

**SURFACE WATER QUALITY AND HYDROLOGY
MONITORING PROGRAMS
AT THE
CLINTON CREEK MINE SITE, 2012**

FOR



**ASSESSMENT AND ABANDONED MINES
ENERGY MINES AND RESOURCES**

BY



February 2013

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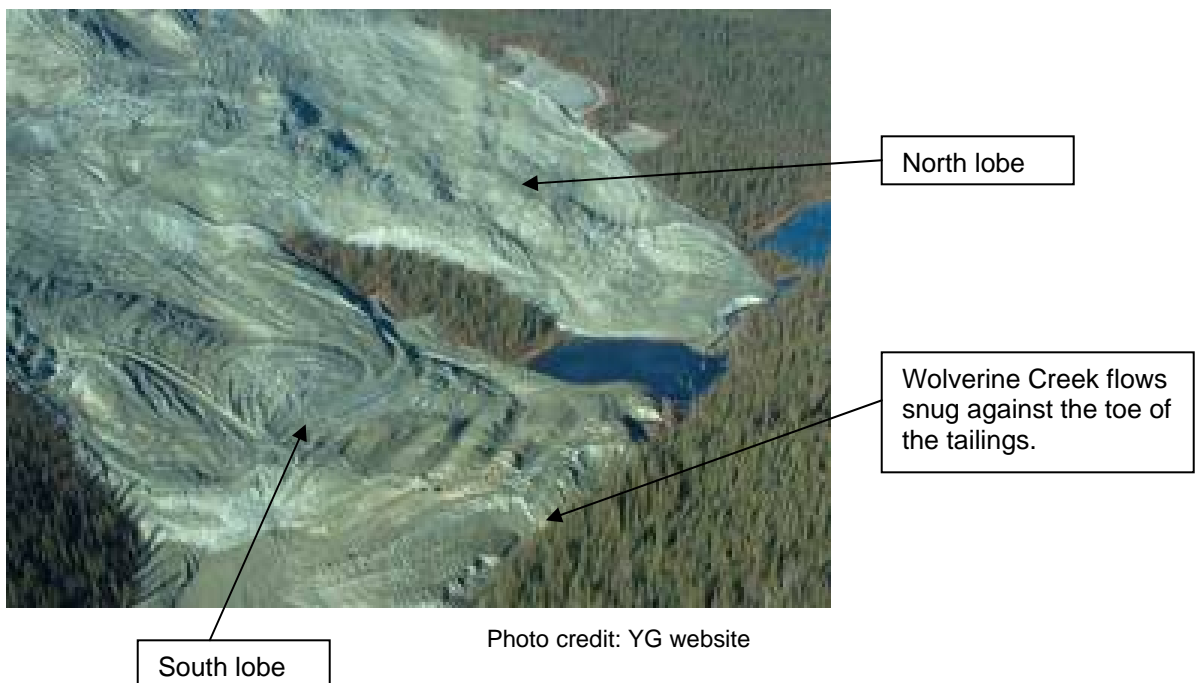
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1.0 BACKGROUND

The former Clinton Creek Asbestos Mine Site is located northwest of Dawson City, Yukon, approximately 100 km by road, and is eight km upstream of the confluence of Clinton Creek and the Forty Mile River. The mine operated from 1967 to 1978. The site encompasses three open pits (Porcupine, Snowshoe and Creek), two waste rock piles (Clinton Creek Dump and Porcupine Creek Dump), and a tailings pile.

In 1974, the original tailings deposit (the south lobe) slid down the Wolverine Creek Valley blocking the flow of Wolverine Creek. The blockage was almost immediately breached dispersing tailings as far as two kilometres downstream. Following the failure of the south lobe, tailings were placed further to the north. By 1986 the north lobe had reached the valley floor forming a second pond.



Also in 1974, 60 million tonnes of the Clinton Creek waste rock pile slumped across the Clinton Creek valley creating Hudgeon Lake. During the 1980s various weirs were constructed to reinforce the Clinton Creek channel in attempts to stabilize and control the outflow from Hudgeon Lake, with limited success. The structures were washed out during a high flow event in 1997. The Federal Government (Department of Indian Affairs and Northern Development) assumed responsibility for the site in 1999; following

Devolution in 2003, the Government of Yukon (YG) assumed responsibility for site management. In a series of stages from 2002 to 2004, gabion drop structures were constructed within the channel downstream of the Hudgeon Lake outlet. YG continues to monitor these structures and conducts repairs as necessary. Currently the site is in the remediation/risk management phase of closure planning under the Federal Contaminated Sites Action Plan (FCSAP) program.

During the summer of 2010, significant flooding occurred in Clinton Creek due to precipitation events coupled with a log jam at the outlet of Hudgeon Lake. This resulted in some damage to the gabion structures, road washouts and landslides in the immediate vicinity.

Road repairs were completed over the summer of 2010 and 2011 with the establishment of a new ford over Clinton Creek at E1 in July 2011. The current access to the lake entails travelling over the waste rock dump since the road that existed adjacent to Clinton Creek downstream of the gabion structures is beyond repair. During September 2011, AECOM Canada Ltd. repaired damages to the gabion drop structures and the channel, with the actual construction undertaken by Copcan Contracting Ltd.

Following the environmental monitoring conducted in 2011, Laberge Environmental Services (Laberge) recommended continued monitoring at the site for 2012, including a minimum of two surface water quality surveys, a stream sediment sampling program and fisheries and benthic invertebrate assessments. YG Assessment and Abandoned Mines (AAM) inspected the site in early summer of 2012 and deemed the site to be unsafe, pending a safety assessment. This was undertaken later in the season and consequently the one round of surface water quality sampling was the only environmental monitoring undertaken in 2012. Laberge was provided with a Health and Safety Plan that was developed for contractors to follow when on site.

1.1 Scope of Work

In the early summer of 2009, Minnow Environmental Inc (Minnow) was contracted by YG to review all existing environmental data pertaining to the Clinton Creek site and make

recommendations for any data gaps. This resulted in an environmental monitoring program conducted in late summer 2009 by Laberge Environmental Services (Laberge Environmental Services, 2010).

Laberge Environmental Services (Laberge) was again contracted by the AAM to conduct various environmental monitoring surveys on Clinton Creek and several of its tributaries during the 2010 season (Laberge 2011). Further monitoring was undertaken by Laberge in 2011 to support the generation of a long-term monitoring plan for the site (Laberge 2012). These two monitoring programs each included two collections of surface water quality samples, including groundwater seepage samples, discharge measurements and a stream sediment survey.

Laberge was contracted to collect one round of surface and groundwater seepage water quality samples and associated stream discharge measurements in 2012. Methods and the results of this monitoring program are summarized in Sections 3.0 and 4.0 of this report.

2.0 STUDY AREA

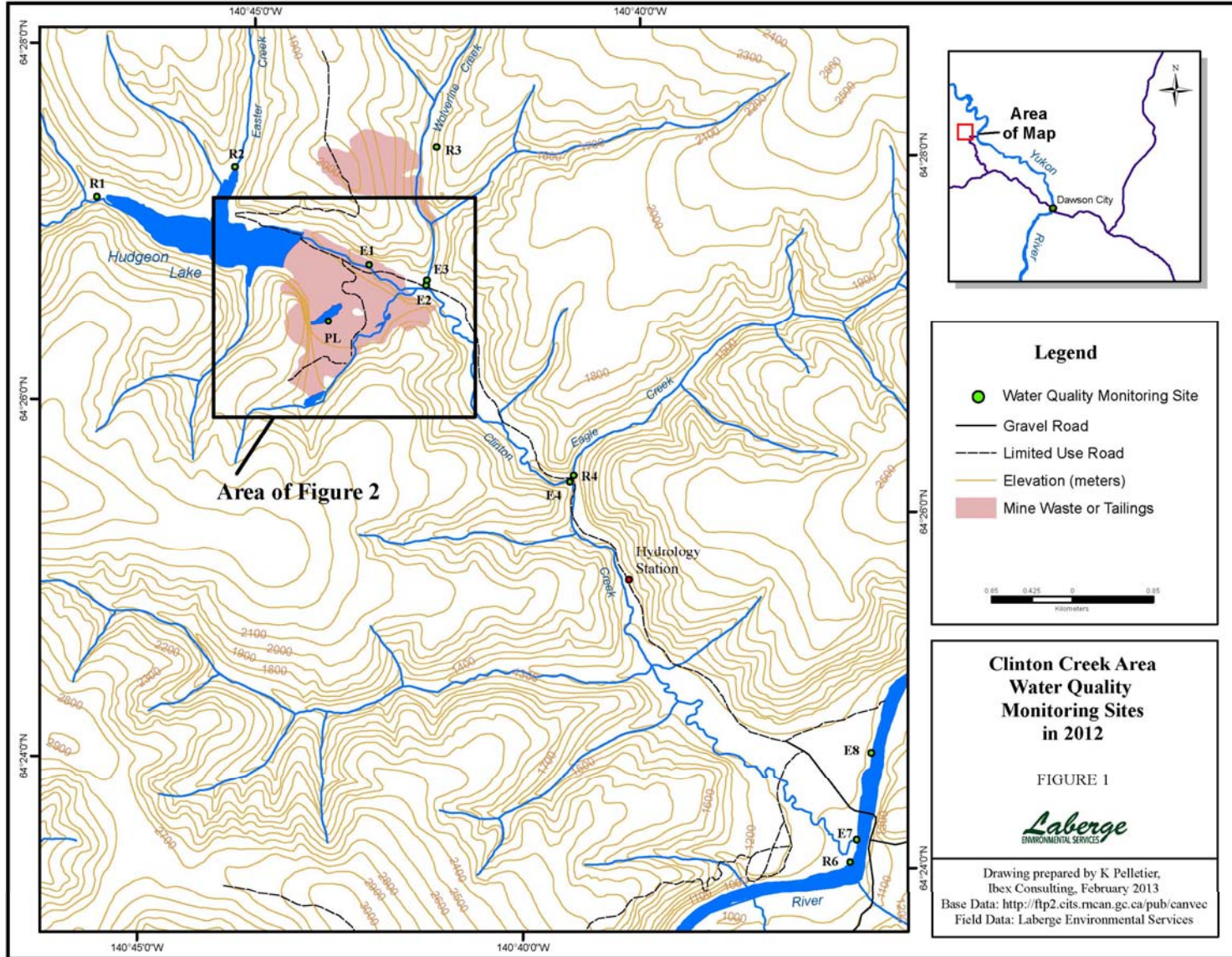
The study area lies in the north-west section of the Klondike Plateau Ecoregion. This ecoregion is part of Beringia and due to the lack of glaciation, V-shaped valleys and extensive upland boulder fields are characteristic. Permafrost is discontinuous but widespread. In the Clinton Creek valley, the south facing slopes are generally well drained and are vegetated with aspen, birch and white spruce. The north facing slopes tend to be underlain with permafrost and contain stands of black spruce.

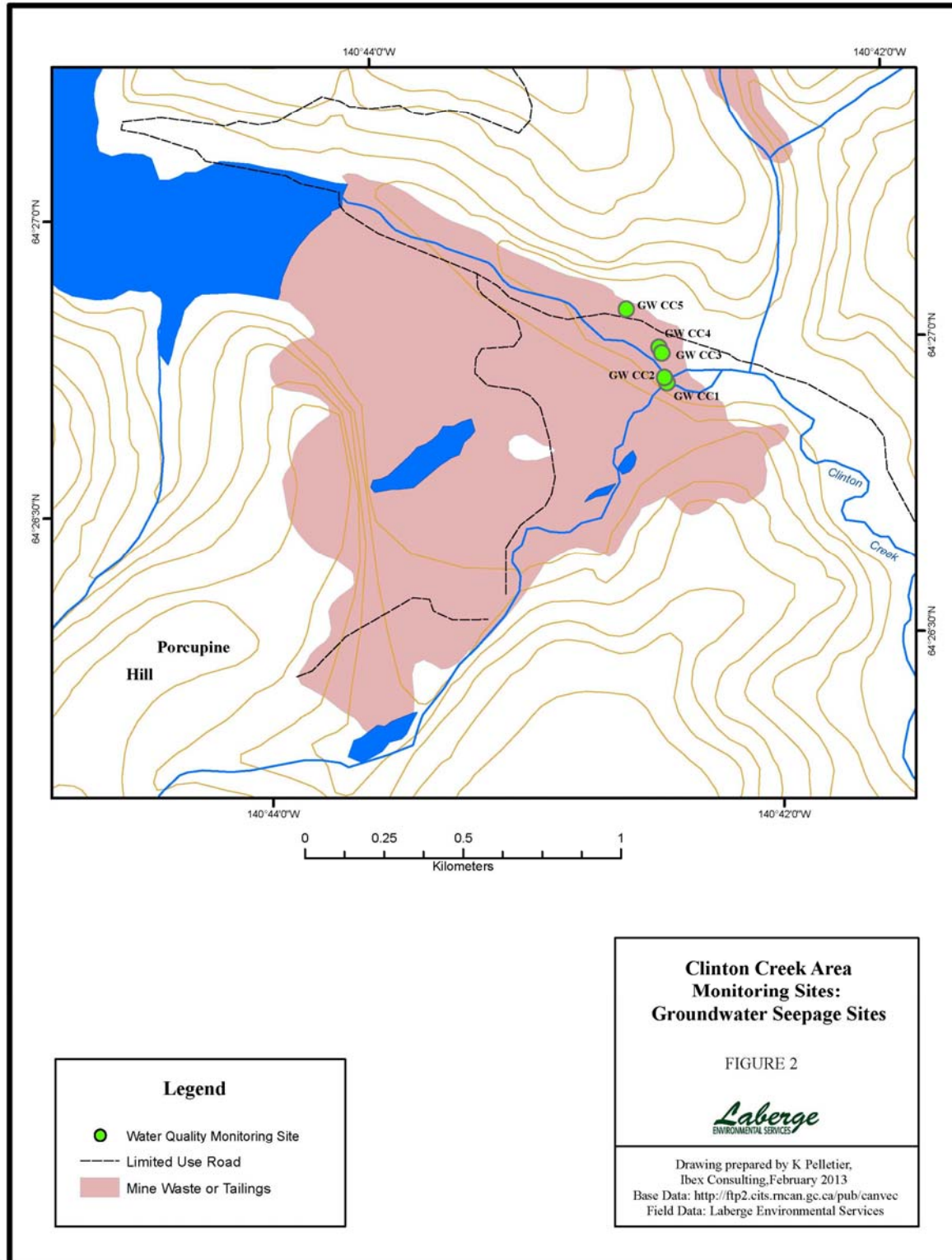
The study area encompasses tributaries to Hudgeon Lake, Clinton Creek and some of its tributaries including groundwater seepage sites, and two sites on the Forty Mile River. Site descriptions and locations are presented in Figures 1 and 2, and below in Table 1.

Due to road washouts resulting from heavy rains and flooding in late summer of 2010, portions of the access road were reconstructed in 2011. Since the flooding had altered the flow path of Clinton Creek downstream of the gabions, a new ford across Clinton Creek near the base of the waste rock dump was created to meet up with the undamaged portion of the road. Access to Hudgeon Lake is now provided by traversing the waste rock dump as opposed to driving alongside Clinton Creek.

Site Type	Water Type	Site #	Site Description	NAD 83 Zone 7W		
				Easting	Northing	
REFERENCE	SURFACE WATER	R1	Clinton Creek u/s Hudgeon Lake	510600	7147506	
		R2	Easter Creek u/s Hudgeon Lake	512006	7148015	
		R3	Wolverine Cr u/s tailings	514079	7148502	
		R4	Eagle Creek u/s culvert	516106	7145161	
		R6	Forty Mile River u/s Clinton Cr	519436	7141962	
EXPOSED		E1	Clinton Creek d/s gabions and u/s Porcupine Creek	513531	7147174	
		PL	Porcupine Pit Lake from shore	513290	7146350	
		SL	Snowshoe Pit Lake	---	---	
		E2	Clinton Creek d/s Porcupine and u/s Wolverine Cr	514299	7146901	
		E3	Wolverine Cr u/s culvert	514315	7147023	
		E4	Clinton Creek d/s Wolverine Cr and u/s Eagle Creek	516072	7145114	
		E7	Clinton Creek near mouth	519517	7141871	
		E8	Forty Mile River d/s Clinton Cr	519455	7142803	
		GW SEEPAGE SITES	GWCC-5	Groundwater flow in old (July 2010) Clinton Creek channel	513925	7146978
			GWCC-4	Groundwater at base of waste rock dump emerging below large rock, flows into side channel u/s ponded area	514000	7146880
	GWCC-3		Groundwater at base of waste rock dump, flows into side channel u/s of ponded area	514009	714685	
	GWCC-2		Groundwater at base of waste rock dump, flows into ponded area northwest of GWCC-1	514018	7146790	
	GWCC-1		Groundwater seepage from base of waste rock dump to dammed and ponded area of Porcupine Creek	513850	7146853	

Note: a sample site has not yet been established on Snowshoe Pit Lake.





3.0 METHODS

The monitoring programs were conducted from October 1st to 5th, 2012. The upstream sites R1 and R2 were accessed by boat from Hudgeon Lake. All other sites were accessed by foot.

3.1 Surface Water Quality

Exova, formerly Bodycote Analytical, supplied Laberge with the necessary sample kits prior to the field trip. Each sample bottle was rinsed three times with the sample waters and then filled and preserved as specified by the laboratory's protocols. Samples were kept cool then shipped as soon as possible to Exova in Surrey, BC. For these analyses Exova used methods as described in Standard Methods for the Examination of Water and Wastewater and from the US Environment Protection Agency test methods.

In situ measurements of pH, conductivity, water temperature and dissolved oxygen were made using hand held instruments that were calibrated daily.

