Environment | Water Resources Branch

Keno Silver MiningDistrict Water Resources Audit Report

Licensee: Alexco Keno Hill Mining Corp. (AKHM) & Elsa Reclamation & Development Co. Ltd. (ERDC)

Licence numbers: QZ09-092-2 & QZ17-076

Site contact: Kai Woloshyn

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Distribution list: AKHM & ERDC; Na-Cho Nyak Dun First Nation; Government of Yukon: ENV-EPAB, EMR-CMI, -AAM, -MRB, HSS-EHS

Water Resources Branch (WRB) is responsible for monitoring surface and groundwater in Yukon and is committed to responsible management, protection and conservation of the territory's water resources. As technical experts in water resources, we provide advice for compliance and inspections purposes and conduct reviews of projects undergoing water licensing and environmental assessment processes.

One of WRB's responsibilities is to conduct audits of various undertakings that use or deposit waste to water. Audits are undertaken to improve understanding of a project's effects on the receiving water environment, with the intention of identifying emerging issues and enhancing understanding of existing water quality and quantity conditions to support technical advice and input into assessment, licensing, and post-licensing processes. The opinions and recommendations expressed in this report are based on relevant data, reports, interpretation/analyses of scientific information available to WRB, and what was observed in the field.

Audit objectives

The objectives of the 2019 audit in the Keno Silver Mining District were to:

1. Evaluate soil quality in the Onek adit discharge area.
2. Assess the potential for increased leaching from sediment materials as Christal Lake water level recedes.

Key findings

- Soil samples collected in the Onek adit discharge area exhibited exceedances of the CSR standards for Ag; while As, Cd, Cu, Pb, Sb and Zn contents measured are above CCME guidelines for residential and industrial uses.
- Christal Lake is receding and water levels have decreased since 2006.
- Groundwater is daylighting around Christal Lake and feeding water to the lake.
- Dissolved arsenic concentrations are increasing in Christal Creek downstream of Christal Lake.

Recommendations:

#1 Further investigate the cause and the impact of Christal Lake water level recession on Christal Creek

#2 Assess the impact of the trends in metal concentrations on the definition of the Water Quality Objectives at KV-6

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Background

Water Resources Branch conducted a previous water quality audit in the Keno Silver Mining District in June 2018. This audit included collection of water samples along Christal Creek upstream and downstream of Christal Lake and the report contained several recommendations regarding water quality in this drainage, some of which have been implemented by the Licencee. Further sampling of the lake and groundwater inputs was considered necessary to better understand water quality influences.

Historical milling operations deposited tailings material in Christal Lake and Christal Creek. The water level of Christal Lake appears to be receding and may result in exposed tailings material which could begin oxidizing and leaching metals into the lake and Christal Creek. A previous study by Kwong et al. (2011) identified a risk of metal leaching if tailings were exposed to air. Sample collection and analysis of submerged and exposed sediment, surface water, shallow groundwater, and shoreline seeps could provide further insight into the water chemistry of the lake and creek.

The Onek adit area is a public health and safety concern due to the discharge of metal-bearing effluent flowing from the historic adit to a ditch near Keno City residences (Figure 1). Yukon Government has heard concerns from local resident related to the quality of the soil downstream of the discharge from the adit. Water Licence QZ17-076 requires the construction of a water treatment plant to commence operation by August 9, 2020 in order to prevent further contamination of the area.

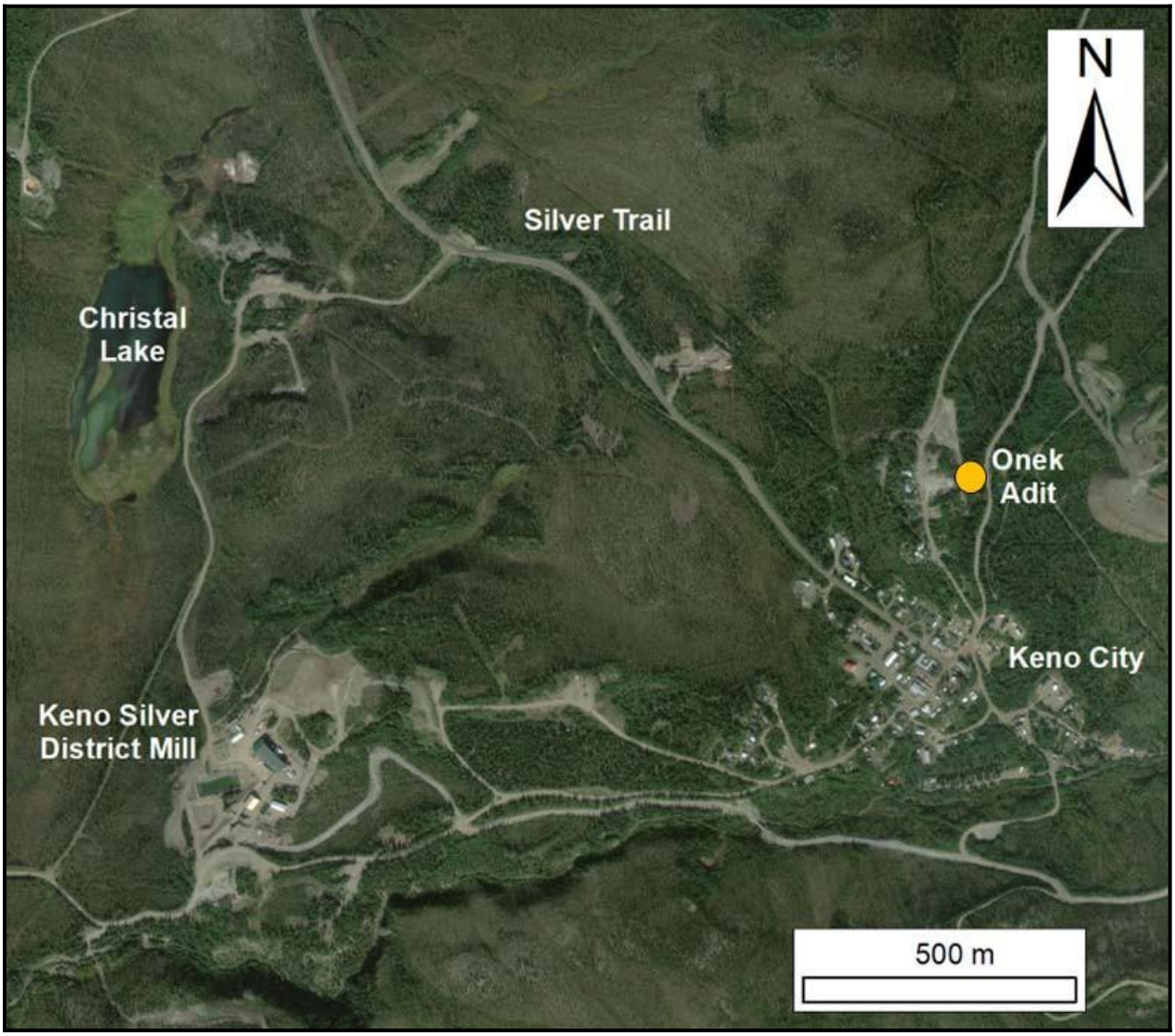

Figure 1. Overview map of sample collection areas at Christal Lake and Onek Adit near Keno City.

Objective 1: Evaluate soil quality in the Onek adit discharge area

Context

The Onek adit area is a public health and safety concern due to high metal concentrations in the effluent discharged from the historic adit, which is flowing down-gradient near residences along Wernecke Road. Yukon Government has heard concerns from local residents about the impact of the Onek discharge on the soil in the area. Conducting a thorough characterization of the soil in the area is outside of the scope of this audit, however the intent of the work presented here was to measure and report on soil quality observed at three locations down-gradient of the discharging adit. Monitoring and reporting of the historic adit water quality is required under Water Licence QZ17-096. The 2019 annual report required by the licence presents the full water quality results and states that the discharge flows are approximately 1 L/s, with maximum flow measured at about 2 L/s while the median concentration between 2008 and 2019 are 44.0 mg/L and 41.6 mg/L for Total and Dissolved Zinc respectively, and 0.54 mg/L and 0.50 mg/L for Total and Dissolved Cadmium respectively (Ensero Solutions 2020).

General observations of the Onek area

Water was flowing out of the adit at the time of the visit. A pipe was installed to convey water from the adit to a culvert about 10 m down-gradient of the road (Alexco said this was installed in Fall 2018); however the pipe was disconnected and water was discharging to ground (Photo 1). Water was flowing on ground surface to about halfway towards Wernecke Road (Figure 2).

The adit discharge is a well-defined channel until approximately 80 m below the Wernecke Road. At that point, the channel is not well defined. There is no orange staining in this area, the vegetation is sparse, and the soil is made up of very fine grained material. Three soil samples were collected, in the upper drainage channel just below Onek adit (ONEK-S1), at the lower end of the well-defined channel (ONEK-S3) and mid-way between the two (ONEK-S2). See Photos 2-4.

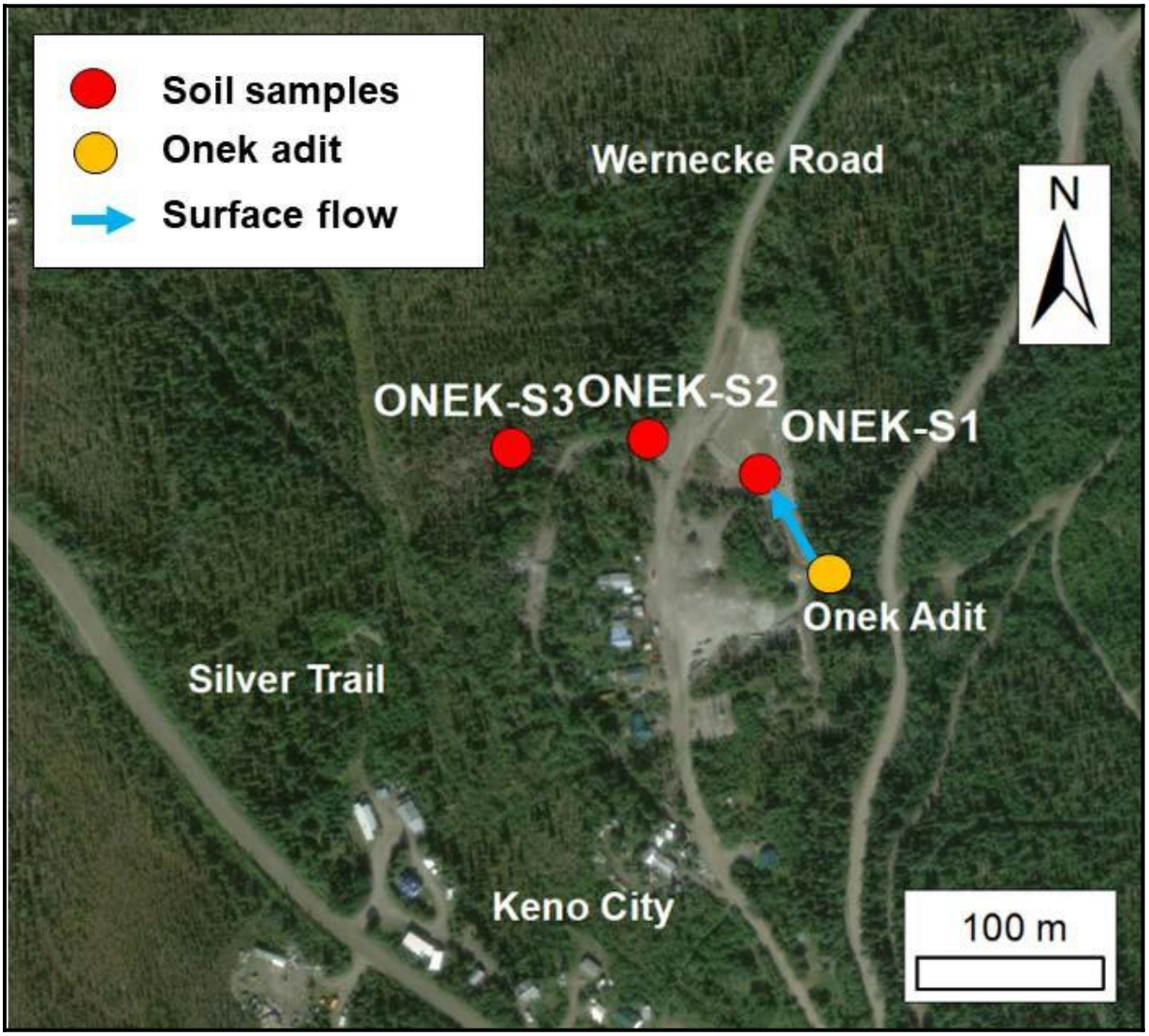

Figure 2. Soil sample sites down-gradient of the Onek adit discharge.

Soil quality results

Although metals are naturally present in the soil, especially around highly mineralized areas such as the Keno Hill Mining District, the continuous discharge of effluent from the historic Onek adit has most likely impacted the down-gradient soils over the years. Table 1 presents the observed metal concentrations in the three soil samples collected in July 2019. Elevated concentrations in these soil samples were expected because they were collected within the Keno Mining Silver District and within the discharge channel.

The two samples collected further away from the Onek adit, ONEK–S2 and ONEK-S3, contained silver concentrations of 39.2 mg/kg and 44.2 mg/L exceeding the CSR numerical standard for residential use (20 mg/kg). ONEK-S3 sample also exceeded the silver standard for industrial use (40 mg/L). However, the sample collected near the discharge (ONEK-S1) contained a much lower silver concentration of 2.29 mg/kg and

this sample does not exceed CSR standards. It is unclear what the source of silver in these soils is. The fact that the sample located nearest to the discharge is the lowest seems to indicate that the discharge from Onek may not be the source of the silver. The Keno District is well known for its silver ore bodies and the surrounding soil most likely has naturally high silver content. Besides, the last 100 years of mining and mineral processing in the district likely emitted dust which would contain silver. Dust deposition could be another source of silver in these samples. Since the sampling program was very limited (only 3 samples and no sample collected outside of the discharge channel or in unaffected areas), this data does not allow for identification of the source of silver.

The CCME standards are useful for comparison; however, they do not apply specifically to the sites where the samples were collected as they are not currently in parkland/residential or industrial use. Rather, they are located near the residences of Keno City and active industrial mining areas. Greater concentrations of As, Cd, Cu, and Zn were present closer to the adit discharge point at ONEK-S1 and decreased moving down gradient. The concentration of Zn at ONEK-S1 was particularly high at 362,000 mg/kg (Table 1).

Table 1. Laboratory analytical results for soil samples collected downgradient of the Onek adit discharge point on July 17, 2019.

Sample Site		**ONEK-S1**	**ONEK-S2**	**ONEK-S3**	**CCME Guidelines* Park./Res.**	**CCME Guidelines* Ind.**	**CSR** Standards Res.**	**CSR** Standards Ind.**
Parameter	**Units**							
SPE[1]	%	73.9	50.1	50.1	-	-		
pH	pH units	7.55	7.45	7.17	-	-		
Ag-T	mg/kg	2.29	**39.2**	**44.2**	-	-	20	40
Al-T	mg/kg	1930	4870	5730	-	-		
As-T	mg/kg	**731**	**400**	**203**	12	12		
Ba-T	mg/kg	38.2	45.2	57	500	2000	500	2000

Be-T	mg/kg	0.2	0.19	0.19	4	8	4	8
Bi-T	mg/kg	0.35	1.59	0.92	-	-		
B-T	mg/kg	<2.0	3.3	4.3	-	-		
Ca-T	mg/kg	4510	2210	2170	-	-		
Cd-T	mg/kg	**1590**	**268**	**144**	10	22		
Co-T	mg/kg	**79.6**	14	11.7	50	300	50	300
Cr-T	mg/kg	3.3	10.4	11.4	64	87		
Cu-T	mg/kg	**229**	**192**	**137**	63	91		
Fe-T	mg/kg	15400	28600	28800	-	-		
Hg-T	mg/kg	0.104	0.502	0.342	6.6	50		
K-T	mg/kg	63	215	205	-	-		
Li-T	mg/kg	2.03	7.75	8.71	-	-		
Mg-T	mg/kg	651	2690	3310	-	-		
Mn-T	mg/kg	45600	6980	4890	-	-		
Mo-T	mg/kg	2.08	1	1.02	10	40	10	40
Na-T	mg/kg	<50	<50	<50	-	-		
Ni-T	mg/kg	**49.8**	19.9	18.7	45	89	100	500
Pb-T	mg/kg	**204**	**1050**	**973**	140	600		
P-T	mg/kg	167	499	486	-	-		
Sb-T	mg/kg	**49.3**	**62.8**	**25.9**	20	40		
Se-T	mg/kg	0.23	0.76	0.65	1	2.9	3	10
Sn-T	mg/kg	6.75	46.7	40.8	50	300	50	300
Sr-T	mg/kg	10.9	8.71	9.03	-	-		
S-T	mg/kg	<1000	2770	1120	-	-		
Te-T	mg/kg	<0.10	<0.10	<0.10	-	-		
Th-T	mg/kg	0.81	2.55	2.43	-	-		
Ti-T	mg/kg	35.7	113	183	-	-		
Tl-T	mg/kg	0.17	0.15	<0.10	1	1		
U-T	mg/kg	**31.6**	4.09	0.75	23	300		
V-T	mg/kg	5.1	14.5	21	130	130	200	
W-T	mg/kg	<0.20	<0.20	<0.20	-	-		
Zn-T	mg/kg	**362000**	**41200**	**12100**	250	410		
Zr-T	mg/kg	<2.0	<2.0	<2.0	-	-		

[1] – *Saturated Paste Extract*

**CCME Soil Quality Guidelines for the Protection of Environmental and Human Health for Residential/Parkland uses and Industrial uses. ** Generic numerical standards listed under the Yukon Contaminated Site Regulation (O.I.C.2002/171) for Residential and Industrial uses.*

Objective 2: Assess the potential for increased leaching from tailings material as Christal Lake recedes

The objective of this work was to study the potential for increased acid rock drainage and metal leaching (ARD/ML) potential from historic tailings material deposited in Christal Lake, as the water level in the lake is receding. It is believed that tailings are mixed in with the lake sediments (Kwong et al. 2011). Some of this sediment material was previously submerged but now a large area of sediment is exposed around the shoreline at the south end of the lake (Figure 3). Exposed tailings may result in oxidizing conditions and result in ARD/ML potential.

Figure 3. Aerial imagery of Christal Lake showing reduced surface area between 2006 and 2014.

General observations at Christal Lake

The lake sediments consisted of fine materials which were dark in colour and appeared to contain decomposed organic matter. There was thick grass surrounding the lake shoreline and slimy sculpin were observed in Christal Creek downstream of the lake but upstream of Mackeno Creek. Field personnel did not observe material which could be clearly identified as tailings in or around the lake, aside from the historic Mackeno tailings site downstream of Mackeno Creek (Figure 4).

The extent of lake surface area appears to be significantly reduced compared to the visible shorelines (Photo 5). Generally, the lake was shallow with depths less than 0.5m in most areas, except at the west side toward the lake outlet where water was deeper (>1m, could not see bottom). At the east shoreline, the water level was 4cm below the bottom of the staff gauge (see Photo 6). Since the lake is shallow in many places,

further decrease in water level would significantly reduce the surface area of the lake. Large boulders which were previously submerged could be seen in the wetlands area near the outlet.

Christal Lake sampling summary

Surface water, sediment, and groundwater was sampled at Christal Lake (Figure 4). Surface water and sediment samples were collected from three sites on Christal Lake: at the south end (CL-1), middle (CL-2), and north end (CL-3) (Photos 7-9). Field measurements were also obtained at surface water collection sites. Sediment samples were collected after the water samples using an Ekman dredge. Water depth at the sample sites ranged from 0.2 – 0.7 m.

Two groundwater seeps were located flowing into Christal Lake along the east shoreline of the lake (CL-SEEP1 and CL-SEEP3; Figure 4). Both seeps contained orange precipitate (iron hydroxide) and were producing bubbles. Water temperature was low (0-2°C) and conductivity was high (1300-1620 µS/cm). Mineral sheens possibly produced by iron-oxidizing bacteria were observed on the water surface (Photos 10 and 11).

Three drivepoint piezometers (CL-DP1, CL-DP2, CL-DP3; Figure 4) were installed to a depth of about 0.4m on July 16, 2019 (Photos 12 – 14). Water samples and field measurements were obtained from all three piezometers on July 17, 2019. Water levels in the piezometers equilibrated for at least 24 hours prior to sampling and static water level was measured using a handheld water level meter. Groundwater samples were collected using a peristaltic pump and polyethylene tubing after being pumped dry the previous day. The drivepoint water samples were filtered through 0.45µm filters immediately after sampling.

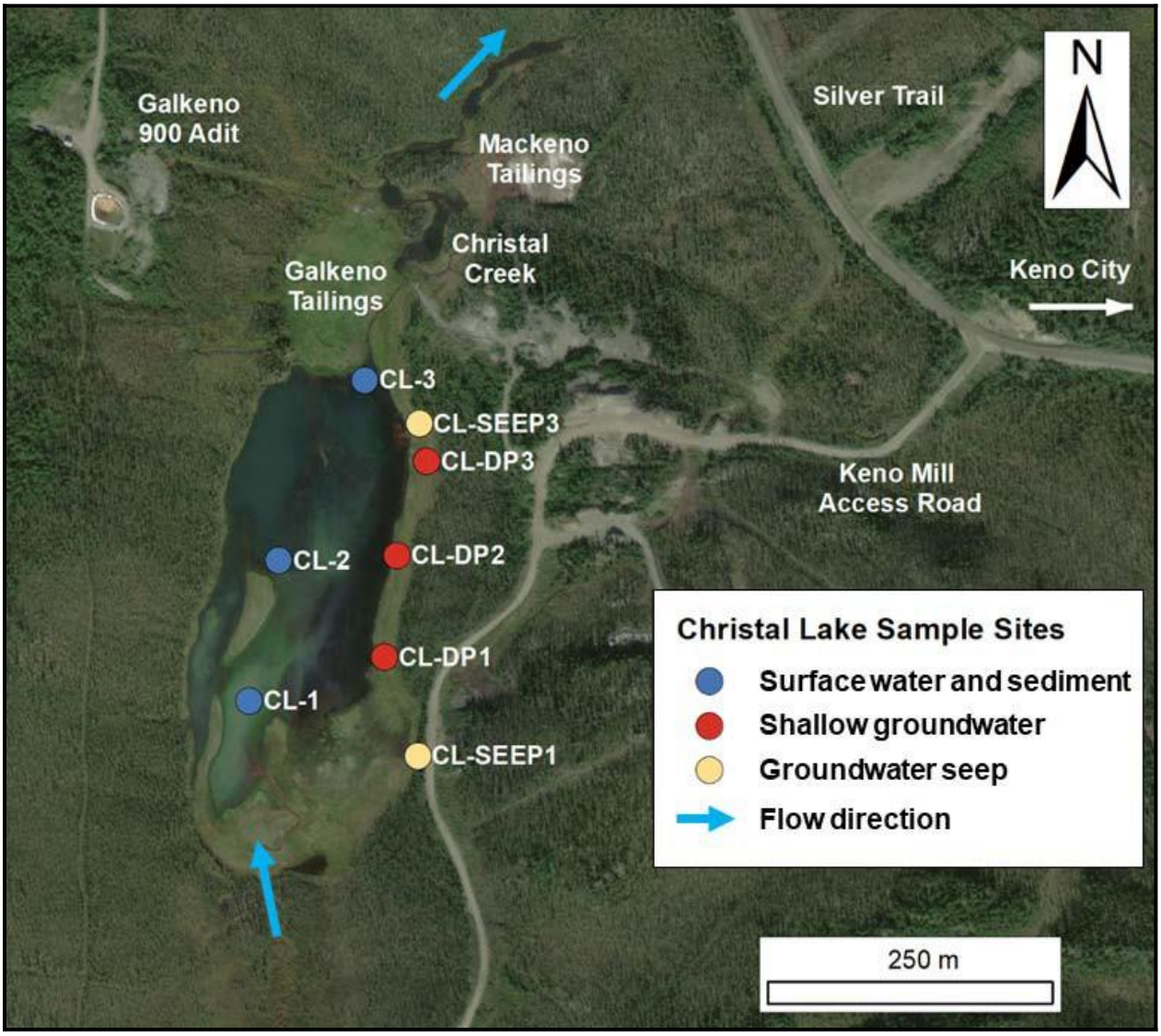

Figure 4. Christal Lake sample sites.

Field and laboratory measurements of surface water conductivity and pH were compared using relative percent difference (Table 2). A YSI ProDSS field meter was used to measure in-situ parameters. All corresponding measurements compared closely (<10% difference) with the exception of pH at CL-SEEP1 which was 10.4% different.

Table 2. Physical/chemical in-situ parameters measured at Christal Lake on July 16, 2019 compared with corresponding laboratory results by relative percent difference (RPD).

Sample Station	Temp. (°C)	SPC (µS/cm)	Lab Cond. (µS/cm)	RPD	Field pH	Lab pH	RPD	DO (mg/L)	Turbidity (NTU)	ORP (mV)
CL-1	11.8	1022	992	3.0%	7.36	7.81	5.9%	10.62	10.6	-
CL-2	18.9	1064	1020	4.2%	8.06	8.1	0.5%	12.93	15.7	-
CL-3	18.4	1082	1040	4.0%	8.14	8.09	0.6%	12.25	18.08	-
CL-SEEP1	0.0	1691	1620	4.3%	6.85	7.6	10.4%	0.3	1.62	-26
CL-SEEP3	1.9	1315	1300	1.1%	7.03	7.71	9.2%	0.59	1.92	-39.4

*Note: Relative percent difference (RPD) calculated using the formula: Relative difference (x,y) = [|x - y| ÷ |(x + y)/2|] * 100*

Surface water quality results

All surface water samples collected from Christal Lake contained elevated concentrations of arsenic, iron, and zinc. The greatest total concentrations of these metals were found at CL-1 and decreased toward the outlet near CL-3. Total zinc and iron were particularly elevated at CL-1 with significantly lower concentrations at CL-2. CCME water quality guidelines for the protection of aquatic life (CCME-PAL) for iron was exceeded at both sites. Unfortunately, the new guideline for dissolved zinc was not available for comparison since its calculation requires Dissolved Organic Carbon values which were not sampled for. It can be noted though that the old total zinc guideline of 0.03 mg/L, which has not applied since 2018, would have been exceeded. The CCME-PAL standard for total arsenic was exceeded at all three sites (Table 3).

Other parameters that were elevated at all sites were conductivity, total dissolved solids, and sulphate. The Adaptive Management Plan (AMP) for the Keno Hill Silver District Mining Operations (Alexco Environmental Group 2018) includes water quality objectives (WQOs) for Christal Creek at KV-6, approximately 0.5km downstream of Christal Lake. These WQOs were not exceeded in the Christal Lake samples (Table 3).

Table 3. Select laboratory analytical results from Christal Lake water samples collected on July 16, 2019.

Sample Site Parameter (mg/L)	CL-1	CL-2	CL-3	CCME	KV-6 AMP WQO
Ag-D	<0.000050	<0.000050	<0.000050		
Ag-T	<0.000050	0.000154	<0.000050	0.00025	0.00037
As-D	0.00466	0.00599	0.0059		
As-T	**0.00979**	**0.00912**	0.00781	0.005	0.014
Ca-D	169	178	183		
Ca-T	177	193	191		
Cd-D	0.00003	<0.000010	<0.000010		
Cd-T	0.000087	0.000065	0.000033	*	0.00257
Cu-D	<0.00040	<0.00040	<0.00040		
Cu-T	<0.00040	<0.00040	<0.00040	*	*
Fe-D	0.233	0.078	0.069		
Fe-T	**1.6**	**0.431**	0.248	0.3	
Ni-D	0.0109	0.00747	0.0064		
Ni-T	0.0119	0.00828	0.00669	*	*
Pb-D	<0.00020	<0.00020	<0.00020		
Pb-T	0.00044	0.00029	<0.00020	*	0.0446
SO4-D	490	532	547		
S-T	179	198	198		
TDS	823	876	884		
TSS	5.2	5.8	2.8		
Zn-D	0.169	0.0087	0.006		
Zn-T	**0.2**	**0.0575**	0.0194	0.03	0.325

[1] – *Canadian Council of Ministers of the Environment protection of freshwater aquatic life guidelines.*
[2] – *Adaptive Management Plan (AMP) Keno Hill Silver District Mining Operations – Alexco Environmental Group, August 2018 – Table 4-8: Water Quality Objectives for Christal Creek (KV-6) and Lightning Creek. The WQO values are based on the upper 95th percentile from the 2008-2018 monitoring data set.*
[3] – *CCME guideline for Total Zinc does not apply anymore as it has been replaced in 2018 by a Dissolved Zinc guideline.*
* – *Calculated guideline value or water quality objective.*

Groundwater results

Groundwater quality results are presented in Table 4 below.

The samples collected from the seeps along the east shoreline of Christal Lake contain relatively high concentrations of arsenic, cadmium, copper, and iron. Of note, total zinc concentrations exceed the former CCME guideline for total zinc, which is no longer relevant. It is unknown if the zinc concentrations observed exceed the current CCME guideline for dissolved zinc because this guideline is based on dissolved organic carbon (DOC), which

was not analyzed in the samples. Arsenic, cadmium, copper and iron concentrations in both seeps exceed, and are markedly greater than, CCME-PAL guidelines. Lead also exceeds the CCME-PAL guideline in the CL-SEEP1 sample.

Most of the seep and shallow groundwater metal concentrations, particularly arsenic and iron, are greater than those found in the lake samples. However, it is unclear whether the lake is receiving metal loading from groundwater seeping into the lake, or from sediment or tailings leaching metals into pore water, or if there is no contribution of groundwater in metal loading into the lake as there is no background groundwater quality data from Christal Lake before the tailings were deposited between approximately 1940 and 1970 (Kwong et al. 2011).

Upward vertical gradients observed in the drivepoint piezometers and the presence of seeps located along the east side of Christal Lake suggest that groundwater was discharging to the lake at the time of the site visit. Groundwater discharge was not measured, so the rate of groundwater flow into the lake is not known. However, relatively lower ionic concentrations in the lake compared to underlying groundwater (based on analysis of samples collected from the drivepoints and seeps) suggest that groundwater input to the lake does not significantly influence the lake chemistry.

Table 4. Select laboratory analytical results from groundwater samples collected from drive point wells and seeps along the shoreline of Christal Lake on July 16 & 17, 2019.

Parameter (mg/L)	CL-DP1	CL-DP2	CL-DP3	CL-SEEP1	CL-SEEP3	CCME-FAL[1]
Ag-D	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-
Ag-T	-	-	-	0.000059	0.000067	0.00025
As-D	0.011	0.00817	0.0302	0.259	0.0571	-
As-T	-	-	-	**0.571**	**0.318**	0.005
Ca-D	162	305	229	313	242	-
Ca-T	-	-	-	304	247	-
Cd-D	0.000104	0.000028	0.000028	0.000025	<0.000010	-
Cd-T	-	-	-	**0.00421**	**0.00078**	*
Cu-D	0.00295	0.00188	0.00063	<0.00040	<0.00040	-
Cu-T	-	-	-	**0.0056**	**0.0058**	*
Fe-D	0.87	1.37	6.27	11.3	4.81	-
Fe-T	-	-	-	**17.4**	**20.9**	0.3
Mn-D	1.99	2.7	1.51	1.19	1.02	*
Mn-T	-	-	-	1.24	1.14	-
Ni-D	0.0215	0.118	0.0488	0.00304	<0.00040	-
Ni-T	-	-	-	0.00575	0.00477	*

Pb-D	0.00022	0.00054	<0.00020	<0.00020	<0.00020	-
Pb-T	-	-	-	**0.00886**	0.00678	*
SO_4-D	290	692	536	773	591	-
S-T	-	-	-	262	202	-
TDS	-	-	-	1420	1080	-
Zn-D	0.0465	0.0572	0.0227	0.0379	0.0049	*
Zn-T	-	-	-	**0.238**	**0.23**	0.03[2]

[1] – *Canadian Council of Ministers of the Environment protection of freshwater aquatic life guidelines.*

[2] - *CCME guideline for Total Zinc does not apply anymore as it has been replaced in 2018 by a Dissolved Zinc guideline.*

* – *Calculated guideline value.*

Sediment geochemistry results

Sediment samples from CL-DP1 and CL-DP2 contain very low total inorganic carbon (TIC), little to no neutralization potential (NP), and high acid potential (AP) (Table 1). According to Price (2009), samples with neutralization potential ratio (NPR) >2 are not likely to generate acidity. The sediment samples collected at CL-1, CL-2, CL-3, and CL- DP3 are Non-Potentially Acid Generating (NPAG) material however CL-DP1 and CL- DP2 have a NPR <1 and are therefore considered Potentially Acid Generating (PAG) material. The variability in NPR amongst the various samples collected during the site visit may be a reflection of the heterogeneity of the sediments in the lake. Tailings were most likely not deposited uniformly in the sediment across the lake.

Table 5. Acid base accounting (ABA) results from sediment samples collected at Christal Lake on July 16 & 17, 2019.

Sample Site	Paste pH	Fizz Rating	TIC[1]	$CaCO_3$ Equiv.[2]	Total S[3]	SO_4 S[3]	SO_3 S[3]	Non-Extract. S[4]	AP[5]	Mod. Sobek NP[6]	NNP[7]	NPR[8]
	pH units		wt %	kg $CaCO_3$/ton	wt %			wt %	kg $CaCO_3$/ton			
RDL	***0.01***		**0.02**	***1.7***	**0.01**	**0.01**	**0.01**	**0.01**	**0.3**			
CL-1	7.3	Slight	0.22	18.3	0.48	0.23	0.23	0.02	7.2	20.1	12.9	2.8
CL-2	7.5	Strong	2.43	202.5	0.76	0.57	0.19	<0.01	5.9	332.7	326.8	56.0
CL-3	7.4	Strong	1.90	158.3	1.36	0.43	0.77	0.16	24.1	222.2	198.1	9.2
CL-DP1	6.3	None	0.18	15.0	2.06	0.14	1.63	0.29	50.9	2.5	-48.4	0.0
CL-DP2	6.6	None	0.25	20.8	1.58	0.12	1.46	<0.01	45.6	-1.3	-46.9	0.0
CL-DP3	7.5	Moderate	0.81	67.5	3.01	0.25	0.78	1.98	24.4	78.3	53.9	3.2

[1] – *Total Inorganic Carbon (TIC)*

[2] – *$CaCO_3$ Equivalents: Based on Total Inorganic Carbon (TIC)*

[3] – *Total Sulfur, Sulfate Sulfur, Sulfide Sulfur*

[4] – *Non-Extractable Sulphur: Total Sulfur – (Sulfate Sulfur + Sulfide Sulfur)*

[5] – *Acid Potential (AP): Sulfide Sulfur x 31.25*

[6] – *Modified Sobek Neutralization Potential (NP)* [7] – *Net Neutralization Potential (NNP): NP – AP* [8] – *Neutralization Potential Ratio (NPR): NP/AP*

Shake flask extraction (SFE) is a geochemical test for understanding the potential risk of metal leaching from geochemically active material. For this test, the sediment samples were mixed with de-ionised water (3:1 liquid to solid ratio) and shaken for 24 hours to promote metal leaching from the sediment into the water. The leachate is then collected and analysed for various parameters including metals (Table 6). Although the concentrations measured in the SFE leachate do not represent the concentration of metals actually leaching from the material in the natural environment, it provides an indication of what could potentially leach out. The water quality objectives (WQOs) established for KV-6 in Christal Creek downstream of Christal Lake are listed for comparison only, as they do not apply to SFE leachate. All metal concentrations in the leachate are lower than the WQOs with the exception of arsenic. The arsenic concentration in the SFE leachate ranges from 0.0119 mg/L at CL-1 to 0.327 mg/L at CL-DP1 while the WQO for arsenic downstream is 0.014 mg/L. The arsenic concentration in CL-DP2 is also elevated at 0.159 mg/L. These results indicate that arsenic may be leaching from the As-containing sediment and that the exposed sediment has higher risk of leaching As than the submerged tailings.

Table 6. Shake flask extraction (SFE) results from sediment samples collected from Christal Lake on July 16 & 17, 2019.

