4 (d/s Giant Pool) DUP27-May-11Surface WaterReach 4 (Under ice)27-May-11Surface WaterReach 4 (Under ice)27-May-11Surface Water	r: Justine Crowe P ne Sample Typ Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat	Ved leta	Containers
SampleSample IdentificationContact:Can DangSample:Justine Growe#(This description will appear on the report)Date (dd-mmm-yy)Time (htmm)Sample Type#Reach 6 (Giant Falls)27-May-11Surface WaterReach 5 (d/s Pond)27-May-11Surface WaterReach 4 (d/s Giant Pool)27-May-11Surface WaterReach 4 (d/s Giant Pool) DUP27-May-11Surface WaterReach 4 (Under ice)27-May-11Surface Water	r: Justine Crowe P ne Sample Typ Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat		tai
#(This description will appear on the report)Date (dd-mmm-yy)Time (dd-mmm-yy)Sample Type#(This description will appear on the report)27-May-11Surface WaterReach 6 (Giant Falls)27-May-11Surface WaterReach 5 (d/s Pond)27-May-11Surface WaterReach 4 (d/s Giant Pool)27-May-11Surface WaterReach 4 (d/s Giant Pool)DUP27-May-11Surface WaterReach 4 (Under ice)27-May-11Surface Water	Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat	e d Turb Ss Greas Vel Tor	5
Reach 5 (d/s Pond)27-May-11Surface WaterReach 4 (d/s Giant Pool)27-May-11Surface WaterReach 4 (d/s Giant Pool) DUP27-May-11Surface WaterReach 4 (Under ice)27-May-11Surface Water	Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat	a a Physical Parameters/Major Io Cyanide Cyanide Hardness Hardness TSS and Turbidity Nutrients NH3 / TKN NH3 / TKN Oil and Grease Oil and Grease DOC Low Level Total Metals Low Level Dissolved Metals	Sulphide
Reach 4 (d/s Giant Pool) 27-May-11 Surface Water Reach 4 (d/s Giant Pool) DUP 27-May-11 Surface Water Reach 4 (Under ice) 27-May-11 Surface Water	Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat		3
Reach 4 (d/s Giant Pool) DUP 27-May-11 Surface Water Reach 4 (Under ice) 27-May-11 Surface Water	Surface Wat Surface Wat Surface Wat Surface Wat Surface Wat	─ ╎ ╎ ╎ / ~ / ~ / ~ / ~ / ~ / ~ / ~ / ~ / 	3
Reach 4 (Under ice) 27-May-11 Surface Water	Surface Wat Surface Wat Surface Wat Surface Wat	ter XXX XXX	3
	Surface Wat Surface Wat Surface Wat	ter XXX XXX	
Reach 2 (Pool) 27-May-11 Surface Water	Surface Wat Surface Wat	ter XXX X X	3
	Surface Wat	ter XXX XX	3
SNP43-5 (above) 27-May-11 Surface Water		ter XXX XX	3
Reach 0 (BC Mouth) 27-May-11 Surface Water	Surface Wat	iter XXX X	3
Reach 6 Exposure Point (Above) 21-May-11 Surface Water		iter X	1
Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercia		ercial/AB Tier 1 - Natural, etc) / Hazardous Details	
water Aquatic Life/BC CSR - Co		mm	mmercial/AB Tier 1 - Natural, etc) / Hazardous Details

At Golder Associates we strive to be the most respected global company providing consulting, design, and construction services in earth, environment, and related areas of energy. Employee owned since our formation in 1960, our focus, unique culture and operating environment offer opportunities and the freedom to excel, which attracts the leading specialists in our fields. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees who operate from offices located throughout Africa, Asia, Australasia, Europe, North America, and South America.

Africa Asia Australasia Europe North America South America + 27 11 254 4800 + 86 21 6258 5522 + 61 3 8862 3500 + 356 21 42 30 20 + 1 800 275 3281 + 55 21 3095 9500

solutions@golder.com www.golder.com

Golder Associates Ltd. 102, 2535 - 3rd Avenue S.E. Calgary, Alberta, T2A 7W5 Canada T: +1 (403) 299 5600