3.2 Water Quantity

Discharge measurements were conducted where possible at each site during the October study period. Spot flow measurements were made using a Price velocity meter following standard velocity-area methods. Ten to 20 measurements were made across each transect with the total discharge recorded as the sum of each of the individual results.

On August 29th, 2012, YG Water Resources installed a new stilling well equipped with a Hobo U20-001-04 water level logger in Clinton Creek. A barometric logger was suspended in the stilling well above the water surface to compensate for atmospheric pressure and convert the data to engineering units (m of water). This location is at Water Resources' previous site that was washed away in 2010, at UTM coordinates Easting 516699 and Northing 7144259, Zone 7, NAD 83. The data logger commenced recording water and air pressure on May 10th and was downloaded on October 9th, 2012.

4.0 RESULTS

4.1 Surface Water Quality

The 11 monitoring sites established at the Clinton Creek mine site in 2009 were sampled in early October 2012. The Porcupine Pit Lake sampling site and five groundwater seepage sites established in 2011 were sampled as well. The groundwater discharges constitute inputs to Clinton Creek between E1 and E2. As no water quality data could be located for Snowshoe Pit Lake, it was added as a sampling location.

One round of surface water quality sampling was completed during the open water season. The weather was already deteriorating and heavy snow falls were encountered on the Top of the World Highway as well as on the Clinton Creek access road. There was very little snow cover however in the lower elevations of the Forty Mile River valley, although the streams were beginning to freeze.

On the final day of sampling, precipitation had increased and another weather system was moving in. In terms of safety a decision was made to cancel sampling the two pits lakes and hiking across the tailings to access W3 (Wolverine Creek upstream of the tailings). These sites should be sampled next season.

Field data is provided in Table 2. The partial dewatering of the beaver pond at Porcupine Creek near E2 was observed during the field visit, an unusual occurrence. During previous years, the water level was high in this ponded area with several overflow streams along the length of the vegetated beaver dam.

The water level in the Forty Mile River was low. Samples were collected from large exposed gravel bars both upstream and downstream of Clinton Creek.

Most of the sampled water bodies were clear. The exceptions were R4 which was significantly turbid, and E1 and E3 which were somewhat turbid.

Water temperatures reflected the seasonality of sampling at the surface water quality sampling sites. The groundwater sites GWCC-3, GWCC-4 and GWCC-5 were quite warm ranging from 8.0°C to 9.1°C.

Site Type	Sample Type	Site #	Date Sampled 2012	Time Sampled	Water Temp oC	pH	Conductivity uS/cm	Dissolved Oxygen mg/L	Dissolved Oxygen %	Average Velocity m/s	Discharge (cms)	Comments	
REFERENCE	SURFACE WATER	R1	Oct 3	15:45	0.4	---	634	12.64	87.4	0.56	0.334	Water clear, frost.	
		R2	Oct 3	14:30	1.7	8.26	580	13.01	93.3	0.36	0.075	Water clear.	
		R4	Oct 2	17:35	0.7	8.31	670	13.64	95.3	0.45	0.110	Water very turbid.	
		R6	Oct 3	10:45	1.4	8.13	281	13.05	93.8	---	---	Water level very low and had to go upstream a distance to get above large back water.	
EXPOSED		E1	Oct 2	16:00	5.6	8.38	583	11.90	95.9	0.63	0.550	Somewhat turbid, light brown. Collected blind duplicate; BD-1.	
		E2	Oct 2	15:15	6.0	8.21	715	11.24	90.3	0.52	0.726	There is a lot less water in the beaver pond and no water water flowing over the dam into creek. Some areas of pond are dry.	
		E3	Oct 2	14:15	2.5	8.33	660	12.87	94.6	0.55	0.102	Somewhat turbid, light brown.	
		E4	Oct 3	11:45	3.4	8.00	756	12.11	91.9	0.69	0.882	Clear water.	
		E7	Oct 3	10:00	2.6	8.12	737	12.72	93.8	0.84	0.919	Water clear, high velocity.	
		E8	Oct 3	9:20	1.7	7.76	286	12.90	92.4	---	---	Clear water, lots of periphyton on rocks, low water.	
		GROUNDWATER SEEPAGE	GWCC-1	Oct 4	10:45	4.1	---	---	4.21	32.2	---	---	Substantial flow but enters at water level of pond.
			GWCC-2	Oct 4	11:15	6.4	---	---	7.17	58.3	---	---	Due to low level of pond could collect actual seep waters through boulders.
	GWCC-3		Oct 4	11:30	8.2	---	---	2.54	21.6	---	---	Collected blind duplicate here labelled BD-2.	
	GWCC-4		Oct 4	11:45	9.1	---	---	2.16	18.8	---	---	No flow sources upstream of this seep.	
	GWCC-5		Oct 2	17:10	8.0	7.38	1133	4.04	32.6			Goes to ground and resurfaces.	

Note that the pH/conductivity meter malfunctioned on the last day of sampling, hence no readings for those sample sites.

All sampled waters were slightly alkaline and the pH ranged from 7.38 at GWCC-5 to 8.38 at E1. High conductivity values were encountered throughout the study area although the sites on the Forty Mile River had significantly lower values.

All surface waters were well aerated and the saturation of dissolved oxygen ranged from 87.4% at R1 to 95.3% at R4. Oxygen levels were depressed at the groundwater seepage sites, which is to be expected due to the limited contact with air.

The analytical data of selected parameters are summarized in Table 3 with comparisons to the Canadian Council of Ministers of the Environment (CCME) water quality guidelines for the

protection of aquatic freshwater life where applicable. The complete analytical report is presented in Appendix B.

Waters were hard in the Forty Mile River and very hard (>181 mg/L as CaCO₃) at the rest of the sites. Several of the groundwater sites had extremely hard water, typical of groundwater sources. Total alkalinity and sulphate concentrations followed the same trend.

Sulphate enters the aquatic environment through leaching of sedimentary rocks including shales, with natural concentrations ranging from 10 to 80 mg/L (CCREM, 1987). Dissolved sulphate concentrations in the Clinton Creek study area ranged from 56.5 mg/L at E8 to 1280 mg/L at GWCC-1. The associated rock in the study area is shale and a contributor of sulphate. There currently are no recommended national (CCME) guidelines for sulphate for the protection of aquatic life; however, British Columbia has set 100 mg/L as a guideline for BC waters. This guideline was exceeded at all locations except at the Forty Mile River sites, R6 and E8.

The CCME recommended metal guidelines for the protection of freshwater aquatic life were exceeded at several of the sites. Some of the metals have guidelines that depend upon the hardness of the water. All of the sites had hard to very hard water. The guideline for cadmium is very conservative but since the majority of the water bodies had hard water, the calculation using the formula $10\{0.86[\log(\text{hardness})]-3.2\}$ was used to determine the site specific guideline for each location. This calculated value is provided in Table 3. The guideline for cadmium was met in all of the dissolved metals samples but was exceeded at the reference sites R1 and R4, and at the exposed site E1 in the totals metals samples.

Copper is another element where toxicity decreases as hardness increases. The CCME guideline for hard waters, 0.003 mg/L has been used for comparison purposes for the October data. This concentration was exceeded in the total metals samples collected from the R1 and R4 only; both are reference sites.

The CCME recommended guideline for iron, 0.3 mg/L, was exceeded at all of the reference sites and at the exposed sites E2, E3, E4, E7 and E8. The greatest concentration of iron was recorded at R1 with a value of 1.29 mg/L.

TABLE 3 SURFACE WATER QUALITY SAMPLING RESULTS (mg/L) FOR THE CLINTON CREEK STUDY AREA, OCTOBER 2012																						
Sample Site	REFERENCE SITES				EXPOSED SITES													Field Blank	Travel Blank	Detection Limit	CCME Guideline	
	R-1	R-2	R-4	R-6	E-1	BD-1	GWCC-5	GWCC-4	GWCC-3	BD-2	GWCC-2	GWCC-1	E-2	E-3	E-4	E-7	E-8					
Date Sampled	10/3/2012	10/3/2012	10/2/2012	10/3/2012	10/2/2012	10/2/2012	10/2/2012	10/4/2012	10/4/2012	10/4/2012	10/4/2012	10/4/2012	10/2/2012	10/2/2012	10/3/2012	10/3/2012	10/3/2012					
Time Sampled	15:00:00	14:00:00	17:00:00	10:00:00	16:00:00		17:00:00	11:00:00	11:00:00		11:00:00	10:00:00	15:00:00	14:00:00	11:00:00	10:00:00	9:00:00					
Total Suspended Solids	22	<2	86	<2	<2	<2	<2	14	<2	<2	<2	<2	<2	13	<2	<2	<2	<2	<2	2		
T-Alkalinity as CaCO ₃	140	156	161	74	142	144	268	173	184	184	242	318	163	132	168	168	75	<5	<5	5		
Sulfate Dissolved	172	134	176	57.7	146	159	354	178	248	268	643	1280	222	211	230	219	56.5	<0.5	<0.5	0.5	100*	
Hardness as CaCO ₃	366	334	390	141	332	335	710	404	502	508	1020	1690	420	380	443	433	148	<5	<5	5		
Aluminum	Dissolved	0.02	0.024	0.034	0.062	0.019	0.018	<0.005	<0.005	<0.005	<0.005	<0.005	0.014	0.029	0.015	0.017	0.065	<0.005	<0.005	0.005	0.1	
	Total	0.226	0.125	0.324	0.146	0.045	0.027	0.002	0.033	0.004	0.005	0.004	0.002	0.046	0.363	0.045	0.06	0.149	0.003	0.002	0.005	0.1
Arsenic	Dissolved	0.0009	0.0009	0.0018	0.0004	0.0008	0.0011	0.001	0.0013	0.0009	0.0011	0.0014	0.002	0.0012	0.001	0.0011	0.001	0.0004	<0.0002	<0.0002	0.0002	0.005
	Total	0.00117	0.00108	0.00246	0.00044	0.00088	0.00082	0.00082	0.00156	0.00089	0.00086	0.00084	0.0017	0.0014	0.00121	0.00119	0.00111	0.00045	<0.00005	<0.00005	0.00005	0.005
Cadmium	Dissolved	0.00008	0.00003	0.00004	0.00001	0.00004	0.00004	0.00005	0.00005	0.00007	0.00008	0.00016	0.0002	0.00004	0.00002	0.00004	0.00006	0.00003	<0.00001	<0.00001	0.00001	**
	Total	0.00011	0.00005	0.0002	0.00004	0.00011	0.00005	0.00007	0.00007	0.00008	0.00009	0.00008	0.00022	0.00006	0.00005	0.00006	0.00007	0.00004	<0.00001	0.00002	0.00001	**
Guideline	0.00010	0.00009	0.00011	0.00004	0.00009	0.00009	0.00018	0.00011	0.00013	0.00013	0.00024	0.00038	0.00011	0.00010	0.00012	0.00012	0.00005					
Chromium	Dissolved	0.0014	0.0015	0.0015	0.0007	0.0014	0.0011	0.0026	0.0016	0.0017	0.0016	0.0025	0.0041	0.0018	0.0016	0.0012	0.0015	0.0007	<0.0004	<0.0004	0.0004	0.001
	Total	0.0008	0.001	0.0015	<0.0005	0.0006	<0.0005	0.0007	0.0025	<0.0005	<0.0005	0.0005	0.0014	0.0013	0.0013	0.0008	0.0008	<0.0005	<0.0005	<0.0005	0.0005	0.001
Copper	Dissolved	0.002	0.001	0.002	0.002	0.002	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.002	0.002	0.002	0.002	<0.001	<0.001	0.001	0.003	
	Total	0.0032	0.0021	0.0046	0.0024	0.0027	0.0026	0.0006	0.0013	0.001	0.001	0.001	0.001	0.0024	0.0027	0.0023	0.0024	0.0024	0.0002	0.0004	0.0001	0.003
Iron	Total	1.29	0.511	0.89	0.418	0.298	0.279	0.008	0.19	0.015	0.013	0.018	0.005	0.537	0.77	0.444	0.465	0.42	0.003	0.004	0.002	0.3
Lead	Dissolved	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.0001	<0.0001	<0.0001	0.0001	0.005	
	Total	0.0004	0.0002	0.0016	<0.0001	0.0016	<0.0001	<0.0001	0.0001	<0.0001	0.0003	<0.0001	<0.0001	0.0001	0.0003	0.0002	0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.005
Selenium	Dissolved	0.001	<0.0006	0.0019	<0.0006	<0.0006	<0.0006	0.0061	<0.0006	<0.0006	0.0017	0.0026	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	0.0006	0.001
	Total	0.0014	0.0007	0.0033	0.0003	0.0009	0.0009	0.0054	0.0005	0.0007	0.0007	0.0007	0.0028	0.001	0.0007	0.0008	0.0008	0.0003	<0.0001	<0.0001	0.0001	0.001
Silver	Dissolved	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.00001	0.0001
	Total	0.00001	<0.00001	0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.00001	0.0001
Zinc	Dissolved	0.003	0.002	0.003	0.008	0.003	0.003	0.002	0.002	0.004	0.004	0.006	0.012	0.003	0.004	0.004	0.006	0.013	0.003	<0.001	0.001	0.030
	Total	0.0054	0.0079	0.0217	0.0048	0.0201	0.0024	0.0018	0.0043	0.0044	0.0077	0.003	0.0081	0.0037	0.0047	0.0061	0.0052	0.005	0.0022	0.0015	0.0005	0.030

NOTES: * BC recommended guideline for protection of freshwater aquatic life
 ** The guideline for cadmium has been calculated using the formula 10(0.86[log(hardness)]-3.2) .
 Values that have exceeded the recommended guidelines have been displayed in bold and highlighted in grey.

The CCME recommended guideline for chromium (0.001 mg/L) was exceeded at all of the sites except the Forty Mile River sites, R6 and E8. Curiously, almost without exception, chromium concentrations were greater in the dissolved metals samples than in the total metals samples. This is too consistent to result from contamination at a particular site (all samples were filtered in the field). Proper protocols were followed in the field; the wearing of latex gloves, using new syringes and filters for each sample, etc. There could not be trace amounts of chromium in the filters because the same supplied filters were used for the dissolved sample for the field blank, which was below the method detection limit. One possible explanation could be laboratory reporting error. The highest concentration in the study area, 0.0041 mg/L occurred in the dissolved metals sample collected from GWCC-1.

Concentrations of selenium at the reference sites R1 and R4, and at the groundwater seepage sites GWCC-5 and GWCC-1, exceeded the CCME recommended guideline for the protection of freshwater aquatic life.

The CCME recommended guidelines for aluminium, arsenic, lead, silver and zinc were met in all of the samples collected from all of the sites.

Some metals exceeded the CCME guidelines at several of the reference sites indicating that these background streams drain mineralized areas.

The CCME recommended guidelines are applicable to total metals only, which includes concentrations contained within the mobilized sediment as well as within the water column. Most metals are more toxic to aquatic life in the dissolved phase.

4.1.1 Quality Assurance and Quality Control

Two blind duplicates were collected as a measure of quality assurance and quality control. Examination of the data (Table 3 and Appendix B) shows that generally good sampling and analytical techniques were employed. A field blank and a travel blank were also components of the QA/QC program. There appears to be a low concentration of zinc in the deionized water used for the blanks.

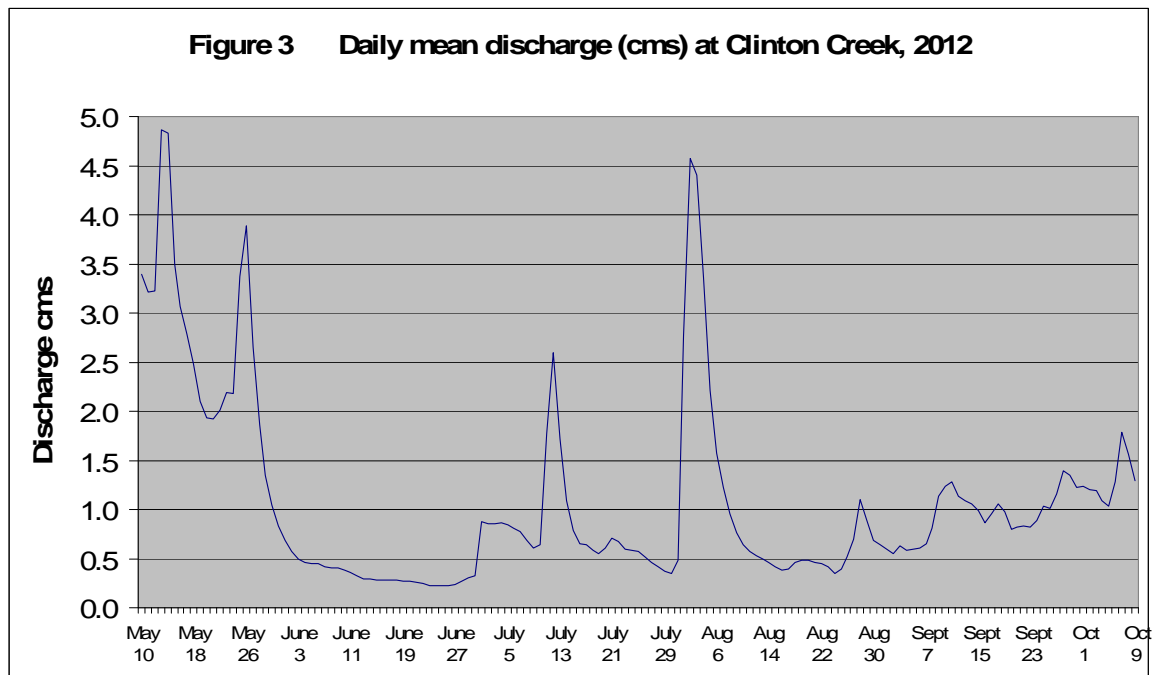
Exova performed their own QA/QC analysis and all tests were passed (Appendix B).