Parameter	Sample Site Units	SFE-CL-1	SFE-CL-2	SFE-CL-3	SFE-CL-DP1	SFE-CL-DP2	SFE-CL-DP3	KV-6 WQO*
Anion	meq/L	11.21	35.31	21.83	15.42	12.16	8.32	
Cation	meq/L	9.26	29.88	21.14	14.04	10.76	10.77	
IB	%	9.5	8.3	1.6	4.7	6.1	12.9	
Acidity-pH8.3	mgCaCO3/L	6.5	14	8	8.5	9	6	
Alk-T	mgCaCO3/L	61	68	66	51.5	60.5	101	
Hard-T	mgCaCO3/L	453	1320	999	677	527	529	
pH-L	pH units	7.6	7.6	7.6	7.3	7.4	7.8	
Cond-L	uS/cm	961	2320	1764	1296	1063	1125	
Ag-D	mg/L	0.000038	<0.000010	<0.000010	0.000011	<0.000010	<0.000010	0.00037
Al-D	mg/L	0.0034	0.0058	0.0067	0.0113	0.0069	0.013	
As-D	mg/L	0.0119	**0.0615**	**0.0658**	**0.327**	**0.159**	**0.0437**	0.014
Ba-D	mg/L	0.0582	0.0997	0.139	0.111	0.0909	0.056	
B-D	mg/L	0.0105	0.0173	0.0189	0.0341	0.0426	0.0175	
Be-D	mg/L	<0.000010	<0.000010	<0.000010	0.000011	<0.000010	<0.000010	
Bi-D	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Ca-D	mg/L	163	410	344	232	187	193	
Cd-D	mg/L	0.0000062	0.0000138	0.0000108	0.0000088	0.0000061	0.0000113	0.00257
Co-D	mg/L	0.00249	0.142	0.0955	0.014	0.007	0.00296	
Cr-D	mg/L	<0.00010	0.00016	0.00015	0.00025	0.00019	0.00013	
Cu-D	mg/L	0.00265	0.00886	0.00563	0.00453	0.00319	0.00489	*
Fe-D	mg/L	0.013	0.0133	0.024	0.111	0.0275	0.017	
Hg-D	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
K-D	mg/L	1.56	5.55	3.3	0.37	0.695	1.65	
Li-D	mg/L	0.0137	0.0499	0.0289	0.0258	0.031	0.0177	
Mg-D	mg/L	11.1	72.4	33.6	23.8	14.4	11.5	

Mn-D	mg/L	1.94	81.2	24.5	8.89	3.05	0.252	
Mo-D	mg/L	0.00184	0.0102	0.00438	0.00766	0.0111	0.00396	
Na-D	mg/L	1.68	6.5	3.8	2.47	1.53	2.47	
Ni-D	mg/L	0.00614	0.66	0.142	0.0174	0.00855	0.0134	*
Pb-D	mg/L	0.000085	0.000192	0.00016	0.000195	0.000125	0.000128	0.0446
P-D	mg/L	0.056	0.109	0.154	0.086	0.043	0.121	
Sb-D	mg/L	0.000702	0.00942	0.00709	0.0114	0.0128	0.00177	
S-D	mg/L	161	540	381	256	190	232	
Se-D	mg/L	0.00152	0.00246	0.00173	0.00103	0.00104	0.00248	
Si-D	mg/L	4.08	19.4	10.3	10.5	8.04	1.94	
Sn-D	mg/L	<0.000050	0.000073	<0.000050	<0.000050	0.000067	0.000285	
SO4	mg/L	479.6	1629.7	984.3	690.7	525.8	302.2	
Sr-D	mg/L	0.222	1.22	0.608	0.442	0.334	0.325	
Te-D	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
Th-D	mg/L	<0.000010	<0.000010	<0.000010	0.000016	0.000011	<0.000010	
Ti-D	mg/L	<0.00020	0.00033	0.00037	0.00087	0.00065	0.00035	
Tl-D	mg/L	0.0000172	0.0000083	0.0000061	<0.0000040	<0.0000040	<0.0000040	
U-D	mg/L	0.000707	0.0118	0.00538	0.000306	0.000594	0.0135	
V-D	mg/L	<0.00020	0.00026	0.00024	0.00171	0.00254	<0.00020	
W-D	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	
Zn-D	mg/L	0.0065	0.0606	0.0143	0.153	0.0535	0.0118	0.325
Zr-D	mg/L	0.000076	0.00009	0.000112	0.000126	0.000093	0.000096	

[1] – *Adaptive Management Plan (AMP) Keno Hill Silver District Mining Operations – Alexco Environmental Group, August 2018 – Table 4-8: Water Quality Objectives for Christal Creek (KV-6) and Lightning Creek. The WQO values are based on the upper 95th percentile from the 2008-2018 monitoring data set.*

* – *Calculated guideline value or water quality objective.*

Results interpretation and discussion

A summary of analytical results is presented in Table 7 for dissolved arsenic, cadmium, and zinc concentrations in surface water, groundwater seeps, shallow groundwater, and shake flask leachate for submerged and exposed sediments. In addition, the concentrations measured in the lake water or pore water was compared to the concentration measured in the SFE leachate. A positive relative difference indicates that the laboratory produced leachate had higher concentration than the ambient water, and the sediment sample could possibly be releasing metals in the ambient water. On the other hand, when the relative difference is negative, the concentration of the metal is higher in the ambient water (lake or pore water) than it is in the laboratory-produced leachate, meaning that the sediments are less likely to release metal in the environment.

Table 7. Summary of select analytical results. Note the units in mg/L for As and Zn and in ug/L for Cd. Relative difference was calculated for each location as RD = (SFE leachate concentration – water sample concentration)/water sample concentration). When Cd was non-detect, the relative difference calculation assumed that cadmium concentration was equal to the detection limit.

Sample sites	As-D (mg/L)	Cd-D (µg/L)	Zn-D (mg/L)
CL-1	0.00466	0.03	0.169
CL-DP1	0.011	0.104	0.0465
CL-SEEP1	**0.259**	0.025	0.0379
CL-1(SFE)	0.0119	0.0062	0.0065
Relative difference with CL-1	155%	-79%	-96%
CL-DP1(SFE)	**0.327**	0.0088	0.153
Relative difference with CL-DP1	2873%	-92%	229%
CL-2	0.00599	<0.010	0.0087
CL-DP2	0.00817	0.028	0.0572
CL-2(SFE)	**0.0615**	0.0138	0.0606
Relative difference with CL-2	927%	38%	597%
CL-DP2(SFE)	**0.159**	0.0061	0.0535
Relative difference with CL-DP2	1846%	-78%	-6%
CL-3	0.0059	<0.010	0.006
CL-DP3	**0.0302**	0.028	0.0227
CL-SEEP3	**0.0571**	<0.010	0.0049
CL-3(SFE)	**0.0658**	0.0108	0.0143
Relative difference with CL-3	1015%	8%	138%
CL-DP3(SFE)	**0.0437**	0.0113	0.0118

Relative difference with CL-DP3	45%	-60%	-48%
CCME WQG	0.005	-	0.03
KV-6 AMP WQO	0.014	2.57	0.325

Arsenic

Dissolved arsenic was measured at greater concentrations in the groundwater seeps (0.259 and 0.0571 mg/L in CL-SEEP1 and CL-SEEP3, respectively) than in the shallow groundwater (0.00817 to 0.0302 mg/L) and Christal Lake (0.00466 to 0.00599 mg/L). The volume of flow from the seeps is unknown; therefore, it is not possible to calculate the load of arsenic from groundwater,. The SFE results of the exposed sediments from CL-DP1 and CL-DP2 contain greater arsenic concentrations than submerged sediment. This could be due to either arsenic being present in greater concentrations in the sediments surrounding the lake, or arsenic is more mobile in sediments exposed to air. Further investigation (including analysis of total metals in the sediment) could help determine the cause of the greater arsenic concentrations in the SFE of the exposed sediment. As per the results discussed previously, arsenic in the SFE leachate is higher than the WQO for arsenic downstream in Christal Lake in all sediment samples except at CL-1. It is unclear how much arsenic the exposed and submerged sediments are contributing to Christal Lake and Christal Creek but it would be worth investigating further.

Cadmium

Dissolved cadmium is similar amongst the various phases in the three locations, on shore and in the lake: lake water varies from non-detect to 0.03ug/L, shallow groundwater varies from 0.028 to 0.104 ug/L, and it was non-detect and 0.025 ug/L in the seeps. Cadmium in SFE leachates is lower (negative relative difference) than in the respective surface and groundwater in most cases, indicating that leaching of cadmium from the sediments is not very likely.

Zinc

Dissolved zinc concentrations were highest at the south (upstream) end of Christal Lake (0.169mg/L), while the north end (downstream) and middle samples were lower (0.006 and 0.0087mg/L, respectively). Concentrations of dissolved zinc in shallow groundwater and seeps was between 0.0049 and 0.0572 mg/L. In the middle and northern lake locations, zinc concentration in the SFE leachate was higher than in lake water (597% and 138% respectively). However the opposite was observed at the southern end of the lake where dissolved zinc in the lake water (0.169 mg/L) was higher than zinc concentrations observed in the SFE leachate (0.0065 mg/L). In the dry area near the south end on the lake, the zinc concentration in the SFE leachate was 229% higher than the pore water at this same location, meaning that sediment could

possibly contribute zinc to the pore water.

Seasonal trends analysis

Seasonal Mann-Kendall trend analysis were conducted on data over a 10 years period, from 2009 to 2019 upstream of Christal Lake (KV-51) and downstream of Christal Lake (KV-6) and the results are presented in Table 8. For Mann-Kendall trends analysis, trends are deemed significant if the z value is less than 0.05 and trends are considered to be increasing if tau value is between 0 and +1; the closer the value is to +1 the bigger the increase. On the other hand, trends are considered to be decreasing if tau value is between 0 and -1; the closer the value is to -1 the bigger the decrease. In addition, plots for dissolved and dissolved arsenic concentrations at KV-51 and KV-6 are presented in Figure 5 and 6 respectively.

It should be noted first that arsenic concentrations are smaller in Christal Creek downstream of Chrystal Lake, at KV-6 than upstream of the lake, at KV-51. This indicates there is some dilution of arsenic in Christal Creek, in the reach between KV-51 and KV-6 (Figure 5). There has been some exceedances of the WQO for the Total arsenic concentrations in some instances at KV-6 (Figure 6). Note that WQO were defined as the upper 95th percentile of Total Arsenic concentration over a 10 years period (2008-2018, Alexco Environmental Group 2018).
The results from the trend analysis indicate that, although there is not a trend in dissolved arsenic concentrations upstream of Christal Creek (KV-51), there is a slight but significant upward trend at KV-6. In other words, the conditions have changed at KV-6 where dissolved arsenic is increasing. This increase cannot be related to an increase in arsenic concentration upstream at KV-51 (arsenic is not increasing at KV-51). Either there is less dilution of arsenic, or there is a source of dissolved arsenic. Both hypothesis are plausible. We know that the lake is receding and this may be due to a lower amount of water coming into the lake, which could result in a lower dilution of arsenic, and hence higher concentrations. On the other hand, a release of arsenic from the exposed sediment may happen, as indicated by the SFE result, and that could be a source of arsenic in the lake. Further investigation of the cause and the impact of Christal Lake recession is recommended.

Table 8. Results of the seasonal Man-Kendall trend analysis for dissolved As, Cd and Zn at stations KV-51 and KV-6 between 2009 and 2019.

Station KV-6 - Downstream of Christal Lake			
Parameter	tau	z	Conclusion
Arsenic, Dissolved	0.357	<0.001	Significantly increasing
Cadmium, Dissolved	-0.165	<0.01	Significantly decreasing
Zinc, Dissolved	0.199	0.02	Significantly increasing

Station KV-51 - Upstream of Christal Lake			
Parameter	tau	z	Conclusion
Arsenic, Dissolved	-0.138	0.39	No significant trend
Cadmium, Dissolved	-0.416	0.01	Significantly decreasing
Zinc, Dissolved	0.320	<0.01	Significantly increasing

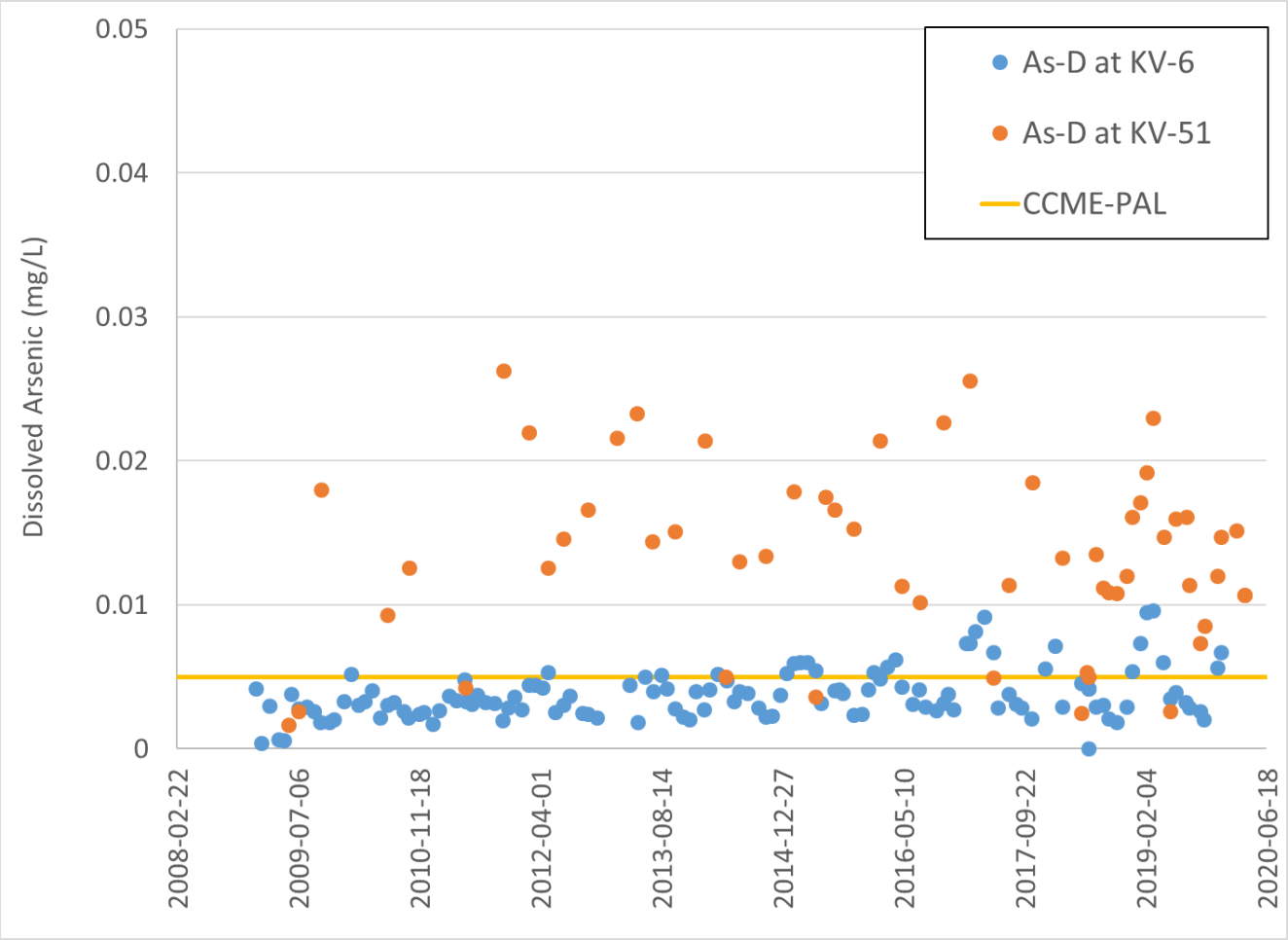

Figure 5. Dissolved arsenic concentration between 2009 and 2019 at stations KV-51 (Christal Creek upstream of Christal Lake) and KV-6 (Christal Creek downstream of Christal Lake).

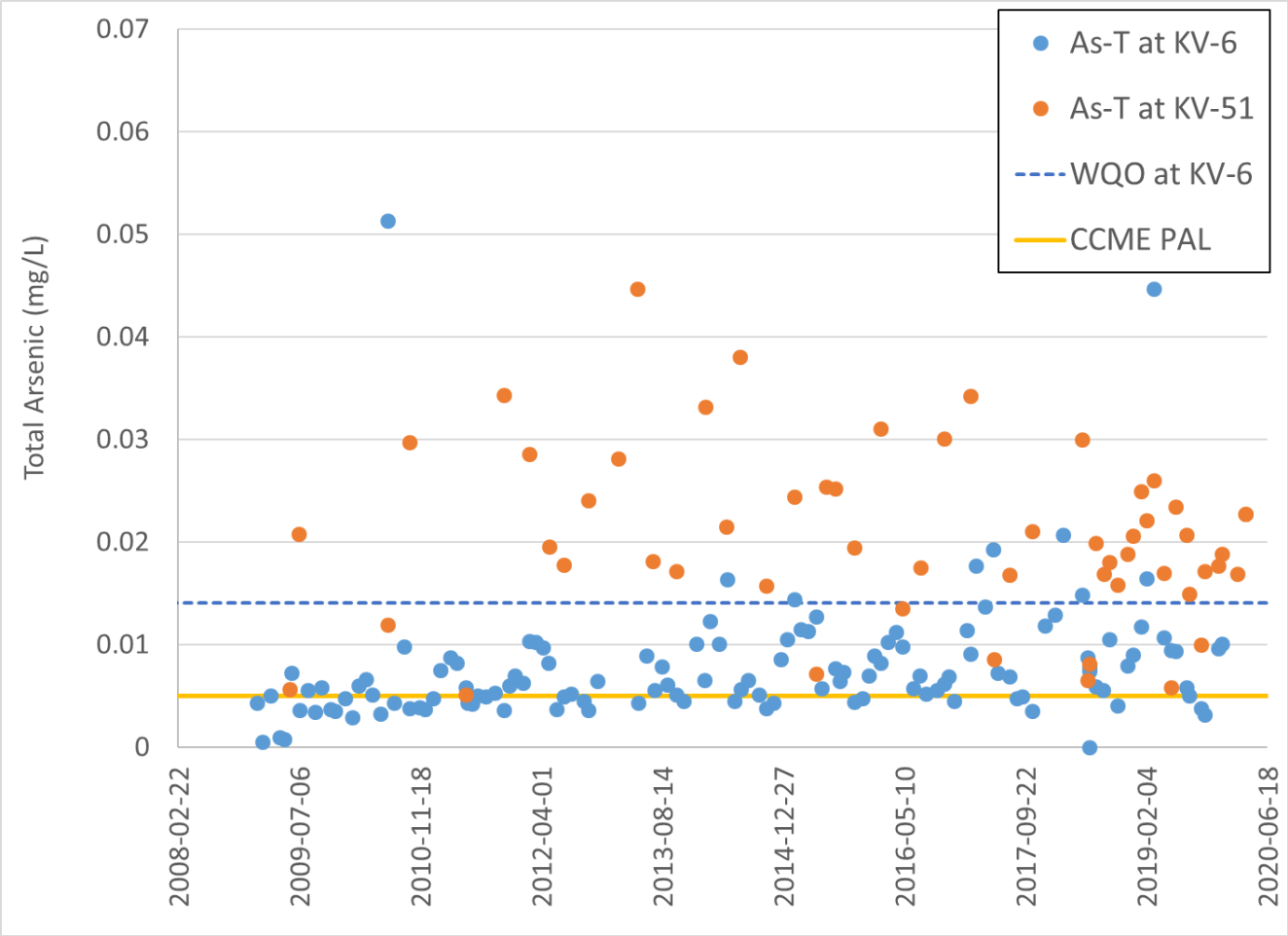

Figure 6. Total arsenic concentrations between 2009 and 2019 at stations KV-51 (Christal Creek upstream of Christal Lake) and KV-6 (Christal Creek downstream of Christal Lake).

Conclusions and recommendations

Recommendations:

Recommendation #1. Further investigate the cause and the impact of Christal lake recession on Christal Creek
Rationale: Christal Lake is receding. An investigation of the cause of the recession should be documented and reported. In addition, it appears the lake recession may have an impact on some water quality parameters, including dissolved arsenic. The impacts of the lake recession on Christal Creek should be documented and reported as well.

Recommendation #2. Assess the impact of the trends in metal concentrations on the definition of the Water Quality Objectives at KV-6
Rationale: WQO for arsenic, cadmium, lead, silver and zinc at KV-6 are based on the

95th percentile and upper confidence level mean of concentrations measured in the 2008-2018 period (Alexco Environmental Group 2018). The use of the 95th percentile or the upper confidence level mean is appropriate for data sets which are not trending upward or downward. It appears that arsenic, cadmium and zinc concentrations are showing trends at KV-6 between 2009 and 2019. The authors did not do trend analysis on silver and lead. The impact of the trends on the definition of the WQO should be acknowledged and discussed.

References

Alexco Environmental Group (2018). Adaptive Management Plan – Keno Hill Silver District Mining Operations. August 2018.

Ensero Solutions (2020). 2019 Annual Water Licence Report – Water Use Licence QZ17-076. March 2020.

Kwong Y.T.J., Arrel S., Roach, P., Guilbeault M., Soprovich E., Miller J. (2011). Metal Background and Mobility at Christal Lake, Keno Hill Mining District. Natural Resource Canada Project MMSL No. 603556.

Price, W. 2009. Prediction Manual for Drainage Chemistry From Sulphidic materials. MEND Report 1.20.1.

Appendix A: Field Data and Notes

Field data

Sample site coordinates and description.

Station Code	Latitude	Longitude	Description
Surface water samples			
CL-1	63.91347	-135.33418	South end of Christal Lake
CL-2	63.91457	-135.33366	Middle of Christal Lake
CL-3	63.91599	-135.33214	North end of Christal Lake
Groundwater samples			
CL-SEEP1	63.9130472	-135.3311597	Christal Lake shoreline seep at S end of lake
CL-SEEP3	63.9156497	-135.3311496	Christal Lake shoreline seep at N end of lake
CL-DP1	63.9138176	-135.3317599	Drivepoint well on east shoreline of Christal Lake at south end
CL-DP2	63.9146168	-135.3315451	Drivepoint well on east shoreline of Christal Lake middle area
CL-DP3	63.9153539	-135.3310238	Drivepoint well on east shoreline of Christal Lake at north end
Sediment samples			
CL-1	63.91347	-135.33418	South end of Christal Lake
CL-2	63.91457	-135.33366	Middle of Christal Lake
CL-3	63.91599	-135.33214	North end of Christal Lake
CL-DP1	63.9138176	-135.3317599	Drivepoint well on east shoreline of Christal Lake at south end
CL-DP2	63.9146168	-135.3315451	Drivepoint well on east shoreline of Christal Lake middle area
CL-DP3	63.9153539	-135.3310238	Drivepoint well on east shoreline of Christal Lake at north end
Soil samples			
ONEK-S1	63.91319	-135.3024	Upper drainage channel below Onek Adit discharge point
ONEK-S2	63.91336	-135.30363	Mid-section of Onek Adit drainage channel below road
ONEK-S3	63.91331	-135.30513	Lower section of Onek Adit drainage channel below road

In-situ field parameter measurements using YSI ProDSS field meter.

Station Name	Temp. (° C)	DO (mg/L)	SPC (µS/cm)	pH	ORP (mV)	Turbidity (NTU)	Date (yymmdd)	Time (24 h)
CL-1	11.8	10.62	1022	7.36	-	10.6	190716	16:00
CL-2	18.9	12.93	1064	8.06	-	15.7	190716	16:25
CL-3	18.4	12.25	1082	8.14	-	18.1	190716	16:41
CL-SEEP1	0.0	0.3	1691	6.85	-26	1.62	190716	14:15
CL-SEEP3	1.9	0.59	1315	7.03	-39.4	1.62	190716	15:05

Field notes

Weather conditions during field activities were mainly warm and sunny with air temperatures up to 25°C, minimal wind, and no precipitation.

An inflatable boat was used to collect water and sediment samples from three sites on Christal Lake at the south end (CL-1), middle (CL-2), and north end (CL-3). Paddles were used to move the boat between sites and an anchor was used to maintain position while sampling. Water samples were collected by hand over the side of the boat. A YSI ProDSS field meter was used to measure in-situ parameters. Sediment samples were collected after the water samples using a sampling device known as an Ekman dredge. The device was lowered to the lake bed with a cable where it was triggered to snap shut with sediment material trapped inside. The device was then brought back in the boat where the sediment was transferred into sample jars.

Appendix B: Photo Log

1 Site Photographs

Photo 1. Onek adit discharging effluent with pipe disconnected.

Photo 2. Sample site ONEK-S1 in discharge channel down-gradient of the adit discharge point.

2 Site Photographs

Photo 3. Sample site ONEK-S2 in the discharge channel below the Wernecke Road culvert.

Photo 4. Sample site ONEK-S3 at the lower end of the defined drainage channel.

3 Site Photographs

Photo 5. View of Christal Lake from the Keno Mill access road on July 16, 2019.

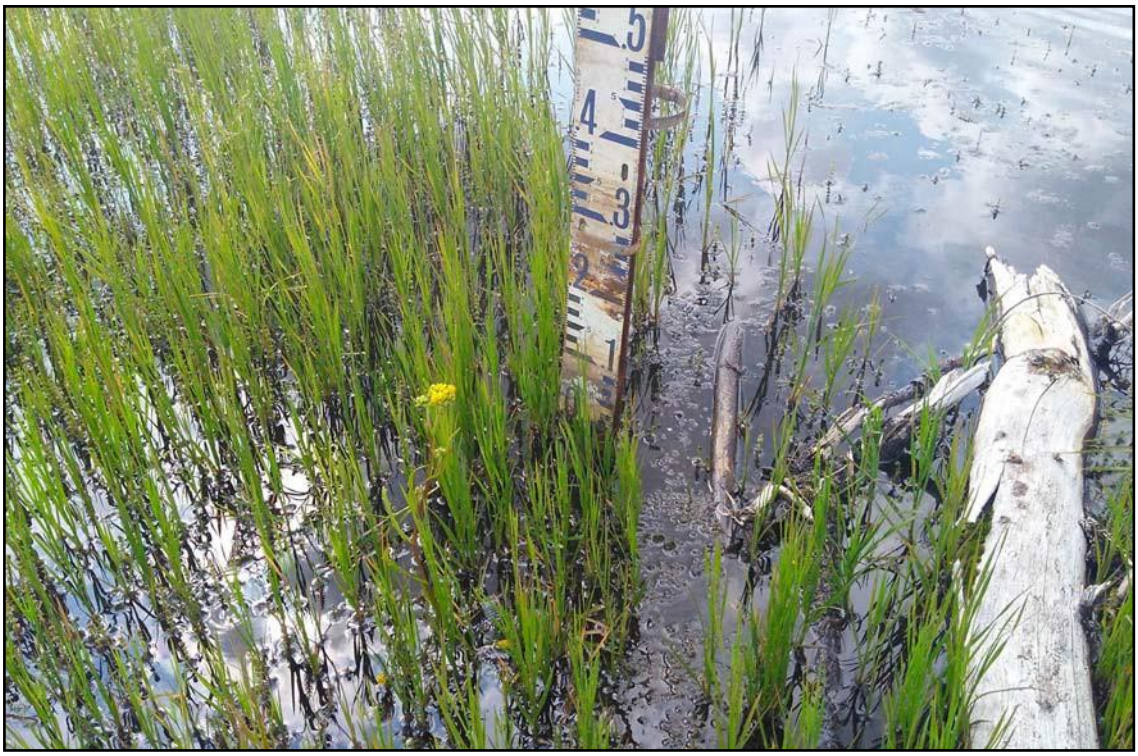

Photo 6. Water level gauge at the northeast shoreline of Christal Lake.

4 Site Photographs

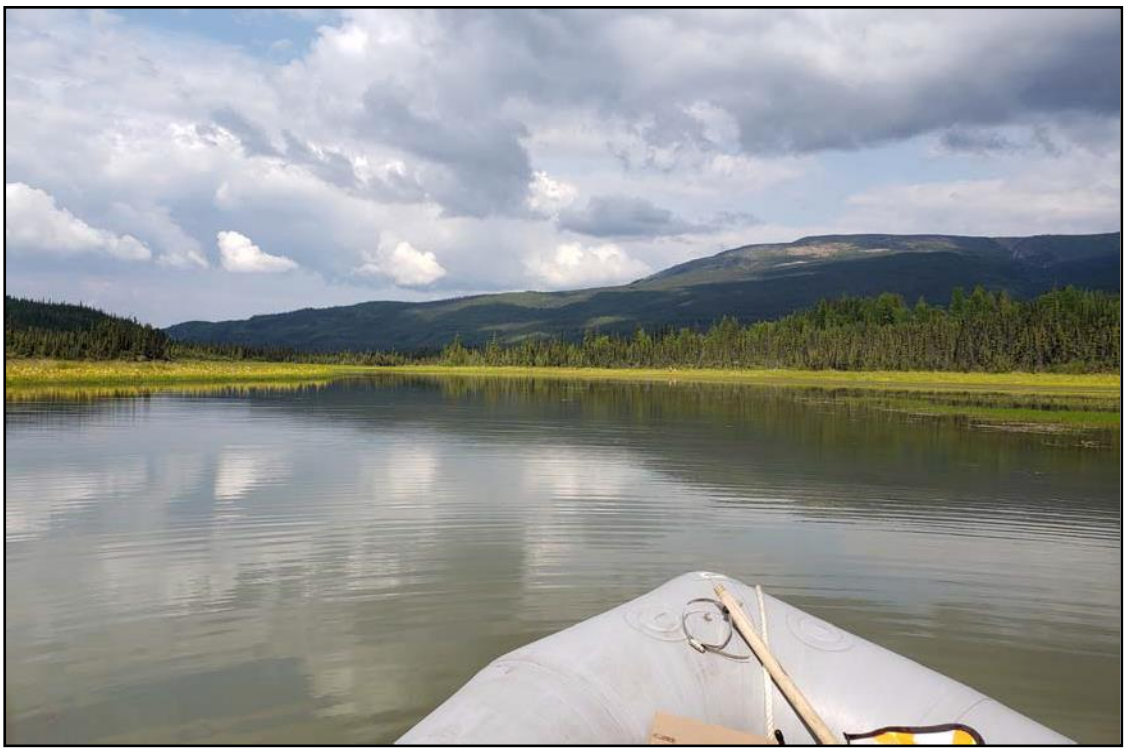

Photo 7. Christal Lake sample site CL-1 looking north.

Photo 8. Christal Lake sample site CL-2 looking south with exposed island on right.

Site Photographs

Photo 9. Christal Lake sample site CL-3 at north end of lake near Christal Creek outflow.

Photo 10. Sample site CL-SEEP1 along the southeast shoreline of Christal Lake.

6 Site Photographs

Photo 11. Sample site CL-SEEP3 along the northeast shoreline of Christal Lake.

Photo 12. Drivepoint well CL-DP1 installed along the east side of Christal Lake.

Site Photographs

Photo 13. Drivepoint well CL-DP2 installed along the east side of Christal Lake.

Photo 14. Drivepoint well CL-DP3 installed along the east side of Christal Lake.

Appendix C: Quality Assurance and Control

Quality control of available field data compared to laboratory data.

Station	Date	Cond-F	Cond-L	RPD (%)	pH-F	pH-L	RPD (%)*
CL-1	July 16, 2019	1022	992	3.0	7.36	7.81	5.9
CL-2	July 16, 2019	1064	1020	4.2	8.06	8.1	0.5
CL-3	July 16, 2019	1082	1040	4.0	8.14	8.09	0.6

**RPD % (Relative percent difference (x,y)) = [|x - y| ÷ |(x + y)/2|] * 100*

Comparison of regular and replicate analytical results from samples collected at CL-3.

Parameter	Units	CL-3 Regular July 16, 2019	CL-3 Replicate July 16, 2019	RPD (%)*
Alk-B	mgCaCO3/L	108	104	3.8
Alk-T	mgCaCO3/L	108	104	3.8
Al-T	mg/L	0.0104	0.0129	21.5
As-D	mg/L	0.0059	0.00573	2.9
As-T	mg/L	0.00781	0.00776	0.6
Ba-D	mg/L	0.0203	0.0204	0.5
Ba-T	mg/L	0.0217	0.021	3.3
B-D	mg/L	0.0066	0.0073	10.1
B-T	mg/L	0.0152	0.0111	31.2
Ca-D	mg/L	183	187	2.2
Ca-T	mg/L	191	186	2.7
Cd-T	mg/L	0.000033	0.000029	12.9
Chlord	mg/L	0.27	0.25	7.7
Co-D	mg/L	0.00153	0.00157	2.6
Cond-L	uS/cm	1040	1040	0.0
Co-T	mg/L	0.00168	0.00165	1.8
Fe-D	mg/L	0.069	0.067	2.9
Fe-T	mg/L	0.248	0.265	6.6
Fluord	mg/L	0.3	0.31	3.3
Hard-D	mgCaCO3/L	577	588	1.9
K-D	mg/L	0.18	0.18	0.0
K-T	mg/L	0.19	0.19	0.0
Li-D	mg/L	0.0273	0.0276	1.1
Li-T	mg/L	0.0288	0.0281	2.5
Mg-D	mg/L	29.3	29	1.0
Mg-T	mg/L	30.2	29.5	2.3
Mn-D	mg/L	1.57	1.57	0.0
Mn-T	mg/L	1.65	1.62	1.8
Mo-D	mg/L	0.00043	0.0004	7.2
Mo-T	mg/L	0.00044	0.00041	7.1

Na-D	mg/L	1.45	1.43	1.4
Na-T	mg/L	1.51	1.46	3.4
Ni-D	mg/L	0.0064	0.00642	0.3
Ni-T	mg/L	0.00669	0.00649	3.0
N-NO23	mg/L	0.0063	0.0056	11.8
pH-L	pH units	8.09	8.07	0.2
S-D	mg/L	193	192	0.5
Si-D	mg/L	3.3	3.3	0.0
Si-T	mg/L	3.4	3.4	0.0
SO4-D	mg/L	547	538	1.7
Sr-D	mg/L	0.333	0.33	0.9
Sr-T	mg/L	0.338	0.33	2.4
S-T	mg/L	198	194	2.0
TDS	mg/L	884	893	1.0
TSS	mg/L	2.8	2	33.3
U-D	mg/L	0.00252	0.00257	2.0
U-T	mg/L	0.00266	0.00258	3.1
Zn-D	mg/L	0.006	0.0085	34.5
Zn-T	mg/L	0.0194	0.0189	2.6

*RPD % (Relative percent difference (x,y)) = [|x - y| ÷ |(x + y)/2|] * 100

Appendix D: Laboratory Analytical Results

CERTIFICATE OF ANALYSIS

REPORTED TO	Yukon Government - Water Resources Suite 210, 419 Range Road Whitehorse, YT Y1A 3V1		
ATTENTION	John Minder	**WORK ORDER**	9072066
PO NUMBER		**RECEIVED / TEMP**	2019-07-19 13:30 / 8°C
PROJECT	Keno Mine Audit	**REPORTED**	2019-07-26 13:17
PROJECT INFO	YK Water Resources - C00043458		

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO 17025:2005 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks

You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

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Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

If you have any questions or concerns, please contact me at bshaw@caro.ca

Authorized By:

Bryan Shaw, Ph.D., P.Chem.
Client Service Coordinator

CERTIFICATE OF ANALYSIS

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072066
PROJECT	Keno Mine Audit	**REPORTED**	2019-07-26 13:17

Analyte	Result	RL	Units	Analyzed	Qualifier
2019T19-01 (9072066-01) I Matrix: Water I Sampled: 2019-07-16 16:00					
Anions					
Chloride	**0.42**	0.10	mg/L	2019-07-22	
Fluoride	**0.27**	0.10	mg/L	2019-07-22	
Nitrate+Nitrite (as N)	**0.0880**	0.0050	mg/L	2019-07-23	
Nitrite (as N)	< 0.0050	0.0050	mg/L	2019-07-19	
Sulfate	**490**	1.0	mg/L	2019-07-22	
Calculated Parameters					
Hardness, Total (as CaCO3)	**539**	0.500	mg/L	N/A	
Nitrate (as N)	**0.0880**	0.0100	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-07-22	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2019-07-22	
Arsenic, dissolved	**0.00466**	0.00050	mg/L	2019-07-22	
Barium, dissolved	**0.0301**	0.0050	mg/L	2019-07-22	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-07-22	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-07-22	
Boron, dissolved	**0.0085**	0.0050	mg/L	2019-07-22	
Cadmium, dissolved	**0.000030**	0.000010	mg/L	2019-07-22	
Calcium, dissolved	**169**	0.20	mg/L	2019-07-22	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2019-07-22	
Cobalt, dissolved	**0.00634**	0.00010	mg/L	2019-07-22	
Copper, dissolved	< 0.00040	0.00040	mg/L	2019-07-22	
Iron, dissolved	**0.233**	0.010	mg/L	2019-07-22	
Lead, dissolved	< 0.00020	0.00020	mg/L	2019-07-22	
Lithium, dissolved	**0.0292**	0.00010	mg/L	2019-07-22	
Magnesium, dissolved	**28.4**	0.010	mg/L	2019-07-22	
Manganese, dissolved	**1.93**	0.00020	mg/L	2019-07-22	
Molybdenum, dissolved	**0.00023**	0.00010	mg/L	2019-07-22	
Nickel, dissolved	**0.0109**	0.00040	mg/L	2019-07-22	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-07-22	
Potassium, dissolved	**0.34**	0.10	mg/L	2019-07-22	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-07-22	
Silicon, dissolved	**4.1**	1.0	mg/L	2019-07-22	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-07-22	
Sodium, dissolved	**1.60**	0.10	mg/L	2019-07-22	
Strontium, dissolved	**0.302**	0.0010	mg/L	2019-07-22	
Sulfur, dissolved	**170**	3.0	mg/L	2019-07-22	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-07-22	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2019-07-22	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-07-22	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-07-22	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-07-22	