4.2 Hydrology

Discharge measurements were conducted at all of the surface water quality sampling sites with the exception of the Forty Mile River, which was much too large to safely wade. This data is included in Table 2. Discharge is reported as cubic meters per second (cms).

AAM is responsible for the weather station located on the waste rock dump at Clinton Creek. Unfortunately the data logger could not be successfully downloaded and thus there is no climate data for 2012.

YG Water Resources operates a hydrology station on Clinton Creek. Their site is located approximately 1 km downstream from E4. This data is presented as a hydrograph in Figure 3. An examination of this graph indicates that following freshet in early May, Clinton Creek was reacting to local rainfall events on May 26th, July 12th and August 2nd, 2012.



The raw data is presented in Appendix C. Midway through the summer one of the loggers was fluctuating more than expected. Based on comparisons with other sensors, the flows were estimated and YG Water Resources is confident in the reported data (email communication, Jan 22, 2013).

5.0 SUMMARY

The waterbodies sampled in 2012 were alkaline, generally clear and hard to very hard. Several CCME guidelines recommended for the protection of freshwater aquatic life were exceeded throughout the study area at both the reference and the exposed sites.

The groundwater seepage sites had significantly greater concentrations of sulphate and the metals that contribute to hardness, than the surface water quality sites located on Clinton Creek and its tributaries.

The hydrology data indicates that flows were seasonal during the October sampling period.

6.0 RECOMMENDATIONS

There is a limited amount of water quality data for this site and a database should be set up to monitor and assess any trends over time. The established sites should continue to be monitored, at a minimum of twice a year. Once sufficient data has been acquired, it will then be easier to determine which sites to include in the long term monitoring program. The instability of the tailings and the waste rock dump dictate the need for on-going monitoring.

It is recommended that a sample site be established on Snowshoe Pit Lake to characterize and monitor the water quality. It is located upstream of the beaver pond and may be hydraulically linked to GW-CC1. Access is difficult to this site which may limit the regularity of sampling but at least one set should be collected and analyzed for the complete suite of parameters.

Stream sediment samples should be collected annually to track the mobilization of the tailings. The collection of stream sediment samples was not a component of the 2012 monitoring program but every effort should be made to include this survey in future programs. The tailings (total volume of 10 to 12 million tons) are continually moving downslope, albeit slowly, and eroding into Wolverine Creek (AECOM, 2011). The leading edge of the tailings is steep and material also frequently slumps into the creek channel. The south and north lobes cover approximately a 750 m length of the creek to a depth of up to 14m above the original creek bed (AECOM, 2011). There is a rock lined channel providing a transition across the tailings downstream of the south lobe to the natural Wolverine Creek channel, whose purpose is to prevent the downcutting of Wolverine Creek into the tailings. Due to the instability of the tailings, the overall transportation of tailings to the receiving environment is an inevitable process.

The instability of chrysotile asbestos minerals is known to release associated trace metals such as chromium, cobalt, nickel and manganese. To examine the fate and transport of these metals in the aquatic ecosystem, it is recommended that slimy sculpin in the Clinton Creek drainage be sampled for whole body metal analysis. Schreier *et al*

(1987) speculate that there may be effects on aquatic biota from these associated trace metals that are released into the stream through the leaching of the chrysotile fibres (Schreier *et al*, 1987). Chromium and nickel have been documented in very high concentrations in the stream sediments at several of the sites within the drainage in past surveys.

Studies conducted on fish in Clinton Creek during 2010 (DFO, in preparation) did not detect any detrimental impacts from exposure to waterborne asbestos, however it is unknown whether exposure to the metal laden sediments in Clinton Creek have any negative influences on the resident slimy sculpin populations. Slimy sculpin are a benthic fish living its life in close proximity to the substrate and thus have a high exposure to these metal laden sediments. In addition, slimy sculpin do not travel very far from where they hatch creating greater exposure to the metals over their lifetime.

A fairly extensive database of metals in slimy sculpin tissues exists and it would be worthwhile to determine the range of concentrations found in the sculpins from the Clinton Creek drainage and compare them regionally. One of the components of the closure options include preserving and/or enhancing fish habitat to benefit several species (juvenile Chinook salmon and Arctic grayling) in Clinton Creek, and assessing the bioavailability of the common metals in this area would either support or undermine that goal.

It is recommended that a benthic invertebrate monitoring program also be conducted in 2013 to further characterize fish habitat, as well as to assess the health of the watershed. Unlike chemical measures, invertebrate assemblages reflect long-term exposure to varying water quality conditions and thus integrate effects of contaminants over time (Rosenberg and Resh, 1993). These organisms are useful in this respect as their abundance and taxonomic diversity respond to a wide range of impacts including sedimentation, organic loading and changes in chemical water quality. Using benthic invertebrates as biomonitoring tools offers many advantages for the following reasons; they are ubiquitous, they are abundant and easy to collect, there are a large number of species offering a spectrum of responses to environmental stress, they are generally sedentary and therefore are representative of local conditions, and they have long life

cycles compared to other groups (i.e. periphyton). As such, benthic macroinvertebrates act as continuous monitors of the water they inhabit and therefore can serve as sentinels of change in local conditions. Clinton Creek is very dynamic and it recommended that another benthos assessment be done. Benthic monitoring programs have only been completed in 1975 (Landucci, 1978), in 2007 (White Mountain Environmental Consulting, 2009) and in 2009 (Laberge 2010).

7.0 REFERENCES

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APPENDIX A

PHOTOGRAPHS OF THE SITES IN THE

CLINTON CREEK STUDY AREA



R1, Clinton Creek u/s Hudgeon Lake, October 3rd, 2012.



R2, Easter Creek u/s Hudgeon Lake, October 3rd, 2012.



R4, Eagle Creek upstream Clinton Creek, October 2nd, 2012.



R6, Forty Mile River u/s Clinton Creek, October Oct 3rd, 2012.



E2, Clinton Creek u/s Wolverine Creek, October 2nd, 2012.



E1, Clinton Creek d/s gabions and d/s ford to Hudgeon Lake, October 2nd, 2012.



E7, Clinton Creek at the mouth, u/s Forty Mile River, Oct 3/12.



E3, Wolverine Creek u/s Clinton Creek, looking towards the Clinton Creek Mine Road, October 3rd, 2012.



E8, Forty Mile River d/s Clinton Creek October 3rd, 2012.



GWCC-1, groundwater seepage flows into the beaver pond, October 4th, 2012.



GWCC-2, groundwater seeps through these rocks into the beaver pond, October 4th, 2012.



GWCC-3, groundwater seeps from the hillside at the base of the waste rock dump, October 4th, 2012.



GWCC-4, groundwater daylights from under the boulders at the base of the waste rock dump, October 4th, 2012.



GWCC-5, a groundwater source daylights in the old channel of Clinton Creek d/s of the original E1, October 2nd, 2012.

APPENDIX B

WATER QUALITY ANALYTICAL REPORT FROM EXOVA

Report Transmission Cover Page

Bill To: Laberge Environmental Services	Project:	Lot ID: 898270
Report To: Laberge Environmental Services	ID:	Control Number:
Box 21072	Name: Clinton Creek	Date Received: Oct 9, 2012
1-405 Ogilvie Street	Location: Clinton Creek	Date Reported: Dec 28, 2012
Whitehorse, YT, Canada	LSD:	Report Number: 1795065
Y1A 6P7	P.O.:	
Attn: Bonnie Burns	Acct code:	
Sampled By:		
Company:		

Contact & Affiliation	Address	Delivery Commitments
Bonnie Burns	1-405 Ogilvie Street, Box 21072	On [Lot Verification] send
Laberge Environmental Services	Whitehorse, Yukon Territory Y1A 6P7	(COA) by Email - Single Report
	Phone: (867) 668-6838	On [Report Approval] send
	Fax: (867) 667-6956	(COC, Test Report) by Email - Multiple Reports
	Email: bonnieburns@northwestel.net	On [Report Approval] send
		(COC, Test Report) by Email - Multiple Reports
		On [Lot Approval and Final Test Report Approval] send
		(Invoice) by Email - Single Report
		On [Lot Creation] send
		(COR) by Email - Single Report

Notes To Clients:

- Report was re-issued to correct the titanium result on all samples previously reported on Test Report 1772978. Report 1795065 replaces report 1772978.
- Upon receipt, samples had exceeded recommended holding time for nitrate and nitrite analysis.

The information contained on this and all other pages transmitted, is intended for the addressee only and is considered confidential. If the reader is not the intended recipient, you are hereby notified that any use, dissemination, distribution or copy of this transmission is strictly prohibited. If you receive this transmission by error, or if this transmission is not satisfactory, please notify us by telephone.

Sample Custody

Bill To: Laberge Environmental Services Project: _____
Report To: Laberge Environmental Services ID: _____
Box 21072 Name: Clinton Creek
1-405 Ogilvie Street Location: Clinton Creek
Whitehorse, YT, Canada LSD:
Y1A 6P7 P.O.:
Attn: Bonnie Burns Acct code:
Sampled By:
Company:

Lot ID: **898270**
Control Number:
Date Received: Oct 9, 2012
Date Reported: Dec 28, 2012
Report Number: 1795065

Sample Disposal Date: November 14, 2012

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

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

The following charges apply to extended sample storage:

Storage for an additional 30 days	\$ 2.50 per sample
Storage for an additional 60 days	\$ 5.00 per sample
Storage for an additional 90 days	\$ 7.50 per sample

Return Sample, collect, to the address below via:

Greyhound

DHL

Purolator

Other (specify) _____

Name _____

Company _____

Address _____

Phone _____

Fax _____

Signature _____

Analytical Report

Bill To: Laberge Environmental Services Project:
 Report To: Laberge Environmental Services ID:
 Box 21072 Name: Clinton Creek
 1-405 Ogilvie Street Location: Clinton Creek
 Whitehorse, YT, Canada LSD:
 Y1A 6P7 P.O.:
 Attn: Bonnie Burns Acct code:

Sampled By:
 Company:

Lot ID: **898270**
 Control Number:
 Date Received: Oct 9, 2012
 Date Reported: Dec 28, 2012
 Report Number: 1795065

		Reference Number	898270-1	898270-2	898270-3	
		Sample Date	Oct 03, 2012	Oct 03, 2012	Oct 02, 2012	
		Sample Time	15:00	14:00	17:00	
		Sample Location				
		Sample Description	R-1	R-2	R-4	
		Matrix	Water	Water	Water	
Analyte	Units	Results	Results	Results	Nominal Detection Limit	
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	14.9	11.2	15.1	0.5
Orthophosphate-P	Dissolved	mg/L	<0.002	0.004	<0.002	0.002
Phosphorus	Total	mg/L	0.032	0.008	0.075	0.003
Ammonia - N		mg/L	0.02	<0.01	<0.01	.01
Metals Dissolved						
Sulfur	Dissolved	mg/L	64.3	49.4	65.3	0.2
Aluminum	Dissolved	mg/L	0.020	0.024	0.034	0.005
Antimony	Dissolved	mg/L	0.0004	0.0006	0.0005	0.0002
Arsenic	Dissolved	mg/L	0.0009	0.0009	0.0018	0.0002
Barium	Dissolved	mg/L	0.054	0.044	0.063	0.001
Beryllium	Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L	0.008	0.012	<0.004	0.004
Cadmium	Dissolved	mg/L	0.00008	0.00003	0.00004	0.00001
Chromium	Dissolved	mg/L	0.0014	0.0015	0.0015	0.0004
Cobalt	Dissolved	mg/L	0.00104	0.00027	0.00091	0.00002
Copper	Dissolved	mg/L	0.002	0.001	0.002	0.001
Lead	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium	Dissolved	mg/L	0.004	0.007	0.006	0.001
Molybdenum	Dissolved	mg/L	0.00157	0.00076	0.00099	0.0001
Nickel	Dissolved	mg/L	0.008	0.004	0.012	0.001
Selenium	Dissolved	mg/L	0.0010	<0.0006	0.0019	0.0006
Silver	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Titanium	Dissolved	mg/L	<0.010	<0.010	<0.010	0.01
Strontium	Dissolved	mg/L	0.377	0.330	0.466	0.001
Tellurium	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Thorium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium	Dissolved	mg/L	0.0020	0.0035	0.0062	0.0004
Vanadium	Dissolved	mg/L	0.00050	0.00053	0.00045	0.0001
Zinc	Dissolved	mg/L	0.003	0.002	0.003	0.001
Zirconium	Dissolved	mg/L	0.00094	0.00057	0.00228	0.0001
Metals Total						
Aluminum	Total	mg/L	0.226	0.125	0.324	0.005
Antimony	Total	mg/L	0.0004	0.0006	0.0004	0.0001

Analytical Report

Bill To: Laberge Environmental Services	Project:	Lot ID: 898270
Report To: Laberge Environmental Services	ID:	Control Number:
Box 21072	Name: Clinton Creek	Date Received: Oct 9, 2012
1-405 Ogilvie Street	Location: Clinton Creek	Date Reported: Dec 28, 2012
Whitehorse, YT, Canada	LSD:	Report Number: 1795065
Y1A 6P7	P.O.:	
Attn: Bonnie Burns	Acct code:	
Sampled By:		
Company:		

	Reference Number	898270-1	898270-2	898270-3		
	Sample Date	Oct 03, 2012	Oct 03, 2012	Oct 02, 2012		
	Sample Time	15:00	14:00	17:00		
	Sample Location					
	Sample Description	R-1	R-2	R-4		
	Matrix	Water	Water	Water		
Analyte	Units	Results	Results	Results	Nominal Detection Limit	
Metals Total - Continued						
Arsenic	Total	mg/L	0.00117	0.00108	0.00246	0.00005
Barium	Total	mg/L	0.0638	0.0655	0.132	0.00005
Beryllium	Total	mg/L	<0.00005	<0.00005	<0.00005	0.00005
Bismuth	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Boron	Total	mg/L	0.010	0.013	0.004	.002
Cadmium	Total	mg/L	0.00011	0.00005	0.00020	0.00001
Calcium	Total	mg/L	77.3	61.3	85.5	0.05
Chromium	Total	mg/L	0.0008	0.0010	0.0015	0.0005
Cobalt	Total	mg/L	0.0011	0.0003	0.0013	0.0001
Copper	Total	mg/L	0.0032	0.0021	0.0046	0.0001
Iron	Total	mg/L	1.29	0.511	0.890	0.002
Lead	Total	mg/L	0.0004	0.0002	0.0016	0.0001
Lithium	Total	mg/L	0.0030	0.0054	0.0052	0.0005
Magnesium	Total	mg/L	37.3	43.5	43.0	0.04
Manganese	Total	mg/L	0.563	0.163	0.350	0.001
Molybdenum	Total	mg/L	0.00173	0.00089	0.00102	0.00005
Nickel	Total	mg/L	0.0067	0.0039	0.0143	0.0002
Potassium	Total	mg/L	0.6	0.7	0.6	0.1
Selenium	Total	mg/L	0.0014	0.0007	0.0033	0.0001
Silicon	Total	mg/L	5.03	6.14	5.83	0.02
Silver	Total	mg/L	0.00001	<0.00001	0.00001	0.0005
Sodium	Total	mg/L	3.4	3.6	4.8	0.1
Strontium	Total	mg/L	0.368	0.334	0.470	0.0001
Thallium	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Thorium	Total	mg/L	0.00009	0.00004	0.00006	0.00001
Tin	Total	mg/L	0.0002	0.0002	0.0001	0.0001
Titanium	Total	mg/L	0.0119	0.0075	0.0184	0.0005
Uranium	Total	mg/L	0.00198	0.00345	0.00578	0.00001
Vanadium	Total	mg/L	0.0011	0.0007	0.0015	0.0001
Zinc	Total	mg/L	0.0054	0.0079	0.0217	0.0005
Zirconium	Total	mg/L	0.0009	0.0007	0.0028	0.0005
Hardness	as CaCO3	mg/L	346	332	391	1
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	22	<2	86	2
Routine Water						
pH	at 25 °C		7.50	7.76	7.83	

Analytical Report

Bill To: Laberge Environmental Services	Project:	Lot ID: 898270
Report To: Laberge Environmental Services	ID:	Control Number:
Box 21072	Name: Clinton Creek	Date Received: Oct 9, 2012
1-405 Ogilvie Street	Location: Clinton Creek	Date Reported: Dec 28, 2012
Whitehorse, YT, Canada	LSD:	Report Number: 1795065
Y1A 6P7	P.O.:	
Attn: Bonnie Burns	Acct code:	
Sampled By:		
Company:		

	Reference Number	898270-1	898270-2	898270-3	
	Sample Date	Oct 03, 2012	Oct 03, 2012	Oct 02, 2012	
	Sample Time	15:00	14:00	17:00	
	Sample Location				
	Sample Description	R-1	R-2	R-4	
	Matrix	Water	Water	Water	
Analyte	Units	Results	Results	Results	Nominal Detection Limit
Routine Water - Continued					
Electrical Conductivity	µS/cm at 25 C	613	548	632	1
Calcium	Dissolved mg/L	81.9	61.8	83.9	0.1
Iron	Dissolved mg/L	0.621	0.240	0.181	0.005
Magnesium	Dissolved mg/L	39.2	43.7	43.9	0.1
Manganese	Dissolved mg/L	0.536	0.139	0.281	0.001
Potassium	Dissolved mg/L	0.6	0.7	0.5	0.1
Silicon	Dissolved mg/L	4.50	5.48	5.03	0.05
Sodium	Dissolved mg/L	3.4	3.4	4.7	0.1
Bicarbonate	mg/L	170	190	196	5
Carbonate	mg/L	<6	<6	<6	6
Hydroxide	mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO ₃ mg/L	140	156	161	5
Nitrate - N	Dissolved mg/L	0.25	0.06	0.23	0.01
Nitrite - N	Dissolved mg/L	<0.01	<0.01	<0.01	0.01
Sulfate (SO ₄)	Dissolved mg/L	172	134	176	0.5
Hardness	as CaCO ₃ mg/L	366	334	390	5

Analytical Report

Bill To: Laberge Environmental Services	Project:	Lot ID: 898270
Report To: Laberge Environmental Services	ID:	Control Number:
Box 21072	Name: Clinton Creek	Date Received: Oct 9, 2012
1-405 Ogilvie Street	Location: Clinton Creek	Date Reported: Dec 28, 2012
Whitehorse, YT, Canada	LSD:	Report Number: 1795065
Y1A 6P7	P.O.:	
Attn: Bonnie Burns	Acct code:	
Sampled By:		
Company:		

		Reference Number	898270-4	898270-5	898270-6	
		Sample Date	Oct 03, 2012	Oct 02, 2012	Oct 02, 2012	
		Sample Time	10:00	16:00	17:00	
		Sample Location				
		Sample Description	R-6	E-1	GWCC-5	
		Matrix	Water	Water	Water	
Analyte	Units	Results	Results	Results	Nominal Detection Limit	
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	9.4	16.0	7.2	0.5
Orthophosphate-P	Dissolved	mg/L	<0.002	<0.002	<0.002	0.002
Phosphorus	Total	mg/L	0.006	0.008	0.004	0.003
Ammonia - N		mg/L	<0.01	0.01	<0.01	.01
Metals Dissolved						
Sulfur	Dissolved	mg/L	20.1	54.2	131	0.2
Aluminum	Dissolved	mg/L	0.062	0.019	<0.005	0.005
Antimony	Dissolved	mg/L	<0.0002	0.0003	0.0006	0.0002
Arsenic	Dissolved	mg/L	0.0004	0.0008	0.0010	0.0002
Barium	Dissolved	mg/L	0.046	0.060	0.043	0.001
Beryllium	Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L	<0.004	0.01	0.046	0.004
Cadmium	Dissolved	mg/L	0.00001	0.00004	0.00005	0.00001
Chromium	Dissolved	mg/L	0.0007	0.0014	0.0026	0.0004
Cobalt	Dissolved	mg/L	0.00062	0.00057	0.00020	0.00002
Copper	Dissolved	mg/L	0.002	0.002	<0.001	0.001
Lead	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium	Dissolved	mg/L	0.005	0.005	0.020	0.001
Molybdenum	Dissolved	mg/L	0.00046	0.00152	0.00151	0.0001
Nickel	Dissolved	mg/L	0.004	0.006	0.047	0.001
Selenium	Dissolved	mg/L	<0.0006	<0.0006	0.0061	0.0006
Silver	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Titanium	Dissolved	mg/L	<0.010	<0.010	<0.010	0.01
Strontium	Dissolved	mg/L	0.187	0.351	1.080	0.001
Tellurium	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium	Dissolved	mg/L	<0.00001	<0.00001	0.00003	0.00001
Thorium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium	Dissolved	mg/L	0.0013	0.0025	0.0037	0.0004
Vanadium	Dissolved	mg/L	0.00039	0.00051	0.00052	0.0001
Zinc	Dissolved	mg/L	0.008	0.003	0.002	0.001
Zirconium	Dissolved	mg/L	0.00053	0.00083	0.00025	0.0001
Metals Total						
Aluminum	Total	mg/L	0.146	0.045	0.002	0.005
Antimony	Total	mg/L	0.0001	0.0004	0.0006	0.0001

Analytical Report

Bill To: Laberge Environmental Services	Project:	Lot ID: 898270
Report To: Laberge Environmental Services	ID:	Control Number:
Box 21072	Name: Clinton Creek	Date Received: Oct 9, 2012
1-405 Ogilvie Street	Location: Clinton Creek	Date Reported: Dec 28, 2012
Whitehorse, YT, Canada	LSD:	Report Number: 1795065
Y1A 6P7	P.O.:	
Attn: Bonnie Burns	Acct code:	
Sampled By:		
Company:		

		Reference Number	898270-4	898270-5	898270-6	
		Sample Date	Oct 03, 2012	Oct 02, 2012	Oct 02, 2012	
		Sample Time	10:00	16:00	17:00	
		Sample Location				
		Sample Description	R-6	E-1	GWCC-5	
		Matrix	Water	Water	Water	
Analyte		Units	Results	Results	Results	Nominal Detection Limit
Metals Total - Continued						
Arsenic	Total	mg/L	0.00044	0.00088	0.00082	0.00005
Barium	Total	mg/L	0.0451	0.119	0.0457	0.00005
Beryllium	Total	mg/L	<0.00005	<0.00005	<0.00005	0.00005
Bismuth	Total	mg/L	0.0001	<0.0001	0.0001	0.0001
Boron	Total	mg/L	0.004	0.011	0.040	.002
Cadmium	Total	mg/L	0.00004	0.00011	0.00007	0.00001
Calcium	Total	mg/L	34.3	74.5	149	0.05
Chromium	Total	mg/L	<0.0005	0.0006	0.0007	0.0005
Cobalt	Total	mg/L	0.0006	0.0005	<0.0001	0.0001
Copper	Total	mg/L	0.0024	0.0027	0.0006	0.0001
Iron	Total	mg/L	0.418	0.298	0.008	0.002
Lead	Total	mg/L	<0.0001	0.0016	<0.0001	0.0001
Lithium	Total	mg/L	0.0043	0.0043	0.0159	0.0005
Magnesium	Total	mg/L	12.1	37.9	73.6	0.04
Manganese	Total	mg/L	0.0459	0.297	0.0023	0.001
Molybdenum	Total	mg/L	0.00053	0.00176	0.00175	0.00005
Nickel	Total	mg/L	0.0031	0.0054	0.0410	0.0002
Potassium	Total	mg/L	1.1	0.8	1.3	0.1
Selenium	Total	mg/L	0.0003	0.0009	0.0054	0.0001
Silicon	Total	mg/L	4.82	4.85	5.50	0.02
Silver	Total	mg/L	<0.00001	<0.00001	<0.00001	0.0005
Sodium	Total	mg/L	5.7	3.6	5.9	0.1
Strontium	Total	mg/L	0.181	0.356	1.25	0.0001
Thallium	Total	mg/L	<0.00001	<0.00001	0.00004	0.00001
Thorium	Total	mg/L	0.00005	0.00004	<0.00001	0.00001
Tin	Total	mg/L	0.0001	0.0002	0.0002	0.0001
Titanium	Total	mg/L	0.0006	0.0048	0.0186	0.0005
Uranium	Total	mg/L	0.00116	0.00228	0.00375	0.00001
Vanadium	Total	mg/L	0.0006	0.0004	<0.0001	0.0001
Zinc	Total	mg/L	0.0048	0.0201	0.0018	0.0005
Zirconium	Total	mg/L	0.0005	0.0009	<0.0005	0.0005
Hardness	as CaCO3	mg/L	136	342	675	1
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	<2	<2	<2	2
Routine Water						
pH	at 25 °C		7.60	7.88	7.18	

Analytical Report

Bill To: Laberge Environmental Services	Project:	Lot ID: 898270
Report To: Laberge Environmental Services	ID:	Control Number:
Box 21072	Name: Clinton Creek	Date Received: Oct 9, 2012
1-405 Ogilvie Street	Location: Clinton Creek	Date Reported: Dec 28, 2012
Whitehorse, YT, Canada	LSD:	Report Number: 1795065
Y1A 6P7	P.O.:	
Attn: Bonnie Burns	Acct code:	
Sampled By:		
Company:		

	Reference Number	898270-4	898270-5	898270-6	
	Sample Date	Oct 03, 2012	Oct 02, 2012	Oct 02, 2012	
	Sample Time	10:00	16:00	17:00	
	Sample Location				
	Sample Description	R-6	E-1	GWCC-5	
	Matrix	Water	Water	Water	
Analyte	Units	Results	Results	Results	Nominal Detection Limit
Routine Water - Continued					
Electrical Conductivity	µS/cm at 25 C	260	541	1050	1
Calcium	Dissolved mg/L	36.0	70.8	155	0.1
Iron	Dissolved mg/L	0.266	0.210	0.008	0.005
Magnesium	Dissolved mg/L	12.4	37.8	78.4	0.1
Manganese	Dissolved mg/L	0.042	0.271	<0.001	0.001
Potassium	Dissolved mg/L	1.2	0.7	1.3	0.1
Silicon	Dissolved mg/L	4.40	4.36	5.26	0.05
Sodium	Dissolved mg/L	5.3	3.3	5.7	0.1
Bicarbonate	mg/L	91	174	327	5
Carbonate	mg/L	<6	<6	<6	6
Hydroxide	mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO3 mg/L	74	142	268	5
Nitrate - N	Dissolved mg/L	0.20	0.14	0.05	0.01
Nitrite - N	Dissolved mg/L	<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved mg/L	57.7	146	354	0.5
Hardness	as CaCO3 mg/L	141	332	710	5

Analytical Report

Bill To: Laberge Environmental Services	Project:	Lot ID: 898270
Report To: Laberge Environmental Services	ID:	Control Number:
Box 21072	Name: Clinton Creek	Date Received: Oct 9, 2012
1-405 Ogilvie Street	Location: Clinton Creek	Date Reported: Dec 28, 2012
Whitehorse, YT, Canada	LSD:	Report Number: 1795065
Y1A 6P7	P.O.:	
Attn: Bonnie Burns	Acct code:	
Sampled By:		
Company:		

Analyte	Units	Reference Number	Results	Results	Results	Nominal Detection Limit
		Sample Date	898270-7	898270-8	898270-9	
		Sample Time	Oct 04, 2012	Oct 04, 2012	Oct 04, 2012	
		Sample Location	11:00	11:00	11:00	
		Sample Description	GWCC-4	GWCC-3	GWCC-2	
		Matrix	Water	Water	Water	
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	10.1	7.5	7.4	0.5
Orthophosphate-P	Dissolved	mg/L	<0.002	<0.002	<0.002	0.002
Phosphorus	Total	mg/L	<0.003	<0.003	<0.003	0.003
Ammonia - N		mg/L	<0.01	<0.01	<0.01	.01
Metals Dissolved						
Sulfur	Dissolved	mg/L	67.1	92.7	216	0.2
Aluminum	Dissolved	mg/L	<0.005	<0.005	<0.005	0.005
Antimony	Dissolved	mg/L	0.0006	0.0006	0.0010	0.0002
Arsenic	Dissolved	mg/L	0.0013	0.0009	0.0014	0.0002
Barium	Dissolved	mg/L	0.038	0.034	0.023	0.001
Beryllium	Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L	0.033	0.039	0.083	0.004
Cadmium	Dissolved	mg/L	0.00005	0.00007	0.00016	0.00001
Chromium	Dissolved	mg/L	0.0016	0.0017	0.0025	0.0004
Cobalt	Dissolved	mg/L	0.00014	0.00013	0.00022	0.00002
Copper	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Lead	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium	Dissolved	mg/L	0.006	0.007	0.013	0.001
Molybdenum	Dissolved	mg/L	0.00258	0.00254	0.00265	0.0001
Nickel	Dissolved	mg/L	0.036	0.034	0.043	0.001
Selenium	Dissolved	mg/L	<0.0006	<0.0006	0.0017	0.0006
Silver	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Titanium	Dissolved	mg/L	<0.010	<0.010	<0.010	0.01
Strontium	Dissolved	mg/L	0.403	0.475	0.853	0.001
Tellurium	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium	Dissolved	mg/L	0.00005	0.00006	0.00006	0.00001
Thorium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium	Dissolved	mg/L	0.0010	0.0012	0.0026	0.0004
Vanadium	Dissolved	mg/L	0.00035	0.00037	0.00054	0.0001
Zinc	Dissolved	mg/L	0.002	0.004	0.006	0.001
Zirconium	Dissolved	mg/L	0.00027	0.00029	0.00028	0.0001
Metals Total						
Aluminum	Total	mg/L	0.033	0.004	0.004	0.005
Antimony	Total	mg/L	0.0006	0.0006	0.0006	0.0001

Analytical Report

Bill To: Laberge Environmental Services	Project:	Lot ID: 898270
Report To: Laberge Environmental Services	ID:	Control Number:
Box 21072	Name: Clinton Creek	Date Received: Oct 9, 2012
1-405 Ogilvie Street	Location: Clinton Creek	Date Reported: Dec 28, 2012
Whitehorse, YT, Canada	LSD:	Report Number: 1795065
Y1A 6P7	P.O.:	
Attn: Bonnie Burns	Acct code:	
Sampled By:		
Company:		

		Reference Number	898270-7	898270-8	898270-9	
		Sample Date	Oct 04, 2012	Oct 04, 2012	Oct 04, 2012	
		Sample Time	11:00	11:00	11:00	
		Sample Location				
		Sample Description	GWCC-4	GWCC-3	GWCC-2	
		Matrix	Water	Water	Water	
Analyte		Units	Results	Results	Results	Nominal Detection Limit
Metals Total - Continued						
Arsenic	Total	mg/L	0.00156	0.00089	0.00084	0.00005
Barium	Total	mg/L	0.0462	0.0370	0.0367	0.00005
Beryllium	Total	mg/L	<0.00005	<0.00005	<0.00005	0.00005
Bismuth	Total	mg/L	<0.0001	<0.0001	0.0001	0.0001
Boron	Total	mg/L	0.034	0.036	0.041	.002
Cadmium	Total	mg/L	0.00007	0.00008	0.00008	0.00001
Calcium	Total	mg/L	82.3	94.2	95.2	0.05
Chromium	Total	mg/L	0.0025	<0.0005	0.0005	0.0005
Cobalt	Total	mg/L	0.0004	<0.0001	<0.0001	0.0001
Copper	Total	mg/L	0.0013	0.0010	0.0010	0.0001
Iron	Total	mg/L	0.190	0.015	0.018	0.002
Lead	Total	mg/L	0.0001	<0.0001	<0.0001	0.0001
Lithium	Total	mg/L	0.0054	0.0058	0.0063	0.0005
Magnesium	Total	mg/L	46.8	61.4	62.4	0.04
Manganese	Total	mg/L	0.0146	0.0019	0.0028	0.001
Molybdenum	Total	mg/L	0.00299	0.00286	0.00293	0.00005
Nickel	Total	mg/L	0.0404	0.0329	0.0325	0.0002
Potassium	Total	mg/L	0.9	0.9	0.9	0.1
Selenium	Total	mg/L	0.0005	0.0007	0.0007	0.0001
Silicon	Total	mg/L	5.77	4.85	4.97	0.02
Silver	Total	mg/L	<0.00001	<0.00001	<0.00001	0.0005
Sodium	Total	mg/L	3.6	3.9	3.9	0.1
Strontium	Total	mg/L	0.393	0.458	0.470	0.0001
Thallium	Total	mg/L	0.00006	0.00007	0.00007	0.00001
Thorium	Total	mg/L	0.00001	<0.00001	<0.00001	0.00001
Tin	Total	mg/L	0.0001	0.0001	0.0002	0.0001
Titanium	Total	mg/L	<0.0005	0.0042	0.0058	0.0005
Uranium	Total	mg/L	0.00097	0.00122	0.00128	0.00001
Vanadium	Total	mg/L	0.0003	<0.0001	<0.0001	0.0001
Zinc	Total	mg/L	0.0043	0.0044	0.0030	0.0005
Zirconium	Total	mg/L	<0.0005	<0.0005	0.0008	0.0005
Hardness	as CaCO3	mg/L	398	488	495	1
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	14	<2	<2	2
Routine Water						
pH	at 25 °C		7.37	7.36	7.55	

Analytical Report

Bill To: Laberge Environmental Services	Project:	Lot ID: 898270
Report To: Laberge Environmental Services	ID:	Control Number:
Box 21072	Name: Clinton Creek	Date Received: Oct 9, 2012
1-405 Ogilvie Street	Location: Clinton Creek	Date Reported: Dec 28, 2012
Whitehorse, YT, Canada	LSD:	Report Number: 1795065
Y1A 6P7	P.O.:	
Attn: Bonnie Burns	Acct code:	
Sampled By:		
Company:		

	Reference Number	898270-7	898270-8	898270-9	
	Sample Date	Oct 04, 2012	Oct 04, 2012	Oct 04, 2012	
	Sample Time	11:00	11:00	11:00	
	Sample Location				
	Sample Description	GWCC-4	GWCC-3	GWCC-2	
	Matrix	Water	Water	Water	
Analyte	Units	Results	Results	Results	Nominal Detection Limit
Routine Water - Continued					
Electrical Conductivity	µS/cm at 25 C	641	781	1510	1
Calcium	Dissolved mg/L	83.1	96.3	155	0.1
Iron	Dissolved mg/L	0.007	0.015	0.010	0.005
Magnesium	Dissolved mg/L	47.6	63.6	154	0.1
Manganese	Dissolved mg/L	<0.001	<0.001	<0.001	0.001
Potassium	Dissolved mg/L	0.9	0.9	1.5	0.1
Silicon	Dissolved mg/L	4.96	4.47	4.81	0.05
Sodium	Dissolved mg/L	3.3	3.6	5.7	0.1
Bicarbonate	mg/L	211	224	295	5
Carbonate	mg/L	<6	<6	<6	6
Hydroxide	mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO ₃ mg/L	173	184	242	5
Nitrate - N	Dissolved mg/L	0.05	0.10	0.27	0.01
Nitrite - N	Dissolved mg/L	<0.01	0.10	<0.01	0.01
Sulfate (SO ₄)	Dissolved mg/L	178	248	643	0.5
Hardness	as CaCO ₃ mg/L	404	502	1020	5