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Analyte	Result	RL	Units	Analyzed	Qualifier
2019T19-01 (9072066-01) I Matrix: Water I Sampled: 2019-07-16 16:00, Continued					
Dissolved Metals, Continued					
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-07-22	
Uranium, dissolved	**0.00215**	0.000020	mg/L	2019-07-22	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-07-22	
Zinc, dissolved	**0.169**	0.0040	mg/L	2019-07-22	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2019-07-22	
General Parameters					
Alkalinity, Total (as CaCO3)	**123**	1.0	mg/L	2019-07-23	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Alkalinity, Bicarbonate (as CaCO3)	**123**	1.0	mg/L	2019-07-23	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Conductivity (EC)	**992**	2.0	µS/cm	2019-07-23	
pH	**7.81**	0.10	pH units	2019-07-23	HT2
Solids, Total Dissolved	**823**	15	mg/L	2019-07-23	
Solids, Total Suspended	**5.2**	2.0	mg/L	2019-07-24	HT1
Total Metals					
Aluminum, total	**0.0291**	0.0050	mg/L	2019-07-22	
Antimony, total	< 0.00020	0.00020	mg/L	2019-07-22	
Arsenic, total	**0.00979**	0.00050	mg/L	2019-07-22	
Barium, total	**0.0331**	0.0050	mg/L	2019-07-22	
Beryllium, total	< 0.00010	0.00010	mg/L	2019-07-22	
Bismuth, total	< 0.00010	0.00010	mg/L	2019-07-22	
Boron, total	**0.107**	0.0050	mg/L	2019-07-22	
Cadmium, total	**0.000087**	0.000010	mg/L	2019-07-22	
Calcium, total	**177**	0.20	mg/L	2019-07-22	
Chromium, total	< 0.00050	0.00050	mg/L	2019-07-22	
Cobalt, total	**0.00677**	0.00010	mg/L	2019-07-22	
Copper, total	< 0.00040	0.00040	mg/L	2019-07-22	
Iron, total	**1.60**	0.010	mg/L	2019-07-22	
Lead, total	**0.00044**	0.00020	mg/L	2019-07-22	
Lithium, total	**0.0307**	0.00010	mg/L	2019-07-22	
Magnesium, total	**30.4**	0.010	mg/L	2019-07-22	
Manganese, total	**2.05**	0.00020	mg/L	2019-07-22	
Molybdenum, total	**0.00031**	0.00010	mg/L	2019-07-22	
Nickel, total	**0.0119**	0.00040	mg/L	2019-07-22	
Phosphorus, total	< 0.050	0.050	mg/L	2019-07-22	
Potassium, total	**0.37**	0.10	mg/L	2019-07-22	
Selenium, total	< 0.00050	0.00050	mg/L	2019-07-22	
Silicon, total	**4.3**	1.0	mg/L	2019-07-22	
Silver, total	< 0.000050	0.000050	mg/L	2019-07-22	
Sodium, total	**1.65**	0.10	mg/L	2019-07-22	

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2019T19-01 (9072066-01) I Matrix: Water I Sampled: 2019-07-16 16:00, Continued					
Total Metals, Continued					
Strontium, total	**0.315**	0.0010	mg/L	2019-07-22	
Sulfur, total	**179**	3.0	mg/L	2019-07-22	
Tellurium, total	< 0.00050	0.00050	mg/L	2019-07-22	
Thallium, total	**0.000036**	0.000020	mg/L	2019-07-22	
Thorium, total	< 0.00010	0.00010	mg/L	2019-07-22	
Tin, total	< 0.00020	0.00020	mg/L	2019-07-22	
Titanium, total	< 0.0050	0.0050	mg/L	2019-07-22	
Tungsten, total	< 0.0010	0.0010	mg/L	2019-07-22	
Uranium, total	**0.00222**	0.000020	mg/L	2019-07-22	
Vanadium, total	< 0.0010	0.0010	mg/L	2019-07-22	
Zinc, total	**0.200**	0.0040	mg/L	2019-07-22	
Zirconium, total	< 0.00010	0.00010	mg/L	2019-07-22	
2019T19-02 (9072066-02) I Matrix: Water I Sampled: 2019-07-16 16:25					
Anions					
Chloride	**0.25**	0.10	mg/L	2019-07-22	
Fluoride	**0.30**	0.10	mg/L	2019-07-22	
Nitrate+Nitrite (as N)	**0.0071**	0.0050	mg/L	2019-07-23	
Nitrite (as N)	< 0.0050	0.0050	mg/L	2019-07-19	
Sulfate	**532**	1.0	mg/L	2019-07-22	
Calculated Parameters					
Hardness, Total (as CaCO3)	**566**	0.500	mg/L	N/A	
Nitrate (as N)	< 0.0100	0.0100	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-07-22	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2019-07-22	
Arsenic, dissolved	**0.00599**	0.00050	mg/L	2019-07-22	
Barium, dissolved	**0.0250**	0.0050	mg/L	2019-07-22	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-07-22	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-07-22	
Boron, dissolved	**0.0073**	0.0050	mg/L	2019-07-22	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2019-07-22	
Calcium, dissolved	**178**	0.20	mg/L	2019-07-22	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2019-07-22	
Cobalt, dissolved	**0.00194**	0.00010	mg/L	2019-07-22	
Copper, dissolved	< 0.00040	0.00040	mg/L	2019-07-22	
Iron, dissolved	**0.078**	0.010	mg/L	2019-07-22	
Lead, dissolved	< 0.00020	0.00020	mg/L	2019-07-22	
Lithium, dissolved	**0.0272**	0.00010	mg/L	2019-07-22	
Magnesium, dissolved	**29.1**	0.010	mg/L	2019-07-22	

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2019T19-02 (9072066-02) I Matrix: Water I Sampled: 2019-07-16 16:25, Continued					
Dissolved Metals, Continued					
Manganese, dissolved	**1.67**	0.00020	mg/L	2019-07-22	
Molybdenum, dissolved	**0.00042**	0.00010	mg/L	2019-07-22	
Nickel, dissolved	**0.00747**	0.00040	mg/L	2019-07-22	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-07-22	
Potassium, dissolved	**0.18**	0.10	mg/L	2019-07-22	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-07-22	
Silicon, dissolved	**2.9**	1.0	mg/L	2019-07-22	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-07-22	
Sodium, dissolved	**1.43**	0.10	mg/L	2019-07-22	
Strontium, dissolved	**0.329**	0.0010	mg/L	2019-07-22	
Sulfur, dissolved	**190**	3.0	mg/L	2019-07-22	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-07-22	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2019-07-22	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-07-22	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-07-22	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-07-22	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-07-22	
Uranium, dissolved	**0.00250**	0.000020	mg/L	2019-07-22	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-07-22	
Zinc, dissolved	**0.0087**	0.0040	mg/L	2019-07-22	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2019-07-22	
General Parameters					
Alkalinity, Total (as CaCO3)	**100**	1.0	mg/L	2019-07-23	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Alkalinity, Bicarbonate (as CaCO3)	**100**	1.0	mg/L	2019-07-23	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Conductivity (EC)	**1020**	2.0	µS/cm	2019-07-23	
pH	**8.10**	0.10	pH units	2019-07-23	HT2
Solids, Total Dissolved	**876**	15	mg/L	2019-07-23	
Solids, Total Suspended	**5.8**	2.0	mg/L	2019-07-24	HT1
Total Metals					
Aluminum, total	**0.0397**	0.0050	mg/L	2019-07-22	
Antimony, total	**0.00022**	0.00020	mg/L	2019-07-22	
Arsenic, total	**0.00912**	0.00050	mg/L	2019-07-22	
Barium, total	**0.0276**	0.0050	mg/L	2019-07-22	
Beryllium, total	< 0.00010	0.00010	mg/L	2019-07-22	
Bismuth, total	< 0.00010	0.00010	mg/L	2019-07-22	
Boron, total	**0.0235**	0.0050	mg/L	2019-07-22	
Cadmium, total	**0.000065**	0.000010	mg/L	2019-07-22	
Calcium, total	**193**	0.20	mg/L	2019-07-22	

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2019T19-02 (9072066-02) I Matrix: Water I Sampled: 2019-07-16 16:25, Continued					
Total Metals, Continued					
Chromium, total	< 0.00050	0.00050	mg/L	2019-07-22	
Cobalt, total	**0.00230**	0.00010	mg/L	2019-07-22	
Copper, total	< 0.00040	0.00040	mg/L	2019-07-22	
Iron, total	**0.431**	0.010	mg/L	2019-07-22	
Lead, total	**0.00029**	0.00020	mg/L	2019-07-22	
Lithium, total	**0.0301**	0.00010	mg/L	2019-07-22	
Magnesium, total	**30.6**	0.010	mg/L	2019-07-22	
Manganese, total	**1.91**	0.00020	mg/L	2019-07-22	
Molybdenum, total	**0.00045**	0.00010	mg/L	2019-07-22	
Nickel, total	**0.00828**	0.00040	mg/L	2019-07-22	
Phosphorus, total	< 0.050	0.050	mg/L	2019-07-22	
Potassium, total	**0.20**	0.10	mg/L	2019-07-22	
Selenium, total	< 0.00050	0.00050	mg/L	2019-07-22	
Silicon, total	**3.1**	1.0	mg/L	2019-07-22	
Silver, total	**0.000154**	0.000050	mg/L	2019-07-22	
Sodium, total	**1.52**	0.10	mg/L	2019-07-22	
Strontium, total	**0.336**	0.0010	mg/L	2019-07-22	
Sulfur, total	**198**	3.0	mg/L	2019-07-22	
Tellurium, total	< 0.00050	0.00050	mg/L	2019-07-22	
Thallium, total	< 0.000020	0.000020	mg/L	2019-07-22	
Thorium, total	< 0.00010	0.00010	mg/L	2019-07-22	
Tin, total	< 0.00020	0.00020	mg/L	2019-07-22	
Titanium, total	< 0.0050	0.0050	mg/L	2019-07-22	
Tungsten, total	< 0.0010	0.0010	mg/L	2019-07-22	
Uranium, total	**0.00275**	0.000020	mg/L	2019-07-22	
Vanadium, total	< 0.0010	0.0010	mg/L	2019-07-22	
Zinc, total	**0.0575**	0.0040	mg/L	2019-07-22	
Zirconium, total	< 0.00010	0.00010	mg/L	2019-07-22	
2019T19-03 (9072066-03) I Matrix: Water I Sampled: 2019-07-16 16:41					
Anions					
Chloride	**0.27**	0.10	mg/L	2019-07-22	
Fluoride	**0.30**	0.10	mg/L	2019-07-22	
Nitrate+Nitrite (as N)	**0.0063**	0.0050	mg/L	2019-07-23	
Nitrite (as N)	< 0.0050	0.0050	mg/L	2019-07-19	
Sulfate	**547**	1.0	mg/L	2019-07-22	
Calculated Parameters					
Hardness, Total (as CaCO3)	**577**	0.500	mg/L	N/A	
Nitrate (as N)	< 0.0100	0.0100	mg/L	N/A	
Dissolved Metals					

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Analyte	Result	RL	Units	Analyzed	Qualifier
2019T19-03 (9072066-03) I Matrix: Water I Sampled: 2019-07-16 16:41, Continued					
Dissolved Metals, Continued					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-07-22	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2019-07-22	
Arsenic, dissolved	**0.00590**	0.00050	mg/L	2019-07-22	
Barium, dissolved	**0.0203**	0.0050	mg/L	2019-07-22	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-07-22	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-07-22	
Boron, dissolved	**0.0066**	0.0050	mg/L	2019-07-22	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2019-07-22	
Calcium, dissolved	**183**	0.20	mg/L	2019-07-22	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2019-07-22	
Cobalt, dissolved	**0.00153**	0.00010	mg/L	2019-07-22	
Copper, dissolved	< 0.00040	0.00040	mg/L	2019-07-22	
Iron, dissolved	**0.069**	0.010	mg/L	2019-07-22	
Lead, dissolved	< 0.00020	0.00020	mg/L	2019-07-22	
Lithium, dissolved	**0.0273**	0.00010	mg/L	2019-07-22	
Magnesium, dissolved	**29.3**	0.010	mg/L	2019-07-22	
Manganese, dissolved	**1.57**	0.00020	mg/L	2019-07-22	
Molybdenum, dissolved	**0.00043**	0.00010	mg/L	2019-07-22	
Nickel, dissolved	**0.00640**	0.00040	mg/L	2019-07-22	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-07-22	
Potassium, dissolved	**0.18**	0.10	mg/L	2019-07-22	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-07-22	
Silicon, dissolved	**3.3**	1.0	mg/L	2019-07-22	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-07-22	
Sodium, dissolved	**1.45**	0.10	mg/L	2019-07-22	
Strontium, dissolved	**0.333**	0.0010	mg/L	2019-07-22	
Sulfur, dissolved	**193**	3.0	mg/L	2019-07-22	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-07-22	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2019-07-22	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-07-22	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-07-22	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-07-22	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-07-22	
Uranium, dissolved	**0.00252**	0.000020	mg/L	2019-07-22	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-07-22	
Zinc, dissolved	**0.0060**	0.0040	mg/L	2019-07-22	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2019-07-22	
General Parameters					
Alkalinity, Total (as CaCO3)	**108**	1.0	mg/L	2019-07-23	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Alkalinity, Bicarbonate (as CaCO3)	**108**	1.0	mg/L	2019-07-23	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	

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2019T19-03 (9072066-03) I Matrix: Water I Sampled: 2019-07-16 16:41, Continued					
General Parameters, Continued					
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Conductivity (EC)	**1040**	2.0	µS/cm	2019-07-23	
pH	**8.09**	0.10	pH units	2019-07-23	HT2
Solids, Total Dissolved	**884**	15	mg/L	2019-07-23	
Solids, Total Suspended	**2.8**	2.0	mg/L	2019-07-24	HT1
Total Metals					
Aluminum, total	**0.0104**	0.0050	mg/L	2019-07-22	
Antimony, total	< 0.00020	0.00020	mg/L	2019-07-22	
Arsenic, total	**0.00781**	0.00050	mg/L	2019-07-22	
Barium, total	**0.0217**	0.0050	mg/L	2019-07-22	
Beryllium, total	< 0.00010	0.00010	mg/L	2019-07-22	
Bismuth, total	< 0.00010	0.00010	mg/L	2019-07-22	
Boron, total	**0.0152**	0.0050	mg/L	2019-07-22	
Cadmium, total	**0.000033**	0.000010	mg/L	2019-07-22	
Calcium, total	**191**	0.20	mg/L	2019-07-22	
Chromium, total	< 0.00050	0.00050	mg/L	2019-07-22	
Cobalt, total	**0.00168**	0.00010	mg/L	2019-07-22	
Copper, total	< 0.00040	0.00040	mg/L	2019-07-22	
Iron, total	**0.248**	0.010	mg/L	2019-07-22	
Lead, total	< 0.00020	0.00020	mg/L	2019-07-22	
Lithium, total	**0.0288**	0.00010	mg/L	2019-07-22	
Magnesium, total	**30.2**	0.010	mg/L	2019-07-22	
Manganese, total	**1.65**	0.00020	mg/L	2019-07-22	
Molybdenum, total	**0.00044**	0.00010	mg/L	2019-07-22	
Nickel, total	**0.00669**	0.00040	mg/L	2019-07-22	
Phosphorus, total	< 0.050	0.050	mg/L	2019-07-22	
Potassium, total	**0.19**	0.10	mg/L	2019-07-22	
Selenium, total	< 0.00050	0.00050	mg/L	2019-07-22	
Silicon, total	**3.4**	1.0	mg/L	2019-07-22	
Silver, total	< 0.000050	0.000050	mg/L	2019-07-22	
Sodium, total	**1.51**	0.10	mg/L	2019-07-22	
Strontium, total	**0.338**	0.0010	mg/L	2019-07-22	
Sulfur, total	**198**	3.0	mg/L	2019-07-22	
Tellurium, total	< 0.00050	0.00050	mg/L	2019-07-22	
Thallium, total	< 0.000020	0.000020	mg/L	2019-07-22	
Thorium, total	< 0.00010	0.00010	mg/L	2019-07-22	
Tin, total	< 0.00020	0.00020	mg/L	2019-07-22	
Titanium, total	< 0.0050	0.0050	mg/L	2019-07-22	
Tungsten, total	< 0.0010	0.0010	mg/L	2019-07-22	
Uranium, total	**0.00266**	0.000020	mg/L	2019-07-22	
Vanadium, total	< 0.0010	0.0010	mg/L	2019-07-22	
Zinc, total	**0.0194**	0.0040	mg/L	2019-07-22	

TEST RESULTS

REPORTED TO Yukon Government - Water Resources
PROJECT Keno Mine Audit

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Analyte	Result	RL	Units	Analyzed	Qualifier
2019T19-03 (9072066-03) I Matrix: Water I Sampled: 2019-07-16 16:41, Continued					
Total Metals, Continued					
Zirconium, total	< 0.00010	0.00010	mg/L	2019-07-22	
2019T19-04 (9072066-04) I Matrix: Water I Sampled: 2019-07-16 16:41					
Anions					
Chloride	**0.25**	0.10	mg/L	2019-07-22	
Fluoride	**0.31**	0.10	mg/L	2019-07-22	
Nitrate+Nitrite (as N)	**0.0056**	0.0050	mg/L	2019-07-23	
Nitrite (as N)	< 0.0050	0.0050	mg/L	2019-07-19	
Sulfate	**538**	1.0	mg/L	2019-07-22	
Calculated Parameters					
Hardness, Total (as CaCO3)	**588**	0.500	mg/L	N/A	
Nitrate (as N)	< 0.0100	0.0100	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	**0.0125**	0.0050	mg/L	2019-07-22	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2019-07-22	
Arsenic, dissolved	**0.00573**	0.00050	mg/L	2019-07-22	
Barium, dissolved	**0.0204**	0.0050	mg/L	2019-07-22	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-07-22	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-07-22	
Boron, dissolved	**0.0073**	0.0050	mg/L	2019-07-22	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2019-07-22	
Calcium, dissolved	**187**	0.20	mg/L	2019-07-22	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2019-07-22	
Cobalt, dissolved	**0.00157**	0.00010	mg/L	2019-07-22	
Copper, dissolved	< 0.00040	0.00040	mg/L	2019-07-22	
Iron, dissolved	**0.067**	0.010	mg/L	2019-07-22	
Lead, dissolved	< 0.00020	0.00020	mg/L	2019-07-22	
Lithium, dissolved	**0.0276**	0.00010	mg/L	2019-07-22	
Magnesium, dissolved	**29.0**	0.010	mg/L	2019-07-22	
Manganese, dissolved	**1.57**	0.00020	mg/L	2019-07-22	
Molybdenum, dissolved	**0.00040**	0.00010	mg/L	2019-07-22	
Nickel, dissolved	**0.00642**	0.00040	mg/L	2019-07-22	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-07-22	
Potassium, dissolved	**0.18**	0.10	mg/L	2019-07-22	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-07-22	
Silicon, dissolved	**3.3**	1.0	mg/L	2019-07-22	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-07-22	
Sodium, dissolved	**1.43**	0.10	mg/L	2019-07-22	
Strontium, dissolved	**0.330**	0.0010	mg/L	2019-07-22	

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Sulfur, dissolved	**192**	3.0	mg/L	2019-07-22

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Analyte	Result	RL	Units	Analyzed	Qualifier
2019T19-04 (9072066-04) I Matrix: Water I Sampled: 2019-07-16 16:41, Continued					
Dissolved Metals, Continued					
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-07-22	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2019-07-22	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-07-22	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-07-22	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-07-22	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-07-22	
Uranium, dissolved	**0.00257**	0.000020	mg/L	2019-07-22	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-07-22	
Zinc, dissolved	**0.0085**	0.0040	mg/L	2019-07-22	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2019-07-22	
General Parameters					
Alkalinity, Total (as CaCO3)	**104**	1.0	mg/L	2019-07-23	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Alkalinity, Bicarbonate (as CaCO3)	**104**	1.0	mg/L	2019-07-23	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Conductivity (EC)	**1040**	2.0	µS/cm	2019-07-23	
pH	**8.07**	0.10	pH units	2019-07-23	HT2
Solids, Total Dissolved	**893**	15	mg/L	2019-07-24	HT1
Solids, Total Suspended	**2.0**	2.0	mg/L	2019-07-24	HT1
Total Metals					
Aluminum, total	**0.0129**	0.0050	mg/L	2019-07-22	
Antimony, total	< 0.00020	0.00020	mg/L	2019-07-22	
Arsenic, total	**0.00776**	0.00050	mg/L	2019-07-22	
Barium, total	**0.0210**	0.0050	mg/L	2019-07-22	
Beryllium, total	< 0.00010	0.00010	mg/L	2019-07-22	
Bismuth, total	< 0.00010	0.00010	mg/L	2019-07-22	
Boron, total	**0.0111**	0.0050	mg/L	2019-07-22	
Cadmium, total	**0.000029**	0.000010	mg/L	2019-07-22	
Calcium, total	**186**	0.20	mg/L	2019-07-22	
Chromium, total	< 0.00050	0.00050	mg/L	2019-07-22	
Cobalt, total	**0.00165**	0.00010	mg/L	2019-07-22	
Copper, total	< 0.00040	0.00040	mg/L	2019-07-22	
Iron, total	**0.265**	0.010	mg/L	2019-07-22	
Lead, total	< 0.00020	0.00020	mg/L	2019-07-22	
Lithium, total	**0.0281**	0.00010	mg/L	2019-07-22	
Magnesium, total	**29.5**	0.010	mg/L	2019-07-22	
Manganese, total	**1.62**	0.00020	mg/L	2019-07-22	
Molybdenum, total	**0.00041**	0.00010	mg/L	2019-07-22	
Nickel, total	**0.00649**	0.00040	mg/L	2019-07-22	
Phosphorus, total	< 0.050	0.050	mg/L	2019-07-22	

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072066
PROJECT	Keno Mine Audit	**REPORTED**	2019-07-26 13:17

Analyte	Result	RL	Units	Analyzed	Qualifier
2019T19-04 (9072066-04) I Matrix: Water I Sampled: 2019-07-16 16:41, Continued					
Total Metals, Continued					
Potassium, total	**0.19**	0.10	mg/L	2019-07-22	
Selenium, total	< 0.00050	0.00050	mg/L	2019-07-22	
Silicon, total	**3.4**	1.0	mg/L	2019-07-22	
Silver, total	< 0.000050	0.000050	mg/L	2019-07-22	
Sodium, total	**1.46**	0.10	mg/L	2019-07-22	
Strontium, total	**0.330**	0.0010	mg/L	2019-07-22	
Sulfur, total	**194**	3.0	mg/L	2019-07-22	
Tellurium, total	< 0.00050	0.00050	mg/L	2019-07-22	
Thallium, total	< 0.000020	0.000020	mg/L	2019-07-22	
Thorium, total	< 0.00010	0.00010	mg/L	2019-07-22	
Tin, total	< 0.00020	0.00020	mg/L	2019-07-22	
Titanium, total	< 0.0050	0.0050	mg/L	2019-07-22	
Tungsten, total	< 0.0010	0.0010	mg/L	2019-07-22	
Uranium, total	**0.00258**	0.000020	mg/L	2019-07-22	
Vanadium, total	< 0.0010	0.0010	mg/L	2019-07-22	
Zinc, total	**0.0189**	0.0040	mg/L	2019-07-22	
Zirconium, total	< 0.00010	0.00010	mg/L	2019-07-22	
2019T19-05 (9072066-05) I Matrix: Water I Sampled: 2019-07-16 16:41					
Anions					
Chloride	< 0.10	0.10	mg/L	2019-07-22	
Fluoride	< 0.10	0.10	mg/L	2019-07-22	
Nitrate+Nitrite (as N)	< 0.0050	0.0050	mg/L	2019-07-23	
Nitrite (as N)	< 0.0050	0.0050	mg/L	2019-07-19	
Sulfate	< 1.0	1.0	mg/L	2019-07-22	
Calculated Parameters					
Hardness, Total (as CaCO3)	< 0.500	0.500	mg/L	N/A	
Nitrate (as N)	< 0.0100	0.0100	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-07-22	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2019-07-22	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2019-07-22	
Barium, dissolved	< 0.0050	0.0050	mg/L	2019-07-22	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-07-22	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-07-22	
Boron, dissolved	< 0.0050	0.0050	mg/L	2019-07-22	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2019-07-22	
Calcium, dissolved	< 0.20	0.20	mg/L	2019-07-22	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2019-07-22	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2019-07-22	

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Analyte	Result	RL	Units	Analyzed	Qualifier
2019T19-05 (9072066-05) I Matrix: Water I Sampled: 2019-07-16 16:41, Continued					
Dissolved Metals, Continued					
Copper, dissolved	< 0.00040	0.00040	mg/L	2019-07-22	
Iron, dissolved	< 0.010	0.010	mg/L	2019-07-22	
Lead, dissolved	< 0.00020	0.00020	mg/L	2019-07-22	
Lithium, dissolved	< 0.00010	0.00010	mg/L	2019-07-22	
Magnesium, dissolved	< 0.010	0.010	mg/L	2019-07-22	
Manganese, dissolved	**0.00031**	0.00020	mg/L	2019-07-22	
Molybdenum, dissolved	< 0.00010	0.00010	mg/L	2019-07-22	
Nickel, dissolved	< 0.00040	0.00040	mg/L	2019-07-22	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-07-22	
Potassium, dissolved	< 0.10	0.10	mg/L	2019-07-22	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-07-22	
Silicon, dissolved	< 1.0	1.0	mg/L	2019-07-22	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-07-22	
Sodium, dissolved	< 0.10	0.10	mg/L	2019-07-22	
Strontium, dissolved	< 0.0010	0.0010	mg/L	2019-07-22	
Sulfur, dissolved	< 3.0	3.0	mg/L	2019-07-22	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-07-22	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2019-07-22	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-07-22	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-07-22	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-07-22	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-07-22	
Uranium, dissolved	< 0.000020	0.000020	mg/L	2019-07-22	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-07-22	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2019-07-22	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2019-07-22	
General Parameters					
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Conductivity (EC)	< 2.0	2.0	µS/cm	2019-07-23	
pH	**4.60**	0.10	pH units	2019-07-23	HT2
Solids, Total Dissolved	< 15	15	mg/L	2019-07-23	
Solids, Total Suspended	< 2.0	2.0	mg/L	2019-07-24	HT1
Total Metals					
Aluminum, total	**0.0057**	0.0050	mg/L	2019-07-22	
Antimony, total	< 0.00020	0.00020	mg/L	2019-07-22	
Arsenic, total	< 0.00050	0.00050	mg/L	2019-07-22	
Barium, total	< 0.0050	0.0050	mg/L	2019-07-22	

TEST RESULTS

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Analyte	Result	RL	Units	Analyzed	Qualifier
2019T19-05 (9072066-05) I Matrix: Water I Sampled: 2019-07-16 16:41, Continued					
Total Metals, Continued					
Beryllium, total	< 0.00010	0.00010	mg/L	2019-07-22	
Bismuth, total	< 0.00010	0.00010	mg/L	2019-07-22	
Boron, total	**0.0064**	0.0050	mg/L	2019-07-22	
Cadmium, total	< 0.000010	0.000010	mg/L	2019-07-22	
Calcium, total	< 0.20	0.20	mg/L	2019-07-22	
Chromium, total	< 0.00050	0.00050	mg/L	2019-07-22	
Cobalt, total	< 0.00010	0.00010	mg/L	2019-07-22	
Copper, total	< 0.00040	0.00040	mg/L	2019-07-22	
Iron, total	< 0.010	0.010	mg/L	2019-07-22	
Lead, total	< 0.00020	0.00020	mg/L	2019-07-22	
Lithium, total	< 0.00010	0.00010	mg/L	2019-07-22	
Magnesium, total	< 0.010	0.010	mg/L	2019-07-22	
Manganese, total	**0.00051**	0.00020	mg/L	2019-07-22	
Molybdenum, total	< 0.00010	0.00010	mg/L	2019-07-22	
Nickel, total	**0.00346**	0.00040	mg/L	2019-07-22	
Phosphorus, total	< 0.050	0.050	mg/L	2019-07-22	
Potassium, total	< 0.10	0.10	mg/L	2019-07-22	
Selenium, total	< 0.00050	0.00050	mg/L	2019-07-22	
Silicon, total	< 1.0	1.0	mg/L	2019-07-22	
Silver, total	< 0.000050	0.000050	mg/L	2019-07-22	
Sodium, total	< 0.10	0.10	mg/L	2019-07-22	
Strontium, total	< 0.0010	0.0010	mg/L	2019-07-22	
Sulfur, total	< 3.0	3.0	mg/L	2019-07-22	
Tellurium, total	< 0.00050	0.00050	mg/L	2019-07-22	
Thallium, total	< 0.000020	0.000020	mg/L	2019-07-22	
Thorium, total	< 0.00010	0.00010	mg/L	2019-07-22	
Tin, total	< 0.00020	0.00020	mg/L	2019-07-22	
Titanium, total	< 0.0050	0.0050	mg/L	2019-07-22	
Tungsten, total	< 0.0010	0.0010	mg/L	2019-07-22	
Uranium, total	< 0.000020	0.000020	mg/L	2019-07-22	
Vanadium, total	< 0.0010	0.0010	mg/L	2019-07-22	
Zinc, total	< 0.0040	0.0040	mg/L	2019-07-22	
Zirconium, total	< 0.00010	0.00010	mg/L	2019-07-22	
2019T19-06 (9072066-06) I Matrix: Water I Sampled: 2019-07-16					
Anions					
Chloride	< 0.10	0.10	mg/L	2019-07-22	
Fluoride	< 0.10	0.10	mg/L	2019-07-22	
Nitrate+Nitrite (as N)	< 0.0050	0.0050	mg/L	2019-07-23	
Nitrite (as N)	< 0.0050	0.0050	mg/L	2019-07-19	
Sulfate	< 1.0	1.0	mg/L	2019-07-22	

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO Yukon Government - Water Resources
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Analyte	Result	RL	Units	Analyzed	Qualifier
2019T19-06 (9072066-06) I Matrix: Water I Sampled: 2019-07-16, Continued					
Calculated Parameters					
Hardness, Total (as CaCO3)	< 0.500	0.500	mg/L	N/A	
Nitrate (as N)	< 0.0100	0.0100	mg/L	N/A	
General Parameters					
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Conductivity (EC)	< 2.0	2.0	µS/cm	2019-07-23	
pH	**4.59**	0.10	pH units	2019-07-23	HT2
Solids, Total Dissolved	< 15	15	mg/L	2019-07-23	
Solids, Total Suspended	< 2.0	2.0	mg/L	2019-07-24	HT1
Total Metals					
Aluminum, total	< 0.0050	0.0050	mg/L	2019-07-22	
Antimony, total	< 0.00020	0.00020	mg/L	2019-07-22	
Arsenic, total	< 0.00050	0.00050	mg/L	2019-07-22	
Barium, total	< 0.0050	0.0050	mg/L	2019-07-22	
Beryllium, total	< 0.00010	0.00010	mg/L	2019-07-22	
Bismuth, total	< 0.00010	0.00010	mg/L	2019-07-22	
Boron, total	**0.0090**	0.0050	mg/L	2019-07-22	
Cadmium, total	< 0.000010	0.000010	mg/L	2019-07-22	
Calcium, total	< 0.20	0.20	mg/L	2019-07-22	
Chromium, total	< 0.00050	0.00050	mg/L	2019-07-22	
Cobalt, total	< 0.00010	0.00010	mg/L	2019-07-22	
Copper, total	< 0.00040	0.00040	mg/L	2019-07-22	
Iron, total	< 0.010	0.010	mg/L	2019-07-22	
Lead, total	< 0.00020	0.00020	mg/L	2019-07-22	
Lithium, total	< 0.00010	0.00010	mg/L	2019-07-22	
Magnesium, total	< 0.010	0.010	mg/L	2019-07-22	
Manganese, total	< 0.00020	0.00020	mg/L	2019-07-22	
Molybdenum, total	< 0.00010	0.00010	mg/L	2019-07-22	
Nickel, total	< 0.00040	0.00040	mg/L	2019-07-22	
Phosphorus, total	< 0.050	0.050	mg/L	2019-07-22	
Potassium, total	< 0.10	0.10	mg/L	2019-07-22	
Selenium, total	< 0.00050	0.00050	mg/L	2019-07-22	
Silicon, total	< 1.0	1.0	mg/L	2019-07-22	
Silver, total	< 0.000050	0.000050	mg/L	2019-07-22	
Sodium, total	< 0.10	0.10	mg/L	2019-07-22	
Strontium, total	< 0.0010	0.0010	mg/L	2019-07-22	
Sulfur, total	< 3.0	3.0	mg/L	2019-07-22	
Tellurium, total	< 0.00050	0.00050	mg/L	2019-07-22	

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072066
PROJECT	Keno Mine Audit	**REPORTED**	2019-07-26 13:17

Analyte	Result	RL	Units	Analyzed	Qualifier
2019T19-06 (9072066-06) I Matrix: Water I Sampled: 2019-07-16, Continued					
Total Metals, Continued					
Thallium, total	< 0.000020	0.000020	mg/L	2019-07-22	
Thorium, total	< 0.00010	0.00010	mg/L	2019-07-22	
Tin, total	< 0.00020	0.00020	mg/L	2019-07-22	
Titanium, total	< 0.0050	0.0050	mg/L	2019-07-22	
Tungsten, total	< 0.0010	0.0010	mg/L	2019-07-22	
Uranium, total	**0.000034**	0.000020	mg/L	2019-07-22	
Vanadium, total	< 0.0010	0.0010	mg/L	2019-07-22	
Zinc, total	< 0.0040	0.0040	mg/L	2019-07-22	
Zirconium, total	< 0.00010	0.00010	mg/L	2019-07-22	
2019T19-07 (9072066-07) I Matrix: Water I Sampled: 2019-07-17 16:25					
Anions					
Chloride	< 0.10	0.10	mg/L	2019-07-22	
Fluoride	**0.90**	0.10	mg/L	2019-07-22	
Nitrate (as N)	**0.100**	0.010	mg/L	2019-07-22	HT1
Nitrite (as N)	< 0.010	0.010	mg/L	2019-07-22	HT1
Sulfate	**508**	1.0	mg/L	2019-07-22	
Calculated Parameters					
Hardness, Total (as CaCO3)	**256**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	**15.0**	0.0050	mg/L	2019-07-22	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2019-07-22	
Arsenic, dissolved	**0.00095**	0.00050	mg/L	2019-07-22	
Barium, dissolved	**0.0372**	0.0050	mg/L	2019-07-22	
Beryllium, dissolved	**0.00089**	0.00010	mg/L	2019-07-22	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-07-22	
Boron, dissolved	< 0.0050	0.0050	mg/L	2019-07-22	
Cadmium, dissolved	**0.0189**	0.000010	mg/L	2019-07-22	
Calcium, dissolved	**41.8**	0.20	mg/L	2019-07-22	
Chromium, dissolved	**0.00062**	0.00050	mg/L	2019-07-22	
Cobalt, dissolved	**0.162**	0.00010	mg/L	2019-07-22	
Copper, dissolved	**0.0991**	0.00040	mg/L	2019-07-22	
Iron, dissolved	**0.507**	0.010	mg/L	2019-07-22	
Lead, dissolved	**0.00388**	0.00020	mg/L	2019-07-22	
Lithium, dissolved	**0.0427**	0.00010	mg/L	2019-07-22	
Magnesium, dissolved	**36.7**	0.010	mg/L	2019-07-22	
Manganese, dissolved	**5.94**	0.00020	mg/L	2019-07-22	
Molybdenum, dissolved	< 0.00010	0.00010	mg/L	2019-07-22	
Nickel, dissolved	**0.712**	0.00040	mg/L	2019-07-22	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-07-22	

TEST RESULTS

REPORTED TO Yukon Government - Water Resources
PROJECT Keno Mine Audit

WORK ORDER 9072066
REPORTED 2019-07-26 13:17

Analyte	Result	RL	Units	Analyzed	Qualifier
2019T19-07 (9072066-07) I Matrix: Water I Sampled: 2019-07-17 16:25, Continued					
Dissolved Metals, Continued					
Potassium, dissolved	**0.26**	0.10	mg/L	2019-07-22	
Selenium, dissolved	**0.00186**	0.00050	mg/L	2019-07-22	
Silicon, dissolved	**6.3**	1.0	mg/L	2019-07-22	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-07-22	
Sodium, dissolved	**0.73**	0.10	mg/L	2019-07-22	
Strontium, dissolved	**0.158**	0.0010	mg/L	2019-07-22	
Sulfur, dissolved	**129**	3.0	mg/L	2019-07-22	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-07-22	
Thallium, dissolved	**0.000027**	0.000020	mg/L	2019-07-22	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-07-22	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-07-22	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-07-22	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-07-22	
Uranium, dissolved	**0.00205**	0.000020	mg/L	2019-07-22	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-07-22	
Zinc, dissolved	**4.00**	0.0040	mg/L	2019-07-22	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2019-07-22	
General Parameters					
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Conductivity (EC)	**664**	2.0	µS/cm	2019-07-23	
pH	**4.27**	0.10	pH units	2019-07-23	HT2
Solids, Total Dissolved	**551**	15	mg/L	2019-07-24	
Solids, Total Suspended	**3.6**	2.0	mg/L	2019-07-24	
Total Metals					
Aluminum, total	**15.3**	0.0050	mg/L	2019-07-22	
Antimony, total	< 0.00020	0.00020	mg/L	2019-07-22	
Arsenic, total	**0.00103**	0.00050	mg/L	2019-07-22	
Barium, total	**0.0376**	0.0050	mg/L	2019-07-22	
Beryllium, total	**0.00091**	0.00010	mg/L	2019-07-22	
Bismuth, total	< 0.00010	0.00010	mg/L	2019-07-22	
Boron, total	< 0.0050	0.0050	mg/L	2019-07-22	
Cadmium, total	**0.0188**	0.000010	mg/L	2019-07-22	
Calcium, total	**42.3**	0.20	mg/L	2019-07-22	
Chromium, total	**0.00072**	0.00050	mg/L	2019-07-22	
Cobalt, total	**0.162**	0.00010	mg/L	2019-07-22	
Copper, total	**0.0997**	0.00040	mg/L	2019-07-22	
Iron, total	**1.45**	0.010	mg/L	2019-07-22	

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072066
PROJECT	Keno Mine Audit	**REPORTED**	2019-07-26 13:17

Analyte	Result	RL	Units	Analyzed	Qualifier
2019T19-07 (9072066-07) I Matrix: Water I Sampled: 2019-07-17 16:25, Continued					
Total Metals, Continued					
Lead, total	**0.00429**	0.00020	mg/L	2019-07-22	
Lithium, total	**0.0428**	0.00010	mg/L	2019-07-22	
Magnesium, total	**37.7**	0.010	mg/L	2019-07-22	
Manganese, total	**6.09**	0.00020	mg/L	2019-07-22	
Molybdenum, total	< 0.00010	0.00010	mg/L	2019-07-22	
Nickel, total	**0.712**	0.00040	mg/L	2019-07-22	
Phosphorus, total	< 0.050	0.050	mg/L	2019-07-22	
Potassium, total	**0.26**	0.10	mg/L	2019-07-22	
Selenium, total	**0.00195**	0.00050	mg/L	2019-07-22	
Silicon, total	**6.3**	1.0	mg/L	2019-07-22	
Silver, total	< 0.000050	0.000050	mg/L	2019-07-22	
Sodium, total	**0.74**	0.10	mg/L	2019-07-22	
Strontium, total	**0.158**	0.0010	mg/L	2019-07-22	
Sulfur, total	**129**	3.0	mg/L	2019-07-22	
Tellurium, total	< 0.00050	0.00050	mg/L	2019-07-22	
Thallium, total	**0.000028**	0.000020	mg/L	2019-07-22	
Thorium, total	**0.00014**	0.00010	mg/L	2019-07-22	
Tin, total	< 0.00020	0.00020	mg/L	2019-07-22	
Titanium, total	< 0.0050	0.0050	mg/L	2019-07-22	
Tungsten, total	< 0.0010	0.0010	mg/L	2019-07-22	
Uranium, total	**0.00212**	0.000020	mg/L	2019-07-22	
Vanadium, total	< 0.0010	0.0010	mg/L	2019-07-22	
Zinc, total	**3.86**	0.0040	mg/L	2019-07-22	
Zirconium, total	< 0.00010	0.00010	mg/L	2019-07-22	

Sample Qualifiers:

HT1 The sample was prepared and/or analyzed past the recommended holding time.