Analytical Report

Bill To: Laberge Environmental Services	Project:	Lot ID: 898270
Report To: Laberge Environmental Services	ID:	Control Number:
Box 21072	Name: Clinton Creek	Date Received: Oct 9, 2012
1-405 Ogilvie Street	Location: Clinton Creek	Date Reported: Dec 28, 2012
Whitehorse, YT, Canada	LSD:	Report Number: 1795065
Y1A 6P7	P.O.:	
Attn: Bonnie Burns	Acct code:	
Sampled By:		
Company:		

		Reference Number	898270-10	898270-11	898270-12	
		Sample Date	Oct 04, 2012	Oct 02, 2012	Oct 02, 2012	
		Sample Time	10:00	15:00	14:00	
		Sample Location				
		Sample Description	GWCC-1	E-2	E-3	
		Matrix	Water	Water	Water	
Analyte	Units	Results	Results	Results	Nominal Detection Limit	
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	5.4	14.9	14.9	0.5
Orthophosphate-P	Dissolved	mg/L	<0.002	<0.002	<0.002	0.002
Phosphorus	Total	mg/L	<0.003	0.014	0.049	0.003
Ammonia - N		mg/L	<0.01	<0.01	<0.01	.01
Metals Dissolved						
Sulfur	Dissolved	mg/L	390	73.6	70.7	0.2
Aluminum	Dissolved	mg/L	<0.005	0.014	0.029	0.005
Antimony	Dissolved	mg/L	0.0012	0.0004	0.0005	0.0002
Arsenic	Dissolved	mg/L	0.0020	0.0012	0.0010	0.0002
Barium	Dissolved	mg/L	0.018	0.059	0.050	0.001
Beryllium	Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L	0.288	0.034	0.040	0.004
Cadmium	Dissolved	mg/L	0.00020	0.00004	0.00002	0.00001
Chromium	Dissolved	mg/L	0.0041	0.0018	0.0016	0.0004
Cobalt	Dissolved	mg/L	0.00030	0.00079	0.00043	0.00002
Copper	Dissolved	mg/L	<0.001	0.002	0.002	0.001
Lead	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium	Dissolved	mg/L	0.082	0.009	0.005	0.001
Molybdenum	Dissolved	mg/L	0.00260	0.00169	0.00138	0.0001
Nickel	Dissolved	mg/L	0.083	0.013	0.009	0.001
Selenium	Dissolved	mg/L	0.0026	<0.0006	<0.0006	0.0006
Silver	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Titanium	Dissolved	mg/L	<0.010	<0.010	<0.010	0.01
Strontium	Dissolved	mg/L	2.060	0.459	0.346	0.001
Tellurium	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium	Dissolved	mg/L	0.00008	<0.00001	<0.00001	0.00001
Thorium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium	Dissolved	mg/L	0.0067	0.0026	0.0036	0.0004
Vanadium	Dissolved	mg/L	0.00082	0.00054	0.00071	0.0001
Zinc	Dissolved	mg/L	0.012	0.003	0.004	0.001
Zirconium	Dissolved	mg/L	0.00027	0.00067	0.00075	0.0001
Metals Total						
Aluminum	Total	mg/L	0.002	0.046	0.363	0.005
Antimony	Total	mg/L	0.0012	0.0004	0.0005	0.0001

Analytical Report

Bill To: Laberge Environmental Services	Project:	Lot ID: 898270
Report To: Laberge Environmental Services	ID:	Control Number:
Box 21072	Name: Clinton Creek	Date Received: Oct 9, 2012
1-405 Ogilvie Street	Location: Clinton Creek	Date Reported: Dec 28, 2012
Whitehorse, YT, Canada	LSD:	Report Number: 1795065
Y1A 6P7	P.O.:	
Attn: Bonnie Burns	Acct code:	
Sampled By:		
Company:		

		Reference Number	898270-10	898270-11	898270-12	
		Sample Date	Oct 04, 2012	Oct 02, 2012	Oct 02, 2012	
		Sample Time	10:00	15:00	14:00	
		Sample Location				
		Sample Description	GWCC-1	E-2	E-3	
		Matrix	Water	Water	Water	
Analyte	Units	Results	Results	Results	Nominal Detection Limit	
Metals Total - Continued						
Arsenic	Total	mg/L	0.00170	0.00140	0.00121	0.00005
Barium	Total	mg/L	0.0194	0.0680	0.0749	0.00005
Beryllium	Total	mg/L	<0.00005	<0.00005	<0.00005	0.00005
Bismuth	Total	mg/L	<0.0001	<0.0001	0.0001	0.0001
Boron	Total	mg/L	0.280	0.035	0.042	.002
Cadmium	Total	mg/L	0.00022	0.00006	0.00005	0.00001
Calcium	Total	mg/L	200	80.4	67.6	0.05
Chromium	Total	mg/L	0.0014	0.0013	0.0013	0.0005
Cobalt	Total	mg/L	<0.0001	0.0008	0.0005	0.0001
Copper	Total	mg/L	0.0010	0.0024	0.0027	0.0001
Iron	Total	mg/L	0.005	0.537	0.770	0.002
Lead	Total	mg/L	<0.0001	0.0001	0.0003	0.0001
Lithium	Total	mg/L	0.0717	0.0084	0.0046	0.0005
Magnesium	Total	mg/L	282	50.2	48.4	0.04
Manganese	Total	mg/L	0.0005	0.288	0.136	0.001
Molybdenum	Total	mg/L	0.00288	0.00194	0.00160	0.00005
Nickel	Total	mg/L	0.0762	0.0130	0.0092	0.0002
Potassium	Total	mg/L	3.0	0.9	0.7	0.1
Selenium	Total	mg/L	0.0028	0.0010	0.0007	0.0001
Silicon	Total	mg/L	6.25	5.01	6.60	0.02
Silver	Total	mg/L	<0.00001	<0.00001	<0.00001	0.0005
Sodium	Total	mg/L	18.3	4.3	4.5	0.1
Strontium	Total	mg/L	2.07	0.433	0.328	0.0001
Thallium	Total	mg/L	0.00008	0.00001	<0.00001	0.00001
Thorium	Total	mg/L	<0.00001	0.00005	0.00008	0.00001
Tin	Total	mg/L	0.0002	0.0002	0.0002	0.0001
Titanium	Total	mg/L	0.0483	0.0006	0.0254	0.0005
Uranium	Total	mg/L	0.00627	0.00235	0.00357	0.00001
Vanadium	Total	mg/L	0.0002	0.0005	0.0016	0.0001
Zinc	Total	mg/L	0.0081	0.0037	0.0047	0.0005
Zirconium	Total	mg/L	<0.0005	0.0008	0.0013	0.0005
Hardness	as CaCO3	mg/L	1660	407	368	1
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	<2	<2	13	2
Routine Water						
pH	at 25 °C		7.32	7.84	7.85	

Analytical Report

Bill To: Laberge Environmental Services	Project:	Lot ID: 898270
Report To: Laberge Environmental Services	ID:	Control Number:
Box 21072	Name: Clinton Creek	Date Received: Oct 9, 2012
1-405 Ogilvie Street	Location: Clinton Creek	Date Reported: Dec 28, 2012
Whitehorse, YT, Canada	LSD:	Report Number: 1795065
Y1A 6P7	P.O.:	
Attn: Bonnie Burns	Acct code:	
Sampled By:		
Company:		

	Reference Number	898270-10	898270-11	898270-12	
	Sample Date	Oct 04, 2012	Oct 02, 2012	Oct 02, 2012	
	Sample Time	10:00	15:00	14:00	
	Sample Location				
	Sample Description	GWCC-1	E-2	E-3	
	Matrix	Water	Water	Water	
Analyte	Units	Results	Results	Results	Nominal Detection Limit
Routine Water - Continued					
Electrical Conductivity	µS/cm at 25 C	2320	715	622	1
Calcium	Dissolved mg/L	202	82.3	69.8	0.1
Iron	Dissolved mg/L	0.014	0.298	0.148	0.005
Magnesium	Dissolved mg/L	288	52.1	49.8	0.1
Manganese	Dissolved mg/L	<0.001	0.264	0.119	0.001
Potassium	Dissolved mg/L	2.9	0.9	0.7	0.1
Silicon	Dissolved mg/L	5.84	4.58	5.65	0.05
Sodium	Dissolved mg/L	16.9	4.1	4.3	0.1
Bicarbonate	mg/L	388	199	161	5
Carbonate	mg/L	<6	<6	<6	6
Hydroxide	mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO3 mg/L	318	163	132	5
Nitrate - N	Dissolved mg/L	0.38	0.12	0.07	0.01
Nitrite - N	Dissolved mg/L	<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved mg/L	1280	222	211	0.5
Hardness	as CaCO3 mg/L	1690	420	380	5

Analytical Report

Bill To: Laberge Environmental Services	Project:	Lot ID: 898270
Report To: Laberge Environmental Services	ID:	Control Number:
Box 21072	Name: Clinton Creek	Date Received: Oct 9, 2012
1-405 Ogilvie Street	Location: Clinton Creek	Date Reported: Dec 28, 2012
Whitehorse, YT, Canada	LSD:	Report Number: 1795065
Y1A 6P7	P.O.:	
Attn: Bonnie Burns	Acct code:	
Sampled By:		
Company:		

		Reference Number	898270-13	898270-14	898270-15	
		Sample Date	Oct 03, 2012	Oct 03, 2012	Oct 03, 2012	
		Sample Time	11:00	10:00	09:00	
		Sample Location				
		Sample Description	E-4	E-7	E-8	
		Matrix	Water	Water	Water	
Analyte	Units	Results	Results	Results	Nominal Detection Limit	
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	14.1	14.7	9.2	0.5
Orthophosphate-P	Dissolved	mg/L	<0.002	<0.002	<0.002	0.002
Phosphorus	Total	mg/L	0.009	0.009	0.006	0.003
Ammonia - N		mg/L	<0.01	<0.01	<0.01	.01
Metals Dissolved						
Sulfur	Dissolved	mg/L	77.5	75.4	20.1	0.2
Aluminum	Dissolved	mg/L	0.015	0.017	0.065	0.005
Antimony	Dissolved	mg/L	0.0004	0.0003	<0.0002	0.0002
Arsenic	Dissolved	mg/L	0.0011	0.0010	0.0004	0.0002
Barium	Dissolved	mg/L	0.055	0.058	0.066	0.001
Beryllium	Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L	0.044	0.037	<0.004	0.004
Cadmium	Dissolved	mg/L	0.00004	0.00006	0.00003	0.00001
Chromium	Dissolved	mg/L	0.0012	0.0015	0.0007	0.0004
Cobalt	Dissolved	mg/L	0.00088	0.00079	0.00056	0.00002
Copper	Dissolved	mg/L	0.002	0.002	0.002	0.001
Lead	Dissolved	mg/L	<0.0001	0.0001	0.0001	0.0001
Lithium	Dissolved	mg/L	0.012	0.011	0.005	0.001
Molybdenum	Dissolved	mg/L	0.00176	0.00152	0.00042	0.0001
Nickel	Dissolved	mg/L	0.015	0.015	0.004	0.001
Selenium	Dissolved	mg/L	<0.0006	<0.0006	<0.0006	0.0006
Silver	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Titanium	Dissolved	mg/L	<0.010	<0.010	<0.010	0.01
Strontium	Dissolved	mg/L	0.494	0.467	0.188	0.001
Tellurium	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Thorium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium	Dissolved	mg/L	0.0024	0.0025	0.0012	0.0004
Vanadium	Dissolved	mg/L	0.00036	0.00040	0.00047	0.0001
Zinc	Dissolved	mg/L	0.004	0.006	0.013	0.001
Zirconium	Dissolved	mg/L	0.00092	0.00120	0.00051	0.0001
Metals Total						
Aluminum	Total	mg/L	0.045	0.060	0.149	0.005
Antimony	Total	mg/L	0.0004	0.0004	0.0001	0.0001

Analytical Report

Bill To: Laberge Environmental Services	Project:	Lot ID: 898270
Report To: Laberge Environmental Services	ID:	Control Number:
Box 21072	Name: Clinton Creek	Date Received: Oct 9, 2012
1-405 Ogilvie Street	Location: Clinton Creek	Date Reported: Dec 28, 2012
Whitehorse, YT, Canada	LSD:	Report Number: 1795065
Y1A 6P7	P.O.:	
Attn: Bonnie Burns	Acct code:	
Sampled By:		
Company:		

		Reference Number	898270-13	898270-14	898270-15	
		Sample Date	Oct 03, 2012	Oct 03, 2012	Oct 03, 2012	
		Sample Time	11:00	10:00	09:00	
		Sample Location				
		Sample Description	E-4	E-7	E-8	
		Matrix	Water	Water	Water	
Analyte	Units	Results	Results	Results	Nominal Detection Limit	
Metals Total - Continued						
Arsenic	Total	mg/L	0.00119	0.00111	0.00045	0.00005
Barium	Total	mg/L	0.0704	0.0617	0.0482	0.00005
Beryllium	Total	mg/L	<0.00005	<0.00005	<0.00005	0.00005
Bismuth	Total	mg/L	0.0001	<0.0001	0.0001	0.0001
Boron	Total	mg/L	0.046	0.038	0.004	.002
Cadmium	Total	mg/L	0.00006	0.00007	0.00004	0.00001
Calcium	Total	mg/L	82.4	77.7	34.6	0.05
Chromium	Total	mg/L	0.0008	0.0008	<0.0005	0.0005
Cobalt	Total	mg/L	0.0008	0.0008	0.0006	0.0001
Copper	Total	mg/L	0.0023	0.0024	0.0024	0.0001
Iron	Total	mg/L	0.444	0.465	0.420	0.002
Lead	Total	mg/L	0.0002	0.0001	<0.0001	0.0001
Lithium	Total	mg/L	0.0116	0.0108	0.0048	0.0005
Magnesium	Total	mg/L	56.9	54.5	12.2	0.04
Manganese	Total	mg/L	0.268	0.321	0.0439	0.001
Molybdenum	Total	mg/L	0.00203	0.00171	0.00063	0.00005
Nickel	Total	mg/L	0.0140	0.0140	0.0030	0.0002
Potassium	Total	mg/L	0.9	0.9	1.1	0.1
Selenium	Total	mg/L	0.0008	0.0008	0.0003	0.0001
Silicon	Total	mg/L	5.26	5.29	4.80	0.02
Silver	Total	mg/L	<0.00001	<0.00001	<0.00001	0.0005
Sodium	Total	mg/L	5.0	4.8	5.5	0.1
Strontium	Total	mg/L	0.484	0.447	0.180	0.0001
Thallium	Total	mg/L	0.00001	<0.00001	<0.00001	0.00001
Thorium	Total	mg/L	0.00004	0.00005	0.00008	0.00001
Tin	Total	mg/L	0.0002	0.0002	0.0002	0.0001
Titanium	Total	mg/L	0.0038	0.0033	<0.0005	0.0005
Uranium	Total	mg/L	0.00254	0.00260	0.00123	0.00001
Vanadium	Total	mg/L	0.0005	0.0004	0.0006	0.0001
Zinc	Total	mg/L	0.0061	0.0052	0.0050	0.0005
Zirconium	Total	mg/L	0.0010	0.0012	0.0006	0.0005
Hardness	as CaCO3	mg/L	440	418	136	1
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	<2	<2	<2	2
Routine Water						
pH	at 25 °C		7.72	7.78	7.65	

Analytical Report

Bill To: Laberge Environmental Services	Project:	Lot ID: 898270
Report To: Laberge Environmental Services	ID:	Control Number:
Box 21072	Name: Clinton Creek	Date Received: Oct 9, 2012
1-405 Ogilvie Street	Location: Clinton Creek	Date Reported: Dec 28, 2012
Whitehorse, YT, Canada	LSD:	Report Number: 1795065
Y1A 6P7	P.O.:	
Attn: Bonnie Burns	Acct code:	
Sampled By:		
Company:		

	Reference Number	898270-13	898270-14	898270-15	
	Sample Date	Oct 03, 2012	Oct 03, 2012	Oct 03, 2012	
	Sample Time	11:00	10:00	09:00	
	Sample Location				
	Sample Description	E-4	E-7	E-8	
	Matrix	Water	Water	Water	
Analyte	Units	Results	Results	Results	Nominal Detection Limit
Routine Water - Continued					
Electrical Conductivity	µS/cm at 25 C	710	691	266	1
Calcium	Dissolved mg/L	82.6	80.5	38.3	0.1
Iron	Dissolved mg/L	0.286	0.274	0.263	0.005
Magnesium	Dissolved mg/L	57.4	56.3	12.6	0.1
Manganese	Dissolved mg/L	0.254	0.302	0.039	0.001
Potassium	Dissolved mg/L	1.0	1.0	1.1	0.1
Silicon	Dissolved mg/L	4.71	4.76	4.38	0.05
Sodium	Dissolved mg/L	4.8	4.6	5.2	0.1
Bicarbonate	mg/L	205	205	92	5
Carbonate	mg/L	<6	<6	<6	6
Hydroxide	mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO ₃ mg/L	168	168	75	5
Nitrate - N	Dissolved mg/L	0.12	0.13	0.13	0.01
Nitrite - N	Dissolved mg/L	<0.01	<0.01	<0.01	0.01
Sulfate (SO ₄)	Dissolved mg/L	230	219	56.5	0.5
Hardness	as CaCO ₃ mg/L	443	433	148	5

Analytical Report

Bill To: Laberge Environmental Services	Project:	Lot ID: 898270
Report To: Laberge Environmental Services	ID:	Control Number:
Box 21072	Name: Clinton Creek	Date Received: Oct 9, 2012
1-405 Ogilvie Street	Location: Clinton Creek	Date Reported: Dec 28, 2012
Whitehorse, YT, Canada	LSD:	Report Number: 1795065
Y1A 6P7	P.O.:	
Attn: Bonnie Burns	Acct code:	
Sampled By:		
Company:		

		Reference Number	898270-16	898270-17	898270-18	
		Sample Date	Oct 02, 2012	Oct 04, 2012		
		Sample Time	NA	NA		
		Sample Location				
		Sample Description	BD-1	BD-2	FB	
		Matrix	Water	Water	Water	
Analyte	Units	Results	Results	Results	Nominal Detection Limit	
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	16.2	9.6	<0.5	0.5
Orthophosphate-P	Dissolved	mg/L	<0.002	<0.002	<0.002	0.002
Phosphorus	Total	mg/L	0.012	0.082	0.039	0.003
Ammonia - N		mg/L	<0.01	<0.01	<0.01	.01
Metals Dissolved						
Sulfur	Dissolved	mg/L	54.2	93.1	<0.2	0.2
Aluminum	Dissolved	mg/L	0.018	<0.005	<0.005	0.005
Antimony	Dissolved	mg/L	0.0003	0.0005	<0.0002	0.0002
Arsenic	Dissolved	mg/L	0.0011	0.0011	<0.0002	0.0002
Barium	Dissolved	mg/L	0.061	0.033	<0.001	0.001
Beryllium	Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L	0.009	0.038	<0.004	0.004
Cadmium	Dissolved	mg/L	0.00004	0.00008	<0.00001	0.00001
Chromium	Dissolved	mg/L	0.0011	0.0016	<0.0004	0.0004
Cobalt	Dissolved	mg/L	0.00054	0.00014	<0.00002	0.00002
Copper	Dissolved	mg/L	0.002	<0.001	<0.001	0.001
Lead	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Lithium	Dissolved	mg/L	0.005	0.007	<0.001	0.001
Molybdenum	Dissolved	mg/L	0.00151	0.00253	<0.00010	0.0001
Nickel	Dissolved	mg/L	0.007	0.034	<0.001	0.001
Selenium	Dissolved	mg/L	<0.0006	<0.0006	<0.0006	0.0006
Silver	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Titanium	Dissolved	mg/L	<0.010	<0.010	<0.010	0.01
Strontium	Dissolved	mg/L	0.356	0.476	<0.001	0.001
Tellurium	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Thallium	Dissolved	mg/L	<0.00001	0.00006	<0.00001	0.00001
Thorium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Uranium	Dissolved	mg/L	0.0025	0.0012	<0.0004	0.0004
Vanadium	Dissolved	mg/L	0.00042	0.00029	<0.00010	0.0001
Zinc	Dissolved	mg/L	0.003	0.004	0.003	0.001
Zirconium	Dissolved	mg/L	0.00081	0.00030	<0.00010	0.0001
Metals Total						
Aluminum	Total	mg/L	0.027	0.005	0.003	0.005
Antimony	Total	mg/L	0.0003	0.0006	<0.0001	0.0001

Analytical Report

Bill To: Laberge Environmental Services	Project:	Lot ID: 898270
Report To: Laberge Environmental Services	ID:	Control Number:
Box 21072	Name: Clinton Creek	Date Received: Oct 9, 2012
1-405 Ogilvie Street	Location: Clinton Creek	Date Reported: Dec 28, 2012
Whitehorse, YT, Canada	LSD:	Report Number: 1795065
Y1A 6P7	P.O.:	
Attn: Bonnie Burns	Acct code:	
Sampled By:		
Company:		

		Reference Number	898270-16	898270-17	898270-18	
		Sample Date	Oct 02, 2012	Oct 04, 2012		
		Sample Time	NA	NA		
		Sample Location				
		Sample Description	BD-1	BD-2	FB	
		Matrix	Water	Water	Water	
Analyte	Units	Results	Results	Results	Nominal Detection Limit	
Metals Total - Continued						
Arsenic	Total	mg/L	0.00082	0.00086	<0.00005	0.00005
Barium	Total	mg/L	0.0640	0.0429	0.00152	0.00005
Beryllium	Total	mg/L	<0.00005	<0.00005	<0.00005	0.00005
Bismuth	Total	mg/L	0.0001	0.0002	<0.0001	0.0001
Boron	Total	mg/L	0.012	0.039	<0.002	.002
Cadmium	Total	mg/L	0.00005	0.00009	<0.00001	0.00001
Calcium	Total	mg/L	68.9	93.7	0.14	0.05
Chromium	Total	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Cobalt	Total	mg/L	0.0004	<0.0001	<0.0001	0.0001
Copper	Total	mg/L	0.0026	0.0010	0.0002	0.0001
Iron	Total	mg/L	0.279	0.013	0.003	0.002
Lead	Total	mg/L	<0.0001	0.0003	<0.0001	0.0001
Lithium	Total	mg/L	0.0044	0.0060	<0.0005	0.0005
Magnesium	Total	mg/L	37.1	60.8	<0.04	0.04
Manganese	Total	mg/L	0.277	0.0020	0.0005	0.001
Molybdenum	Total	mg/L	0.00170	0.00292	<0.00005	0.00005
Nickel	Total	mg/L	0.0052	0.0322	<0.0002	0.0002
Potassium	Total	mg/L	0.7	0.9	<0.1	0.1
Selenium	Total	mg/L	0.0009	0.0007	<0.0001	0.0001
Silicon	Total	mg/L	4.78	4.77	0.03	0.02
Silver	Total	mg/L	<0.00001	<0.00001	<0.00001	0.0005
Sodium	Total	mg/L	3.5	4.0	0.2	0.1
Strontium	Total	mg/L	0.327	0.460	0.0010	0.0001
Thallium	Total	mg/L	<0.00001	0.00008	<0.00001	0.00001
Thorium	Total	mg/L	0.00006	0.00002	<0.00001	0.00001
Tin	Total	mg/L	0.0002	0.0002	0.0001	0.0001
Titanium	Total	mg/L	<0.0005	0.0040	<0.0005	0.0005
Uranium	Total	mg/L	0.00222	0.00128	<0.00001	0.00001
Vanadium	Total	mg/L	0.0004	<0.0001	<0.0001	0.0001
Zinc	Total	mg/L	0.0024	0.0077	0.0022	0.0005
Zirconium	Total	mg/L	0.0008	<0.0005	<0.0005	0.0005
Hardness	as CaCO3	mg/L	325	484	<1	1
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	<2	<2	<2	2
Routine Water						
pH	at 25 °C		7.94	7.45	6.18	

Analytical Report

Bill To: Laberge Environmental Services	Project:	Lot ID: 898270
Report To: Laberge Environmental Services	ID:	Control Number:
Box 21072	Name: Clinton Creek	Date Received: Oct 9, 2012
1-405 Ogilvie Street	Location: Clinton Creek	Date Reported: Dec 28, 2012
Whitehorse, YT, Canada	LSD:	Report Number: 1795065
Y1A 6P7	P.O.:	
Attn: Bonnie Burns	Acct code:	
Sampled By:		
Company:		

	Reference Number	898270-16	898270-17	898270-18	
	Sample Date	Oct 02, 2012	Oct 04, 2012		
	Sample Time	NA	NA		
	Sample Location				
	Sample Description	BD-1	BD-2	FB	
	Matrix	Water	Water	Water	
Analyte	Units	Results	Results	Results	Nominal Detection Limit
Routine Water - Continued					
Electrical Conductivity	µS/cm at 25 C	553	809	1	1
Calcium	Dissolved mg/L	71.6	97.8	0.15	0.1
Iron	Dissolved mg/L	0.214	0.010	<0.005	0.005
Magnesium	Dissolved mg/L	38.0	64.2	<0.1	0.1
Manganese	Dissolved mg/L	0.272	<0.001	<0.001	0.001
Potassium	Dissolved mg/L	0.8	0.9	<0.1	0.1
Silicon	Dissolved mg/L	4.43	4.48	<0.05	0.05
Sodium	Dissolved mg/L	3.2	3.8	<0.1	0.1
Bicarbonate	mg/L	175	224	<5	5
Carbonate	mg/L	<6	<6	<6	6
Hydroxide	mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO3 mg/L	144	184	<5	5
Nitrate - N	Dissolved mg/L	0.16	0.08	<0.01	0.01
Nitrite - N	Dissolved mg/L	<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved mg/L	159	268	<0.5	0.5
Hardness	as CaCO3 mg/L	335	508	<5	5

Analytical Report

Bill To: Laberge Environmental Services Project:
 Report To: Laberge Environmental Services ID:
 Box 21072 Name: Clinton Creek
 1-405 Ogilvie Street Location: Clinton Creek
 Whitehorse, YT, Canada LSD:
 Y1A 6P7 P.O.:
 Attn: Bonnie Burns Acct code:

Sampled By:
 Company:

Lot ID: **898270**
 Control Number:
 Date Received: Oct 9, 2012
 Date Reported: Dec 28, 2012
 Report Number: 1795065

Reference Number 898270-19
 Sample Date
 Sample Time
 Sample Location
 Sample Description Travel Blank
 Matrix Water

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Inorganic Nonmetallic Parameters					
Organic Carbon	Total Nonpurgeable	mg/L	<0.5		0.5
Orthophosphate-P	Dissolved	mg/L	<0.002		0.002
Phosphorus	Total	mg/L	<0.003		0.003
Ammonia - N		mg/L	<0.01		.01
Metals Dissolved					
Sulfur	Dissolved	mg/L	<0.2		0.2
Aluminum	Dissolved	mg/L	<0.005		0.005
Antimony	Dissolved	mg/L	<0.0002		0.0002
Arsenic	Dissolved	mg/L	<0.0002		0.0002
Barium	Dissolved	mg/L	<0.001		0.001
Beryllium	Dissolved	mg/L	<0.00004		0.00004
Bismuth	Dissolved	mg/L	<0.001		0.001
Boron	Dissolved	mg/L	<0.004		0.004
Cadmium	Dissolved	mg/L	<0.00001		0.00001
Chromium	Dissolved	mg/L	<0.0004		0.0004
Cobalt	Dissolved	mg/L	<0.00002		0.00002
Copper	Dissolved	mg/L	<0.001		0.001
Lead	Dissolved	mg/L	<0.0001		0.0001
Lithium	Dissolved	mg/L	<0.001		0.001
Molybdenum	Dissolved	mg/L	<0.00010		0.0001
Nickel	Dissolved	mg/L	<0.001		0.001
Selenium	Dissolved	mg/L	<0.0006		0.0006
Silver	Dissolved	mg/L	<0.00001		0.00001
Titanium	Dissolved	mg/L	<0.010		0.01
Strontium	Dissolved	mg/L	<0.001		0.001
Tellurium	Dissolved	mg/L	<0.0001		0.0001
Thallium	Dissolved	mg/L	<0.00001		0.00001
Thorium	Dissolved	mg/L	<0.0004		0.0004
Tin	Dissolved	mg/L	<0.0001		0.0001
Uranium	Dissolved	mg/L	<0.0004		0.0004
Vanadium	Dissolved	mg/L	<0.00010		0.0001
Zinc	Dissolved	mg/L	<0.001		0.001
Zirconium	Dissolved	mg/L	<0.00010		0.0001
Metals Total					
Aluminum	Total	mg/L	0.002		0.005
Antimony	Total	mg/L	<0.0001		0.0001

Analytical Report

Bill To: Laberge Environmental Services Project:
 Report To: Laberge Environmental Services ID:
 Box 21072 Name: Clinton Creek
 1-405 Ogilvie Street Location: Clinton Creek
 Whitehorse, YT, Canada LSD:
 Y1A 6P7 P.O.:
 Attn: Bonnie Burns Acct code:

Sampled By:
 Company:

Lot ID: **898270**
 Control Number:
 Date Received: Oct 9, 2012
 Date Reported: Dec 28, 2012
 Report Number: 1795065

Reference Number 898270-19
 Sample Date
 Sample Time
 Sample Location
 Sample Description Travel Blank
 Matrix Water

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Metals Total - Continued					
Arsenic	Total	mg/L	<0.00005		0.00005
Barium	Total	mg/L	0.00005		0.00005
Beryllium	Total	mg/L	<0.00005		0.00005
Bismuth	Total	mg/L	0.0001		0.0001
Boron	Total	mg/L	0.003		.002
Cadmium	Total	mg/L	0.00002		0.00001
Calcium	Total	mg/L	<0.05		0.05
Chromium	Total	mg/L	<0.0005		0.0005
Cobalt	Total	mg/L	<0.0001		0.0001
Copper	Total	mg/L	0.0004		0.0001
Iron	Total	mg/L	0.004		0.002
Lead	Total	mg/L	<0.0001		0.0001
Lithium	Total	mg/L	<0.0005		0.0005
Magnesium	Total	mg/L	<0.04		0.04
Manganese	Total	mg/L	<0.0002		0.001
Molybdenum	Total	mg/L	<0.00005		0.00005
Nickel	Total	mg/L	<0.0002		0.0002
Potassium	Total	mg/L	<0.1		0.1
Selenium	Total	mg/L	<0.0001		0.0001
Silicon	Total	mg/L	0.04		0.02
Silver	Total	mg/L	<0.00001		0.0005
Sodium	Total	mg/L	0.2		0.1
Strontium	Total	mg/L	<0.0001		0.0001
Thallium	Total	mg/L	<0.00001		0.00001
Thorium	Total	mg/L	<0.00001		0.00001
Tin	Total	mg/L	0.0002		0.0001
Titanium	Total	mg/L	<0.0005		0.0005
Uranium	Total	mg/L	<0.00001		0.00001
Vanadium	Total	mg/L	<0.0001		0.0001
Zinc	Total	mg/L	0.0015		0.0005
Zirconium	Total	mg/L	<0.0005		0.0005
Hardness	as CaCO3	mg/L	<1		1
Physical and Aggregate Properties					
Solids	Total Suspended	mg/L	<2		2
Routine Water					
pH	at 25 °C		5.73		

Analytical Report

Bill To: Laberge Environmental Services Project:
 Report To: Laberge Environmental Services ID:
 Box 21072 Name: Clinton Creek
 1-405 Ogilvie Street Location: Clinton Creek
 Whitehorse, YT, Canada LSD:
 Y1A 6P7 P.O.:
 Attn: Bonnie Burns Acct code:

Sampled By:
 Company:

Lot ID: **898270**
 Control Number:
 Date Received: Oct 9, 2012
 Date Reported: Dec 28, 2012
 Report Number: 1795065

Reference Number 898270-19
 Sample Date
 Sample Time
 Sample Location
 Sample Description Travel Blank
 Matrix Water

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Routine Water - Continued					
Electrical Conductivity	µS/cm at 25 C	<1			1
Calcium	Dissolved mg/L	<0.10			0.1
Iron	Dissolved mg/L	<0.005			0.005
Magnesium	Dissolved mg/L	<0.1			0.1
Manganese	Dissolved mg/L	<0.001			0.001
Potassium	Dissolved mg/L	<0.1			0.1
Silicon	Dissolved mg/L	<0.05			0.05
Sodium	Dissolved mg/L	0.1			0.1
Bicarbonate	mg/L	<5			5
Carbonate	mg/L	<6			6
Hydroxide	mg/L	<5			5
T-Alkalinity	as CaCO3 mg/L	<5			5
Nitrate - N	Dissolved mg/L	<0.01			0.01
Nitrite - N	Dissolved mg/L	<0.01			0.01
Sulfate (SO4)	Dissolved mg/L	<0.5			0.5
Hardness	as CaCO3 mg/L	<5			5

Approved by: 
 Anthony Neumann, MSc
 Laboratory Operations Manager

Quality Control

Bill To: Laberge Environmental Services	Project:	Lot ID: 898270
Report To: Laberge Environmental Services	ID:	Control Number:
Box 21072	Name: Clinton Creek	Date Received: Oct 9, 2012
1-405 Ogilvie Street	Location: Clinton Creek	Date Reported: Dec 28, 2012
Whitehorse, YT, Canada	LSD:	Report Number: 1795065
Y1A 6P7	P.O.:	
Attn: Bonnie Burns	Acct code:	
Sampled By:		
Company:		

Inorganic Nonmetallic Parameters

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Orthophosphate-P	mg/L	0	-0.002	0.002	yes
Phosphorus	mg/L	0.0001	-0.003	0.003	yes
Ammonium - N	ug/L	-22.397	-110.00	10.00	yes
Date Acquired:	October 10, 2012				
Organic Carbon	mg/L	0.00164	-0.5	0.5	yes
Date Acquired:	October 10, 2012				

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Orthophosphate-P	mg/L	99.00	90	110	yes
Phosphorus	mg/L	100.60	90	110	yes
Ammonium - N	ug/L	92.44	85	115	yes
Date Acquired:	October 10, 2012				
Orthophosphate-P	mg/L	92.00	90	110	yes
Phosphorus	mg/L	105.00	80	120	yes
Ammonium - N	ug/L	85.10	70	130	yes
Date Acquired:	October 10, 2012				

Certified Reference Material	Units	Measured	Target	Lower Limit	Upper Limit	Passed QC
Ammonium - N	mg/L	0.21	0.24	0.07	0.42	yes
Date Acquired:	October 10, 2012					
Orthophosphate-P	mg/L	1.18	1.208	1.160	1.256	yes
Date Acquired:	October 10, 2012					

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Organic Carbon	mg/L	16.8	195	10	1.0	yes
Date Acquired:	October 10, 2012					
Orthophosphate-P	mg/L	<0.002	<0.002	20	0.050	yes
Phosphorus	mg/L	0.032	0.031	20	0.050	yes
Ammonia - N	mg/L	<0.01	<0.01	20	50.00	yes
Date Acquired:	October 10, 2012					

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Organic Carbon	mg/L	126	109.6	133.6	yes
Date Acquired:	October 10, 2012				
Organic Carbon	mg/L	14.7	12.8	17.2	yes
Date Acquired:	October 10, 2012				
Organic Carbon	mg/L	2.9	2.4	4.0	yes
Date Acquired:	October 10, 2012				
Phosphorus	mg/L	0.113	0.039	0.159	yes
Date Acquired:	October 10, 2012				