HT2 The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072066
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Analysis Description	Method Ref.	Technique	Location
Alkalinity in Water	SM 2320 B* (2017)	Titration with H2SO4	Kelowna
Anions in Water	SM 4110 B (2017)	Ion Chromatography	Kelowna
Conductivity in Water	SM 2510 B (2017)	Conductivity Meter	Kelowna
Dissolved Metals in Water	EPA 200.8 / EPA 6020B	0.45 µm Filtration / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	Richmond
Hardness in Water	SM 2340 B (2017)	Calculation: 2.497 [diss Ca] + 4.118 [diss Mg]	N/A
Nitrate+Nitrite in Water	SM 4500-NO3- F (2017)	Automated Colorimetry (Cadmium Reduction)	Kelowna
Nitrite in Water	SM 4500-NO2 B (2017)	Colorimetry	Richmond
pH in Water	SM 4500-H+ B (2017)	Electrometry	Kelowna
Solids, Total Dissolved in Water	SM 2540 C* (2017)	Gravimetry (Dried at 103-105C)	Kelowna
Solids, Total Suspended in Water	SM 2540 D* (2017)	Gravimetry (Dried at 103-105C)	Kelowna
Total Metals in Water	EPA 200.2* / EPA 6020B	HNO3+HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	Richmond

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Glossary of Terms:

RL	Reporting Limit (default)
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
mg/L	Milligrams per litre
pH units	pH < 7 = acidic, ph > 7 = basic
µS/cm	Microsiemens per centimetre
EPA	United States Environmental Protection Agency Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

General Comments:

The results in this report apply to the samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued unless otherwise agreed to in writing.

Results in **Bold** indicate values that are above CARO's method reporting limits. Any results that are above regulatory limits are highlighted **red**. Please note that results will only be highlighted red if the regulatory limits are included on the CARO report. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager:bshaw@caro.ca

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072066
PROJECT	Keno Mine Audit	**REPORTED**	2019-07-26 13:17

The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk)**: A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup)**: An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS)**: A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS)**: A second aliquot of sample is fortified with with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM)**: A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Anions, Batch B9G1781										
Blank (B9G1781-BLK1)				Prepared: 2019-07-19, Analyzed: 2019-07-19						
Nitrite (as N)	< 0.0050	0.0050	mg/L							
LCS (B9G1781-BS1)				Prepared: 2019-07-19, Analyzed: 2019-07-19						
Nitrite (as N)	0.0526	0.0050	mg/L	0.0500		105	90-110			
Matrix Spike (B9G1781-MS1)		**Source: 9072066-06**		Prepared: 2019-07-19, Analyzed: 2019-07-19						
Nitrite (as N)	0.0489	0.0050	mg/L	0.0500	< 0.0050	98	80-120			
Anions, Batch B9G1873										
Blank (B9G1873-BLK1)				Prepared: 2019-07-22, Analyzed: 2019-07-22						
Chloride	< 0.10	0.10	mg/L							
Fluoride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Sulfate	< 1.0	1.0	mg/L							
LCS (B9G1873-BS1)				Prepared: 2019-07-22, Analyzed: 2019-07-22						
Chloride	16.0	0.10	mg/L	16.0		100	90-110			
Fluoride	4.03	0.10	mg/L	4.00		101	88-108			
Nitrate (as N)	4.02	0.010	mg/L	4.00		100	90-110			
Nitrite (as N)	2.00	0.010	mg/L	2.00		100	85-115			
Sulfate	16.0	1.0	mg/L	16.0		100	90-110			
Anions, Batch B9G1976										
Blank (B9G1976-BLK1)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Nitrate+Nitrite (as N)	< 0.0050	0.0050	mg/L							
Blank (B9G1976-BLK2)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Nitrate+Nitrite (as N)	< 0.0050	0.0050	mg/L							
LCS (B9G1976-BS1)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Nitrate+Nitrite (as N)	0.508	0.0050	mg/L	0.500		102	91-108			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072066
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Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Anions, Batch B9G1976, Continued										
LCS (B9G1976-BS2)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Nitrate+Nitrite (as N)	0.496	0.0050	mg/L	0.500		99	91-108			
Duplicate (B9G1976-DUP1)		**Source: 9072066-01**		Prepared: 2019-07-23, Analyzed: 2019-07-23						
Nitrate+Nitrite (as N)	0.0881	0.0050	mg/L		0.0880			< 1	10	
Matrix Spike (B9G1976-MS1)		**Source: 9072066-01**		Prepared: 2019-07-23, Analyzed: 2019-07-23						
Nitrate+Nitrite (as N)	0.207	0.0050	mg/L	0.125	0.0880	95	80-120			
Dissolved Metals, Batch B9G1841										
Blank (B9G1841-BLK1)				Prepared: 2019-07-22, Analyzed: 2019-07-22						
Aluminum, dissolved	< 0.0050	0.0050	mg/L							
Antimony, dissolved	< 0.00020	0.00020	mg/L							
Arsenic, dissolved	< 0.00050	0.00050	mg/L							
Barium, dissolved	< 0.0050	0.0050	mg/L							
Beryllium, dissolved	< 0.00010	0.00010	mg/L							
Bismuth, dissolved	< 0.00010	0.00010	mg/L							
Boron, dissolved	< 0.0050	0.0050	mg/L							
Cadmium, dissolved	< 0.000010	0.000010	mg/L							
Calcium, dissolved	< 0.20	0.20	mg/L							
Chromium, dissolved	< 0.00050	0.00050	mg/L							
Cobalt, dissolved	< 0.00010	0.00010	mg/L							
Copper, dissolved	< 0.00040	0.00040	mg/L							
Iron, dissolved	< 0.010	0.010	mg/L							
Lead, dissolved	< 0.00020	0.00020	mg/L							
Lithium, dissolved	< 0.00010	0.00010	mg/L							
Magnesium, dissolved	< 0.010	0.010	mg/L							
Manganese, dissolved	< 0.00020	0.00020	mg/L							
Molybdenum, dissolved	< 0.00010	0.00010	mg/L							
Nickel, dissolved	< 0.00040	0.00040	mg/L							
Phosphorus, dissolved	< 0.050	0.050	mg/L							
Potassium, dissolved	< 0.10	0.10	mg/L							
Selenium, dissolved	< 0.00050	0.00050	mg/L							
Silicon, dissolved	< 1.0	1.0	mg/L							
Silver, dissolved	< 0.000050	0.000050	mg/L							
Sodium, dissolved	< 0.10	0.10	mg/L							
Strontium, dissolved	< 0.0010	0.0010	mg/L							
Sulfur, dissolved	< 3.0	3.0	mg/L							
Tellurium, dissolved	< 0.00050	0.00050	mg/L							
Thallium, dissolved	< 0.000020	0.000020	mg/L							
Thorium, dissolved	< 0.00010	0.00010	mg/L							
Tin, dissolved	< 0.00020	0.00020	mg/L							
Titanium, dissolved	< 0.0050	0.0050	mg/L							
Tungsten, dissolved	< 0.0010	0.0010	mg/L							
Uranium, dissolved	< 0.000020	0.000020	mg/L							
Vanadium, dissolved	< 0.0010	0.0010	mg/L							
Zinc, dissolved	< 0.0040	0.0040	mg/L							
Zirconium, dissolved	< 0.00010	0.00010	mg/L							
Blank (B9G1841-BLK2)				Prepared: 2019-07-22, Analyzed: 2019-07-22						
Aluminum, dissolved	< 0.0050	0.0050	mg/L							
Antimony, dissolved	< 0.00020	0.00020	mg/L							
Arsenic, dissolved	< 0.00050	0.00050	mg/L							
Barium, dissolved	< 0.0050	0.0050	mg/L							
Beryllium, dissolved	< 0.00010	0.00010	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072066
PROJECT	Keno Mine Audit	**REPORTED**	2019-07-26 13:17

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B9G1841, Continued										
Blank (B9G1841-BLK2), Continued				Prepared: 2019-07-22, Analyzed: 2019-07-22						
Bismuth, dissolved	< 0.00010	0.00010	mg/L							
Boron, dissolved	< 0.0050	0.0050	mg/L							
Cadmium, dissolved	< 0.000010	0.000010	mg/L							
Calcium, dissolved	< 0.20	0.20	mg/L							
Chromium, dissolved	< 0.00050	0.00050	mg/L							
Cobalt, dissolved	< 0.00010	0.00010	mg/L							
Copper, dissolved	< 0.00040	0.00040	mg/L							
Iron, dissolved	< 0.010	0.010	mg/L							
Lead, dissolved	< 0.00020	0.00020	mg/L							
Lithium, dissolved	< 0.00010	0.00010	mg/L							
Magnesium, dissolved	< 0.010	0.010	mg/L							
Manganese, dissolved	< 0.00020	0.00020	mg/L							
Molybdenum, dissolved	< 0.00010	0.00010	mg/L							
Nickel, dissolved	< 0.00040	0.00040	mg/L							
Phosphorus, dissolved	< 0.050	0.050	mg/L							
Potassium, dissolved	< 0.10	0.10	mg/L							
Selenium, dissolved	< 0.00050	0.00050	mg/L							
Silicon, dissolved	< 1.0	1.0	mg/L							
Silver, dissolved	< 0.000050	0.000050	mg/L							
Sodium, dissolved	< 0.10	0.10	mg/L							
Strontium, dissolved	< 0.0010	0.0010	mg/L							
Sulfur, dissolved	< 3.0	3.0	mg/L							
Tellurium, dissolved	< 0.00050	0.00050	mg/L							
Thallium, dissolved	< 0.000020	0.000020	mg/L							
Thorium, dissolved	< 0.00010	0.00010	mg/L							
Tin, dissolved	< 0.00020	0.00020	mg/L							
Titanium, dissolved	< 0.0050	0.0050	mg/L							
Tungsten, dissolved	< 0.0010	0.0010	mg/L							
Uranium, dissolved	< 0.000020	0.000020	mg/L							
Vanadium, dissolved	< 0.0010	0.0010	mg/L							
Zinc, dissolved	< 0.0040	0.0040	mg/L							
Zirconium, dissolved	< 0.00010	0.00010	mg/L							
LCS (B9G1841-BS1)				Prepared: 2019-07-22, Analyzed: 2019-07-22						
Aluminum, dissolved	0.0195	0.0050	mg/L	0.0200		98	80-120			
Antimony, dissolved	0.0164	0.00020	mg/L	0.0200		82	80-120			
Arsenic, dissolved	0.0200	0.00050	mg/L	0.0200		100	80-120			
Barium, dissolved	0.0200	0.0050	mg/L	0.0200		100	80-120			
Beryllium, dissolved	0.0213	0.00010	mg/L	0.0200		106	80-120			
Bismuth, dissolved	0.0201	0.00010	mg/L	0.0200		100	80-120			
Boron, dissolved	0.0202	0.0050	mg/L	0.0200		101	80-120			
Cadmium, dissolved	0.0203	0.000010	mg/L	0.0200		101	80-120			
Calcium, dissolved	1.74	0.20	mg/L	2.02		86	80-120			
Chromium, dissolved	0.0199	0.00050	mg/L	0.0200		99	80-120			
Cobalt, dissolved	0.0199	0.00010	mg/L	0.0200		100	80-120			
Copper, dissolved	0.0200	0.00040	mg/L	0.0200		100	80-120			
Iron, dissolved	1.85	0.010	mg/L	2.02		92	80-120			
Lead, dissolved	0.0199	0.00020	mg/L	0.0200		99	80-120			
Lithium, dissolved	0.0208	0.00010	mg/L	0.0199		105	80-120			
Magnesium, dissolved	1.90	0.010	mg/L	2.02		94	80-120			
Manganese, dissolved	0.0195	0.00020	mg/L	0.0200		97	80-120			
Molybdenum, dissolved	0.0194	0.00010	mg/L	0.0200		97	80-120			
Nickel, dissolved	0.0193	0.00040	mg/L	0.0200		96	80-120			
Phosphorus, dissolved	1.94	0.050	mg/L	2.00		97	80-120			
Potassium, dissolved	1.88	0.10	mg/L	2.02		93	80-120			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072066
PROJECT	Keno Mine Audit	**REPORTED**	2019-07-26 13:17

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B9G1841, Continued										
LCS (B9G1841-BS1), Continued				Prepared: 2019-07-22, Analyzed: 2019-07-22						
Silicon, dissolved	2.0	1.0	mg/L	2.00		102	80-120			
Silver, dissolved	0.0194	0.000050	mg/L	0.0200		97	80-120			
Sodium, dissolved	1.90	0.10	mg/L	2.02		94	80-120			
Strontium, dissolved	0.0212	0.0010	mg/L	0.0200		106	80-120			
Sulfur, dissolved	5.0	3.0	mg/L	5.00		100	80-120			
Tellurium, dissolved	0.0211	0.00050	mg/L	0.0200		106	80-120			
Thallium, dissolved	0.0208	0.000020	mg/L	0.0200		104	80-120			
Thorium, dissolved	0.0192	0.00010	mg/L	0.0200		96	80-120			
Tin, dissolved	0.0201	0.00020	mg/L	0.0200		100	80-120			
Titanium, dissolved	0.0201	0.0050	mg/L	0.0200		101	80-120			
Tungsten, dissolved	0.0195	0.0010	mg/L	0.0200		98	80-120			
Uranium, dissolved	0.0212	0.000020	mg/L	0.0200		106	80-120			
Vanadium, dissolved	0.0206	0.0010	mg/L	0.0200		103	80-120			
Zinc, dissolved	0.0205	0.0040	mg/L	0.0200		103	80-120			
Zirconium, dissolved	0.0226	0.00010	mg/L	0.0200		113	80-120			
Duplicate (B9G1841-DUP1)		**Source: 9072066-01**		Prepared: 2019-07-22, Analyzed: 2019-07-22						
Aluminum, dissolved	< 0.0050	0.0050	mg/L		< 0.0050					11
Antimony, dissolved	< 0.00020	0.00020	mg/L		< 0.00020					20
Arsenic, dissolved	0.00461	0.00050	mg/L		0.00466			1		8
Barium, dissolved	0.0301	0.0050	mg/L		0.0301			< 1		7
Beryllium, dissolved	< 0.00010	0.00010	mg/L		< 0.00010					14
Bismuth, dissolved	< 0.00010	0.00010	mg/L		< 0.00010					20
Boron, dissolved	0.0114	0.0050	mg/L		0.0085					13
Cadmium, dissolved	0.000027	0.000010	mg/L		0.000030					20
Calcium, dissolved	170	0.20	mg/L		169			< 1		8
Chromium, dissolved	< 0.00050	0.00050	mg/L		< 0.00050					14
Cobalt, dissolved	0.00627	0.00010	mg/L		0.00634			1		10
Copper, dissolved	< 0.00040	0.00040	mg/L		< 0.00040					20
Iron, dissolved	0.231	0.010	mg/L		0.233			< 1		14
Lead, dissolved	< 0.00020	0.00020	mg/L		< 0.00020					20
Lithium, dissolved	0.0292	0.00010	mg/L		0.0292			< 1		14
Magnesium, dissolved	28.2	0.010	mg/L		28.4			< 1		6
Manganese, dissolved	1.93	0.00020	mg/L		1.93			< 1		9
Molybdenum, dissolved	0.00023	0.00010	mg/L		0.00023					19
Nickel, dissolved	0.0108	0.00040	mg/L		0.0109			< 1		20
Phosphorus, dissolved	< 0.050	0.050	mg/L		< 0.050					14
Potassium, dissolved	0.34	0.10	mg/L		0.34					8
Selenium, dissolved	< 0.00050	0.00050	mg/L		< 0.00050					20
Silicon, dissolved	4.0	1.0	mg/L		4.1					12
Silver, dissolved	< 0.000050	0.000050	mg/L		< 0.000050					20
Sodium, dissolved	1.53	0.10	mg/L		1.60			5		6
Strontium, dissolved	0.301	0.0010	mg/L		0.302			< 1		6
Sulfur, dissolved	170	3.0	mg/L		170			< 1		20
Tellurium, dissolved	< 0.00050	0.00050	mg/L		< 0.00050					20
Thallium, dissolved	< 0.000020	0.000020	mg/L		< 0.000020					13
Thorium, dissolved	< 0.00010	0.00010	mg/L		< 0.00010					20
Tin, dissolved	< 0.00020	0.00020	mg/L		< 0.00020					20
Titanium, dissolved	< 0.0050	0.0050	mg/L		< 0.0050					20
Tungsten, dissolved	< 0.0010	0.0010	mg/L		< 0.0010					20
Uranium, dissolved	0.00212	0.000020	mg/L		0.00215			1		14
Vanadium, dissolved	< 0.0010	0.0010	mg/L		< 0.0010					20
Zinc, dissolved	0.167	0.0040	mg/L		0.169			1		11
Zirconium, dissolved	< 0.00010	0.00010	mg/L		< 0.00010					20

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072066
PROJECT	Keno Mine Audit	**REPORTED**	2019-07-26 13:17

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B9G1841, Continued										
Reference (B9G1841-SRM1)				Prepared: 2019-07-22, Analyzed: 2019-07-22						
Aluminum, dissolved	0.221	0.0050	mg/L	0.235		94	79-114			
Antimony, dissolved	0.0475	0.00020	mg/L	0.0431		110	89-123			
Arsenic, dissolved	0.462	0.00050	mg/L	0.423		109	87-113			
Barium, dissolved	3.21	0.0050	mg/L	3.30		97	85-114			
Beryllium, dissolved	0.234	0.00010	mg/L	0.209		112	79-122			
Boron, dissolved	1.71	0.0050	mg/L	1.65		104	79-117			
Cadmium, dissolved	0.233	0.000010	mg/L	0.221		105	89-112			
Calcium, dissolved	7.00	0.20	mg/L	7.72		91	85-120			
Chromium, dissolved	0.449	0.00050	mg/L	0.434		104	87-113			
Cobalt, dissolved	0.128	0.00010	mg/L	0.124		103	90-117			
Copper, dissolved	0.865	0.00040	mg/L	0.815		106	90-115			
Iron, dissolved	1.24	0.010	mg/L	1.27		98	86-112			
Lead, dissolved	0.113	0.00020	mg/L	0.110		103	90-113			
Lithium, dissolved	0.111	0.00010	mg/L	0.100		111	77-127			
Magnesium, dissolved	6.57	0.010	mg/L	6.59		100	84-116			
Manganese, dissolved	0.338	0.00020	mg/L	0.342		99	85-113			
Molybdenum, dissolved	0.425	0.00010	mg/L	0.404		105	87-112			
Nickel, dissolved	0.869	0.00040	mg/L	0.835		104	90-114			
Phosphorus, dissolved	0.534	0.050	mg/L	0.499		107	74-119			
Potassium, dissolved	2.96	0.10	mg/L	2.88		103	78-119			
Selenium, dissolved	0.0356	0.00050	mg/L	0.0324		110	89-123			
Sodium, dissolved	17.6	0.10	mg/L	18.0		98	81-117			
Strontium, dissolved	0.961	0.0010	mg/L	0.935		103	82-111			
Thallium, dissolved	0.0402	0.000020	mg/L	0.0385		104	90-113			
Uranium, dissolved	0.246	0.000020	mg/L	0.258		96	87-113			
Vanadium, dissolved	0.878	0.0010	mg/L	0.873		101	85-110			
Zinc, dissolved	0.954	0.0040	mg/L	0.848		112	88-114			
General Parameters, Batch B9G1955										
Blank (B9G1955-BLK1)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Conductivity (EC)	< 2.0	2.0	µS/cm							
Blank (B9G1955-BLK2)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Conductivity (EC)	< 2.0	2.0	µS/cm							
Blank (B9G1955-BLK3)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Conductivity (EC)	< 2.0	2.0	µS/cm							

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REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072066
PROJECT	Keno Mine Audit	**REPORTED**	2019-07-26 13:17

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B9G1955, Continued										
LCS (B9G1955-BS1)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Alkalinity, Total (as CaCO3)	93.6	1.0	mg/L	100		94	80-120			
LCS (B9G1955-BS2)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Alkalinity, Total (as CaCO3)	102	1.0	mg/L	100		102	80-120			
LCS (B9G1955-BS3)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Alkalinity, Total (as CaCO3)	96.1	1.0	mg/L	100		96	80-120			
LCS (B9G1955-BS4)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Conductivity (EC)	1400	2.0	µS/cm	1410		99	95-104			
LCS (B9G1955-BS5)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Conductivity (EC)	1380	2.0	µS/cm	1410		98	95-104			
LCS (B9G1955-BS6)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Conductivity (EC)	1380	2.0	µS/cm	1410		98	95-104			
Duplicate (B9G1955-DUP2)	**Source: 9072066-04**			Prepared: 2019-07-23, Analyzed: 2019-07-23						
Alkalinity, Total (as CaCO3)	108	1.0	mg/L		104			4	10	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L		< 1.0				10	
Alkalinity, Bicarbonate (as CaCO3)	108	1.0	mg/L		104			4	10	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L		< 1.0				10	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L		< 1.0				10	
Conductivity (EC)	1060	2.0	µS/cm		1040			2	5	
pH	8.06	0.10	pH units		8.07			< 1	4	
Reference (B9G1955-SRM1)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
pH	7.00	0.10	pH units	7.01		100	98-102			
Reference (B9G1955-SRM2)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
pH	6.98	0.10	pH units	7.01		100	98-102			
Reference (B9G1955-SRM3)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
pH	6.99	0.10	pH units	7.01		100	98-102			
General Parameters, Batch B9G1964										
Blank (B9G1964-BLK1)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Solids, Total Dissolved	< 15	15	mg/L							
LCS (B9G1964-BS1)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Solids, Total Dissolved	241	15	mg/L	240		100	85-115			
General Parameters, Batch B9G1973										
Blank (B9G1973-BLK1)				Prepared: 2019-07-24, Analyzed: 2019-07-24						
Solids, Total Suspended	< 2.0	2.0	mg/L							
Blank (B9G1973-BLK2)				Prepared: 2019-07-24, Analyzed: 2019-07-24						
Solids, Total Suspended	< 2.0	2.0	mg/L							
LCS (B9G1973-BS1)				Prepared: 2019-07-24, Analyzed: 2019-07-24						
Solids, Total Suspended	95.0	10.0	mg/L	100		95	85-115			
LCS (B9G1973-BS2)				Prepared: 2019-07-24, Analyzed: 2019-07-24						
Solids, Total Suspended	93.0	10.0	mg/L	100		93	85-115			

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Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B9G2089										
Blank (B9G2089-BLK1)				Prepared: 2019-07-24, Analyzed: 2019-07-24						
Solids, Total Dissolved	< 15	15	mg/L							
LCS (B9G2089-BS1)				Prepared: 2019-07-24, Analyzed: 2019-07-24						
Solids, Total Dissolved	239	15	mg/L	240		100	85-115			
Total Metals, Batch B9G1840										
Blank (B9G1840-BLK1)				Prepared: 2019-07-21, Analyzed: 2019-07-22						
Aluminum, total	< 0.0050	0.0050	mg/L							
Antimony, total	< 0.00020	0.00020	mg/L							
Arsenic, total	< 0.00050	0.00050	mg/L							
Barium, total	< 0.0050	0.0050	mg/L							
Beryllium, total	< 0.00010	0.00010	mg/L							
Bismuth, total	< 0.00010	0.00010	mg/L							
Boron, total	< 0.0050	0.0050	mg/L							
Cadmium, total	< 0.000010	0.000010	mg/L							
Calcium, total	< 0.20	0.20	mg/L							
Chromium, total	< 0.00050	0.00050	mg/L							
Cobalt, total	< 0.00010	0.00010	mg/L							
Copper, total	< 0.00040	0.00040	mg/L							
Iron, total	< 0.010	0.010	mg/L							
Lead, total	< 0.00020	0.00020	mg/L							
Lithium, total	< 0.00010	0.00010	mg/L							
Magnesium, total	< 0.010	0.010	mg/L							
Manganese, total	< 0.00020	0.00020	mg/L							
Molybdenum, total	< 0.00010	0.00010	mg/L							
Nickel, total	< 0.00040	0.00040	mg/L							
Phosphorus, total	< 0.050	0.050	mg/L							
Potassium, total	< 0.10	0.10	mg/L							
Selenium, total	< 0.00050	0.00050	mg/L							
Silicon, total	< 1.0	1.0	mg/L							
Silver, total	< 0.000050	0.000050	mg/L							
Sodium, total	< 0.10	0.10	mg/L							
Strontium, total	< 0.0010	0.0010	mg/L							
Sulfur, total	< 3.0	3.0	mg/L							
Tellurium, total	< 0.00050	0.00050	mg/L							
Thallium, total	< 0.000020	0.000020	mg/L							
Thorium, total	< 0.00010	0.00010	mg/L							
Tin, total	< 0.00020	0.00020	mg/L							
Titanium, total	< 0.0050	0.0050	mg/L							
Tungsten, total	< 0.0010	0.0010	mg/L							
Uranium, total	< 0.000020	0.000020	mg/L							
Vanadium, total	< 0.0010	0.0010	mg/L							
Zinc, total	< 0.0040	0.0040	mg/L							
Zirconium, total	< 0.00010	0.00010	mg/L							
Blank (B9G1840-BLK2)				Prepared: 2019-07-21, Analyzed: 2019-07-22						
Aluminum, total	< 0.0050	0.0050	mg/L							
Antimony, total	< 0.00020	0.00020	mg/L							
Arsenic, total	< 0.00050	0.00050	mg/L							
Barium, total	< 0.0050	0.0050	mg/L							
Beryllium, total	< 0.00010	0.00010	mg/L							
Bismuth, total	< 0.00010	0.00010	mg/L							
Boron, total	< 0.0050	0.0050	mg/L							

Cadmium, total	< 0.000010	0.000010	mg/L

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REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072066
PROJECT	Keno Mine Audit	**REPORTED**	2019-07-26 13:17

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier

Total Metals, Batch B9G1840, Continued

Blank (B9G1840-BLK2), Continued — Prepared: 2019-07-21, Analyzed: 2019-07-22

Calcium, total	< 0.20	0.20	mg/L
Chromium, total	< 0.00050	0.00050	mg/L
Cobalt, total	< 0.00010	0.00010	mg/L
Copper, total	< 0.00040	0.00040	mg/L
Iron, total	< 0.010	0.010	mg/L
Lead, total	< 0.00020	0.00020	mg/L
Lithium, total	< 0.00010	0.00010	mg/L
Magnesium, total	< 0.010	0.010	mg/L
Manganese, total	< 0.00020	0.00020	mg/L
Molybdenum, total	< 0.00010	0.00010	mg/L
Nickel, total	< 0.00040	0.00040	mg/L
Phosphorus, total	< 0.050	0.050	mg/L
Potassium, total	< 0.10	0.10	mg/L
Selenium, total	< 0.00050	0.00050	mg/L
Silicon, total	< 1.0	1.0	mg/L
Silver, total	< 0.000050	0.000050	mg/L
Sodium, total	< 0.10	0.10	mg/L
Strontium, total	< 0.0010	0.0010	mg/L
Sulfur, total	< 3.0	3.0	mg/L
Tellurium, total	< 0.00050	0.00050	mg/L
Thallium, total	< 0.000020	0.000020	mg/L
Thorium, total	< 0.00010	0.00010	mg/L
Tin, total	< 0.00020	0.00020	mg/L
Titanium, total	< 0.0050	0.0050	mg/L
Tungsten, total	< 0.0010	0.0010	mg/L
Uranium, total	< 0.000020	0.000020	mg/L
Vanadium, total	< 0.0010	0.0010	mg/L
Zinc, total	< 0.0040	0.0040	mg/L
Zirconium, total	< 0.00010	0.00010	mg/L

Blank (B9G1840-BLK3) — Prepared: 2019-07-21, Analyzed: 2019-07-22

Aluminum, total	< 0.0050	0.0050	mg/L
Antimony, total	< 0.00020	0.00020	mg/L
Arsenic, total	< 0.00050	0.00050	mg/L
Barium, total	< 0.0050	0.0050	mg/L
Beryllium, total	< 0.00010	0.00010	mg/L
Bismuth, total	< 0.00010	0.00010	mg/L
Boron, total	< 0.0050	0.0050	mg/L
Cadmium, total	< 0.000010	0.000010	mg/L
Calcium, total	< 0.20	0.20	mg/L
Chromium, total	< 0.00050	0.00050	mg/L
Cobalt, total	< 0.00010	0.00010	mg/L
Copper, total	< 0.00040	0.00040	mg/L
Iron, total	< 0.010	0.010	mg/L
Lead, total	< 0.00020	0.00020	mg/L
Lithium, total	< 0.00010	0.00010	mg/L
Magnesium, total	< 0.010	0.010	mg/L
Manganese, total	< 0.00020	0.00020	mg/L
Molybdenum, total	< 0.00010	0.00010	mg/L
Nickel, total	< 0.00040	0.00040	mg/L
Phosphorus, total	< 0.050	0.050	mg/L
Potassium, total	< 0.10	0.10	mg/L
Selenium, total	< 0.00050	0.00050	mg/L
Silicon, total	< 1.0	1.0	mg/L
Silver, total	< 0.000050	0.000050	mg/L

Sodium, total	< 0.10	0.10	mg/L

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REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072066
PROJECT	Keno Mine Audit	**REPORTED**	2019-07-26 13:17

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B9G1840, Continued										
Blank (B9G1840-BLK3), Continued				Prepared: 2019-07-21, Analyzed: 2019-07-22						
Strontium, total	< 0.0010	0.0010	mg/L							
Sulfur, total	< 3.0	3.0	mg/L							
Tellurium, total	< 0.00050	0.00050	mg/L							
Thallium, total	< 0.000020	0.000020	mg/L							
Thorium, total	< 0.00010	0.00010	mg/L							
Tin, total	< 0.00020	0.00020	mg/L							
Titanium, total	< 0.0050	0.0050	mg/L							
Tungsten, total	< 0.0010	0.0010	mg/L							
Uranium, total	< 0.000020	0.000020	mg/L							
Vanadium, total	< 0.0010	0.0010	mg/L							
Zinc, total	< 0.0040	0.0040	mg/L							
Zirconium, total	< 0.00010	0.00010	mg/L							
LCS (B9G1840-BS1)				Prepared: 2019-07-21, Analyzed: 2019-07-22						
Aluminum, total	0.0217	0.0050	mg/L	0.0200		108	80-120			
Antimony, total	0.0175	0.00020	mg/L	0.0200		88	80-120			
Arsenic, total	0.0211	0.00050	mg/L	0.0200		105	80-120			
Barium, total	0.0208	0.0050	mg/L	0.0200		104	80-120			
Beryllium, total	0.0224	0.00010	mg/L	0.0200		112	80-120			
Bismuth, total	0.0215	0.00010	mg/L	0.0200		108	80-120			
Boron, total	0.0235	0.0050	mg/L	0.0200		118	80-120			
Cadmium, total	0.0215	0.000010	mg/L	0.0200		107	80-120			
Calcium, total	1.90	0.20	mg/L	2.02		94	80-120			
Chromium, total	0.0211	0.00050	mg/L	0.0200		105	80-120			
Cobalt, total	0.0212	0.00010	mg/L	0.0200		106	80-120			
Copper, total	0.0216	0.00040	mg/L	0.0200		108	80-120			
Iron, total	1.94	0.010	mg/L	2.02		96	80-120			
Lead, total	0.0213	0.00020	mg/L	0.0200		106	80-120			
Lithium, total	0.0220	0.00010	mg/L	0.0199		110	80-120			
Magnesium, total	2.05	0.010	mg/L	2.02		102	80-120			
Manganese, total	0.0215	0.00020	mg/L	0.0200		107	80-120			
Molybdenum, total	0.0208	0.00010	mg/L	0.0200		104	80-120			
Nickel, total	0.0207	0.00040	mg/L	0.0200		104	80-120			
Phosphorus, total	2.08	0.050	mg/L	2.00		104	80-120			
Potassium, total	2.00	0.10	mg/L	2.02		99	80-120			
Selenium, total	0.0223	0.00050	mg/L	0.0200		112	80-120			
Silicon, total	2.2	1.0	mg/L	2.00		109	80-120			
Silver, total	0.0207	0.000050	mg/L	0.0200		103	80-120			
Sodium, total	2.05	0.10	mg/L	2.02		101	80-120			
Strontium, total	0.0221	0.0010	mg/L	0.0200		111	80-120			
Sulfur, total	5.0	3.0	mg/L	5.00		100	80-120			
Tellurium, total	0.0223	0.00050	mg/L	0.0200		111	80-120			
Thallium, total	0.0222	0.000020	mg/L	0.0200		111	80-120			
Thorium, total	0.0204	0.00010	mg/L	0.0200		102	80-120			
Tin, total	0.0211	0.00020	mg/L	0.0200		106	80-120			
Titanium, total	0.0212	0.0050	mg/L	0.0200		106	80-120			
Tungsten, total	0.0206	0.0010	mg/L	0.0200		103	80-120			
Uranium, total	0.0226	0.000020	mg/L	0.0200		113	80-120			
Vanadium, total	0.0224	0.0010	mg/L	0.0200		112	80-120			
Zinc, total	0.0217	0.0040	mg/L	0.0200		108	80-120			
Zirconium, total	0.0236	0.00010	mg/L	0.0200		118	80-120			
Duplicate (B9G1840-DUP1)	**Source: 9072066-01**			Prepared: 2019-07-21, Analyzed: 2019-07-22						
Aluminum, total	0.0273	0.0050	mg/L		0.0291			6	20	
Antimony, total	< 0.00020	0.00020	mg/L		< 0.00020				20	
Arsenic, total	0.00981	0.00050	mg/L		0.00979			< 1	15	