Quality Control

Bill To: Laberge Environmental Services Project:
 Report To: Laberge Environmental Services ID:
 Box 21072 Name: Clinton Creek
 1-405 Ogilvie Street Location: Clinton Creek
 Whitehorse, YT, Canada LSD:
 Y1A 6P7 P.O.:
 Attn: Bonnie Burns Acct code:

Sampled By:
 Company:

Lot ID: **898270**
 Control Number:
 Date Received: Oct 9, 2012
 Date Reported: Dec 28, 2012
 Report Number: 1795065

Metals Dissolved

Certified Reference Material	Units	Measured	Target	Lower Limit	Upper Limit	Passed QC
Aluminum	mg/L	0.274	0.300	0.256	0.344	yes
Antimony	mg/L	0.0747	0.0750	0.0558	0.0942	yes
Arsenic	mg/L	0.0632	0.0649	0.0529	0.0769	yes
Barium	mg/L	0.189	0.200	0.182	0.218	yes
Beryllium	mg/L	0.0712	0.07520	0.06560	0.08480	yes
Boron	mg/L	0.091	0.087	0.070	0.104	yes
Cadmium	mg/L	0.05660	0.05800	0.04960	0.06640	yes
Chromium	mg/L	0.0608	0.0675	0.0558	0.0792	yes
Cobalt	mg/L	0.0743	0.07980	0.06990	0.08970	yes
Copper	mg/L	0.055	0.057	0.052	0.061	yes
Lead	mg/L	0.160	0.1527	0.1305	0.1749	yes
Molybdenum	mg/L	0.05680	0.05990	0.04970	0.07010	yes
Nickel	mg/L	0.207	0.220	0.198	0.243	yes
Selenium	mg/L	0.1100	0.1099	0.0856	0.1342	yes
Silver	mg/L	0.01350	0.01499	0.01319	0.01679	yes
Strontium	mg/L	0.047	0.050	0.043	0.058	yes
Thallium	mg/L	0.06650	0.06508	0.05278	0.07738	yes
Vanadium	mg/L	0.6930	0.75000	0.66390	0.83610	yes
Zinc	mg/L	0.121	0.130	0.115	0.145	yes

Date Acquired: October 11, 2012

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Sulfur	mg/L	64.3	64.0	30	3.0	yes
Titanium	mg/L	<0.010	<0.010	30	0.012	yes

Date Acquired: October 11, 2012

Metals Total

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	0.721343	-1	1	yes
Antimony	µg/L	0.0142339	-0.1	0.1	yes
Arsenic	µg/L	0.00570692	-0.05	0.05	yes
Barium	µg/L	0.0313498	-0.02	0.08	yes
Beryllium	µg/L	0.000221296	-0.05	0.05	yes
Bismuth	µg/L	0.012937	-0.1	0.1	yes
Boron	µg/L	0.492377	-2	2	yes
Cadmium	µg/L	-0.000444112	-0.01	0.01	yes
Calcium	mg/L	-0.0021	-0.05	0.05	yes
Chromium	µg/L	-0.096853	-0.5	0.5	yes
Cobalt	µg/L	0.00403074	-0.1	0.1	yes
Copper	µg/L	0.100209	-0.1	0.1	yes
Iron	µg/L	0.312	-2	2	yes
Lead	µg/L	0.00336165	-0.1	0.1	yes

Quality Control

Bill To: Laberge Environmental Services Project:
 Report To: Laberge Environmental Services ID:
 Box 21072 Name: Clinton Creek
 1-405 Ogilvie Street Location: Clinton Creek
 Whitehorse, YT, Canada LSD:
 Y1A 6P7 P.O.:
 Attn: Bonnie Burns Acct code:

Sampled By:
 Company:

Lot ID: **898270**
 Control Number:
 Date Received: Oct 9, 2012
 Date Reported: Dec 28, 2012
 Report Number: 1795065

Metals Total - Continued

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Lithium	µg/L	0.0381365	-0.5	0.5	yes
Magnesium	mg/L	0.0031	-0.02	0.02	yes
Manganese	µg/L	0.149904	-0.2	0.2	yes
Molybdenum	µg/L	0.0025	-0.05	0.05	yes
Nickel	µg/L	0.0234383	-0.2	0.2	yes
Potassium	mg/L	0.0223	-0.1	0.1	yes
Selenium	µg/L	0.00144186	-0.0	0.0	yes
Silicon	mg/L	0.0049	-0.02	0.02	yes
Silver	µg/L	0.00165671	-0.01	0.01	yes
Sodium	mg/L	0.0226	-0.2	0.2	yes
Strontium	µg/L	0.0267853	-0.1	0.1	yes
Thallium	µg/L	0.0009	-0.01	0.01	yes
Thorium	µg/L	0.005	-0.01	0.01	yes
Tin	µg/L	0.0347	-0.1	0.1	yes
Titanium	µg/L	0.0626539	-0.5	0.5	yes
Uranium	µg/L	0.004	-0.01	0.01	yes
Vanadium	µg/L	-0.00763026	-0.1	0.1	yes
Zinc	µg/L	0.335	-0.5	0.5	yes
Zirconium	µg/L	0.0548408	-0.5	0.5	yes

Date Acquired: October 11, 2012

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Aluminum	µg/L	394	402	15	1	yes
Antimony	µg/L	0.5	0.6	15	0.0	yes
Arsenic	µg/L	1.21	1.27	15	0.01	yes
Barium	µg/L	74.9	67.6	15	0.05	yes
Beryllium	µg/L	<0.05	<0.05	15	0.05	yes
Bismuth	µg/L	0.1	0.1	15	0.1	yes
Boron	µg/L	42	41	15	2	yes
Cadmium	µg/L	0.05	0.05	15	0.01	yes
Calcium	mg/L	82.3	82.3	15	0.05	yes
Chromium	µg/L	2.3	2.3	15	0.5	yes
Cobalt	µg/L	0.5	0.6	15	0.1	yes
Copper	µg/L	13.0	12.4	15	0.1	yes
Iron	µg/L	770	855	15	1	yes
Lead	µg/L	0.3	0.4	15	0.0	yes
Lithium	µg/L	4.6	4.7	15	0.5	yes
Magnesium	mg/L	46.8	46.8	15	0.04	yes
Manganese	µg/L	832	800	15	0.1	yes
Molybdenum	µg/L	42.4	43.4	15	0.05	yes
Nickel	µg/L	9.2	9.5	15	0.1	yes
Potassium	mg/L	0.9	0.9	15	0.1	yes
Selenium	µg/L	0.7	0.8	15	0.1	yes

Quality Control

Bill To: Laberge Environmental Services	Project:	Lot ID: 898270
Report To: Laberge Environmental Services	ID:	Control Number:
Box 21072	Name: Clinton Creek	Date Received: Oct 9, 2012
1-405 Ogilvie Street	Location: Clinton Creek	Date Reported: Dec 28, 2012
Whitehorse, YT, Canada	LSD:	Report Number: 1795065
Y1A 6P7	P.O.:	
Attn: Bonnie Burns	Acct code:	
Sampled By:		
Company:		

Metals Total - Continued

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Silicon	mg/L	5.77	5.76	15	0.02	yes
Silver	µg/L	<0.01	0.01	15	0.01	yes
Sodium	mg/L	3.6	3.6	15	0.1	yes
Strontium	µg/L	328	335	15	0.1	yes
Thallium	µg/L	<0.01	0.01	15	0.01	yes
Thorium	µg/L	0.08	0.09	15	0.01	yes
Tin	µg/L	0.2	0.2	15	0.1	yes
Titanium	µg/L	120	111	15	0.5	yes
Uranium	µg/L	3.57	3.69	15	0.01	yes
Vanadium	µg/L	1.6	1.8	15	0.1	yes
Zinc	µg/L	57.7	60.7	15	0.5	yes
Zirconium	µg/L	1.3	0.9	15	0.5	yes

Date Acquired: October 11, 2012

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Antimony	µg/L	11.7	10.8	13.2	yes
Arsenic	µg/L	11.0	10.80	13.20	yes
Barium	µg/L	61.7	54.00	66.00	yes
Beryllium	µg/L	5.68	5.40	6.60	yes
Bismuth	µg/L	29.6	27.0	33.0	yes
Boron	µg/L	118	108	132	yes
Cadmium	µg/L	0.60	0.51	0.69	yes
Calcium	mg/L	53.2	44.99	55.01	yes
Chromium	µg/L	29.4	27.0	33.0	yes
Cobalt	µg/L	5.6	5.4	6.6	yes
Copper	µg/L	58.9	54.0	66.0	yes
Lead	µg/L	5.8	5.4	6.6	yes
Lithium	µg/L	60.6	54.0	66.0	yes
Magnesium	mg/L	20.8	17.99	22.01	yes
Molybdenum	µg/L	59.8	54.00	66.00	yes
Nickel	µg/L	29.3	27.0	33.0	yes
Potassium	mg/L	52.0	45.0	55.0	yes
Selenium	µg/L	11.3	10.8	13.2	yes
Silicon	mg/L	2.24	-0.01	4.01	yes
Silver	µg/L	5.88	5.40	6.60	yes
Sodium	mg/L	53.5	45.0	55.0	yes
Strontium	µg/L	58.7	54.0	66.0	yes
Thallium	µg/L	2.81	2.70	3.30	yes
Thorium	µg/L	29.9	27.00	33.00	yes
Tin	µg/L	60.4	54.0	66.0	yes
Titanium	µg/L	30.1	27.0	33.0	yes
Uranium	µg/L	29.8	27.00	33.00	yes
Vanadium	µg/L	5.9	5.4	6.6	yes

Quality Control

Bill To: Laberge Environmental Services Project:
 Report To: Laberge Environmental Services ID:
 Box 21072 Name: Clinton Creek
 1-405 Ogilvie Street Location: Clinton Creek
 Whitehorse, YT, Canada LSD:
 Y1A 6P7 P.O.:
 Attn: Bonnie Burns Acct code:

Sampled By:
 Company:

Lot ID: **898270**
 Control Number:
 Date Received: Oct 9, 2012
 Date Reported: Dec 28, 2012
 Report Number: 1795065

Metals Total - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Zinc	µg/L	57.4	54.0	66.0	yes
Zirconium	µg/L	55.4	54.0	66.0	yes
Date Acquired: October 11, 2012					
Aluminum	µg/L	957	900	1100	yes
Antimony	µg/L	39.9	36.0	44.0	yes
Arsenic	µg/L	38.2	36.01	43.99	yes
Barium	µg/L	202	179.99	220.01	yes
Beryllium	µg/L	19.5	17.99	22.01	yes
Bismuth	µg/L	98.9	90.0	110.0	yes
Boron	µg/L	362	360	440	yes
Cadmium	µg/L	1.98	1.80	2.20	yes
Calcium	mg/L	247	225.01	274.99	yes
Chromium	µg/L	94.7	90.0	110.0	yes
Cobalt	µg/L	18.0	18.0	22.0	yes
Copper	µg/L	193	180.0	220.0	yes
Iron	µg/L	3900	3600	4400	yes
Lead	µg/L	19.3	18.0	22.0	yes
Lithium	µg/L	192	180.0	220.0	yes
Magnesium	mg/L	99.4	90.01	109.99	yes
Manganese	µg/L	400	360.1	439.9	yes
Molybdenum	µg/L	204	179.99	220.01	yes
Nickel	µg/L	94.7	90.0	110.0	yes
Potassium	mg/L	251	225.0	275.0	yes
Selenium	µg/L	37.7	36.0	44.0	yes
Silicon	mg/L	10.2	9.01	10.99	yes
Silver	µg/L	18.9	17.99	22.01	yes
Sodium	mg/L	254	225.0	275.0	yes
Strontium	µg/L	191	180.0	220.0	yes
Thallium	µg/L	9.30	9.01	10.99	yes
Thorium	µg/L	99.0	90.01	109.99	yes
Tin	µg/L	204	180.0	220.0	yes
Titanium	µg/L	97.4	90.0	110.0	yes
Uranium	µg/L	97.3	90.01	109.99	yes
Vanadium	µg/L	19.1	18.0	22.0	yes
Zinc	µg/L	194	180.0	220.0	yes
Zirconium	µg/L	191	180.0	220.0	yes
Date Acquired: October 11, 2012					
Aluminum	µg/L	51	45	55	yes
Antimony	µg/L	2.0	1.8	2.2	yes
Arsenic	µg/L	1.92	1.80	2.20	yes
Barium	µg/L	10.3	9.01	10.99	yes
Beryllium	µg/L	1.02	0.90	1.10	yes

Quality Control

Bill To: Laberge Environmental Services	Project:	Lot ID: 898270
Report To: Laberge Environmental Services	ID:	Control Number:
Box 21072	Name: Clinton Creek	Date Received: Oct 9, 2012
1-405 Ogilvie Street	Location: Clinton Creek	Date Reported: Dec 28, 2012
Whitehorse, YT, Canada	LSD:	Report Number: 1795065
Y1A 6P7	P.O.:	
Attn: Bonnie Burns	Acct code:	
Sampled By:		
Company:		

Metals Total - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Bismuth	µg/L	5.0	4.5	5.5	yes
Boron	µg/L	21	18	22	yes
Cadmium	µg/L	0.10	0.09	0.11	yes
Calcium	mg/L	5.28	4.50	5.50	yes
Chromium	µg/L	5.1	4.5	5.5	yes
Cobalt	µg/L	0.9	0.9	1.1	yes
Copper	µg/L	10.0	9.0	11.0	yes
Iron	µg/L	202	180	220	yes
Lead	µg/L	1.0	0.9	1.1	yes
Lithium	µg/L	10.3	9.0	11.0	yes
Magnesium	mg/L	2.07	1.80	2.20	yes
Manganese	µg/L	20.4	18.0	22.0	yes
Molybdenum	µg/L	10.1	9.01	10.99	yes
Nickel	µg/L	5.2	4.5	5.5	yes
Potassium	mg/L	5.2	4.5	5.5	yes
Selenium	µg/L	1.9	1.8	2.2	yes
Silicon	mg/L	0.21	0.18	0.22	yes
Silver	µg/L	1.04	0.90	1.10	yes
Sodium	mg/L	5.3	4.5	5.5	yes
Strontium	µg/L	9.9	9.0	11.0	yes
Thallium	µg/L	0.50	0.45	0.55	yes
Thorium	µg/L	4.88	4.50	5.50	yes
Tin	µg/L	10.0	9.0	11.0	yes
Titanium	µg/L	5.1	4.5	5.5	yes
Uranium	µg/L	4.89	4.50	5.50	yes
Vanadium	µg/L	1.0	0.9	1.1	yes
Zinc	µg/L	10.7	9.0	11.0	yes
Zirconium	µg/L	9.2	9.0	11.0	yes

Date Acquired: October 11, 2012

Physical and Aggregate Properties

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Solids	mg/L	16	17	30	20	yes

Date Acquired: October 11, 2012

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Solids	mg/L	498	291	591	yes
Solids	mg/L	22	16	31	yes
Solids	mg/L	<2	-3	3	yes

Date Acquired: October 11, 2012

Quality Control

Bill To: Laberge Environmental Services	Project:	Lot ID: 898270
Report To: Laberge Environmental Services	ID:	Control Number:
Box 21072	Name: Clinton Creek	Date Received: Oct 9, 2012
1-405 Ogilvie Street	Location: Clinton Creek	Date Reported: Dec 28, 2012
Whitehorse, YT, Canada	LSD:	Report Number: 1795065
Y1A 6P7	P.O.:	
Attn: Bonnie Burns	Acct code:	
Sampled By:		
Company:		

Physical and Aggregate Properties -

Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Date Acquired:	October 11, 2012				

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	0	-0.05	0.05	yes
Iron	mg/L	-0.0022	-0.006	0.004	yes
Magnesium	mg/L	0.0091	-0.05	0.07	yes
Manganese	mg/L	-0.0012	-0.007	0.001	yes
Phosphorus	mg/L	-0.0033	-0.04	0.04	yes
Potassium	mg/L	0.0233	-0.4	0.4	yes
Silicon	mg/L	0.0006	-0.20	0.25	yes
Sodium	mg/L	0.006	-0.2	0.2	yes
Date Acquired:	October 11, 2012				
Calcium	mg/L	-0.0017	-0.13	0.16	yes
Iron	mg/L	0.0034	-0.005	0.005	yes
Magnesium	mg/L	-0.0117	-0.07	0.08	yes
Manganese	mg/L	-0.0021	-0.009	0.002	yes
Phosphorus	mg/L	0.009	-0.14	0.16	yes
Potassium	mg/L	0.0269	-0.8	0.8	yes
Silicon	mg/L	-0.0058	-1.76	2.02	yes
Sodium	mg/L	0.0027	-0.3	0.4	yes
Date Acquired:	October 11, 2012				
Nitrate - N	mg/L	0	-0.03	0.03	yes
Nitrite - N	mg/L	0	-0.10	0.10	yes
Sulfate (SO4)	mg/L	0	-1.0	1.0	yes
Date Acquired:	October 10, 2012				

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Nitrate - N	mg/L	92.07	85	115	yes
Nitrite - N	mg/L	100.93	90	110	yes
Sulfate (SO4)	mg/L	94.36	85	115	yes
Date Acquired:	October 10, 2012				
Calcium	mg/L	107.21	91	109	yes
Iron	mg/L	103.80	91	109	yes
Magnesium	mg/L	102.10	91	109	yes
Manganese	mg/L	104.30	90	110	yes
Phosphorus	mg/L	100.98	90	110	yes
Potassium	mg/L	100.72	91	109	yes
Silicon	mg/L	101.64	80	120	yes
Sodium	mg/L	100.15	90	110	yes