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO Yukon Government - Water Resources
PROJECT Keno Mine Audit

WORK ORDER 9072066
REPORTED 2019-07-26 13:17

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B9G1840, Continued										
Duplicate (B9G1840-DUP1), Continued				**Source: 9072066-01**		Prepared: 2019-07-21, Analyzed: 2019-07-22				
Barium, total	0.0329	0.0050	mg/L		0.0331			< 1	9	
Beryllium, total	< 0.00010	0.00010	mg/L		< 0.00010				16	
Bismuth, total	< 0.00010	0.00010	mg/L		< 0.00010				20	
Boron, total	< 0.0050	0.0050	mg/L		0.107				20	
Cadmium, total	0.000069	0.000010	mg/L		0.000087			22	20	
Calcium, total	179	0.20	mg/L		177			1	12	
Chromium, total	< 0.00050	0.00050	mg/L		< 0.00050				12	
Cobalt, total	0.00676	0.00010	mg/L		0.00677			< 1	13	
Copper, total	< 0.00040	0.00040	mg/L		< 0.00040				20	
Iron, total	1.59	0.010	mg/L		1.60			< 1	18	
Lead, total	0.00030	0.00020	mg/L		0.00044				20	
Lithium, total	0.0305	0.00010	mg/L		0.0307			< 1	19	
Magnesium, total	30.0	0.010	mg/L		30.4			1	10	
Manganese, total	2.03	0.00020	mg/L		2.05			1	13	
Molybdenum, total	0.00024	0.00010	mg/L		0.00031				20	
Nickel, total	0.0118	0.00040	mg/L		0.0119			1	20	
Phosphorus, total	< 0.050	0.050	mg/L		< 0.050				20	
Potassium, total	0.36	0.10	mg/L		0.37				13	
Selenium, total	< 0.00050	0.00050	mg/L		< 0.00050				20	
Silicon, total	4.4	1.0	mg/L		4.3				11	
Silver, total	0.000061	0.000050	mg/L		< 0.000050				18	
Sodium, total	1.63	0.10	mg/L		1.65			2	10	
Strontium, total	0.312	0.0010	mg/L		0.315			< 1	9	
Sulfur, total	177	3.0	mg/L		179			1	20	
Tellurium, total	< 0.00050	0.00050	mg/L		< 0.00050				20	
Thallium, total	< 0.000020	0.000020	mg/L		0.000036				20	
Thorium, total	< 0.00010	0.00010	mg/L		< 0.00010				18	
Tin, total	< 0.00020	0.00020	mg/L		< 0.00020				20	
Titanium, total	< 0.0050	0.0050	mg/L		< 0.0050				20	
Tungsten, total	< 0.0010	0.0010	mg/L		< 0.0010				20	
Uranium, total	0.00219	0.000020	mg/L		0.00222			< 1	14	
Vanadium, total	< 0.0010	0.0010	mg/L		< 0.0010				17	
Zinc, total	0.202	0.0040	mg/L		0.200			1	8	
Zirconium, total	< 0.00010	0.00010	mg/L		< 0.00010				20	
Reference (B9G1840-SRM1)						Prepared: 2019-07-21, Analyzed: 2019-07-22				
Aluminum, total	0.295	0.0050	mg/L	0.303		97	82-114			
Antimony, total	0.0522	0.00020	mg/L	0.0511		102	88-115			
Arsenic, total	0.123	0.00050	mg/L	0.118		105	88-111			
Barium, total	0.788	0.0050	mg/L	0.823		96	83-110			
Beryllium, total	0.0534	0.00010	mg/L	0.0496		108	80-119			
Boron, total	3.44	0.0050	mg/L	3.45		100	80-118			
Cadmium, total	0.0503	0.000010	mg/L	0.0495		102	90-110			
Calcium, total	9.95	0.20	mg/L	11.6		86	85-113			
Chromium, total	0.263	0.00050	mg/L	0.250		105	88-111			
Cobalt, total	0.0397	0.00010	mg/L	0.0377		105	90-114			
Copper, total	0.525	0.00040	mg/L	0.486		108	90-117			
Iron, total	0.489	0.010	mg/L	0.488		100	90-116			
Lead, total	0.200	0.00020	mg/L	0.204		98	90-110			
Lithium, total	0.427	0.00010	mg/L	0.403		106	79-118			
Magnesium, total	3.83	0.010	mg/L	3.79		101	88-116			
Manganese, total	0.107	0.00020	mg/L	0.109		98	88-108			
Molybdenum, total	0.202	0.00010	mg/L	0.198		102	88-110			
Nickel, total	0.255	0.00040	mg/L	0.249		103	90-112			
Phosphorus, total	0.201	0.050	mg/L	0.227		89	72-118			
Potassium, total	7.08	0.10	mg/L	7.21		98	87-116			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072066
PROJECT	Keno Mine Audit	**REPORTED**	2019-07-26 13:17

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B9G1840, Continued										
Reference (B9G1840-SRM1), Continued				Prepared: 2019-07-21, Analyzed: 2019-07-22						
Selenium, total	0.129	0.00050	mg/L	0.121		107	90-122			
Sodium, total	7.38	0.10	mg/L	7.54		98	86-118			
Strontium, total	0.393	0.0010	mg/L	0.375		105	86-110			
Thallium, total	0.0807	0.000020	mg/L	0.0805		100	90-113			
Uranium, total	0.0294	0.000020	mg/L	0.0306		96	88-112			
Vanadium, total	0.402	0.0010	mg/L	0.386		104	87-110			
Zinc, total	2.66	0.0040	mg/L	2.49		107	90-113			

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ANALYTICAL SERVICES #10\

Caring About Results, Obviously. 172

CHAIN OF CUSTODY RECORD

COC#

CARO BC COC, Rev 2017-0

PAGE 1 OF 1

RELINQUISHED BY: -- DATE:fa.{1.4 /8'//9 RECEIVED BY: DATE:o --r / ICI,

TIME: / :DO A7r l\\t)e -i;c_ TIME: .I O

; 1H7

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tEPORTTO: **INV** -0

:OMPANY: Yukon Government, Dept of ENV COM

,DD RESS: Water Resources Branch (V-31O) A D D RESS:

Box 2703, Whitehorse, YTY1A 2(6 :-r 1?¥-J.4.r

:ONTACT: John Minder CONTACT: J.lglJ, c,,iel.lleiF!!iJ & John Minder

'EL/ FAX: 867-66 7-3102 TEL/ FAX:

iELIVERY METHOD: EMAIL p< MAIL1 OTHER* r DELIVERY METH OD: EMAIL lx' MAIL J OTHER* J

1ATAFORMAT: EXCEL rx WATERTRAX ESdat JJ EMAIL 1: john.ryder@go v.yk.ca

EQuIS J BC EMS J OTHER* rX

EMAIL2: john.minder@gov.yk.ca

MAIL 1: john.minder@gov. yk.ca EMAIL3:

MAIL2: amelie.janin @gov .yk.ca

M AIL 3: PO # :

* **If you would like to sign up for ClientConnect and/or EnviroChain, CARO's online service offerings, please check here:** J

TURNAROUND TIME REQUESTED:

Routi n e: (5-7 Days) 1

Rush: 1 Day* J 2 Day* J 3 Day* J

Other*

*Contact Lab To Confirm. Surcharge May Apply

PROJECT NUMBER/ INFO:

Keno Mine Audit

REGULATORY APPLICATION: Show on Report

Canadian Drinking Water Quality r BCWQG r BCHWR

BC CSR Soil: WLr ALr PLr RL-LDr RL-HID cLr Ilr

BC CSR Water: AWr IW r Lwr Dwr

CCME: Other:

A: Biohazard D: Asbestos G: Strong Odour

B: Cyanide E: Heavy Metals H: High Contaminatio n

C: PCBs F: Flammable I: Other (please specify*)

COMMENTS:

ANALYSES REQUESTED:

AMPLED BY:

MATRIX: **SAMPLING:**

SAMPLE ID - SAMPLE CLASS - STATION CODE					DATE	TIME	(e.g. flow/volume	media ID/notes)						
2019T19-01	M	CL-1	./	4	20 19-0 7- 16	16:00	/ /		./	./	./	./	./	
2019T19-02	M	CL-2	,/	4	2019-07-16	16:25	/ /		./	./	./	./	./	
2019T19-03	M	CL-3	V	4	2019-07-16	16:41	/ /		./	./	./	./	./	

YYYY-MM- DD HH:MM

2019T19-04	QR	CL-3	,/	4	20 19 -0 7- 16	16 :4 1	/ /	./	./	./	./
2019T19-05	QFB	CL-3	V'	4	2019-07-16	16:41	/ /	./	./	./	./
2019T19-06	QTB	QAQC	•;	4	2019-07-16	n/a		./	./	./	./
2019T19-07	M	CACHE-04	v'	4	20 19 - 0 7- 17	16 : 25	/ /	./	./	./	./

HIPPING INSTRUCTIONS: ReturnCooler(s)r 1
upplies Needed:

SAMPLE RETENTION:
30 Days (default) r
60 Days r 90 Days r
Other (surcharges **will** apply):

***OTHER INSTRUCTIONS:**

SAMPLE RECEIPT CONDITION:
COOLER 1 (°C): 8.0 ICE Y Nr
COOLER 2 (°C): ICE: v r N r
COOLER 3 (°C): --- ICE: vr N r

If you would like to talk to a real live Scientist about your project requirements, please check here: J

CUSTODY SEALS INTACT: NA r vr N r

CERTIFICATE OF ANALYSIS

REPORTED TO	Yukon Government - Water Resources Suite 210, 419 Range Road Whitehorse, YT Y1A 3V1		
ATTENTION	John Minder	**WORK ORDER**	9072065
PO NUMBER		**RECEIVED / TEMP**	2019-07-19 13:30 / 5°C
PROJECT	Keno Mine Audit	**REPORTED**	2019-08-14 22:46
PROJECT INFO	YK Water Resources - C00043458		

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO 17025:2005 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks

You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

We've Got Chemistry

It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

Ahead of the Curve

Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

If you have any questions or concerns, please contact me at bshaw@caro.ca

Authorized By:

Bryan Shaw, Ph.D., P.Chem.
Client Service Coordinator

CERTIFICATE OF ANALYSIS

TEST RESULTS

REPORTED TO Yukon Government - Water Resources
PROJECT Keno Mine Audit

WORK ORDER 9072065
REPORTED 2019-08-14 22:46

Analyte	Result	RL	Units	Analyzed	Qualifier
2019T19-08 (9072065-04) I Matrix: Soil I Sampled: 2019-07-17 14:55					
Salinity Parameters (Sat. Paste Extract)					
pH, Saturated Paste	**7.55**	0.10	pH units	2019-07-23	
Saturation	**73.9**	1.0	%	2019-07-23	
Strong Acid Leachable Metals					
Aluminum	**1930**	40	mg/kg dry	2019-07-22	
Antimony	**49.3**	0.10	mg/kg dry	2019-07-22	
Arsenic	**731**	0.30	mg/kg dry	2019-07-23	
Barium	**38.2**	1.0	mg/kg dry	2019-07-22	
Beryllium	**0.20**	0.10	mg/kg dry	2019-07-22	
Bismuth	**0.35**	0.10	mg/kg dry	2019-07-22	
Boron	< 2.0	2.0	mg/kg dry	2019-07-22	
Cadmium	**1590**	0.040	mg/kg dry	2019-07-23	
Calcium	**4510**	100	mg/kg dry	2019-07-22	
Chromium	**3.3**	1.0	mg/kg dry	2019-07-22	
Cobalt	**79.6**	0.10	mg/kg dry	2019-07-22	
Copper	**229**	0.40	mg/kg dry	2019-07-22	
Iron	**15400**	20	mg/kg dry	2019-07-22	
Lead	**204**	0.20	mg/kg dry	2019-07-22	
Lithium	**2.03**	0.10	mg/kg dry	2019-07-22	
Magnesium	**651**	10	mg/kg dry	2019-07-22	
Manganese	**45600**	0.40	mg/kg dry	2019-07-23	
Mercury	**0.104**	0.040	mg/kg dry	2019-07-22	
Molybdenum	**2.08**	0.10	mg/kg dry	2019-07-22	
Nickel	**49.8**	0.60	mg/kg dry	2019-07-22	
Phosphorus	**167**	10	mg/kg dry	2019-07-22	
Potassium	**63**	40	mg/kg dry	2019-07-22	
Selenium	**0.23**	0.20	mg/kg dry	2019-07-22	
Silver	**2.29**	0.10	mg/kg dry	2019-07-22	
Sodium	< 50	50	mg/kg dry	2019-07-22	
Strontium	**10.9**	0.20	mg/kg dry	2019-07-22	
Sulfur	< 1000	1000	mg/kg dry	2019-07-22	
Tellurium	< 0.10	0.10	mg/kg dry	2019-07-22	
Thallium	**0.17**	0.10	mg/kg dry	2019-07-22	
Thorium	**0.81**	0.50	mg/kg dry	2019-07-22	
Tin	**6.75**	0.20	mg/kg dry	2019-07-22	
Titanium	**35.7**	1.0	mg/kg dry	2019-07-22	
Tungsten	< 0.20	0.20	mg/kg dry	2019-07-22	
Uranium	**31.6**	0.050	mg/kg dry	2019-07-22	
Vanadium	**5.1**	1.0	mg/kg dry	2019-07-22	
Zinc	**362000**	2.0	mg/kg dry	2019-07-23	
Zirconium	< 2.0	2.0	mg/kg dry	2019-07-22	

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072065
PROJECT	Keno Mine Audit	**REPORTED**	2019-08-14 22:46

Analyte	Result	RL	Units	Analyzed	Qualifier
2019T19-09 (9072065-05) I Matrix: Soil I Sampled: 2019-07-17 14:40					
Salinity Parameters (Sat. Paste Extract)					
pH, Saturated Paste	**7.45**	0.10	pH units	2019-07-23	
Saturation	**50.1**	1.0	%	2019-07-23	
Strong Acid Leachable Metals					
Aluminum	**4870**	40	mg/kg dry	2019-07-22	
Antimony	**62.8**	0.10	mg/kg dry	2019-07-22	
Arsenic	**400**	0.30	mg/kg dry	2019-07-22	
Barium	**45.2**	1.0	mg/kg dry	2019-07-22	
Beryllium	**0.19**	0.10	mg/kg dry	2019-07-22	
Bismuth	**1.59**	0.10	mg/kg dry	2019-07-22	
Boron	**3.3**	2.0	mg/kg dry	2019-07-22	
Cadmium	**268**	0.040	mg/kg dry	2019-07-22	
Calcium	**2210**	100	mg/kg dry	2019-07-22	
Chromium	**10.4**	1.0	mg/kg dry	2019-07-22	
Cobalt	**14.0**	0.10	mg/kg dry	2019-07-22	
Copper	**192**	0.40	mg/kg dry	2019-07-22	
Iron	**28600**	20	mg/kg dry	2019-07-22	
Lead	**1050**	0.20	mg/kg dry	2019-07-23	
Lithium	**7.75**	0.10	mg/kg dry	2019-07-22	
Magnesium	**2690**	10	mg/kg dry	2019-07-22	
Manganese	**6980**	0.40	mg/kg dry	2019-07-23	
Mercury	**0.502**	0.040	mg/kg dry	2019-07-22	
Molybdenum	**1.00**	0.10	mg/kg dry	2019-07-22	
Nickel	**19.9**	0.60	mg/kg dry	2019-07-22	
Phosphorus	**499**	10	mg/kg dry	2019-07-22	
Potassium	**215**	40	mg/kg dry	2019-07-22	
Selenium	**0.76**	0.20	mg/kg dry	2019-07-22	
Silver	**39.2**	0.10	mg/kg dry	2019-07-22	
Sodium	< 50	50	mg/kg dry	2019-07-22	
Strontium	**8.71**	0.20	mg/kg dry	2019-07-22	
Sulfur	**2770**	1000	mg/kg dry	2019-07-22	
Tellurium	< 0.10	0.10	mg/kg dry	2019-07-22	
Thallium	**0.15**	0.10	mg/kg dry	2019-07-22	
Thorium	**2.55**	0.50	mg/kg dry	2019-07-22	
Tin	**46.7**	0.20	mg/kg dry	2019-07-22	
Titanium	**113**	1.0	mg/kg dry	2019-07-22	
Tungsten	< 0.20	0.20	mg/kg dry	2019-07-22	
Uranium	**4.09**	0.050	mg/kg dry	2019-07-22	
Vanadium	**14.5**	1.0	mg/kg dry	2019-07-22	
Zinc	**41200**	2.0	mg/kg dry	2019-07-23	
Zirconium	< 2.0	2.0	mg/kg dry	2019-07-22	

TEST RESULTS

REPORTED TO Yukon Government - Water Resources
PROJECT Keno Mine Audit

WORK ORDER 9072065
REPORTED 2019-08-14 22:46

Analyte	Result	RL	Units	Analyzed	Qualifier
2019T19-10 (9072065-06) I Matrix: Soil I Sampled: 2019-07-17 14:20					
Salinity Parameters (Sat. Paste Extract)					
pH, Saturated Paste	**7.17**	0.10	pH units	2019-07-23	
Saturation	**50.1**	1.0	%	2019-07-23	
Strong Acid Leachable Metals					
Aluminum	**5730**	40	mg/kg dry	2019-07-22	
Antimony	**25.9**	0.10	mg/kg dry	2019-07-22	
Arsenic	**203**	0.30	mg/kg dry	2019-07-22	
Barium	**57.0**	1.0	mg/kg dry	2019-07-22	
Beryllium	**0.19**	0.10	mg/kg dry	2019-07-22	
Bismuth	**0.92**	0.10	mg/kg dry	2019-07-22	
Boron	**4.3**	2.0	mg/kg dry	2019-07-22	
Cadmium	**144**	0.040	mg/kg dry	2019-07-22	
Calcium	**2170**	100	mg/kg dry	2019-07-22	
Chromium	**11.4**	1.0	mg/kg dry	2019-07-22	
Cobalt	**11.7**	0.10	mg/kg dry	2019-07-22	
Copper	**137**	0.40	mg/kg dry	2019-07-22	
Iron	**28800**	20	mg/kg dry	2019-07-22	
Lead	**973**	0.20	mg/kg dry	2019-07-23	
Lithium	**8.71**	0.10	mg/kg dry	2019-07-22	
Magnesium	**3310**	10	mg/kg dry	2019-07-22	
Manganese	**4890**	0.40	mg/kg dry	2019-07-23	
Mercury	**0.342**	0.040	mg/kg dry	2019-07-22	
Molybdenum	**1.02**	0.10	mg/kg dry	2019-07-22	
Nickel	**18.7**	0.60	mg/kg dry	2019-07-22	
Phosphorus	**486**	10	mg/kg dry	2019-07-22	
Potassium	**205**	40	mg/kg dry	2019-07-22	
Selenium	**0.65**	0.20	mg/kg dry	2019-07-22	
Silver	**44.2**	0.10	mg/kg dry	2019-07-22	
Sodium	< 50	50	mg/kg dry	2019-07-22	
Strontium	**9.03**	0.20	mg/kg dry	2019-07-22	
Sulfur	**1120**	1000	mg/kg dry	2019-07-22	
Tellurium	< 0.10	0.10	mg/kg dry	2019-07-22	
Thallium	< 0.10	0.10	mg/kg dry	2019-07-22	
Thorium	**2.43**	0.50	mg/kg dry	2019-07-22	
Tin	**40.8**	0.20	mg/kg dry	2019-07-22	
Titanium	**183**	1.0	mg/kg dry	2019-07-22	
Tungsten	< 0.20	0.20	mg/kg dry	2019-07-22	
Uranium	**0.750**	0.050	mg/kg dry	2019-07-22	
Vanadium	**21.0**	1.0	mg/kg dry	2019-07-22	
Zinc	**12100**	2.0	mg/kg dry	2019-07-23	
Zirconium	< 2.0	2.0	mg/kg dry	2019-07-22	

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072065
PROJECT	Keno Mine Audit	**REPORTED**	2019-08-14 22:46

Analysis Description	Method Ref.	Technique	Location
SALM in Soil	BCMOE SALM V.2 / EPA 6020B	HNO3+HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	Richmond
Saturated Paste Extraction in Soil	Carter 15.2.1 / Carter 15.2.1	Saturated Paste Extraction / Calculation	Richmond
Saturated Paste pH in Soil	SM 4500-H+ B (2017)	Electrometry	Richmond

Glossary of Terms:

RL	Reporting Limit (default)
%	Percent
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
mg/kg dry	Milligrams per kilogram (dry weight basis)
pH units	pH < 7 = acidic, ph > 7 = basic
Carter	Soil Sampling and Methods of Analysis, 2nd Edition (2007), Carter/Gregorich
EPA	United States Environmental Protection Agency Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

General Comments:

The results in this report apply to the samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued unless otherwise agreed to in writing.

Results in **Bold** indicate values that are above CARO's method reporting limits. Any results that are above regulatory limits are highlighted **red**. Please note that results will only be highlighted red if the regulatory limits are included on the CARO report. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager:bshaw@caro.ca

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072065
PROJECT	Keno Mine Audit	**REPORTED**	2019-08-14 22:46

The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk)**: A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup)**: An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS)**: A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS)**: A second aliquot of sample is fortified with with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM)**: A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Salinity Parameters (Sat. Paste Extract), Batch B9G1874										
Duplicate (B9G1874-DUP1)				**Source: 9072065-05**	Prepared: 2019-07-22, Analyzed: 2019-07-23					
Saturation	49.7	1.0	%		50.1			< 1	20	
Salinity Parameters (Sat. Paste Extract), Batch B9G2002										
Duplicate (B9G2002-DUP1)				**Source: 9072065-05**	Prepared: 2019-07-23, Analyzed: 2019-07-23					
pH, Saturated Paste	7.39	0.10	pH units		7.45			< 1	10	
Strong Acid Leachable Metals, Batch B9G1847										
Blank (B9G1847-BLK1)					Prepared: 2019-07-22, Analyzed: 2019-07-22					
Aluminum	< 40	40	mg/kg dry							
Antimony	Molybd									< 0.10
Arsenic	enum									< 0.30
Barium	Nickel									< 1.0
Beryllium	Phosph									< 0.10
Bismuth	orus									< 0.10
Boron	Potassi									< 2.0
Cadmium	um									< 0.040
Calcium	Seleniu									< 100
Chromium	m									< 1.0
Cobalt	Silver									< 0.10
Copper										< 0.40
Iron										< 20
Lead										< 0.20
Lithium										< 0.10
Magnesium										< 10
Manganese										< 0.40
Mercury										< 0.040
										< 0.10

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072065
PROJECT	Keno Mine Audit	**REPORTED**	2019-08-14 22:46

< 0.60	0.10	mg/kg dry
< 10	0.30	mg/kg dry
< 40	1.0	mg/kg dry
< 0.20	0.10	mg/kg dry
< 0.10	0.10	mg/kg dry
	2.0	mg/kg dry
	0.040	mg/kg dry
	100	mg/kg dry
	1.0	mg/kg dry
	0.10	mg/kg dry
	0.40	mg/kg dry
	20	mg/kg dry
	0.20	mg/kg dry
	0.10	mg/kg dry
	10	mg/kg dry
	0.40	mg/kg dry
	0.040	mg/kg dry
	0.10	mg/kg dry
	0.60	mg/kg dry
	10	mg/kg dry
	40	mg/kg dry
	0.20	mg/kg dry
	0.10	mg/kg dry

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072065
PROJECT	Keno Mine Audit	**REPORTED**	2019-08-14 22:46

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier

Strong Acid Leachable Metals, Batch B9G1847, Continued

Blank (B9G1847-BLK1), Continued				Prepared: 2019-07-22, Analyzed: 2019-07-22						
Sodium	< 50	50	mg/kg dry							
Strontium	< 0.20	0.20	mg/kg dry							
Sulfur	< 1000	1000	mg/kg dry							
Tellurium	< 0.10	0.10	mg/kg dry							
Thallium	< 0.10	0.10	mg/kg dry							
Thorium	< 0.50	0.50	mg/kg dry							
Tin	< 0.20	0.20	mg/kg dry							
Titanium	< 1.0	1.0	mg/kg dry							
Tungsten	< 0.20	0.20	mg/kg dry							
Uranium	< 0.050	0.050	mg/kg dry							
Vanadium	< 1.0	1.0	mg/kg dry							
Zinc	< 2.0	2.0	mg/kg dry							
Zirconium	< 2.0	2.0	mg/kg dry							

Blank (B9G1847-BLK2)				Prepared: 2019-07-22, Analyzed: 2019-07-22						
Aluminum	< 40	40	mg/kg dry							
Antimony	< 0.10	0.10	mg/kg dry							
Arsenic	< 0.30	0.30	mg/kg dry							
Barium	< 1.0	1.0	mg/kg dry							
Beryllium	< 0.10	0.10	mg/kg dry							
Bismuth	< 0.10	0.10	mg/kg dry							
Boron	< 2.0	2.0	mg/kg dry							
Cadmium	< 0.040	0.040	mg/kg dry							
Calcium	< 100	100	mg/kg dry							
Chromium	< 1.0	1.0	mg/kg dry							
Cobalt	< 0.10	0.10	mg/kg dry							
Copper	< 0.40	0.40	mg/kg dry							
Iron	< 20	20	mg/kg dry							
Lead	< 0.20	0.20	mg/kg dry							
Lithium	< 0.10	0.10	mg/kg dry							
Magnesium	< 10	10	mg/kg dry							
Manganese	< 0.40	0.40	mg/kg dry							
Mercury	< 0.040	0.040	mg/kg dry							
Molybdenum	< 0.10	0.10	mg/kg dry							
Nickel	< 0.60	0.60	mg/kg dry							
Phosphorus	< 10	10	mg/kg dry							
Potassium	< 40	40	mg/kg dry							
Selenium	< 0.20	0.20	mg/kg dry							
Silver	< 0.10	0.10	mg/kg dry							
Sodium	< 50	50	mg/kg dry							
Strontium	< 0.20	0.20	mg/kg dry							
Sulfur	< 1000	1000	mg/kg dry							
Tellurium	< 0.10	0.10	mg/kg dry							
Thallium	< 0.10	0.10	mg/kg dry							
Thorium	< 0.50	0.50	mg/kg dry							
Tin	< 0.20	0.20	mg/kg dry							
Titanium	< 1.0	1.0	mg/kg dry							
Tungsten	< 0.20	0.20	mg/kg dry							
Uranium	< 0.050	0.050	mg/kg dry							
Vanadium	< 1.0	1.0	mg/kg dry							
Zinc	< 2.0	2.0	mg/kg dry							
Zirconium	< 2.0	2.0	mg/kg dry							

Blank (B9G1847-BLK3)				Prepared: 2019-07-22, Analyzed: 2019-07-22
Aluminum	< 40	40	mg/kg dry	
Antimony	< 0.10	0.10	mg/kg dry	

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072065
PROJECT	Keno Mine Audit	**REPORTED**	2019-08-14 22:46

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO Yukon Government - Water Resources
PROJECT Keno Mine Audit

WORK ORDER 9072065
REPORTED 2019-08-14 22:46

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Strong Acid Leachable Metals, Batch B9G1847, Continued										
Blank (B9G1847-BLK3), Continued				Prepared: 2019-07-22, Analyzed: 2019-07-22						
Arsenic	< 0.30	0.30	mg/kg dry							
Barium	< 1.0	1.0	mg/kg dry							
Beryllium	< 0.10	0.10	mg/kg dry							
Bismuth	< 0.10	0.10	mg/kg dry							
Boron	< 2.0	2.0	mg/kg dry							
Cadmium	< 0.040	0.040	mg/kg dry							
Calcium	< 100	100	mg/kg dry							
Chromium	< 1.0	1.0	mg/kg dry							
Cobalt	< 0.10	0.10	mg/kg dry							
Copper	< 0.40	0.40	mg/kg dry							
Iron	< 20	20	mg/kg dry							
Lead	< 0.20	0.20	mg/kg dry							
Lithium	< 0.10	0.10	mg/kg dry							
Magnesium	< 10	10	mg/kg dry							
Manganese	< 0.40	0.40	mg/kg dry							
Mercury	< 0.040	0.040	mg/kg dry							
Molybdenum	< 0.10	0.10	mg/kg dry							
Nickel	< 0.60	0.60	mg/kg dry							
Phosphorus	< 10	10	mg/kg dry							
Potassium	< 40	40	mg/kg dry							
Selenium	< 0.20	0.20	mg/kg dry							
Silver	< 0.10	0.10	mg/kg dry							
Sodium	< 50	50	mg/kg dry							
Strontium	< 0.20	0.20	mg/kg dry							
Sulfur	< 1000	1000	mg/kg dry							
Tellurium	< 0.10	0.10	mg/kg dry							
Thallium	< 0.10	0.10	mg/kg dry							
Thorium	< 0.50	0.50	mg/kg dry							
Tin	< 0.20	0.20	mg/kg dry							
Titanium	< 1.0	1.0	mg/kg dry							
Tungsten	< 0.20	0.20	mg/kg dry							
Uranium	< 0.050	0.050	mg/kg dry							
Vanadium	< 1.0	1.0	mg/kg dry							
Zinc	< 2.0	2.0	mg/kg dry							
Zirconium	< 2.0	2.0	mg/kg dry							
LCS (B9G1847-BS1)				Prepared: 2019-07-22, Analyzed: 2019-07-22						
Antimony	1.68	0.10	mg/kg dry	2.00		84	80-120			
Arsenic	1.95	0.30	mg/kg dry	2.00		98	80-120			
Barium	2.0	1.0	mg/kg dry	2.00		98	80-120			
Beryllium	1.97	0.10	mg/kg dry	2.00		98	80-120			
Bismuth	2.09	0.10	mg/kg dry	2.00		105	80-120			
Boron	2.1	2.0	mg/kg dry	2.00		104	80-120			
Cadmium	2.05	0.040	mg/kg dry	2.00		103	80-120			
Calcium	195	100	mg/kg dry	202		97	80-120			
Chromium	2.0	1.0	mg/kg dry	2.00		99	80-120			
Cobalt	2.05	0.10	mg/kg dry	2.00		103	80-120			
Copper	2.03	0.40	mg/kg dry	2.00		102	80-120			
Iron	191	20	mg/kg dry	202		95	80-120			
Lead	2.08	0.20	mg/kg dry	2.00		104	80-120			
Lithium	2.18	0.10	mg/kg dry	1.99		109	80-120			
Magnesium	206	10	mg/kg dry	202		102	80-120			
Manganese	2.09	0.40	mg/kg dry	2.00		104	80-120			
Mercury	0.103	0.040	mg/kg dry	0.100		103	80-120			
Molybdenum	1.93	0.10	mg/kg dry	2.00		97	80-120			
Nickel	1.87	0.60	mg/kg dry	2.00		93	80-120			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072065
PROJECT	Keno Mine Audit	**REPORTED**	2019-08-14 22:46

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Strong Acid Leachable Metals, Batch B9G1847, Continued										
LCS (B9G1847-BS1), Continued				Prepared: 2019-07-22, Analyzed: 2019-07-22						
Phosphorus	202	10	mg/kg dry	200		101	80-120			
Potassium	186	40	mg/kg dry	202		92	80-120			
Selenium	2.05	0.20	mg/kg dry	2.00		102	80-120			
Silver	2.05	0.10	mg/kg dry	2.00		103	80-120			
Sodium	231	50	mg/kg dry	202		115	80-120			
Strontium	2.04	0.20	mg/kg dry	2.00		102	80-120			
Sulfur	< 1000	1000	mg/kg dry	500		112	80-120			
Tellurium	2.03	0.10	mg/kg dry	2.00		102	80-120			
Thallium	2.16	0.10	mg/kg dry	2.00		108	80-120			
Thorium	1.84	0.50	mg/kg dry	2.00		92	80-120			
Tin	1.97	0.20	mg/kg dry	2.00		98	80-120			
Titanium	2.1	1.0	mg/kg dry	2.00		103	80-120			
Tungsten	2.24	0.20	mg/kg dry	2.00		112	80-120			
Uranium	2.28	0.050	mg/kg dry	2.00		114	80-120			
Vanadium	2.2	1.0	mg/kg dry	2.00		110	80-120			
Zinc	2.1	2.0	mg/kg dry	2.00		105	80-120			
Zirconium	2.1	2.0	mg/kg dry	2.00		105	80-120			
Reference (B9G1847-SRM1)				Prepared: 2019-07-22, Analyzed: 2019-07-22						
Aluminum	16500	40	mg/kg dry	17500		94	70-130			
Antimony	6.20	0.10	mg/kg dry	6.46		96	70-130			
Arsenic	14.8	0.30	mg/kg dry	15.1		98	70-130			
Barium	74.2	1.0	mg/kg dry	80.6		92	70-130			
Beryllium	0.49	0.10	mg/kg dry	0.522		93	70-130			
Bismuth	1.80	0.10	mg/kg dry	1.89		95	70-130			
Boron	3.2	2.0	mg/kg dry	3.00		105	70-130			
Cadmium	0.225	0.040	mg/kg dry	0.216		104	70-130			
Calcium	3260	100	mg/kg dry	3290		99	70-130			
Chromium	26.9	1.0	mg/kg dry	27.5		98	70-130			
Cobalt	11.9	0.10	mg/kg dry	12.4		96	70-130			
Copper	42.2	0.40	mg/kg dry	45.3		93	70-130			
Iron	30200	20	mg/kg dry	32600		93	70-130			
Lead	12.8	0.20	mg/kg dry	13.8		93	70-130			
Lithium	10.5	0.10	mg/kg dry	9.91		106	70-130			
Magnesium	5640	10	mg/kg dry	5770		98	70-130			
Manganese	1010	0.40	mg/kg dry	1090		92	70-130			
Mercury	0.091	0.040	mg/kg dry	0.103		89	70-130			
Molybdenum	0.68	0.10	mg/kg dry	0.731		92	70-130			
Nickel	15.7	0.60	mg/kg dry	17.4		90	70-130			
Phosphorus	733	10	mg/kg dry	756		97	70-130			
Potassium	574	40	mg/kg dry	631		91	70-130			
Selenium	0.21	0.20	mg/kg dry	0.300		68	50-200			
Sodium	393	50	mg/kg dry	388		101	70-130			
Strontium	11.8	0.20	mg/kg dry	11.5		103	70-130			
Thorium	3.75	0.50	mg/kg dry	3.61		104	70-130			
Tin	1.01	0.20	mg/kg dry	1.03		98	70-130			
Titanium	843	1.0	mg/kg dry	833		101	70-130			
Uranium	0.825	0.050	mg/kg dry	0.837		99	70-130			
Vanadium	53.2	1.0	mg/kg dry	54.9		97	70-130			
Zinc	61.0	2.0	mg/kg dry	66.8		91	70-130			

CERTIFICATE OF ANALYSIS • COVER PAGE

Global ARD Testing Services Inc.

CLIENT INFORMATION		
Client:		CARO Analytical Services
Consulting Client:		N/A
Project Manager(s):	**Adrian Q:**	Adrian Quesada (aquesada@caro.ca)
	Bryan S:	Bryan Shaw (bshaw@caro.ca)
Mailing Address:	**Adrian Q:**	102-3677 Hwy 97N, Kelowna, BC, Canada V1X 5C3.
	Bryan S:	110 - 4011 Viking Way, Richmond, BC, Canada V6V 2K9.
Contact No:	**Alana:**	Main: (250) 765-9646; Direct: (604)-207-5110 x 413
	Bryan S:	Main: (604) 279-1499; Direct: (604) 207-5110 x 129
Fax No:		(604) 855-7378

COMPANY INFORMATION	
Legal Name:	Global ARD Testing Services Inc.
Mailing Address:	6891 Antrim Avenue, Burnaby, BC, Canada, V5J 4M5.
Contact No:	Main: (604) 428-2730
	Ivy Rajan (Cell): (604) 319-7707
	Prab Bhatia (Cell): (604) 603-1359
Fax No:	(604) 428-2731

PROJECT INFORMATION	
Project Name:	N/A
Project Number:	9072065

REPORT INFORMATION	
Global Project No:	1934
Report Version:	1
Pages (Including Cover):	5
Report Title:	ABA SFE Report 6 x 9072065 Samples (rec'd 23-Jul19)
Analysis Reviewed By:	Ivy Rajan (IRajan@GlobalARDTesting.com)
Position:	Acid Rock Drainage (ARD) Lab & Project Manager
Report Certified By:	Ivy Rajan
Signature:	Ivy Rajan

RESULTS		
Reported To:	**1**	Adrian Quesada (aquesada@caro.ca)
	2	Bryan Shaw (bshaw@caro.ca)
	3	N/A
cc:		N/A
Date Reported:		August 14, 2019 (Wed.)

INVOICE		
Submitted To:	**1**	Adrian Quesada (aquesada@caro.ca)
	2	N/A
cc:		Bryan Shaw (bshaw@caro.ca)
Global Invoice No:		ARD1934-0819A
Date Submitted:		August 14, 2019 (Wed.)