Quality Control

Bill To: Laberge Environmental Services	Project:	Lot ID: 898270
Report To: Laberge Environmental Services	ID:	Control Number:
Box 21072	Name: Clinton Creek	Date Received: Oct 9, 2012
1-405 Ogilvie Street	Location: Clinton Creek	Date Reported: Dec 28, 2012
Whitehorse, YT, Canada	LSD:	Report Number: 1795065
Y1A 6P7	P.O.:	
Attn: Bonnie Burns	Acct code:	
Sampled By:		
Company:		

Routine Water - Continued

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Date Acquired:	October 11, 2012				
Nitrate - N	mg/L	99.89	88	108	yes
Nitrite - N	mg/L	105.63	99	119	yes
Sulfate (SO4)	mg/L	95.94	90	110	yes

Date Acquired: October 10, 2012

Certified Reference Material	Units	Measured	Target	Lower Limit	Upper Limit	Passed QC
T-Alkalinity	mg/L	10	10	8	12	yes
Date Acquired:	October 09, 2012					
Calcium	mg/L	1.53	1.51	1.31	1.72	yes
Iron	mg/L	0.310	0.319	0.279	0.359	yes
Magnesium	mg/L	1.00	1.00	0.86	1.14	yes
Manganese	mg/L	0.376	0.374	0.340	0.408	yes
Potassium	mg/L	0.6	0.6	0.5	0.7	yes
Sodium	mg/L	0.8	0.9	0.8	1.0	yes

Date Acquired: October 11, 2012

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Calcium	mg/L	81.9	81.7	30	1.00	yes
Iron	mg/L	0.621	0.616	30	0.060	yes
Magnesium	mg/L	39.2	39.2	30	1.00	yes
Manganese	mg/L	0.536	0.536	30	0.015	yes
Phosphorus	mg/L	0.01	<0.01	30	0.10	yes
Potassium	mg/L	0.6	0.7	30	1.0	yes
Silicon	mg/L	4.50	4.48	30	0.15	yes
Sodium	mg/L	3.4	3.4	30	1.0	yes

Date Acquired: October 11, 2012

pH		6.46	6.44	2		yes
Electrical Conductivity	dS/m at 25 C	0.781	0.790	10	0.005	yes
Bicarbonate	mg/L	224	225	10	10	yes
Carbonate	mg/L	<6	<6	10	10	yes
Hydroxide	mg/L	<5	<5	10	10	yes
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	184	184	10	5	yes
Nitrate - N	mg/L	2.62	2.70	15	0.05	yes
Nitrite - N	mg/L	<0.01	<0.01	15	0.50	yes
Sulfate (SO4)	mg/L	6.4	6.6	15	0.5	yes

Date Acquired: October 10, 2012

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Nitrate - N	mg/L	0.26	0.22	12	0.05	yes
Nitrite - N	mg/L	0.27	0.27	6	0.01	yes

Quality Control

Bill To: Laberge Environmental Services	Project:	Lot ID: 898270
Report To: Laberge Environmental Services	ID:	Control Number:
Box 21072	Name: Clinton Creek	Date Received: Oct 9, 2012
1-405 Ogilvie Street	Location: Clinton Creek	Date Reported: Dec 28, 2012
Whitehorse, YT, Canada	LSD:	Report Number: 1795065
Y1A 6P7	P.O.:	
Attn: Bonnie Burns	Acct code:	
Sampled By:		
Company:		

Routine Water - Continued

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Sulfate (SO4)	mg/L	3.7	3.7	6	0.0	yes
Date Acquired: October 10, 2012						

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
pH		10.1	9.17	10.81	yes
Electrical Conductivity	µS/cm at 25 C	192	165	243	yes
P-Alkalinity	mg/L	36	7	55	yes
T-Alkalinity	mg/L	92	90	101	yes
Date Acquired: October 09, 2012					
pH		4.00	3.88	4.12	yes
Date Acquired: October 09, 2012					
pH		7.94	7.88	8.12	yes
Date Acquired: October 09, 2012					
Electrical Conductivity	µS/cm at 25 C	18	0	2	yes
Date Acquired: October 09, 2012					
Electrical Conductivity	µS/cm at 25 C	1360	1323	1503	yes
Date Acquired: October 09, 2012					
Electrical Conductivity	µS/cm at 25 C	<1	-2	2	yes
Date Acquired: October 09, 2012					

Trace Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	0	-10	10	yes
Antimony	µg/L	0	-0.4	0.2	yes
Arsenic	µg/L	0	-0.5	0.5	yes
Barium	µg/L	0	-0	0	yes
Beryllium	µg/L	0	-0.10	0.10	yes
Bismuth	µg/L	0	-1.0	1.0	yes
Boron	µg/L	0	-6	5	yes
Cadmium	µg/L	0	-0.03	0.03	yes
Chromium	µg/L	0	-0.1	0.2	yes
Cobalt	µg/L	0	-0.07	0.07	yes
Copper	µg/L	0	-1	1	yes
Lead	µg/L	0	-0.1	0.1	yes
Lithium	µg/L	0	-1	1	yes
Molybdenum	µg/L	0	-0.31	0.29	yes
Nickel	µg/L	0	-1	1	yes
Selenium	µg/L	0	-1.7	1.3	yes
Silver	µg/L	0	-0.05	0.05	yes
Strontium	µg/L	0	-0	0	yes
Tellurium	µg/L	0	-0.7	0.7	yes

Quality Control

Bill To: Laberge Environmental Services Project:
 Report To: Laberge Environmental Services ID:
 Box 21072 Name: Clinton Creek
 1-405 Ogilvie Street Location: Clinton Creek
 Whitehorse, YT, Canada LSD:
 Y1A 6P7 P.O.:
 Attn: Bonnie Burns Acct code:

Sampled By:
 Company:

Lot ID: **898270**
 Control Number:
 Date Received: Oct 9, 2012
 Date Reported: Dec 28, 2012
 Report Number: 1795065

Trace Metals Dissolved - Continued

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Thallium	µg/L	0	-0.03	0.03	yes
Thorium	µg/L	0	-1.5	1.5	yes
Tin	µg/L	0	-3.0	3.0	yes
Titanium	µg/L	0	-0.2	0.2	yes
Uranium	µg/L	0	-0.03	0.03	yes
Vanadium	µg/L	0	-0.35	0.35	yes
Zinc	µg/L	9.205	-2	4	yes
Zirconium	µg/L	0	-0.1	0.1	yes
Date Acquired: October 11, 2012					
Aluminum	µg/L	0.671	-6	6	yes
Antimony	µg/L	-0.023	-0.4	0.3	yes
Arsenic	µg/L	-0.013	-0.4	0.3	yes
Barium	µg/L	-0.006	-0	1	yes
Beryllium	µg/L	-0.001	-0.10	0.10	yes
Bismuth	µg/L	0.394	0.0	0.0	yes
Boron	µg/L	-1.589	-18	19	yes
Cadmium	µg/L	-0.004	-0.03	0.03	yes
Chromium	µg/L	0.032	-0.1	0.2	yes
Cobalt	µg/L	0.03	-0.30	0.30	yes
Copper	µg/L	-0.077	-1	1	yes
Lead	µg/L	-0.012	-0.3	0.4	yes
Lithium	µg/L	0.043	-0	0	yes
Molybdenum	µg/L	0.021	-0.95	0.85	yes
Nickel	µg/L	0.005	-1	1	yes
Selenium	µg/L	-1.283	-1.7	1.7	yes
Silver	µg/L	0.015	-0.67	0.47	yes
Strontium	µg/L	0.041	-2	4	yes
Tellurium	µg/L	-0.174	-0.7	0.7	yes
Thallium	µg/L	-0.004	-0.06	0.06	yes
Thorium	µg/L	-0.218	-0.7	0.5	yes
Tin	µg/L	0.072	-3.8	4.0	yes
Titanium	µg/L	0.037	-0.3	0.2	yes
Uranium	µg/L	0.019	-0.04	0.02	yes
Vanadium	µg/L	-0.093	-0.30	0.30	yes
Zinc	µg/L	9.534	-11	19	yes
Zirconium	µg/L	0.073	-0.0	0.0	yes
Date Acquired: October 11, 2012					

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	98.20	70	130	yes
Antimony	µg/L	100.04	85	115	yes
Arsenic	µg/L	103.52	90	110	yes
Barium	µg/L	95.60	90	110	yes

Quality Control

Bill To: Laberge Environmental Services	Project:	Lot ID: 898270
Report To: Laberge Environmental Services	ID:	Control Number:
Box 21072	Name: Clinton Creek	Date Received: Oct 9, 2012
1-405 Ogilvie Street	Location: Clinton Creek	Date Reported: Dec 28, 2012
Whitehorse, YT, Canada	LSD:	Report Number: 1795065
Y1A 6P7	P.O.:	
Attn: Bonnie Burns	Acct code:	
Sampled By:		
Company:		

Trace Metals Dissolved - Continued

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Beryllium	µg/L	99.80	90	110	yes
Bismuth	µg/L	99.52	90	110	yes
Boron	µg/L	100.80	70	130	yes
Cadmium	µg/L	106.12	90	110	yes
Chromium	µg/L	99.60	90	110	yes
Cobalt	µg/L	101.30	90	110	yes
Copper	µg/L	105.66	90	110	yes
Lead	µg/L	104.28	90	110	yes
Lithium	µg/L	105.04	90	110	yes
Molybdenum	µg/L	99.36	90	110	yes
Nickel	µg/L	99.84	90	110	yes
Selenium	µg/L	102.68	90	110	yes
Silver	µg/L	0.09	0	0	yes
Strontium	µg/L	102.44	90	110	yes
Thallium	µg/L	101.60	90	110	yes
Tin	µg/L	104.80	90	110	yes
Titanium	µg/L	94.92	90	110	yes
Uranium	µg/L	102.24	85	115	yes
Vanadium	µg/L	98.96	90	110	yes
Zinc	µg/L	98.94	90	110	yes
Zirconium	µg/L	108.52	90	110	yes

Date Acquired: October 11, 2012

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Aluminum	µg/L	20	20	20	20	yes
Antimony	µg/L	0.4	0.9	20	1.0	yes
Arsenic	µg/L	0.9	1.0	20	1.0	yes
Barium	µg/L	54	54	20	5	yes
Beryllium	µg/L	<0.04	<0.04	20	1.00	yes
Boron	µg/L	8	10	20	5	yes
Cadmium	µg/L	0.08	0.07	20	0.50	yes
Chromium	µg/L	1.4	1.3	20	5.0	yes
Cobalt	µg/L	1.04	1.04	20	0.50	yes
Copper	µg/L	2	2	20	5	yes
Lead	µg/L	<0.1	<0.1	20	0.5	yes
Lithium	µg/L	4	4	20	5	yes
Molybdenum	µg/L	1.57	1.64	20	0.50	yes
Nickel	µg/L	8	7	20	5	yes
Selenium	µg/L	1.0	<0.6	20	0.5	yes
Silver	µg/L	<0.01	<0.01	20	0.50	yes
Strontium	µg/L	377	372	20	0	yes
Tellurium	µg/L	<0.1	<0.1	20	0.5	yes
Thallium	µg/L	<0.01	0.02	20	0.10	yes

Quality Control

Bill To: Laberge Environmental Services Project:
Report To: Laberge Environmental Services ID:
Box 21072 Name: Clinton Creek
1-405 Ogilvie Street Location: Clinton Creek
Whitehorse, YT, Canada LSD:
Y1A 6P7 P.O.:
Attn: Bonnie Burns Acct code:
Sampled By:
Company:

Lot ID: **898270**
Control Number:
Date Received: Oct 9, 2012
Date Reported: Dec 28, 2012
Report Number: 1795065

Trace Metals Dissolved - Continued

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Thorium	µg/L	<0.4	<0.4	10	0.1	yes
Tin	µg/L	<0.1	0.1	20	0.5	yes
Titanium	µg/L	2.7	2.6	20	0.5	yes
Uranium	µg/L	1.95	2.04	20	0.10	yes
Vanadium	µg/L	0.50	0.51	20	0.50	yes
Zinc	µg/L	3	3	20	5	yes
Zirconium	µg/L	0.9	1.0	20	0.5	yes

Date Acquired: October 11, 2012

Methodology and Notes

Bill To: Laberge Environmental Services	Project:	Lot ID: 898270
Report To: Laberge Environmental Services	ID:	Control Number:
Box 21072	Name: Clinton Creek	Date Received: Oct 9, 2012
1-405 Ogilvie Street	Location: Clinton Creek	Date Reported: Dec 28, 2012
Whitehorse, YT, Canada	LSD:	Report Number: 1795065
Y1A 6P7	P.O.:	
Attn: Bonnie Burns	Acct code:	
Sampled By:		
Company:		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alk, pH, EC, Turb in water (Surrey)	APHA	* Alkalinity - Titration Method, 2320 B	09-Oct-12	Exova Surrey
Alk, pH, EC, Turb in water (Surrey)	APHA	* Conductivity, 2510 B	09-Oct-12	Exova Surrey
Alk, pH, EC, Turb in water (Surrey)	APHA	* pH - Electrometric Method, 4500-H+ B	09-Oct-12	Exova Surrey
Ammonia-N in Water (Surrey)	APHA	* Flow Injection Analysis, 4500-NH3 H	10-Oct-12	Exova Surrey
Anions by IEC in water (Surrey)	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	10-Oct-12	Exova Surrey
BC ICP-MS Total Metals in Water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	11-Oct-12	Exova Edmonton
BC ICP-MS Total Metals in Water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	27-Dec-12	Exova Edmonton
BC Trace Total Metals in Water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	11-Oct-12	Exova Edmonton
Carbon Organic (Total) in water (TOC)	APHA	High-Temperature Combustion Method, 5310 B	10-Oct-12	Exova Edmonton
Metals SemiTrace (Dissolved) in water (Surrey)	US EPA	* Metals & Trace Elements by ICP-AES, 6010C	11-Oct-12	Exova Surrey
Phosphorus - total (low level) - Surrey	APHA	* Preliminary Acid Hydrolysis, Ascorbic Acid Reduction Method, 4500-P B,E	10-Oct-12	Exova Surrey
Phosphorus - total reactive P (orthophosphate) - Surrey	APHA	Ascorbic Acid Reduction Method, 4500 -P E	10-Oct-12	Exova Surrey
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105°C, 2540 D	11-Oct-12	Exova Surrey
Trace Metals (dissolved) in Water (Surrey)	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	11-Oct-12	Exova Surrey
Trace Metals (dissolved) in Water (Surrey)	US EPA	* Metals & Trace Elements by ICP-AES, 6010C	11-Oct-12	Exova Surrey

* Reference Method Modified

References

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

Comments:

- Report was re-issued to correct the titanium result on all samples previously reported on Test Report 1772978. Report 1795065 replaces report 1772978.
- Upon receipt, samples had exceeded recommended holding time for nitrate and nitrite analysis.

Methodology and Notes

Bill To:	Laberge Environmental Services	Project:		Lot ID:	898270
Report To:	Laberge Environmental Services	ID:		Control Number:	
	Box 21072	Name:	Clinton Creek	Date Received:	Oct 9, 2012
	1-405 Ogilvie Street	Location:	Clinton Creek	Date Reported:	Dec 28, 2012
	Whitehorse, YT, Canada	LSD:		Report Number:	1795065
	Y1A 6P7	P.O.:			
Attn:	Bonnie Burns	Acct code:			
Sampled By:					
Company:					

Please direct any inquiries regarding this report to our Client Services group.

Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

APPENDIX C

RAW HYDROLOGY DATA FROM WATER RESOURCES

GOVERNMENT OF YUKON DEPARTMENT OF ENVIRONMENT
29EC001 CLINTON CREEK Middle

DAILY DISCHARGE IN CUBIC METRES PER SECOND FOR 2012

Day	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1						.688	.882	2.76	.592E	1.24E		
2						.576	.855	4.57	.550E	1.20E		
3						.499	.849	4.40	.633E	1.19E		
4						.464	.864	3.36	.588E	1.09E		
5						.452	.844	2.21	.598E	1.03E		
6						.446	.806	1.57	.610E	1.28E		
7						.421	.771	1.23 E	.656E	1.79E		
8						.410	.689	.953E	.811E	1.56E		
9						.403	.609	.765E	1.14 E	1.29E		
10					3.39	.386	.643	.642E	1.24 E			
11					3.21	.358	1.77	.576E	1.28 E			
12					3.22	.322	2.59	.527E	1.13 E			
13					4.87	.296	1.72	.497E	1.09 E			
14					4.83	.293	1.09	.456E	1.06 E			
15					3.50	.284	.781	.417E	.990E			
16					3.07	.279	.655	.379E	.865E			
17					2.79	.285	.643	.397E	.959E			
18					2.48	.276	.585	.457E	1.06 E			
19					2.10	.271	.554	.480E	.981E			
20					1.93	.269	.611	.480E	.799E			
21					1.92	.262	.709	.464E	.824E			
22					2.01	.243	.676	.453E	.831E			
23					2.19	.230	.593	.413E	.820E			
24					2.18	.227	.581	.344E	.888E			
25					3.37	.220	.574	.395E	1.03 E			
26					3.89	.228	.518	.518E	1.01 E			
27					2.65	.239	.465	.697E	1.16 E			
28					1.86	.275	.417	1.10 E	1.39 E			
29					1.35	.300	.370	.887E	1.35 E			
30		-----			1.05	.331	.350	.683E	1.23 E			
31		-----		-----	.837	-----	.485	.636E	-----		-----	
TOTAL					58.697	10.233	24.549	33.716	28.165	11.67		
MEAN					2.67	.341	.792	1.09	.939	1.30		
MAX					4.87	.688	2.59	4.57	1.39	1.79		
MIN					.837	.220	.350	.344	.550	1.03		
DAM3					5,070	884	2,120	2,910	2,430	1,010		
YEAR 2012	*	*	*	*	*	*	*	*	*	*	*	*
TOTAL*		167.030	MEAN	1.09	MAX	4.87	MIN	.220	DAM3	14,400		

* Incomplete Record