NOTES
All samples are stored at no charge for 90 days past reporting date.
HCT, column, custom leach columns (Lysimeters) & SAD column samples
will be stored free for 90 days past kinetic testing program or Closedown.
Please contact the lab if you require additional sample storage time.
Storage charges will apply.

CERTIFICATE OF ANALYSIS • SAMPLE DETAILS

Global ARD Testing Services Inc.

GLOBAL PROJECT NO: 1934

CLIENT: CARO Analytical Services

PROJECT NAME / NO: NA / WO 9072065

REPORT VERSION: 1

S. No.	Sample ID	Sample Type	Condition (Wet/Dry)	Wt. of Sample Rec'd (kg)	Global Notes (if any)
1	9072065-01	Soil	Wet	0.80	
2	9072065-02	Soil	Wet	0.70	
3	9072065-03	Soil	Wet	0.70	
4	9072065-07	Soil	Wet	0.75	
5	9072065-08	Soil	Wet	0.75	
6	9072065-09	Soil	Wet	0.75	

Total wt. of sample rec'd (kg): **4.45**

SAMPLE RECEIPT INFO:	
Date Samples Received:	July 23, 2019 (Tuesday)
No. of Samples Received:	6
Samples Received By:	Jyoti Nayak

ANALYTICAL INSTRUCTIONS:	
From:	Adrian Quesada (aquesada@caro.ca)
	by email/COC received with samples.
	CARO WO: 9072065
Date:	July 23, 2019 (Tuesday)

CERTIFICATE OF ANALYSIS • ABA + QAQC RESULTS

Global ARD Testing Services Inc.

GLOBAL PROJECT NO: 1934
CLIENT: CARO Analytical Services
PROJECT NAME / NO: NA / WO 9072065
REPORT VERSION: 1

							Modified ASTM D2492-02 Method						
S. No.	**Sample ID**	**Paste pH**	**Fizz Rating**	**Total Inorganic C**	**$CaCO_3$ Equivalents[*1]**	**Total Sulphur**	**Sulphate Sulphur**	**Sulphide Sulphur**	**Non-Extractable Sulphur[*2]**	**AP[*3]**	**Modified Sobek NP**	**NNP[*4]**	**NPR[*5]**
	Units:	**pH Units**		**wt %**	**kg CaCO3/tonne**	**wt %**	**wt %**	**wt %**	**wt %**		**kg CaCO3/tonne**		
	Reported Detection Limit:	***0.01***		***0.02***	***1.7***	***0.01***	***0.01***	***0.01***	***0.01***	**0.3**			
1	9072065-01	7.3	Slight	0.22	18.3	0.48	0.23	0.23	0.02	7.2	20.1	12.9	2.8
2	9072065-02	7.5	Strong	2.43	202.5	0.76	0.57	0.19	<0.01	5.9	332.7	326.8	56.0
3	9072065-03	7.4	Strong	1.90	158.3	1.36	0.43	0.77	0.16	24.1	222.2	198.1	9.2
4	9072065-07	6.3	None	0.18	15.0	2.06	0.14	1.63	0.29	50.9	2.5	-48.4	0.0
5	9072065-08	6.6	None	0.25	20.8	1.58	0.12	1.46	<0.01	45.6	-1.3	-46.9	0.0
6	9072065-09	7.5	Moderate	0.81	67.5	3.01	0.25	0.78	1.98	24.4	78.3	53.9	3.2
QUALITY ASSURANCE / QUALITY CONTROL													
Replicate Analysis:													
1	9072065-01			0.22	18.3	0.48							
1 R	9072065-01 (Rep)			0.23	19.2	0.50							
6	9072065-09						0.25	0.78					
6 R	9072065-09 (Rep)						0.26	0.78					
Certified Reference Material (CRM) Analysis:													
Certified Reference Material		KZK-1		KZK-1		KZK-1	RTS-3a	KZK-1			1) KZK-1 (Slight) 2) KZK-1 (Moderate)		
CRM True Value		**8.80**		**0.844**		**0.80**	**1.10**	**0.37**			**1) 58.9 2) 61.6**		
Reference Material Results / % Recovery		8.86		0.720		0.65	1.09	0.37			1) 54.5 2) N/A		
Tolerance (+/-) as per COA or Acceptance Range (at Global):		***0.09***		***80 - 120***		***80 - 120***	***0.99 - 1.21***	***0.33 - 0.41***			***1) 1.1 2) 3.4***		
Method Blank Analysis:													
Method Blank Results				<0.02		<0.01	<0.01	<0.01					
GLOBAL SOP NO:		*ARD-004*	*ARD-005*	*HCl Leach/LECO*	*Calc.*	*LECO*	*ARD-013 (Seq. HCl/HNO3 leach)*		*Calc.*	*Calc.*	*ARD-005*	*Calc.*	*Calc.*

NOTES:
Job No: 19V497343
Date of Analysis: Aug. 5/6, 2019
pH of DI water used (pH Units): 5.77
EC of DI water used (µS/cm): 0.17

METHODS:
Total sulphur by Leco; TIC by HCl Leach/Leco Analysis.

ABBREVIATIONS:
R = Rep = Replicate (a replicate is a sub-sample scooped from a single pulp sample bag produced per client sample)
D = Dup = Duplicate (a duplicate is 2nd sub-pulp sample bag produced by processing a 2nd split of the client sample. A duplicate pulp sample is prepared only at client request.
EC = Electric Conductivity
NP = Neutralization Potential
Calc. = Calculation
IND = Indeterminate
COA = Certificate of Analysis
N/A = Not Applicable

CALCULATIONS:
*1 $CaCO_3$ Equivalents: Is based on TIC (Total Inorganic Carbon)
*2 Non-Extractable Sulphur: Total sulphur - (sulphate sulphur + sulphide sulphur)
*3 AP (Acid Potential): Sulphide-sulphur x 31.25
*4 NNP (Net Neutralization Potential): NP - AP
*5 NPR (Neutralization Potential Ratio): NP/AP

REFERENCES:
Sample Preparation: ASTM E877-08; MEND Report 1.20.1, Version 0 (2009)
ABA: Air-dried, jaw-crushed, split by riffling and pulverized to 85% passing 200 mesh (75 µm).
Modified ABA (Sobek) NP: MEND Acid Rock Drainage Prediction Manual, MEND Project 1.16.1b (pages 6.2-11 to 17), March 1991.
Paste pH / Fizz Rating: Sobek, A.A., Schuller, W.A., Freeman, J.R. and Smith, R.M.; US EPA-600/2-78-054 (1978).
Sulphur Speciation: Modified ASTM D2492-02 Method. The S extracted is determined by analysing the extract for SO4 using UV-Vis Spectrophotometer (STD Method 4500-SO42- E).

CERTIFICATE OF ANALYSIS • MEND-SHAKE FLASK EXTRACTION RESULTS

Global ARD Testing Services Inc.

GLOBAL PROJECT NO: 1934
CLIENT: CARO Analytical Services
PROJECT NAME / NO: NA / WO 9072065
REPORT VERSION: 1

Parameter	Method	Unit	MRL	1	2	3	4	5	5 R	6	Method blank
				Sample ID							
				9072065-01	9072065-02	9072065-03	9072065-07	9072065-08	9072065-08 (Rep)	9072065-09	
Weight of dry sample used	Weighing Scale	g	0.01	250	250	250	250	250	N/A	250	N/A
Volume of DI water used	Graduated Cylinder	mL	0.50	750	750	750	750	750	N/A	750	750
On filtered samples using 0.45 micron filter paper											
pH	pH Meter	pH units	0.01	7.6	7.6	7.6	7.3	7.4		7.8	5.6
EC	EC Meter	µS/cm	0.5	961	2320	1764	1296	1063		1125	1.09
Acidity (to pH 8.3)	Titration/Calc.	mg $CaCO_3$/L	0.5	6.5	14.0	8.0	8.5	9.0		6.0	6.0
Alkalinity (to pH 4.5)	Titration/Calc.	mg $CaCO_3$/L	0.5	61.0	68.0	66.0	51.5	60.5		101.0	1.0
Sulphate	Turbidimetry	mg/L	0.5	479.6	1629.7	984.3	690.7	525.8		302.2	<0.5
Dissolved Metals Analysis by ICP-MS:											
Hardness, Total (as CaCO3)	ICP-MS	mg/L	0.1	453	1320	999	677	527	519.0972	529	0.21
Aluminum, dissolved	ICP-MS	mg/L	0.001	0.0034	0.0058	0.0067	0.0113	0.0069	0.0067	0.013	0.001
Antimony, dissolved	ICP-MS	mg/L	0.00005	0.000702	0.00942	0.00709	0.0114	0.0128	0.0127	0.00177	<0.000050
Arsenic, dissolved	ICP-MS	mg/L	0.00005	0.0119	0.0615	0.0658	0.327	0.159	0.159	0.0437	<0.000050
Barium, dissolved	ICP-MS	mg/L	0.0001	0.0582	0.0997	0.139	0.111	0.0909	0.0908	0.056	0.00038
Beryllium, dissolved	ICP-MS	mg/L	0.00001	<0.000010	<0.000010	<0.000010	0.000011	<0.000010	<0.000010	<0.000010	<0.000010
Bismuth, dissolved	ICP-MS	mg/L	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Boron, dissolved	ICP-MS	mg/L	0.002	0.0105	0.0173	0.0189	0.0341	0.0426	0.0429	0.0175	<0.0020
Cadmium, dissolved	ICP-MS	mg/L	0.000002	0.0000062	0.0000138	0.0000108	0.0000088	0.0000061	0.0000056	0.0000113	<0.0000020
Calcium, dissolved	ICP-MS	mg/L	0.04	163	410.00	344.00	232.00	187.00	185.00	193	0.084
Chromium, dissolved	ICP-MS	mg/L	0.0001	<0.00010	0.00016	0.00015	0.00025	0.00019	0.00018	0.00013	<0.00010
Cobalt, dissolved	ICP-MS	mg/L	0.000005	0.00249	0.142	0.0955	0.014	0.007	0.00696	0.00296	<0.0000050
Copper, dissolved	ICP-MS	mg/L	0.0001	0.00265	0.00886	0.00563	0.00453	0.00319	0.00317	0.00489	0.00061
Iron, dissolved	ICP-MS	mg/L	0.002	0.013	0.0133	0.024	0.111	0.0275	0.0264	0.017	<0.0020
Lead, dissolved	ICP-MS	mg/L	0.00005	0.000085	0.000192	0.00016	0.000195	0.000125	0.000123	0.000128	<0.000050
Lithium, dissolved	ICP-MS	mg/L	0.00005	0.0137	0.0499	0.0289	0.0258	0.031	0.0308	0.0177	<0.000050
Magnesium, dissolved	ICP-MS	mg/L	0.01	11.1	72.400	33.600	23.800	14.400	14.200	11.5	<0.0050
Manganese, dissolved	ICP-MS	mg/L	0.00005	1.94	81.2	24.5	8.89	3.05	3.64	0.252	0.00023
Mercury, dissolved	ICP-MS	mg/L	0.00002	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Molybdenum, dissolved	ICP-MS	mg/L	0.00001	0.00184	0.0102	0.00438	0.00766	0.0111	0.011	0.00396	0.000015
Nickel, dissolved	ICP-MS	mg/L	0.00004	0.00614	0.66	0.142	0.0174	0.00855	0.00853	0.0134	<0.000040
Phosphorus, dissolved	ICP-MS	mg/L	0.01	0.056	0.109	0.154	0.086	0.043	0.045	0.121	<0.010
Potassium, dissolved	ICP-MS	mg/L	0.01	1.56	5.55	3.3	0.37	0.695	0.69	1.65	<0.010
Selenium, dissolved	ICP-MS	mg/L	0.0001	0.00152	0.00246	0.00173	0.00103	0.00104	0.00106	0.00248	<0.00010
Silicon, dissolved	ICP-MS	mg/L	0.10	4.08	19.4	10.3	10.5	8.04	7.94	1.94	<0.10
Silver, dissolved	ICP-MS	mg/L	0.00001	0.000038	<0.000010	<0.000010	0.000011	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, dissolved	ICP-MS	mg/L	0.02	1.68	6.5	3.8	2.47	1.53	1.51	2.47	<0.020
Strontium, dissolved	ICP-MS	mg/L	0.0001	0.222	1.22	0.608	0.442	0.334	0.333	0.325	<0.00010
Sulphur, dissolved	ICP-MS	mg/L	1.0	161	540	381	256	190	189	232	<1.00
Tellurium, dissolved	ICP-MS	mg/L	0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Thallium, dissolved	ICP-MS	mg/L	0.000004	0.0000172	0.0000083	0.0000061	<0.0000040	<0.0000040	<0.0000040	<0.0000040	<0.0000040
Thorium, dissolved	ICP-MS	mg/L	0.00001	<0.000010	<0.000010	<0.000010	0.000016	0.000011	0.000011	<0.000010	<0.000010
Tin, dissolved	ICP-MS	mg/L	0.00005	<0.000050	0.000073	<0.000050	<0.000050	0.000067	<0.000050	0.000285	<0.000050
Titanium, dissolved	ICP-MS	mg/L	0.0002	<0.00020	0.00033	0.00037	0.00087	0.00065	0.00063	0.00035	<0.00020
Tungsten, dissolved	ICP-MS	mg/L	0.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Uranium, dissolved	ICP-MS	mg/L	0.000001	0.000707	0.0118	0.00538	0.000306	0.000594	0.000593	0.0135	0.0000019
Vanadium, dissolved	ICP-MS	mg/L	0.0002	<0.00020	0.00026	0.00024	0.00171	0.00254	0.00253	<0.00020	<0.00020
Zinc, dissolved	ICP-MS	mg/L	0.001	0.0065	0.0606	0.0143	0.153	0.0535	0.053	0.0118	<0.0010
Zirconium, dissolved	ICP-MS	mg/L	0.00002	0.000076	0.00009	0.000112	0.000126	0.000093	0.0001	0.000096	<0.000020
Ion Balance											
Major Anions	Calc.	meq/L		11.21	35.31	21.83	15.42	12.16	12.16	8.32	
Major Cations	Calc.	meq/L		9.26	29.88	21.14	14.04	10.76	10.67	10.77	
Difference	Calc.	meq/L		1.95	5.43	0.69	1.38	1.40	1.50	-2.46	
Balance (%)	Calc.	%		9.5%	8.3%	1.6%	4.7%	6.1%	6.6%	-12.9%	
			SFE ID:	*9080225-01*	*9080225-02*	*9080225-03*	*9080225-04*	*9080225-05*	*9080225-05*	*9080225-06*	*9080225-07*

NOTES:
CARO Job No: 9080225
Reported Detection Limit (RDL) may be higher than the Method Reporting Limit (MRL) due to various factors such as dilutions, limited sample volume, high moisture, or interferences.
Date of Analysis (24 h): July 28/29, 2019
pH of DI water used (pH Units): 5.61
EC of DI water used (µS/cm): 0.65
Abbreviations:
R / Rep = Replicate (which involves the analysis of the same Shake Flask Extract aliquot).
D / Dup = Duplicate (which involves the analysis of a separate SF extract, produced by processing a secopnd split of the original client sample received).
MRL: Method Reporting Limit
EC = Electrical Conductivity
ORP = Oxidation Reduction Potential
N/A = Not Applicable.
NR = Not Reported.
mg/L = Milligrams per Litre
Method Reference: Prediction Manual for Drainage Chemistry from Sulphidic Geologic Material, MEND Report 1.20.1; Version 0 - Dec. 2009. Section 11.5; P 11 (8-9).
Extraction Method used: Using gyratory shaker for 24h (± 2h; gentle agitation).
Liquid: Solid ratio used: 3: 1; L: S; 750 mL DI H_2O: 250 g of crushed sample (85% passing 1/4 inch - i.e. 6.3 mm)
ICP-MS Method Reference Descriptions (APHA): Standard Methods for the Examination of Water and Wastewater, 22nd Edition, American Public Health Association/American Water Works Association/Water Environment Federation.

SFE - Sulphate:

Certified Reference Material:	Parameter: Sulphate	% Recovery	Matrix Spike % Recovery	Units	QC Limits (%)
STD Mineral Water (29.7 mg/L)	29.9	100.7%		%	80 - 120
Spiked Blank (19.61 mg/L)	20.40		104.0%	%	80 - 120

SFE - Dissolved Metals by ICP-MS:

Sample Code	Parameter	Prefix	Result	Result Units	Total or Filtered	Method Type	Method Name	Date Analyzed	EQL	EQL Units	UCL	LCL
9080225_B9H0425-BLK1	Aluminum dissolved	<	0.001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.001	mg/L		
9080225_B9H0425-BLK1	Antimony dissolved	<	0.00005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-BLK1	Arsenic dissolved	<	0.00005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-BLK1	Barium dissolved	<	0.0001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-BLK1	Beryllium dissolved	<	0.00001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-BLK1	Bismuth dissolved	<	0.00001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-BLK1	Boron dissolved	<	0.002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.002	mg/L		
9080225_B9H0425-BLK1	Cadmium dissolved	<	0.000002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.000002	mg/L		
9080225_B9H0425-BLK1	Calcium dissolved	<	0.04	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.04	mg/L		
9080225_B9H0425-BLK1	Chromium dissolved	<	0.0001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-BLK1	Cobalt dissolved	<	0.000005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.000005	mg/L		
9080225_B9H0425-BLK1	Copper dissolved	<	0.0001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-BLK1	Iron dissolved	<	0.002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.002	mg/L		
9080225_B9H0425-BLK1	Lead dissolved	<	0.00005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-BLK1	Lithium dissolved	<	0.00005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-BLK1	Magnesium dissolved	<	0.005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.005	mg/L		
9080225_B9H0425-BLK1	Manganese dissolved	<	0.00005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-BLK1	Mercury dissolved	<	0.00002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00002	mg/L		
9080225_B9H0425-BLK1	Molybdenum dissolved	<	0.00001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-BLK1	Nickel dissolved	<	0.00002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00002	mg/L		
9080225_B9H0425-BLK1	Phosphorus dissolved	<	0.01	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.01	mg/L		
9080225_B9H0425-BLK1	Potassium dissolved	<	0.01	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.01	mg/L		
9080225_B9H0425-BLK1	Selenium dissolved	<	0.0001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-BLK1	Silicon dissolved	<	0.1	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.1	mg/L		
9080225_B9H0425-BLK1	Silver dissolved	<	0.00001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-BLK1	Sodium dissolved	<	0.02	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.02	mg/L		
9080225_B9H0425-BLK1	Strontium dissolved	<	0.0001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-BLK1	Sulfur dissolved	<	1	mg/L	F	Metals	EPA 6020B	11-Aug-19	1	mg/L		
9080225_B9H0425-BLK1	Tellurium dissolved	<	0.00005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-BLK1	Thallium dissolved	<	0.000004	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.000004	mg/L		
9080225_B9H0425-BLK1	Thorium dissolved	<	0.00001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-BLK1	Tin dissolved	<	0.00005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-BLK1	Titanium dissolved	<	0.0002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0002	mg/L		
9080225_B9H0425-BLK1	Tungsten dissolved	<	0.2	ug/L	F	Metals	EPA 6020B	11-Aug-19	0.2	ug/L		
9080225_B9H0425-BLK1	Uranium dissolved	<	0.000001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.000001	mg/L		
9080225_B9H0425-BLK1	Vanadium dissolved	<	0.0002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0002	mg/L		
9080225_B9H0425-BLK1	Zinc dissolved	<	0.001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.001	mg/L		
9080225_B9H0425-BLK1	Zirconium dissolved	<	0.00002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00002	mg/L		
9080225_B9H0425-BLK2	Aluminum dissolved	<	0.001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.001	mg/L		
9080225_B9H0425-BLK2	Antimony dissolved	<	0.00005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-BLK2	Arsenic dissolved	<	0.00005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-BLK2	Barium dissolved	<	0.0001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-BLK2	Beryllium dissolved	<	0.00001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-BLK2	Bismuth dissolved	<	0.00001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-BLK2	Boron dissolved	<	0.002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.002	mg/L		
9080225_B9H0425-BLK2	Cadmium dissolved	<	0.000002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.000002	mg/L		
9080225_B9H0425-BLK2	Calcium dissolved	<	0.04	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.04	mg/L		
9080225_B9H0425-BLK2	Chromium dissolved	<	0.0001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-BLK2	Cobalt dissolved	<	0.000005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.000005	mg/L		
9080225_B9H0425-BLK2	Copper dissolved	<	0.0001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-BLK2	Iron dissolved	<	0.002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.002	mg/L		
9080225_B9H0425-BLK2	Lead dissolved	<	0.00005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-BLK2	Lithium dissolved	<	0.00005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-BLK2	Magnesium dissolved	<	0.005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.005	mg/L		
9080225_B9H0425-BLK2	Manganese dissolved	<	0.00005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-BLK2	Mercury dissolved	<	0.00002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00002	mg/L		
9080225_B9H0425-BLK2	Molybdenum dissolved	<	0.00001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-BLK2	Nickel dissolved	<	0.00002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00002	mg/L		
9080225_B9H0425-BLK2	Phosphorus dissolved	<	0.01	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.01	mg/L		
9080225_B9H0425-BLK2	Potassium dissolved	<	0.01	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.01	mg/L		
9080225_B9H0425-BLK2	Selenium dissolved	<	0.0001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-BLK2	Silicon dissolved	<	0.1	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.1	mg/L		
9080225_B9H0425-BLK2	Silver dissolved	<	0.00001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-BLK2	Sodium dissolved	<	0.02	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.02	mg/L		
9080225_B9H0425-BLK2	Strontium dissolved	<	0.0001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-BLK2	Sulfur dissolved	<	1	mg/L	F	Metals	EPA 6020B	11-Aug-19	1	mg/L		
9080225_B9H0425-BLK2	Tellurium dissolved	<	0.00005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		

Sample Code	Parameter	Prefix	Result	Result Units	Total or Filtered	Method Type	Method Name	Date Analyzed	EQL	EQL Units	UCL	LCL
9080225_B9H0425-BLK2	Thallium dissolved	<	0.000004	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.000004	mg/L		
9080225_B9H0425-BLK2	Thorium dissolved	<	0.00001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-BLK2	Tin dissolved	<	0.00005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-BLK2	Titanium dissolved	<	0.0002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0002	mg/L		
9080225_B9H0425-BLK2	Tungsten dissolved	<	0.2	ug/L	F	Metals	EPA 6020B	11-Aug-19	0.2	ug/L		
9080225_B9H0425-BLK2	Uranium dissolved	<	0.000001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.000001	mg/L		
9080225_B9H0425-BLK2	Vanadium dissolved	<	0.0002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0002	mg/L		
9080225_B9H0425-BLK2	Zinc dissolved	<	0.001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.001	mg/L		
9080225_B9H0425-BLK2	Zirconium dissolved	<	0.00002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00002	mg/L		
9080225_B9H0425-BS1	Aluminum dissolved		109	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Antimony dissolved		104	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Arsenic dissolved		102	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Barium dissolved		101	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Beryllium dissolved		104	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Bismuth dissolved		108	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Boron dissolved		110	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Cadmium dissolved		106	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Calcium dissolved		88	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Chromium dissolved		100	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Cobalt dissolved		101	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Copper dissolved		105	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Iron dissolved		95	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Lead dissolved		107	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Lithium dissolved		103	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Magnesium dissolved		102	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Manganese dissolved		102	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Mercury dissolved		89	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Molybdenum dissolved		101	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Nickel dissolved		104	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Phosphorus dissolved		100	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Potassium dissolved		98	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Selenium dissolved		107	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Silicon dissolved		107	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Silver dissolved		102	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Sodium dissolved		100	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Strontium dissolved		102	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Sulfur dissolved		88	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Tellurium dissolved		112	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Thallium dissolved		108	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Thorium dissolved		104	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Tin dissolved		106	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Titanium dissolved		99	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Tungsten dissolved		99	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Uranium dissolved		118	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Vanadium dissolved		98	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Zinc dissolved		111	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Zirconium dissolved		104	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-DUP1 = 9080225-05 = 9072065-08:												
9080225_B9H0425-DUP1	Aluminum dissolved		0.0067	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.001	mg/L		
9080225_B9H0425-DUP1	Antimony dissolved		0.0127	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-DUP1	Arsenic dissolved		0.159	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-DUP1	Barium dissolved		0.0908	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-DUP1	Beryllium dissolved	<	<0.000010	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-DUP1	Bismuth dissolved	<	<0.000010	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-DUP1	Boron dissolved		0.0429	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.002	mg/L		
9080225_B9H0425-DUP1	Cadmium dissolved		0.0000056	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.000002	mg/L		
9080225_B9H0425-DUP1	Calcium dissolved		185	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.04	mg/L		
9080225_B9H0425-DUP1	Chromium dissolved		0.00018	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-DUP1	Cobalt dissolved		0.00696	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.000005	mg/L		
9080225_B9H0425-DUP1	Copper dissolved		0.00317	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-DUP1	Iron dissolved		0.0264	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.002	mg/L		
9080225_B9H0425-DUP1	Lead dissolved		0.000123	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-DUP1	Lithium dissolved		0.0308	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-DUP1	Magnesium dissolved		14.2	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.005	mg/L		
9080225_B9H0425-DUP1	Manganese dissolved		3.64	mg/L	F	Metals	EPA 6020B	12-Aug-19	0.005	mg/L		
9080225_B9H0425-DUP1	Mercury dissolved	<	<0.000020	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00002	mg/L		
9080225_B9H0425-DUP1	Molybdenum dissolved		0.011	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-DUP1	Nickel dissolved		0.00853	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00002	mg/L		
9080225_B9H0425-DUP1	Phosphorus dissolved		0.045	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.01	mg/L		
9080225_B9H0425-DUP1	Potassium dissolved		0.69	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.01	mg/L		
9080225_B9H0425-DUP1	Selenium dissolved		0.00106	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-DUP1	Silicon dissolved		7.94	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.1	mg/L		
9080225_B9H0425-DUP1	Silver dissolved	<	<0.000010	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-DUP1	Sodium dissolved		1.51	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.02	mg/L		
9080225_B9H0425-DUP1	Strontium dissolved		0.333	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-DUP1	Sulfur dissolved		189	mg/L	F	Metals	EPA 6020B	11-Aug-19	1	mg/L		
9080225_B9H0425-DUP1	Tellurium dissolved	<	<0.000050	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-DUP1	Thallium dissolved	<	<0.0000040	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.000004	mg/L		
9080225_B9H0425-DUP1	Thorium dissolved		0.000011	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-DUP1	Tin dissolved	<	<0.000050	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-DUP1	Titanium dissolved		0.00063	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0002	mg/L		
9080225_B9H0425-DUP1	Tungsten dissolved	<	<0.20	ug/L	F	Metals	EPA 6020B	11-Aug-19	0.2	ug/L		

Sample Code	Parameter	Prefix	Result	Result Units	Total or Filtered	Method Type	Method Name	Date Analyzed	EQL	EQL Units	UCL	LCL
9080225_B9H0425-DUP1	Uranium dissolved		0.000593	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.000001	mg/L		
9080225_B9H0425-DUP1	Vanadium dissolved		0.00253	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0002	mg/L		
9080225_B9H0425-DUP1	Zinc dissolved		0.053	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.001	mg/L		
9080225_B9H0425-DUP1	Zirconium dissolved		0.0001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00002	mg/L		
9080225_B9H0425-SRM1	Aluminum dissolved		97	%	F	Metals	EPA 6020B	11-Aug-19	1	%	114	79
9080225_B9H0425-SRM1	Antimony dissolved		109	%	F	Metals	EPA 6020B	11-Aug-19	1	%	123	89
9080225_B9H0425-SRM1	Arsenic dissolved		105	%	F	Metals	EPA 6020B	11-Aug-19	1	%	113	87
9080225_B9H0425-SRM1	Barium dissolved		98	%	F	Metals	EPA 6020B	11-Aug-19	1	%	114	85
9080225_B9H0425-SRM1	Beryllium dissolved		106	%	F	Metals	EPA 6020B	11-Aug-19	1	%	122	79
9080225_B9H0425-SRM1	Boron dissolved		104	%	F	Metals	EPA 6020B	11-Aug-19	1	%	117	79
9080225_B9H0425-SRM1	Cadmium dissolved		105	%	F	Metals	EPA 6020B	11-Aug-19	1	%	112	89
9080225_B9H0425-SRM1	Calcium dissolved		92	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	85
9080225_B9H0425-SRM1	Chromium dissolved		102	%	F	Metals	EPA 6020B	11-Aug-19	1	%	113	87
9080225_B9H0425-SRM1	Cobalt dissolved		103	%	F	Metals	EPA 6020B	11-Aug-19	1	%	117	90
9080225_B9H0425-SRM1	Copper dissolved		107	%	F	Metals	EPA 6020B	11-Aug-19	1	%	115	90
9080225_B9H0425-SRM1	Iron dissolved		98	%	F	Metals	EPA 6020B	11-Aug-19	1	%	112	86
9080225_B9H0425-SRM1	Lead dissolved		107	%	F	Metals	EPA 6020B	11-Aug-19	1	%	113	90
9080225_B9H0425-SRM1	Lithium dissolved		105	%	F	Metals	EPA 6020B	11-Aug-19	1	%	127	77
9080225_B9H0425-SRM1	Magnesium dissolved		103	%	F	Metals	EPA 6020B	11-Aug-19	1	%	116	84
9080225_B9H0425-SRM1	Manganese dissolved		101	%	F	Metals	EPA 6020B	11-Aug-19	1	%	113	85
9080225_B9H0425-SRM1	Molybdenum dissolved		106	%	F	Metals	EPA 6020B	11-Aug-19	1	%	112	87
9080225_B9H0425-SRM1	Nickel dissolved		105	%	F	Metals	EPA 6020B	11-Aug-19	1	%	114	90
9080225_B9H0425-SRM1	Phosphorus dissolved		111	%	F	Metals	EPA 6020B	11-Aug-19	1	%	119	74
9080225_B9H0425-SRM1	Potassium dissolved		100	%	F	Metals	EPA 6020B	11-Aug-19	1	%	119	78
9080225_B9H0425-SRM1	Selenium dissolved		110	%	F	Metals	EPA 6020B	11-Aug-19	1	%	123	89
9080225_B9H0425-SRM1	Sodium dissolved		101	%	F	Metals	EPA 6020B	11-Aug-19	1	%	117	81
9080225_B9H0425-SRM1	Strontium dissolved		101	%	F	Metals	EPA 6020B	11-Aug-19	1	%	111	82
9080225_B9H0425-SRM1	Thallium dissolved		108	%	F	Metals	EPA 6020B	11-Aug-19	1	%	113	90
9080225_B9H0425-SRM1	Uranium dissolved		100	%	F	Metals	EPA 6020B	11-Aug-19	1	%	113	87
9080225_B9H0425-SRM1	Vanadium dissolved		99	%	F	Metals	EPA 6020B	11-Aug-19	1	%	110	85
9080225_B9H0425-SRM1	Zinc dissolved		106	%	F	Metals	EPA 6020B	11-Aug-19	1	%	114	88

NOTES:
CARO Job No: 9080225

Abbreviations & Descriptions:
Method Blank (Blk): A blank sample that undergoes sample processing identical to that carried out for the test samples.
Method Blank results are used to assess contamination from the laboratory environment and reagents.

•Duplicate (Dup): An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process.
Duplicates provide a measure of the analytical method's precision (reproducibility).

Blank Spike (BS): A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS).
Blank spikes provide a measure of the analytical method's accuracy.

Matrix Spike (MS): A second aliquot of sample is fortified with a known concentration of target analytes and carried through the entire analytical process.
Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.

Standard Reference Material (SRM): A homogenous material of similar matrix to the samples, certified for the parameter(s) listed.
Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples.
For all types of QC, specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

EQL = Estimated Quantitation Limits
PQL = Practical Quantitation Limits
UCL = Upper Control Limit
LCL = Lower Control Limit
BLK = Blank
BS = Blank Spike
MS = Matrix Spike
DUP = Duplicate
SRM = Standard Reference Materials

CARO BC COC, Rev 2017-0

CARC:

ANALYTICAL SERV IC ES

11111111 || **1-8846**

C V6V2K9

IC V1XSC3

Caring About Results, Obviously.

* 9 0 ? 2 0 6 5 *

,B TSS 1H7

CHAIN OF CUSTODY RECORD

COC# | NW 3116 | PAGE 7 OF 7

RELINQUISHED BY: TIME: DATE: RECEIVED BY: TIME: DATE:

tEPORTTO:

:OMPANY: Yuk on Government, Dept of ENV

1DDR ESS: Water Resources Branch (V-31O)

Box 2703, Whitehorse, YTY1A 2(6

:oNTACT: John Minder

H /FAX: 867-667-3102

iELIVERY METHOD: EMAIL fx MAI L 1 OTHER* 1

1ATA FORMAT: EXCEL fx WATERTRAX 1 ESd at r

EQuiS 1 BC EMS 1 OTHER* fx

MAIL 1: john.minder@gov. yk.ca

MAIL2: amelie.janin@gov .yk.ca

MAIL 3: dongnan .zhu@go v.yk.ca

INVOICE TO: SAME AS REPORT TO fx

COMPANY:

ADDRESS:

CONTACT: Jalelly Cal lie & John Minder

TEL/FAX:

D ELIVERY METHOD: EMAIL fx MAIL 1 OTHER* 1

EMAIL 1: john .ryder@go v.yk.ca

EMAIL 2: john .mind er@go v.yk.ca

EMAIL 3:

PO#:

TURNAROUND TIME REQUESTED:

Routine: (5-7 Days) 1

Rush: 1 Day* J 2 Day* J 3 Day* J

PROJECTNUMBER/ INFO:

Keno Mine Audit

REGULATORY APPLICATION: Sh owon Report

Canadian DrinkingWater Quality r BCWQG1 BCHWR

BCCSRSoil: WLr ALr PL1 RL-LDr RL-HDr CL1 IL LW r Dwr

Other:

A: Biohazard D: Asb estos G: Strong Odour

B: Cyanide E: Heavy Metals H: High Con taminat ion

C: PCBs F: Flammable I: Other (please spe cify*)

* **If you would like to sign up for ClientConnect and/or EnviroChain, CARO's online service offerings, please check here:** J

COMMENTS:

ANALYSES REQUESTED:

AMPLED BY:

MATRIX:

SAMPLING:

SAMPLE ID-	SAMPLE CLASS-	STATION CODE			DATE	TIME	media ID/notes)	
					YYYY-MM-DD	HH:MM		
2019T19-01	M	CL-1	/	3	2019-07-16	16:00		./ ./
2019T19-02	M	CL-2	/	3	2019-07-16	16:25		./ ./
2019T19-03	M	CL-3	/	3	2019-07-16	16:41		./ ./
2019T19-08	M	ONEK-Sl	/	1	2019-07-17	14:55		./ ./
2019T19-09	M	ONEK-S2	/	1	2019-07-17	14:40		./ ./

2019T19-10	M	ONEK-S3	/	1	2019-07-17	14:20	./ ./	
2019T20-03	M	CL-DPI	/	3	2019-07-17	14:10	./ ./	
2019T20-04	M	CL-DP2	/	3	2019-07-17	14:30	./ ./	
2019T20-05	M	CL-DP3	/	3	2019-07-17	15:05	./ ./	

HIPPING INSTRUCTIONS: Return Cooler(s) 1
upplies Needed:

SAMPLE RETENTION:
30 Days (default) r
60 Days r 90 Days r
Other (surcharges will apply):

OTHER INSTRUCTIONS:

If you would like to talk to a real live Scientist about your project req uirements, please check here: J

SAMPLE RECEIPT CONDITION:

COOLER 1 (°C):	ICE: Y}(	N r	Lj.:5
COOLER 2 (°C):	ICE: Y 1	N r	
COOLER 3 {°C):	ICE: v r	N 1	
CUSTODY SEALS INTACT: NA 1	vr	N r	

CERTIFICATE OF ANALYSIS

REPORTED TO	Yukon Government - Water Resources Suite 210, 419 Range Road Whitehorse, YT Y1A 3V1		
ATTENTION	John Minder	**WORK ORDER**	9072061
PO NUMBER		**RECEIVED / TEMP**	2019-07-19 13:30 / 8°C
PROJECT	Keno Mine Audit	**REPORTED**	2019-07-29 11:09
PROJECT INFO	YK Water Resources - C00043458		

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO 17025:2005 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks

You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

We've Got Chemistry

It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

Ahead of the Curve

Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

If you have any questions or concerns, please contact me at bshaw@caro.ca

Authorized By:

Bryan Shaw, Ph.D., P.Chem.
Client Service Coordinator

CERTIFICATE OF ANALYSIS

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072061
PROJECT	Keno Mine Audit	**REPORTED**	2019-07-29 11:09

Analyte	Result	RL	Units	Analyzed	Qualifier
2019T20-01 (9072061-01) I Matrix: Water I Sampled: 2019-07-16 15:50					
Anions					
Chloride	**0.33**	0.10	mg/L	2019-07-22	
Fluoride	**0.41**	0.10	mg/L	2019-07-22	
Nitrate+Nitrite (as N)	**0.0068**	0.0050	mg/L	2019-07-23	
Nitrite (as N)	< 0.0050	0.0050	mg/L	2019-07-19	
Sulfate	**773**	1.0	mg/L	2019-07-22	
Calculated Parameters					
Hardness, Total (as CaCO3)	**940**	0.500	mg/L	N/A	
Nitrate (as N)	< 0.0100	0.0100	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-07-23	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2019-07-23	
Arsenic, dissolved	**0.259**	0.00050	mg/L	2019-07-23	
Barium, dissolved	**0.0295**	0.0050	mg/L	2019-07-23	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-07-23	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-07-23	
Boron, dissolved	**0.0102**	0.0050	mg/L	2019-07-23	
Cadmium, dissolved	**0.000025**	0.000010	mg/L	2019-07-23	
Calcium, dissolved	**313**	0.20	mg/L	2019-07-23	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2019-07-23	
Cobalt, dissolved	**0.00138**	0.00010	mg/L	2019-07-23	
Copper, dissolved	< 0.00040	0.00040	mg/L	2019-07-23	
Iron, dissolved	**11.3**	0.010	mg/L	2019-07-23	
Lead, dissolved	< 0.00020	0.00020	mg/L	2019-07-23	
Lithium, dissolved	**0.0274**	0.00010	mg/L	2019-07-23	
Magnesium, dissolved	**38.6**	0.010	mg/L	2019-07-23	
Manganese, dissolved	**1.19**	0.00020	mg/L	2019-07-23	
Molybdenum, dissolved	**0.00058**	0.00010	mg/L	2019-07-23	
Nickel, dissolved	**0.00304**	0.00040	mg/L	2019-07-23	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-07-23	
Potassium, dissolved	**1.09**	0.10	mg/L	2019-07-23	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-07-23	
Silicon, dissolved	**4.4**	1.0	mg/L	2019-07-23	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-07-23	
Sodium, dissolved	**1.88**	0.10	mg/L	2019-07-23	
Strontium, dissolved	**0.377**	0.0010	mg/L	2019-07-23	
Sulfur, dissolved	**280**	3.0	mg/L	2019-07-23	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-07-23	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2019-07-23	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-07-23	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-07-23	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-07-23	

TEST RESULTS

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Analyte	Result	RL	Units	Analyzed	Qualifier
2019T20-01 (9072061-01) I Matrix: Water I Sampled: 2019-07-16 15:50, Continued					
Dissolved Metals, Continued					
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-07-23	
Uranium, dissolved	**0.00751**	0.000020	mg/L	2019-07-23	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-07-23	
Zinc, dissolved	**0.0379**	0.0040	mg/L	2019-07-23	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2019-07-23	
General Parameters					
Alkalinity, Total (as CaCO3)	**269**	1.0	mg/L	2019-07-23	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Alkalinity, Bicarbonate (as CaCO3)	**269**	1.0	mg/L	2019-07-23	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Conductivity (EC)	**1620**	2.0	µS/cm	2019-07-23	
pH	**7.60**	0.10	pH units	2019-07-23	HT2
Solids, Total Dissolved	**1420**	15	mg/L	2019-07-23	
Solids, Total Suspended	**58.0**	2.0	mg/L	2019-07-24	HT1
Total Metals					
Aluminum, total	**0.287**	0.0050	mg/L	2019-07-26	
Antimony, total	**0.00044**	0.00020	mg/L	2019-07-26	
Arsenic, total	**0.571**	0.00050	mg/L	2019-07-26	
Barium, total	**0.0376**	0.0050	mg/L	2019-07-26	
Beryllium, total	< 0.00010	0.00010	mg/L	2019-07-26	
Bismuth, total	< 0.00010	0.00010	mg/L	2019-07-26	
Boron, total	< 0.0050	0.0050	mg/L	2019-07-26	
Cadmium, total	**0.00421**	0.000010	mg/L	2019-07-26	
Calcium, total	**304**	0.20	mg/L	2019-07-26	
Chromium, total	**0.00067**	0.00050	mg/L	2019-07-26	
Cobalt, total	**0.00198**	0.00010	mg/L	2019-07-26	
Copper, total	**0.00560**	0.00040	mg/L	2019-07-26	
Iron, total	**17.4**	0.010	mg/L	2019-07-26	
Lead, total	**0.00886**	0.00020	mg/L	2019-07-26	
Lithium, total	**0.0263**	0.00010	mg/L	2019-07-26	
Magnesium, total	**39.8**	0.010	mg/L	2019-07-26	
Manganese, total	**1.24**	0.00020	mg/L	2019-07-26	
Molybdenum, total	**0.00064**	0.00010	mg/L	2019-07-26	
Nickel, total	**0.00575**	0.00040	mg/L	2019-07-26	
Phosphorus, total	**0.231**	0.050	mg/L	2019-07-26	
Potassium, total	**1.12**	0.10	mg/L	2019-07-26	
Selenium, total	< 0.00050	0.00050	mg/L	2019-07-26	
Silicon, total	**4.9**	1.0	mg/L	2019-07-26	
Silver, total	**0.000059**	0.000050	mg/L	2019-07-26	
Sodium, total	**1.94**	0.10	mg/L	2019-07-26	

TEST RESULTS

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Analyte	Result	RL	Units	Analyzed	Qualifier
2019T20-01 (9072061-01) I Matrix: Water I Sampled: 2019-07-16 15:50, Continued					
Total Metals, Continued					
Strontium, total	**0.367**	0.0010	mg/L	2019-07-26	
Sulfur, total	**262**	3.0	mg/L	2019-07-26	
Tellurium, total	< 0.00050	0.00050	mg/L	2019-07-26	
Thallium, total	**0.000074**	0.000020	mg/L	2019-07-26	
Thorium, total	**0.00012**	0.00010	mg/L	2019-07-26	
Tin, total	< 0.00020	0.00020	mg/L	2019-07-26	
Titanium, total	**0.0116**	0.0050	mg/L	2019-07-26	
Tungsten, total	< 0.0010	0.0010	mg/L	2019-07-26	
Uranium, total	**0.00815**	0.000020	mg/L	2019-07-26	
Vanadium, total	**0.0011**	0.0010	mg/L	2019-07-26	
Zinc, total	**0.238**	0.0040	mg/L	2019-07-26	
Zirconium, total	< 0.00010	0.00010	mg/L	2019-07-26	
2019T20-02 (9072061-02) I Matrix: Water I Sampled: 2019-07-16 16:00					
Anions					
Chloride	**1.27**	0.10	mg/L	2019-07-22	
Fluoride	**0.45**	0.10	mg/L	2019-07-22	
Nitrate+Nitrite (as N)	**0.0057**	0.0050	mg/L	2019-07-23	
Nitrite (as N)	< 0.0050	0.0050	mg/L	2019-07-19	
Sulfate	**591**	1.0	mg/L	2019-07-22	
Calculated Parameters					
Hardness, Total (as CaCO3)	**706**	0.500	mg/L	N/A	
Nitrate (as N)	< 0.0100	0.0100	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-07-23	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2019-07-23	
Arsenic, dissolved	**0.0571**	0.00050	mg/L	2019-07-23	
Barium, dissolved	**0.0109**	0.0050	mg/L	2019-07-23	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-07-23	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-07-23	
Boron, dissolved	**0.0078**	0.0050	mg/L	2019-07-23	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2019-07-23	
Calcium, dissolved	**242**	0.20	mg/L	2019-07-23	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2019-07-23	
Cobalt, dissolved	**0.00021**	0.00010	mg/L	2019-07-23	
Copper, dissolved	< 0.00040	0.00040	mg/L	2019-07-23	
Iron, dissolved	**4.81**	0.010	mg/L	2019-07-23	
Lead, dissolved	< 0.00020	0.00020	mg/L	2019-07-23	
Lithium, dissolved	**0.0252**	0.00010	mg/L	2019-07-23	
Magnesium, dissolved	**24.3**	0.010	mg/L	2019-07-23	

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Analyte	Result	RL	Units	Analyzed	Qualifier
2019T20-02 (9072061-02) I Matrix: Water I Sampled: 2019-07-16 16:00, Continued					
Dissolved Metals, Continued					
Manganese, dissolved	**1.02**	0.00020	mg/L	2019-07-23	
Molybdenum, dissolved	**0.00113**	0.00010	mg/L	2019-07-23	
Nickel, dissolved	< 0.00040	0.00040	mg/L	2019-07-23	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-07-23	
Potassium, dissolved	**0.54**	0.10	mg/L	2019-07-23	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-07-23	
Silicon, dissolved	**4.0**	1.0	mg/L	2019-07-23	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-07-23	
Sodium, dissolved	**1.69**	0.10	mg/L	2019-07-23	
Strontium, dissolved	**0.375**	0.0010	mg/L	2019-07-23	
Sulfur, dissolved	**202**	3.0	mg/L	2019-07-23	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-07-23	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2019-07-23	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-07-23	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-07-23	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-07-23	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-07-23	
Uranium, dissolved	**0.00489**	0.000020	mg/L	2019-07-23	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-07-23	
Zinc, dissolved	**0.0049**	0.0040	mg/L	2019-07-23	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2019-07-23	
General Parameters					
Alkalinity, Total (as CaCO3)	**202**	1.0	mg/L	2019-07-23	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Alkalinity, Bicarbonate (as CaCO3)	**202**	1.0	mg/L	2019-07-23	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2019-07-23	
Conductivity (EC)	**1300**	2.0	µS/cm	2019-07-23	
pH	**7.71**	0.10	pH units	2019-07-23	HT2
Solids, Total Dissolved	**1080**	15	mg/L	2019-07-23	
Solids, Total Suspended	**93.4**	2.0	mg/L	2019-07-24	HT1
Total Metals					
Aluminum, total	**0.633**	0.0050	mg/L	2019-07-26	
Antimony, total	**0.00021**	0.00020	mg/L	2019-07-26	
Arsenic, total	**0.318**	0.00050	mg/L	2019-07-26	
Barium, total	**0.0260**	0.0050	mg/L	2019-07-26	
Beryllium, total	< 0.00010	0.00010	mg/L	2019-07-26	
Bismuth, total	< 0.00010	0.00010	mg/L	2019-07-26	
Boron, total	< 0.0050	0.0050	mg/L	2019-07-26	
Cadmium, total	**0.000780**	0.000010	mg/L	2019-07-26	
Calcium, total	**247**	0.20	mg/L	2019-07-26	

TEST RESULTS

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Analyte	Result	RL	Units	Analyzed	Qualifier
2019T20-02 (9072061-02) I Matrix: Water I Sampled: 2019-07-16 16:00, Continued					
Total Metals, Continued					
Chromium, total	**0.00139**	0.00050	mg/L	2019-07-26	
Cobalt, total	**0.00182**	0.00010	mg/L	2019-07-26	
Copper, total	**0.00580**	0.00040	mg/L	2019-07-26	
Iron, total	**20.9**	0.010	mg/L	2019-07-26	
Lead, total	**0.00678**	0.00020	mg/L	2019-07-26	
Lithium, total	**0.0253**	0.00010	mg/L	2019-07-26	
Magnesium, total	**26.6**	0.010	mg/L	2019-07-26	
Manganese, total	**1.14**	0.00020	mg/L	2019-07-26	
Molybdenum, total	**0.00141**	0.00010	mg/L	2019-07-26	
Nickel, total	**0.00477**	0.00040	mg/L	2019-07-26	
Phosphorus, total	**0.333**	0.050	mg/L	2019-07-26	
Potassium, total	**0.66**	0.10	mg/L	2019-07-26	
Selenium, total	< 0.00050	0.00050	mg/L	2019-07-26	
Silicon, total	**5.3**	1.0	mg/L	2019-07-26	
Silver, total	**0.000067**	0.000050	mg/L	2019-07-26	
Sodium, total	**1.91**	0.10	mg/L	2019-07-26	
Strontium, total	**0.385**	0.0010	mg/L	2019-07-26	
Sulfur, total	**202**	3.0	mg/L	2019-07-26	
Tellurium, total	< 0.00050	0.00050	mg/L	2019-07-26	
Thallium, total	< 0.000020	0.000020	mg/L	2019-07-26	
Thorium, total	**0.00026**	0.00010	mg/L	2019-07-26	
Tin, total	**0.00034**	0.00020	mg/L	2019-07-26	
Titanium, total	**0.0230**	0.0050	mg/L	2019-07-26	
Tungsten, total	< 0.0010	0.0010	mg/L	2019-07-26	
Uranium, total	**0.00666**	0.000020	mg/L	2019-07-26	
Vanadium, total	**0.0020**	0.0010	mg/L	2019-07-26	
Zinc, total	**0.230**	0.0040	mg/L	2019-07-26	
Zirconium, total	< 0.00010	0.00010	mg/L	2019-07-26	
2019T20-03 (9072061-03) I Matrix: Water I Sampled: 2019-07-17 14:10					
Anions					
Chloride	**5.48**	0.10	mg/L	2019-07-22	
Fluoride	**0.31**	0.10	mg/L	2019-07-22	
Nitrate (as N)	**0.379**	0.010	mg/L	2019-07-22	HT1
Nitrite (as N)	< 0.010	0.010	mg/L	2019-07-22	HT1
Sulfate	**290**	1.0	mg/L	2019-07-22	
Calculated Parameters					
Hardness, Total (as CaCO3)	**501**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	**0.0100**	0.0050	mg/L	2019-07-23	

TEST RESULTS

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Analyte	Result	RL	Units	Analyzed	Qualifier
2019T20-03 (9072061-03) I Matrix: Water I Sampled: 2019-07-17 14:10, Continued					
Dissolved Metals, Continued					
Antimony, dissolved	**0.00121**	0.00020	mg/L	2019-07-23	
Arsenic, dissolved	**0.0110**	0.00050	mg/L	2019-07-23	
Barium, dissolved	**0.152**	0.0050	mg/L	2019-07-23	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-07-23	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-07-23	
Boron, dissolved	**0.0763**	0.0050	mg/L	2019-07-23	
Cadmium, dissolved	**0.000104**	0.000010	mg/L	2019-07-23	
Calcium, dissolved	**162**	0.20	mg/L	2019-07-23	
Chromium, dissolved	**0.00242**	0.00050	mg/L	2019-07-23	
Cobalt, dissolved	**0.00486**	0.00010	mg/L	2019-07-23	
Copper, dissolved	**0.00295**	0.00040	mg/L	2019-07-23	
Iron, dissolved	**0.870**	0.010	mg/L	2019-07-23	
Lead, dissolved	**0.00022**	0.00020	mg/L	2019-07-23	
Lithium, dissolved	**0.0121**	0.00010	mg/L	2019-07-23	
Magnesium, dissolved	**23.0**	0.010	mg/L	2019-07-23	
Manganese, dissolved	**1.99**	0.00020	mg/L	2019-07-23	
Molybdenum, dissolved	**0.00214**	0.00010	mg/L	2019-07-23	
Nickel, dissolved	**0.0215**	0.00040	mg/L	2019-07-23	
Phosphorus, dissolved	**0.111**	0.050	mg/L	2019-07-23	
Potassium, dissolved	**0.72**	0.10	mg/L	2019-07-23	
Selenium, dissolved	**0.00053**	0.00050	mg/L	2019-07-23	
Silicon, dissolved	**19.1**	1.0	mg/L	2019-07-23	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-07-23	
Sodium, dissolved	**1.78**	0.10	mg/L	2019-07-23	
Strontium, dissolved	**0.360**	0.0010	mg/L	2019-07-23	
Sulfur, dissolved	**93.1**	3.0	mg/L	2019-07-23	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-07-23	
Thallium, dissolved	**0.000044**	0.000020	mg/L	2019-07-23	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-07-23	
Tin, dissolved	**0.00026**	0.00020	mg/L	2019-07-23	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-07-23	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-07-23	
Uranium, dissolved	**0.00365**	0.000020	mg/L	2019-07-23	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-07-23	
Zinc, dissolved	**0.0465**	0.0040	mg/L	2019-07-23	
Zirconium, dissolved	**0.00017**	0.00010	mg/L	2019-07-23	
General Parameters					
Alkalinity, Total (as CaCO3)	**305**	1.0	mg/L	2019-07-26	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2019-07-26	
Alkalinity, Bicarbonate (as CaCO3)	**305**	1.0	mg/L	2019-07-26	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2019-07-26	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2019-07-26	

TEST RESULTS

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Analyte	Result	RL	Units	Analyzed	Qualifier
2019T20-03 (9072061-03) I Matrix: Water I Sampled: 2019-07-17 14:10, Continued					
General Parameters, Continued					
Conductivity (EC)	**934**	2.0	µS/cm	2019-07-26	
pH	**7.98**	0.10	pH units	2019-07-26	HT2
2019T20-04 (9072061-04) I Matrix: Water I Sampled: 2019-07-17 14:30					
Anions					
Chloride	**3.60**	0.10	mg/L	2019-07-22	
Fluoride	**0.43**	0.10	mg/L	2019-07-22	
Nitrate (as N)	< 0.100	0.010	mg/L	2019-07-22	HT1, RA1
Nitrite (as N)	< 0.010	0.010	mg/L	2019-07-22	HT1
Sulfate	**692**	1.0	mg/L	2019-07-22	
Calculated Parameters					
Hardness, Total (as CaCO3)	**877**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	**0.0054**	0.0050	mg/L	2019-07-23	
Antimony, dissolved	**0.00281**	0.00020	mg/L	2019-07-23	
Arsenic, dissolved	**0.00817**	0.00050	mg/L	2019-07-23	
Barium, dissolved	**0.108**	0.0050	mg/L	2019-07-23	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-07-23	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-07-23	
Boron, dissolved	**0.194**	0.0050	mg/L	2019-07-23	
Cadmium, dissolved	**0.000028**	0.000010	mg/L	2019-07-23	
Calcium, dissolved	**305**	0.20	mg/L	2019-07-23	
Chromium, dissolved	**0.00177**	0.00050	mg/L	2019-07-23	
Cobalt, dissolved	**0.00368**	0.00010	mg/L	2019-07-23	
Copper, dissolved	**0.00188**	0.00040	mg/L	2019-07-23	
Iron, dissolved	**1.37**	0.010	mg/L	2019-07-23	
Lead, dissolved	**0.00054**	0.00020	mg/L	2019-07-23	
Lithium, dissolved	**0.0344**	0.00010	mg/L	2019-07-23	
Magnesium, dissolved	**27.6**	0.010	mg/L	2019-07-23	
Manganese, dissolved	**2.70**	0.00020	mg/L	2019-07-23	
Molybdenum, dissolved	**0.0135**	0.00010	mg/L	2019-07-23	
Nickel, dissolved	**0.118**	0.00040	mg/L	2019-07-23	
Phosphorus, dissolved	**0.195**	0.050	mg/L	2019-07-23	
Potassium, dissolved	**0.94**	0.10	mg/L	2019-07-23	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-07-23	
Silicon, dissolved	**15.1**	1.0	mg/L	2019-07-23	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-07-23	
Sodium, dissolved	**4.78**	0.10	mg/L	2019-07-23	
Strontium, dissolved	**0.559**	0.0010	mg/L	2019-07-23	
Sulfur, dissolved	**237**	3.0	mg/L	2019-07-23	

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072061
PROJECT	Keno Mine Audit	**REPORTED**	2019-07-29 11:09

Analyte	Result	RL	Units	Analyzed	Qualifier
2019T20-04 (9072061-04) I Matrix: Water I Sampled: 2019-07-17 14:30, Continued					
Dissolved Metals, Continued					
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-07-23	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2019-07-23	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-07-23	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-07-23	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-07-23	
Tungsten, dissolved	**0.0019**	0.0010	mg/L	2019-07-23	
Uranium, dissolved	**0.00237**	0.000020	mg/L	2019-07-23	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-07-23	
Zinc, dissolved	**0.0572**	0.0040	mg/L	2019-07-23	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2019-07-23	
General Parameters					
Alkalinity, Total (as CaCO3)	**320**	1.0	mg/L	2019-07-26	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2019-07-26	
Alkalinity, Bicarbonate (as CaCO3)	**320**	1.0	mg/L	2019-07-26	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2019-07-26	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2019-07-26	
Conductivity (EC)	**1320**	2.0	µS/cm	2019-07-26	
pH	**7.78**	0.10	pH units	2019-07-26	HT2
2019T20-05 (9072061-05) I Matrix: Water I Sampled: 2019-07-17 15:05					
Anions					
Chloride	**1.26**	0.10	mg/L	2019-07-22	
Fluoride	**0.33**	0.10	mg/L	2019-07-22	
Nitrate (as N)	< 0.010	0.010	mg/L	2019-07-22	HT1
Nitrite (as N)	< 0.010	0.010	mg/L	2019-07-22	HT1
Sulfate	**536**	1.0	mg/L	2019-07-22	
Calculated Parameters					
Hardness, Total (as CaCO3)	**669**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2019-07-23	
Antimony, dissolved	**0.00120**	0.00020	mg/L	2019-07-23	
Arsenic, dissolved	**0.0302**	0.00050	mg/L	2019-07-23	
Barium, dissolved	**0.0526**	0.0050	mg/L	2019-07-23	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2019-07-23	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2019-07-23	
Boron, dissolved	**0.0331**	0.0050	mg/L	2019-07-23	
Cadmium, dissolved	**0.000028**	0.000010	mg/L	2019-07-23	
Calcium, dissolved	**229**	0.20	mg/L	2019-07-23	
Chromium, dissolved	**0.00271**	0.00050	mg/L	2019-07-23	

TEST RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072061
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Analyte	Result	RL	Units	Analyzed	Qualifier
2019T20-05 (9072061-05) I Matrix: Water I Sampled: 2019-07-17 15:05, Continued					
Dissolved Metals, Continued					
Cobalt, dissolved	**0.00394**	0.00010	mg/L	2019-07-23	
Copper, dissolved	**0.00063**	0.00040	mg/L	2019-07-23	
Iron, dissolved	**6.27**	0.010	mg/L	2019-07-23	
Lead, dissolved	< 0.00020	0.00020	mg/L	2019-07-23	
Lithium, dissolved	**0.0239**	0.00010	mg/L	2019-07-23	
Magnesium, dissolved	**23.2**	0.010	mg/L	2019-07-23	
Manganese, dissolved	**1.51**	0.00020	mg/L	2019-07-23	
Molybdenum, dissolved	**0.00998**	0.00010	mg/L	2019-07-23	
Nickel, dissolved	**0.0488**	0.00040	mg/L	2019-07-23	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2019-07-23	
Potassium, dissolved	**0.37**	0.10	mg/L	2019-07-23	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2019-07-23	
Silicon, dissolved	**7.6**	1.0	mg/L	2019-07-23	
Silver, dissolved	< 0.000050	0.000050	mg/L	2019-07-23	
Sodium, dissolved	**1.73**	0.10	mg/L	2019-07-23	
Strontium, dissolved	**0.377**	0.0010	mg/L	2019-07-23	
Sulfur, dissolved	**181**	3.0	mg/L	2019-07-23	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2019-07-23	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2019-07-23	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2019-07-23	
Tin, dissolved	< 0.00020	0.00020	mg/L	2019-07-23	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2019-07-23	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2019-07-23	
Uranium, dissolved	**0.000756**	0.000020	mg/L	2019-07-23	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2019-07-23	
Zinc, dissolved	**0.0227**	0.0040	mg/L	2019-07-23	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2019-07-23	
General Parameters					
Alkalinity, Total (as CaCO3)	**240**	1.0	mg/L	2019-07-26	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2019-07-26	
Alkalinity, Bicarbonate (as CaCO3)	**240**	1.0	mg/L	2019-07-26	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2019-07-26	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2019-07-26	
Conductivity (EC)	**1100**	2.0	µS/cm	2019-07-26	
pH	**7.76**	0.10	pH units	2019-07-26	HT2

Sample Qualifiers:

HT1	The sample was prepared and/or analyzed past the recommended holding time.
HT2	The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.
RA1	The Reporting Limit has been raised due to matrix interference.

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072061
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Analysis Description	Method Ref.	Technique	Location
Alkalinity in Water	SM 2320 B* (2017)	Titration with H2SO4	Kelowna
Anions in Water	SM 4110 B (2017)	Ion Chromatography	Kelowna
Conductivity in Water	SM 2510 B (2017)	Conductivity Meter	Kelowna
Dissolved Metals in Water	EPA 200.8 / EPA 6020B	0.45 µm Filtration / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	Richmond
Hardness in Water	SM 2340 B (2017)	Calculation: 2.497 [diss Ca] + 4.118 [diss Mg]	N/A
Nitrate+Nitrite in Water	SM 4500-NO3- F (2017)	Automated Colorimetry (Cadmium Reduction)	Kelowna
Nitrite in Water	SM 4500-NO2 B (2017)	Colorimetry	Richmond
pH in Water	SM 4500-H+ B (2017)	Electrometry	Kelowna
Solids, Total Dissolved in Water	SM 2540 C* (2017)	Gravimetry (Dried at 103-105C)	Kelowna
Solids, Total Suspended in Water	SM 2540 D* (2017)	Gravimetry (Dried at 103-105C)	Kelowna
Total Metals in Water	EPA 200.2* / EPA 6020B	HNO3+HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	Richmond

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Glossary of Terms:

RL	Reporting Limit (default)
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
mg/L	Milligrams per litre
pH units	pH < 7 = acidic, ph > 7 = basic
µS/cm	Microsiemens per centimetre
EPA	United States Environmental Protection Agency Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

General Comments:

The results in this report apply to the samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued unless otherwise agreed to in writing.

Results in **Bold** indicate values that are above CARO's method reporting limits. Any results that are above regulatory limits are highlighted **red**. Please note that results will only be highlighted red if the regulatory limits are included on the CARO report. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager:bshaw@caro.ca

APPENDIX 2: QUALITY CONTROL RESULTS

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The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk)**: A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup)**: An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS)**: A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS)**: A second aliquot of sample is fortified with with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM)**: A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Anions, Batch B9G1781										
Blank (B9G1781-BLK1)				Prepared: 2019-07-19, Analyzed: 2019-07-19						
Nitrite (as N)	< 0.0050	0.0050	mg/L							
LCS (B9G1781-BS1)				Prepared: 2019-07-19, Analyzed: 2019-07-19						
Nitrite (as N)	0.0526	0.0050	mg/L	0.0500		105	90-110			
Duplicate (B9G1781-DUP1)		**Source: 9072061-01**		Prepared: 2019-07-19, Analyzed: 2019-07-19						
Nitrite (as N)	< 0.0050	0.0050	mg/L		< 0.0050				10	
Anions, Batch B9G1873										
Blank (B9G1873-BLK1)				Prepared: 2019-07-22, Analyzed: 2019-07-22						
Chloride	< 0.10	0.10	mg/L							
Fluoride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Sulfate	< 1.0	1.0	mg/L							
LCS (B9G1873-BS1)				Prepared: 2019-07-22, Analyzed: 2019-07-22						
Chloride	16.0	0.10	mg/L	16.0		100	90-110			
Fluoride	4.03	0.10	mg/L	4.00		101	88-108			
Nitrate (as N)	4.02	0.010	mg/L	4.00		100	90-110			
Nitrite (as N)	2.00	0.010	mg/L	2.00		100	85-115			
Sulfate	16.0	1.0	mg/L	16.0		100	90-110			
Anions, Batch B9G1976										
Blank (B9G1976-BLK1)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Nitrate+Nitrite (as N)	< 0.0050	0.0050	mg/L							
Blank (B9G1976-BLK2)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Nitrate+Nitrite (as N)	< 0.0050	0.0050	mg/L							
LCS (B9G1976-BS1)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Nitrate+Nitrite (as N)	0.508	0.0050	mg/L	0.500		102	91-108			

APPENDIX 2: QUALITY CONTROL RESULTS

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Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Anions, Batch B9G1976, Continued										
LCS (B9G1976-BS2)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Nitrate+Nitrite (as N)	0.496	0.0050	mg/L	0.500		99	91-108			
Dissolved Metals, Batch B9G1866										
Blank (B9G1866-BLK1)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Aluminum, dissolved	< 0.0050	0.0050	mg/L							
Antimony, dissolved	< 0.00020	0.00020	mg/L							
Arsenic, dissolved	< 0.00050	0.00050	mg/L							
Barium, dissolved	< 0.0050	0.0050	mg/L							
Beryllium, dissolved	< 0.00010	0.00010	mg/L							
Bismuth, dissolved	< 0.00010	0.00010	mg/L							
Boron, dissolved	< 0.0050	0.0050	mg/L							
Cadmium, dissolved	< 0.000010	0.000010	mg/L							
Calcium, dissolved	< 0.20	0.20	mg/L							
Chromium, dissolved	< 0.00050	0.00050	mg/L							
Cobalt, dissolved	< 0.00010	0.00010	mg/L							
Copper, dissolved	< 0.00040	0.00040	mg/L							
Iron, dissolved	< 0.010	0.010	mg/L							
Lead, dissolved	< 0.00020	0.00020	mg/L							
Lithium, dissolved	< 0.00010	0.00010	mg/L							
Magnesium, dissolved	< 0.010	0.010	mg/L							
Manganese, dissolved	< 0.00020	0.00020	mg/L							
Molybdenum, dissolved	< 0.00010	0.00010	mg/L							
Nickel, dissolved	< 0.00040	0.00040	mg/L							
Phosphorus, dissolved	< 0.050	0.050	mg/L							
Potassium, dissolved	< 0.10	0.10	mg/L							
Selenium, dissolved	< 0.00050	0.00050	mg/L							
Silicon, dissolved	< 1.0	1.0	mg/L							
Silver, dissolved	< 0.000050	0.000050	mg/L							
Sodium, dissolved	< 0.10	0.10	mg/L							
Strontium, dissolved	< 0.0010	0.0010	mg/L							
Sulfur, dissolved	< 3.0	3.0	mg/L							
Tellurium, dissolved	< 0.00050	0.00050	mg/L							
Thallium, dissolved	< 0.000020	0.000020	mg/L							
Thorium, dissolved	< 0.00010	0.00010	mg/L							
Tin, dissolved	< 0.00020	0.00020	mg/L							
Titanium, dissolved	< 0.0050	0.0050	mg/L							
Tungsten, dissolved	< 0.0010	0.0010	mg/L							
Uranium, dissolved	< 0.000020	0.000020	mg/L							
Vanadium, dissolved	< 0.0010	0.0010	mg/L							
Zinc, dissolved	< 0.0040	0.0040	mg/L							
Zirconium, dissolved	< 0.00010	0.00010	mg/L							
Blank (B9G1866-BLK2)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Aluminum, dissolved	< 0.0050	0.0050	mg/L							
Antimony, dissolved	< 0.00020	0.00020	mg/L							
Arsenic, dissolved	< 0.00050	0.00050	mg/L							
Barium, dissolved	< 0.0050	0.0050	mg/L							
Beryllium, dissolved	< 0.00010	0.00010	mg/L							
Bismuth, dissolved	< 0.00010	0.00010	mg/L							
Boron, dissolved	< 0.0050	0.0050	mg/L							
Cadmium, dissolved	< 0.000010	0.000010	mg/L							
Calcium, dissolved	< 0.20	0.20	mg/L							
Chromium, dissolved	< 0.00050	0.00050	mg/L							
Cobalt, dissolved	< 0.00010	0.00010	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072061
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Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B9G1866, Continued										
Blank (B9G1866-BLK2), Continued				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Copper, dissolved	< 0.00040	0.00040	mg/L							
Iron, dissolved	< 0.010	0.010	mg/L							
Lead, dissolved	< 0.00020	0.00020	mg/L							
Lithium, dissolved	< 0.00010	0.00010	mg/L							
Magnesium, dissolved	< 0.010	0.010	mg/L							
Manganese, dissolved	< 0.00020	0.00020	mg/L							
Molybdenum, dissolved	< 0.00010	0.00010	mg/L							
Nickel, dissolved	< 0.00040	0.00040	mg/L							
Phosphorus, dissolved	< 0.050	0.050	mg/L							
Potassium, dissolved	< 0.10	0.10	mg/L							
Selenium, dissolved	< 0.00050	0.00050	mg/L							
Silicon, dissolved	< 1.0	1.0	mg/L							
Silver, dissolved	< 0.000050	0.000050	mg/L							
Sodium, dissolved	< 0.10	0.10	mg/L							
Strontium, dissolved	< 0.0010	0.0010	mg/L							
Sulfur, dissolved	< 3.0	3.0	mg/L							
Tellurium, dissolved	< 0.00050	0.00050	mg/L							
Thallium, dissolved	< 0.000020	0.000020	mg/L							
Thorium, dissolved	< 0.00010	0.00010	mg/L							
Tin, dissolved	< 0.00020	0.00020	mg/L							
Titanium, dissolved	< 0.0050	0.0050	mg/L							
Tungsten, dissolved	< 0.0010	0.0010	mg/L							
Uranium, dissolved	< 0.000020	0.000020	mg/L							
Vanadium, dissolved	< 0.0010	0.0010	mg/L							
Zinc, dissolved	< 0.0040	0.0040	mg/L							
Zirconium, dissolved	< 0.00010	0.00010	mg/L							
LCS (B9G1866-BS1)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Aluminum, dissolved	0.0237	0.0050	mg/L	0.0200		119	80-120			
Antimony, dissolved	0.0166	0.00020	mg/L	0.0200		83	80-120			
Arsenic, dissolved	0.0194	0.00050	mg/L	0.0200		97	80-120			
Barium, dissolved	0.0191	0.0050	mg/L	0.0200		96	80-120			
Beryllium, dissolved	0.0226	0.00010	mg/L	0.0200		113	80-120			
Bismuth, dissolved	0.0198	0.00010	mg/L	0.0200		99	80-120			
Boron, dissolved	0.0218	0.0050	mg/L	0.0200		109	80-120			
Cadmium, dissolved	0.0216	0.000010	mg/L	0.0200		108	80-120			
Calcium, dissolved	1.86	0.20	mg/L	2.02		92	80-120			
Chromium, dissolved	0.0197	0.00050	mg/L	0.0200		99	80-120			
Cobalt, dissolved	0.0197	0.00010	mg/L	0.0200		99	80-120			
Copper, dissolved	0.0207	0.00040	mg/L	0.0200		104	80-120			
Iron, dissolved	1.82	0.010	mg/L	2.02		90	80-120			
Lead, dissolved	0.0208	0.00020	mg/L	0.0200		104	80-120			
Lithium, dissolved	0.0204	0.00010	mg/L	0.0199		103	80-120			
Magnesium, dissolved	1.89	0.010	mg/L	2.02		94	80-120			
Manganese, dissolved	0.0194	0.00020	mg/L	0.0200		97	80-120			
Molybdenum, dissolved	0.0192	0.00010	mg/L	0.0200		96	80-120			
Nickel, dissolved	0.0201	0.00040	mg/L	0.0200		101	80-120			
Phosphorus, dissolved	2.02	0.050	mg/L	2.00		101	80-120			
Potassium, dissolved	1.81	0.10	mg/L	2.02		89	80-120			
Selenium, dissolved	0.0216	0.00050	mg/L	0.0200		108	80-120			
Silicon, dissolved	1.8	1.0	mg/L	2.00		92	80-120			
Silver, dissolved	0.0210	0.000050	mg/L	0.0200		105	80-120			
Sodium, dissolved	1.85	0.10	mg/L	2.02		92	80-120			
Strontium, dissolved	0.0209	0.0010	mg/L	0.0200		105	80-120			
Sulfur, dissolved	4.5	3.0	mg/L	5.00		90	80-120			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO Yukon Government - Water Resources
PROJECT Keno Mine Audit

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Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B9G1866, Continued										
LCS (B9G1866-BS1), Continued				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Thallium, dissolved	0.0212	0.000020	mg/L	0.0200		106	80-120			
Thorium, dissolved	0.0197	0.00010	mg/L	0.0200		98	80-120			
Tin, dissolved	0.0199	0.00020	mg/L	0.0200		99	80-120			
Titanium, dissolved	0.0196	0.0050	mg/L	0.0200		98	80-120			
Tungsten, dissolved	0.0193	0.0010	mg/L	0.0200		97	80-120			
Uranium, dissolved	0.0220	0.000020	mg/L	0.0200		110	80-120			
Vanadium, dissolved	0.0201	0.0010	mg/L	0.0200		101	80-120			
Zinc, dissolved	0.0223	0.0040	mg/L	0.0200		111	80-120			
Zirconium, dissolved	0.0218	0.00010	mg/L	0.0200		109	80-120			
Duplicate (B9G1866-DUP1)				**Source: 9072061-01**	Prepared: 2019-07-23, Analyzed: 2019-07-23					
Aluminum, dissolved	< 0.0050	0.0050	mg/L		< 0.0050					11
Antimony, dissolved	< 0.00020	0.00020	mg/L		< 0.00020					20
Arsenic, dissolved	0.257	0.00050	mg/L		0.259			< 1		8
Barium, dissolved	0.0291	0.0050	mg/L		0.0295			1		7
Beryllium, dissolved	< 0.00010	0.00010	mg/L		< 0.00010					14
Bismuth, dissolved	< 0.00010	0.00010	mg/L		< 0.00010					20
Boron, dissolved	0.0115	0.0050	mg/L		0.0102					13
Cadmium, dissolved	0.000024	0.000010	mg/L		0.000025					20
Calcium, dissolved	311	0.20	mg/L		313			< 1		8
Chromium, dissolved	< 0.00050	0.00050	mg/L		< 0.00050					14
Cobalt, dissolved	0.00141	0.00010	mg/L		0.00138			2		10
Copper, dissolved	< 0.00040	0.00040	mg/L		< 0.00040					20
Iron, dissolved	11.4	0.010	mg/L		11.3			< 1		14
Lead, dissolved	< 0.00020	0.00020	mg/L		< 0.00020					20
Lithium, dissolved	0.0274	0.00010	mg/L		0.0274			< 1		14
Magnesium, dissolved	38.2	0.010	mg/L		38.6			1		6
Manganese, dissolved	1.18	0.00020	mg/L		1.19			< 1		9
Molybdenum, dissolved	0.00056	0.00010	mg/L		0.00058			3		19
Nickel, dissolved	0.00311	0.00040	mg/L		0.00304			2		20
Phosphorus, dissolved	0.056	0.050	mg/L		< 0.050					14
Potassium, dissolved	1.08	0.10	mg/L		1.09			< 1		8
Selenium, dissolved	< 0.00050	0.00050	mg/L		< 0.00050					20
Silicon, dissolved	4.3	1.0	mg/L		4.4					12
Silver, dissolved	< 0.000050	0.000050	mg/L		< 0.000050					20
Sodium, dissolved	1.76	0.10	mg/L		1.88			6		6
Strontium, dissolved	0.378	0.0010	mg/L		0.377			< 1		6
Sulfur, dissolved	278	3.0	mg/L		280			< 1		20
Tellurium, dissolved	< 0.00050	0.00050	mg/L		< 0.00050					20
Thallium, dissolved	< 0.000020	0.000020	mg/L		< 0.000020					13
Thorium, dissolved	< 0.00010	0.00010	mg/L		< 0.00010					20
Tin, dissolved	< 0.00020	0.00020	mg/L		< 0.00020					20
Titanium, dissolved	< 0.0050	0.0050	mg/L		< 0.0050					20
Tungsten, dissolved	< 0.0010	0.0010	mg/L		< 0.0010					20
Uranium, dissolved	0.00749	0.000020	mg/L		0.00751			< 1		14
Vanadium, dissolved	< 0.0010	0.0010	mg/L		< 0.0010					20
Zinc, dissolved	0.0384	0.0040	mg/L		0.0379			2		11
Zirconium, dissolved	< 0.00010	0.00010	mg/L		< 0.00010					20
Reference (B9G1866-SRM1)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Aluminum, dissolved	0.215	0.0050	mg/L	0.235		91	79-114			
Antimony, dissolved	0.0480	0.00020	mg/L	0.0431		111	89-123			
Arsenic, dissolved	0.442	0.00050	mg/L	0.423		104	87-113			
Barium, dissolved	3.07	0.0050	mg/L	3.30		93	85-114			
Beryllium, dissolved	0.246	0.00010	mg/L	0.209		118	79-122			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072061
PROJECT	Keno Mine Audit	**REPORTED**	2019-07-29 11:09

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B9G1866, Continued										
Reference (B9G1866-SRM1), Continued				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Cadmium, dissolved	0.246	0.000010	mg/L	0.221		111	89-112			
Calcium, dissolved	6.99	0.20	mg/L	7.72		91	85-120			
Chromium, dissolved	0.435	0.00050	mg/L	0.434		100	87-113			
Cobalt, dissolved	0.126	0.00010	mg/L	0.124		101	90-117			
Copper, dissolved	0.850	0.00040	mg/L	0.815		104	90-115			
Iron, dissolved	1.21	0.010	mg/L	1.27		95	86-112			
Lead, dissolved	0.113	0.00020	mg/L	0.110		103	90-113			
Lithium, dissolved	0.108	0.00010	mg/L	0.100		108	77-127			
Magnesium, dissolved	6.31	0.010	mg/L	6.59		96	84-116			
Manganese, dissolved	0.328	0.00020	mg/L	0.342		96	85-113			
Molybdenum, dissolved	0.415	0.00010	mg/L	0.404		103	87-112			
Nickel, dissolved	0.842	0.00040	mg/L	0.835		101	90-114			
Phosphorus, dissolved	0.555	0.050	mg/L	0.499		111	74-119			
Potassium, dissolved	2.73	0.10	mg/L	2.88		95	78-119			
Selenium, dissolved	0.0385	0.00050	mg/L	0.0324		119	89-123			
Sodium, dissolved	16.7	0.10	mg/L	18.0		93	81-117			
Strontium, dissolved	0.919	0.0010	mg/L	0.935		98	82-111			
Thallium, dissolved	0.0406	0.000020	mg/L	0.0385		105	90-113			
Uranium, dissolved	0.252	0.000020	mg/L	0.258		98	87-113			
Vanadium, dissolved	0.842	0.0010	mg/L	0.873		96	85-110			
Zinc, dissolved	0.921	0.0040	mg/L	0.848		109	88-114			
General Parameters, Batch B9G1955										
Blank (B9G1955-BLK1)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Conductivity (EC)	< 2.0	2.0	µS/cm							
Blank (B9G1955-BLK2)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Conductivity (EC)	< 2.0	2.0	µS/cm							
Blank (B9G1955-BLK3)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Conductivity (EC)	< 2.0	2.0	µS/cm							
LCS (B9G1955-BS1)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Alkalinity, Total (as CaCO3)	93.6	1.0	mg/L	100		94	80-120			
LCS (B9G1955-BS2)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Alkalinity, Total (as CaCO3)	102	1.0	mg/L	100		102	80-120			
LCS (B9G1955-BS3)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Alkalinity, Total (as CaCO3)	96.1	1.0	mg/L	100		96	80-120			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072061
PROJECT	Keno Mine Audit	**REPORTED**	2019-07-29 11:09

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B9G1955, Continued										
LCS (B9G1955-BS4)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Conductivity (EC)	1400	2.0	µS/cm	1410		99	95-104			
LCS (B9G1955-BS5)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Conductivity (EC)	1380	2.0	µS/cm	1410		98	95-104			
LCS (B9G1955-BS6)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Conductivity (EC)	1380	2.0	µS/cm	1410		98	95-104			
Reference (B9G1955-SRM1)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
pH	7.00	0.10	pH units	7.01		100	98-102			
Reference (B9G1955-SRM2)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
pH	6.98	0.10	pH units	7.01		100	98-102			
Reference (B9G1955-SRM3)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
pH	6.99	0.10	pH units	7.01		100	98-102			
General Parameters, Batch B9G1963										
Blank (B9G1963-BLK1)				Prepared: 2019-07-26, Analyzed: 2019-07-26						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Conductivity (EC)	< 2.0	2.0	µS/cm							
LCS (B9G1963-BS1)				Prepared: 2019-07-26, Analyzed: 2019-07-26						
Alkalinity, Total (as CaCO3)	98.0	1.0	mg/L	100		98	80-120			
LCS (B9G1963-BS2)				Prepared: 2019-07-26, Analyzed: 2019-07-26						
Conductivity (EC)	1400	2.0	µS/cm	1410		99	95-104			
Reference (B9G1963-SRM1)				Prepared: 2019-07-24, Analyzed: 2019-07-24						
pH	7.01	0.10	pH units	7.01		100	98-102			
General Parameters, Batch B9G1964										
Blank (B9G1964-BLK1)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Solids, Total Dissolved	< 15	15	mg/L							
LCS (B9G1964-BS1)				Prepared: 2019-07-23, Analyzed: 2019-07-23						
Solids, Total Dissolved	241	15	mg/L	240		100	85-115			
General Parameters, Batch B9G1973										
Blank (B9G1973-BLK1)				Prepared: 2019-07-24, Analyzed: 2019-07-24						
Solids, Total Suspended	< 2.0	2.0	mg/L							
Blank (B9G1973-BLK2)				Prepared: 2019-07-24, Analyzed: 2019-07-24						
Solids, Total Suspended	< 2.0	2.0	mg/L							
LCS (B9G1973-BS1)				Prepared: 2019-07-24, Analyzed: 2019-07-24						
Solids, Total Suspended	95.0	10.0	mg/L	100		95	85-115			

APPENDIX 2: QUALITY CONTROL RESULTS

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Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B9G1973, Continued										
LCS (B9G1973-BS2)				Prepared: 2019-07-24, Analyzed: 2019-07-24						
Solids, Total Suspended	93.0	10.0	mg/L	100		93	85-115			
Total Metals, Batch B9G2121										
Blank (B9G2121-BLK1)				Prepared: 2019-07-24, Analyzed: 2019-07-26						
Aluminum, total	< 0.0050	0.0050	mg/L							
Antimony, total	< 0.00020	0.00020	mg/L							
Arsenic, total	< 0.00050	0.00050	mg/L							
Barium, total	< 0.0050	0.0050	mg/L							
Beryllium, total	< 0.00010	0.00010	mg/L							
Bismuth, total	< 0.00010	0.00010	mg/L							
Boron, total	< 0.0050	0.0050	mg/L							
Cadmium, total	< 0.000010	0.000010	mg/L							
Calcium, total	< 0.20	0.20	mg/L							
Chromium, total	< 0.00050	0.00050	mg/L							
Cobalt, total	< 0.00010	0.00010	mg/L							
Copper, total	< 0.00040	0.00040	mg/L							
Iron, total	< 0.010	0.010	mg/L							
Lead, total	< 0.00020	0.00020	mg/L							
Lithium, total	< 0.00010	0.00010	mg/L							
Magnesium, total	< 0.010	0.010	mg/L							
Manganese, total	< 0.00020	0.00020	mg/L							
Molybdenum, total	< 0.00010	0.00010	mg/L							
Nickel, total	< 0.00040	0.00040	mg/L							
Phosphorus, total	< 0.050	0.050	mg/L							
Potassium, total	< 0.10	0.10	mg/L							
Selenium, total	< 0.00050	0.00050	mg/L							
Silicon, total	< 1.0	1.0	mg/L							
Silver, total	< 0.000050	0.000050	mg/L							
Sodium, total	< 0.10	0.10	mg/L							
Strontium, total	< 0.0010	0.0010	mg/L							
Sulfur, total	< 3.0	3.0	mg/L							
Tellurium, total	< 0.00050	0.00050	mg/L							
Thallium, total	< 0.000020	0.000020	mg/L							
Thorium, total	< 0.00010	0.00010	mg/L							
Tin, total	< 0.00020	0.00020	mg/L							
Titanium, total	< 0.0050	0.0050	mg/L							
Tungsten, total	< 0.0010	0.0010	mg/L							
Uranium, total	< 0.000020	0.000020	mg/L							
Vanadium, total	< 0.0010	0.0010	mg/L							
Zinc, total	< 0.0040	0.0040	mg/L							
Zirconium, total	< 0.00010	0.00010	mg/L							
Blank (B9G2121-BLK2)				Prepared: 2019-07-24, Analyzed: 2019-07-26						
Aluminum, total	< 0.0050	0.0050	mg/L							
Antimony, total	< 0.00020	0.00020	mg/L							
Arsenic, total	< 0.00050	0.00050	mg/L							
Barium, total	< 0.0050	0.0050	mg/L							
Beryllium, total	< 0.00010	0.00010	mg/L							
Bismuth, total	< 0.00010	0.00010	mg/L							
Boron, total	< 0.0050	0.0050	mg/L							
Cadmium, total	< 0.000010	0.000010	mg/L							
Calcium, total	< 0.20	0.20	mg/L							
Chromium, total	< 0.00050	0.00050	mg/L							
Cobalt, total	< 0.00010	0.00010	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072061
PROJECT	Keno Mine Audit	**REPORTED**	2019-07-29 11:09

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B9G2121, Continued										
Blank (B9G2121-BLK2), Continued				Prepared: 2019-07-24, Analyzed: 2019-07-26						
Copper, total	< 0.00040	0.00040	mg/L							
Iron, total	< 0.010	0.010	mg/L							
Lead, total	< 0.00020	0.00020	mg/L							
Lithium, total	< 0.00010	0.00010	mg/L							
Magnesium, total	< 0.010	0.010	mg/L							
Manganese, total	< 0.00020	0.00020	mg/L							
Molybdenum, total	< 0.00010	0.00010	mg/L							
Nickel, total	< 0.00040	0.00040	mg/L							
Phosphorus, total	< 0.050	0.050	mg/L							
Potassium, total	< 0.10	0.10	mg/L							
Selenium, total	< 0.00050	0.00050	mg/L							
Silicon, total	< 1.0	1.0	mg/L							
Silver, total	< 0.000050	0.000050	mg/L							
Sodium, total	< 0.10	0.10	mg/L							
Strontium, total	< 0.0010	0.0010	mg/L							
Sulfur, total	< 3.0	3.0	mg/L							
Tellurium, total	< 0.00050	0.00050	mg/L							
Thallium, total	< 0.000020	0.000020	mg/L							
Thorium, total	< 0.00010	0.00010	mg/L							
Tin, total	< 0.00020	0.00020	mg/L							
Titanium, total	< 0.0050	0.0050	mg/L							
Tungsten, total	< 0.0010	0.0010	mg/L							
Uranium, total	< 0.000020	0.000020	mg/L							
Vanadium, total	< 0.0010	0.0010	mg/L							
Zinc, total	< 0.0040	0.0040	mg/L							
Zirconium, total	< 0.00010	0.00010	mg/L							
Blank (B9G2121-BLK3)				Prepared: 2019-07-24, Analyzed: 2019-07-26						
Aluminum, total	< 0.0050	0.0050	mg/L							
Antimony, total	< 0.00020	0.00020	mg/L							
Arsenic, total	< 0.00050	0.00050	mg/L							
Barium, total	< 0.0050	0.0050	mg/L							
Beryllium, total	< 0.00010	0.00010	mg/L							
Bismuth, total	< 0.00010	0.00010	mg/L							
Boron, total	< 0.0050	0.0050	mg/L							
Cadmium, total	< 0.000010	0.000010	mg/L							
Calcium, total	< 0.20	0.20	mg/L							
Chromium, total	< 0.00050	0.00050	mg/L							
Cobalt, total	< 0.00010	0.00010	mg/L							
Copper, total	< 0.00040	0.00040	mg/L							
Iron, total	< 0.010	0.010	mg/L							
Lead, total	< 0.00020	0.00020	mg/L							
Lithium, total	< 0.00010	0.00010	mg/L							
Magnesium, total	< 0.010	0.010	mg/L							
Manganese, total	< 0.00020	0.00020	mg/L							
Molybdenum, total	< 0.00010	0.00010	mg/L							
Nickel, total	< 0.00040	0.00040	mg/L							
Phosphorus, total	< 0.050	0.050	mg/L							
Potassium, total	< 0.10	0.10	mg/L							
Selenium, total	< 0.00050	0.00050	mg/L							
Silicon, total	< 1.0	1.0	mg/L							
Silver, total	< 0.000050	0.000050	mg/L							
Sodium, total	< 0.10	0.10	mg/L							
Strontium, total	< 0.0010	0.0010	mg/L							
Sulfur, total	< 3.0	3.0	mg/L							

Tellurium, total	< 0.00050	0.00050	mg/L

APPENDIX 2: QUALITY CONTROL RESULTS

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APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072061
PROJECT	Keno Mine Audit	**REPORTED**	2019-07-29 11:09

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B9G2121, Continued										
Blank (B9G2121-BLK3), Continued				Prepared: 2019-07-24, Analyzed: 2019-07-26						
Thallium, total	< 0.000020	0.000020	mg/L							
Thorium, total	< 0.00010	0.00010	mg/L							
Tin, total	< 0.00020	0.00020	mg/L							
Titanium, total	< 0.0050	0.0050	mg/L							
Tungsten, total	< 0.0010	0.0010	mg/L							
Uranium, total	< 0.000020	0.000020	mg/L							
Vanadium, total	< 0.0010	0.0010	mg/L							
Zinc, total	< 0.0040	0.0040	mg/L							
Zirconium, total	< 0.00010	0.00010	mg/L							
LCS (B9G2121-BS1)				Prepared: 2019-07-24, Analyzed: 2019-07-26						
Aluminum, total	0.0212	0.0050	mg/L	0.0200		106	80-120			
Antimony, total	0.0221	0.00020	mg/L	0.0200		111	80-120			
Arsenic, total	0.0209	0.00050	mg/L	0.0200		104	80-120			
Barium, total	0.0205	0.0050	mg/L	0.0200		103	80-120			
Beryllium, total	0.0199	0.00010	mg/L	0.0200		99	80-120			
Bismuth, total	0.0214	0.00010	mg/L	0.0200		107	80-120			
Boron, total	0.0184	0.0050	mg/L	0.0200		92	80-120			
Cadmium, total	0.0208	0.000010	mg/L	0.0200		104	80-120			
Calcium, total	1.85	0.20	mg/L	2.02		92	80-120			
Chromium, total	0.0212	0.00050	mg/L	0.0200		106	80-120			
Cobalt, total	0.0215	0.00010	mg/L	0.0200		108	80-120			
Copper, total	0.0224	0.00040	mg/L	0.0200		112	80-120			
Iron, total	1.92	0.010	mg/L	2.02		95	80-120			
Lead, total	0.0212	0.00020	mg/L	0.0200		106	80-120			
Lithium, total	0.0197	0.00010	mg/L	0.0199		99	80-120			
Magnesium, total	2.03	0.010	mg/L	2.02		101	80-120			
Manganese, total	0.0213	0.00020	mg/L	0.0200		107	80-120			
Molybdenum, total	0.0200	0.00010	mg/L	0.0200		100	80-120			
Nickel, total	0.0220	0.00040	mg/L	0.0200		110	80-120			
Phosphorus, total	2.06	0.050	mg/L	2.00		103	80-120			
Potassium, total	1.95	0.10	mg/L	2.02		97	80-120			
Selenium, total	0.0218	0.00050	mg/L	0.0200		109	80-120			
Silicon, total	2.1	1.0	mg/L	2.00		104	80-120			
Silver, total	0.0212	0.000050	mg/L	0.0200		106	80-120			
Sodium, total	2.12	0.10	mg/L	2.02		105	80-120			
Strontium, total	0.0216	0.0010	mg/L	0.0200		108	80-120			
Sulfur, total	5.1	3.0	mg/L	5.00		102	80-120			
Tellurium, total	0.0208	0.00050	mg/L	0.0200		104	80-120			
Thallium, total	0.0218	0.000020	mg/L	0.0200		109	80-120			
Thorium, total	0.0201	0.00010	mg/L	0.0200		101	80-120			
Tin, total	0.0208	0.00020	mg/L	0.0200		104	80-120			
Titanium, total	0.0211	0.0050	mg/L	0.0200		106	80-120			
Tungsten, total	0.0207	0.0010	mg/L	0.0200		104	80-120			
Uranium, total	0.0229	0.000020	mg/L	0.0200		114	80-120			
Vanadium, total	0.0219	0.0010	mg/L	0.0200		110	80-120			
Zinc, total	0.0222	0.0040	mg/L	0.0200		111	80-120			
Zirconium, total	0.0229	0.00010	mg/L	0.0200		115	80-120			
Reference (B9G2121-SRM1)				Prepared: 2019-07-24, Analyzed: 2019-07-26						
Aluminum, total	0.288	0.0050	mg/L	0.303		95	82-114			
Antimony, total	0.0508	0.00020	mg/L	0.0511		99	88-115			
Arsenic, total	0.122	0.00050	mg/L	0.118		104	88-111			
Barium, total	0.774	0.0050	mg/L	0.823		94	83-110			
Beryllium, total	0.0501	0.00010	mg/L	0.0496		101	80-119			
Boron, total	3.53	0.0050	mg/L	3.45		102	80-118			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Yukon Government - Water Resources	**WORK ORDER**	9072061
PROJECT	Keno Mine Audit	**REPORTED**	2019-07-29 11:09

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B9G2121, Continued										
Reference (B9G2121-SRM1), Continued				Prepared: 2019-07-24, Analyzed: 2019-07-26						
Cadmium, total	0.0497	0.000010	mg/L	0.0495		100	90-110			
Calcium, total	10.2	0.20	mg/L	11.6		88	85-113			
Chromium, total	0.258	0.00050	mg/L	0.250		103	88-111			
Cobalt, total	0.0400	0.00010	mg/L	0.0377		106	90-114			
Copper, total	0.533	0.00040	mg/L	0.486		110	90-117			
Iron, total	0.481	0.010	mg/L	0.488		99	90-116			
Lead, total	0.211	0.00020	mg/L	0.204		104	90-110			
Lithium, total	0.398	0.00010	mg/L	0.403		99	79-118			
Magnesium, total	3.80	0.010	mg/L	3.79		100	88-116			
Manganese, total	0.108	0.00020	mg/L	0.109		100	88-108			
Molybdenum, total	0.197	0.00010	mg/L	0.198		100	88-110			
Nickel, total	0.264	0.00040	mg/L	0.249		106	90-112			
Phosphorus, total	0.246	0.050	mg/L	0.227		108	72-118			
Potassium, total	6.92	0.10	mg/L	7.21		96	87-116			
Selenium, total	0.130	0.00050	mg/L	0.121		108	90-122			
Sodium, total	7.36	0.10	mg/L	7.54		98	86-118			
Strontium, total	0.381	0.0010	mg/L	0.375		101	86-110			
Thallium, total	0.0849	0.000020	mg/L	0.0805		106	90-113			
Uranium, total	0.0313	0.000020	mg/L	0.0306		102	88-112			
Vanadium, total	0.391	0.0010	mg/L	0.386		101	87-110			
Zinc, total	2.56	0.0040	mg/L	2.49		103	90-113			

CARO.ca 1-888-311-8846

V6V 2K9
V1X5C3
T5S 1H7

CARO BC COC, Rev 2017-05

CHAIN OF CUSTODY RECORD

COC# | | PAGE 7 OF 7

ANALYTICAL SERVICES

Caring About Results, Obviously.

RELINQUISH BY: DATE: RECEIVED BY: TL

TIME: TIME:

tEPORTTO:

RTTO fx

.TUA'NAROU ND TIME REQUESTED:
Routine: (5-7 Days) r
Rush: 1 Day* r 2 Day r 3 Day* r
Other*

REGULATORY APPLICATION:
Canadian Drinking Water Quality r
Show on Report r
BC WQG r BC HWR r
BC CSR Soil: WL r ALr PLr RL-LDr RL-HDr CLr ILr
BC CSR Water: AW r IW r LW r DWr

:OMPANY: Yukon Government, Dept of ENV CG * 9 0 7 Z 0 6 1

1DDRESS: Water Resources Branch (V-31O)
Box 2703, Whitehorse, YT YI A 2C6

ADDRESS:

*** Contact Lab To Confirm. Surcharge May Apply** (CME: Other:

PROJECT NU MBER/ INF O:

A: Biohazard D: Asbestos G: Strong Odour
B: Cyanide E: Heavy Metals H: High Contamination
C: PCBs F: Flammable I: Other (please specify*)

:ONTACT: Dongnan Zhu

CON TACT: John Ryder & Dongnan Zhu

Keno Mine Audit

'EL/FAX : 867-667-3102

TEL/FAX :

tELIVERY METHO.D: EMAIL rx MAIL r OTHER* r

DELIVERY METH OD: EMAIL rx MAIL r OTHER* r

COMMENTS:

ANALYSES REQUESTED:

•ATA FORMAT: EXCEL fx WATERTRAX r ESdat r

EQUIS r BCEMS r OTHER fx

EMAIL 1: john.ryder@gov.yk.ca

EMAIL 2: dongnan.zhu@gov.yk.ca

MAIL 1: dongnan.zhu@gov.yk.ca

EMAIL 3

MAIL2: amelie.janin@gov.yk.ca

MAIL3:

PO#:

* If you would like to sign up for ClientConnect and/or EnviroChain, CARO's online service offerings, please check here: r

MATRIX: **SAMPLING:**

AMPLED BY:

SAMPLE ID - SAMPLE CLASS- STATION CODE			DATE	TIME					(e.g. now/volume media ID/notes)
			YYYY-MM-DD	HH:MM					
2019T20-01	M	CL-SEEP1	2019-07-16	15:50	4	./	./	./	2019T20-04 M
2019T20-02	M	CL-SEEP3	2019-07-16	16:00	4	./	./	./	CL-DP2
2019T20-03	M	CL-DP1	2019-07-17	14:10	2	./	./	./	2019T20-05
			2019-07-17	14:30	2	./	./	./	CL-DP3

HIPPING INSTRUCTIONS: Return Cooler(s) n **SAMPLE RETENTION:** * **OTHER INSTRUCTIONS:**

upplies Needed

30 Days (default) r

60 Days r 90 Days r

Other (surcharges will apply

If you would like to talk to a real live Scientist about your project requirements , please check here: r

SAMPLE RECEIPI,CONDITION: /

COOLER 1 (ICE: Y') v' N r

COOLER 2 (ICE: Y r N r

COOLER 3 (°C): ICE: Y r N r

CUSTODY SEALS INTACT: NA r y r Nr

CERTIFICATE OF ANALYSIS ▪ COVER PAGE

Global ARD Testing Services Inc.

CLIENT INFORMATION		
Client:		CARO Analytical Services
Consulting Client:		N/A
Project Manager(s):	**Adrian Q:**	Adrian Quesada (aquesada@caro.ca)
	Bryan S:	Bryan Shaw (bshaw@caro.ca)
Mailing Address:	**Adrian Q:**	102-3677 Hwy 97N, Kelowna, BC, Canada V1X 5C3.
	Bryan S:	110 - 4011 Viking Way, Richmond, BC, Canada V6V 2K9.
Contact No:	**Alana:**	Main: (250) 765-9646; Direct: (604)-207-5110 x 413
	Bryan S:	Main: (604) 279-1499; Direct: (604) 207-5110 x 129
Fax No:		(604) 855-7378

COMPANY INFORMATION	
Legal Name:	Global ARD Testing Services Inc.
Mailing Address:	6891 Antrim Avenue, Burnaby, BC, Canada, V5J 4M5.
Contact No:	Main: (604) 428-2730
	Ivy Rajan (Cell): (604) 319-7707
	Prab Bhatia (Cell): (604) 603-1359
Fax No:	(604) 428-2731

PROJECT INFORMATION	
Project Name:	N/A
Project Number:	9072065

REPORT INFORMATION	
Global Project No:	1934
Report Version:	1
Pages (Including Cover):	5
Report Title:	ABA SFE Report 6 x 9072065 Samples (rec'd 23-Jul19)
Analysis Reviewed By:	Ivy Rajan (IRajan@GlobalARDTesting.com)
Position:	Acid Rock Drainage (ARD) Lab & Project Manager
Report Certified By:	Ivy Rajan
Signature:	Ivy Rajan

RESULTS		
Reported To:	**1**	Adrian Quesada (aquesada@caro.ca)
	2	Bryan Shaw (bshaw@caro.ca)
	3	N/A
cc:		N/A
Date Reported:		August 14, 2019 (Wed.)

INVOICE		
Submitted To:	**1**	Adrian Quesada (aquesada@caro.ca)
	2	N/A
cc:		Bryan Shaw (bshaw@caro.ca)
Global Invoice No:		ARD1934-0819A
Date Submitted:		August 14, 2019 (Wed.)

NOTES
All samples are stored at no charge for 90 days past reporting date.
HCT, column, custom leach columns (Lysimeters) & SAD column samples
will be stored free for 90 days past kinetic testing program or Closedown.
Please contact the lab if you require additional sample storage time.
Storage charges will apply.

CERTIFICATE OF ANALYSIS ▪ SAMPLE DETAILS

Global ARD Testing Services Inc.

GLOBAL PROJECT NO: 1934

CLIENT: CARO Analytical Services

PROJECT NAME / NO: NA / WO 9072065

REPORT VERSION: 1

S. No.	Sample ID	Sample Type	Condition (Wet/Dry)	Wt. of Sample Rec'd (kg)	Global Notes (if any)
1	9072065-01	Soil	Wet	0.80	
2	9072065-02	Soil	Wet	0.70	
3	9072065-03	Soil	Wet	0.70	
4	9072065-07	Soil	Wet	0.75	
5	9072065-08	Soil	Wet	0.75	
6	9072065-09	Soil	Wet	0.75	

Total wt. of sample rec'd (kg): **4.45**

SAMPLE RECEIPT INFO:	
Date Samples Received:	July 23, 2019 (Tuesday)
No. of Samples Received:	6
Samples Received By:	Jyoti Nayak

ANALYTICAL INSTRUCTIONS:	
From:	Adrian Quesada (aquesada@caro.ca)
	by email/COC received with samples.
	CARO WO: 9072065
Date:	July 23, 2019 (Tuesday)

CERTIFICATE OF ANALYSIS ▪ ABA + QAQC RESULTS

Global ARD Testing Services Inc.

GLOBAL PROJECT NO: 1934
CLIENT: CARO Analytical Services
PROJECT NAME / NO: NA / WO 9072065
REPORT VERSION: 1

							Modified ASTM D2492-02 Method						
S. No.	**Sample ID**	**Paste pH**	**Fizz Rating**	**Total Inorganic C**	**$CaCO_3$ Equivalents[*1]**	**Total Sulphur**	**Sulphate Sulphur**	**Sulphide Sulphur**	**Non-Extractable Sulphur[*2]**	**AP[*3]**	**Modified Sobek NP**	**NNP[*4]**	**NPR[*5]**
	Units:	**pH Units**		**wt %**	**kg CaCO3/tonne**	**wt %**	**wt %**	**wt %**	**wt %**		**kg CaCO3/tonne**		
	Reported Detection Limit:	***0.01***		***0.02***	***1.7***	***0.01***	***0.01***	***0.01***	***0.01***	**0.3**			
1	9072065-01	7.3	Slight	0.22	18.3	0.48	0.23	0.23	0.02	7.2	20.1	12.9	2.8
2	9072065-02	7.5	Strong	2.43	202.5	0.76	0.57	0.19	<0.01	5.9	332.7	326.8	56.0
3	9072065-03	7.4	Strong	1.90	158.3	1.36	0.43	0.77	0.16	24.1	222.2	198.1	9.2
4	9072065-07	6.3	None	0.18	15.0	2.06	0.14	1.63	0.29	50.9	2.5	-48.4	0.0
5	9072065-08	6.6	None	0.25	20.8	1.58	0.12	1.46	<0.01	45.6	-1.3	-46.9	0.0
6	9072065-09	7.5	Moderate	0.81	67.5	3.01	0.25	0.78	1.98	24.4	78.3	53.9	3.2
QUALITY ASSURANCE / QUALITY CONTROL													
Replicate Analysis:													
1	9072065-01			0.22	18.3	0.48							
1 R	9072065-01 (Rep)			0.23	19.2	0.50							
6	9072065-09						0.25	0.78					
6 R	9072065-09 (Rep)						0.26	0.78					
Certified Reference Material (CRM) Analysis:													
Certified Reference Material		KZK-1		KZK-1		KZK-1	RTS-3a	KZK-1			1) KZK-1 (Slight) 2) KZK-1 (Moderate)		
CRM True Value		**8.80**		**0.844**		**0.80**	**1.10**	**0.37**			**1) 58.9 2) 61.6**		
Reference Material Results / % Recovery		8.86		0.720		0.65	1.09	0.37			1) 54.5 2) N/A		
Tolerance (+/-) as per COA or Acceptance Range (at Global):		***0.09***		***80 - 120***		***80 - 120***	***0.99 - 1.21***	***0.33 - 0.41***			***1) 1.1 2) 3.4***		
Method Blank Analysis:													
Method Blank Results				<0.02		<0.01	<0.01	<0.01					
GLOBAL SOP NO:		*ARD-004*	*ARD-005*	*HCl Leach/LECO*	*Calc.*	*LECO*	*ARD-013 (Seq. HCl/HNO3 leach)*		*Calc.*	*Calc.*	*ARD-005*	*Calc.*	*Calc.*

NOTES:
Job No: 19V497343
Date of Analysis: Aug. 5/6, 2019
pH of DI water used (pH Units): 5.77
EC of DI water used (µS/cm): 0.17

METHODS:
Total sulphur by Leco; TIC by HCl Leach/Leco Analysis.

ABBREVIATIONS:
R = Rep = Replicate (a replicate is a sub-sample scooped from a single pulp sample bag produced per client sample)
D = Dup = Duplicate (a duplicate is 2nd sub-pulp sample bag produced by processing a 2nd split of the client sample. A duplicate pulp sample is prepared only at client request.
EC = Electric Conductivity
NP = Neutralization Potential
Calc. = Calculation
IND = Indeterminate
COA = Certificate of Analysis
N/A = Not Applicable

CALCULATIONS:
*1 $CaCO_3$ Equivalents: Is based on TIC (Total Inorganic Carbon)
*2 Non-Extractable Sulphur: Total sulphur - (sulphate sulphur + sulphide sulphur)
*3 AP (Acid Potential): Sulphide-sulphur x 31.25
*4 NNP (Net Neutralization Potential): NP - AP
*5 NPR (Neutralization Potential Ratio): NP/AP

REFERENCES:
Sample Preparation: ASTM E877-08; MEND Report 1.20.1, Version 0 (2009)
ABA: Air-dried, jaw-crushed, split by riffling and pulverized to 85% passing 200 mesh (75 µm).
Modified ABA (Sobek) NP: MEND Acid Rock Drainage Prediction Manual, MEND Project 1.16.1b (pages 6.2-11 to 17), March 1991.
Paste pH / Fizz Rating: Sobek, A.A., Schuller, W.A., Freeman, J.R. and Smith, R.M.; US EPA-600/2-78-054 (1978).
Sulphur Speciation: Modified ASTM D2492-02 Method. The S extracted is determined by analysing the extract for SO4 using UV-Vis Spectrophotometer (STD Method 4500-SO42- E).

CERTIFICATE OF ANALYSIS ▪ MEND-SHAKE FLASK EXTRACTION RESULTS

Global ARD Testing Services Inc.

GLOBAL PROJECT NO: 1934
CLIENT: CARO Analytical Services
PROJECT NAME / NO: NA / WO 9072065
REPORT VERSION: 1

Parameter	Method	Unit	MRL	1	2	3	4	5	5 R	6	Method blank
				Sample ID							
				9072065-01	9072065-02	9072065-03	9072065-07	9072065-08	9072065-08 (Rep)	9072065-09	
Weight of dry sample used	Weighing Scale	g	0.01	250	250	250	250	250	N/A	250	N/A
Volume of DI water used	Graduated Cylinder	mL	0.50	750	750	750	750	750	N/A	750	750
On filtered samples using 0.45 micron filter paper											
pH	pH Meter	pH units	0.01	7.6	7.6	7.6	7.3	7.4		7.8	5.6
EC	EC Meter	µS/cm	0.5	961	2320	1764	1296	1063		1125	1.09
Acidity (to pH 8.3)	Titration/Calc.	mg $CaCO_3$/L	0.5	6.5	14.0	8.0	8.5	9.0		6.0	6.0
Alkalinity (to pH 4.5)	Titration/Calc.	mg $CaCO_3$/L	0.5	61.0	68.0	66.0	51.5	60.5		101.0	1.0
Sulphate	Turbidimetry	mg/L	0.5	479.6	1629.7	984.3	690.7	525.8		302.2	<0.5
Dissolved Metals Analysis by ICP-MS:											
Hardness, Total (as CaCO3)	ICP-MS	mg/L	0.1	453	1320	999	677	527	519.0972	529	0.21
Aluminum, dissolved	ICP-MS	mg/L	0.001	0.0034	0.0058	0.0067	0.0113	0.0069	0.0067	0.013	0.001
Antimony, dissolved	ICP-MS	mg/L	0.00005	0.000702	0.00942	0.00709	0.0114	0.0128	0.0127	0.00177	<0.000050
Arsenic, dissolved	ICP-MS	mg/L	0.00005	0.0119	0.0615	0.0658	0.327	0.159	0.159	0.0437	<0.000050
Barium, dissolved	ICP-MS	mg/L	0.0001	0.0582	0.0997	0.139	0.111	0.0909	0.0908	0.056	0.00038
Beryllium, dissolved	ICP-MS	mg/L	0.00001	<0.000010	<0.000010	<0.000010	0.000011	<0.000010	<0.000010	<0.000010	<0.000010
Bismuth, dissolved	ICP-MS	mg/L	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Boron, dissolved	ICP-MS	mg/L	0.002	0.0105	0.0173	0.0189	0.0341	0.0426	0.0429	0.0175	<0.0020
Cadmium, dissolved	ICP-MS	mg/L	0.0000002	0.0000062	0.0000138	0.0000108	0.0000088	0.0000061	0.0000056	0.0000113	<0.0000020
Calcium, dissolved	ICP-MS	mg/L	0.04	163	410.00	344.00	232.00	187.00	185.00	193	0.084
Chromium, dissolved	ICP-MS	mg/L	0.0001	<0.00010	0.00016	0.00015	0.00025	0.00019	0.00018	0.00013	<0.00010
Cobalt, dissolved	ICP-MS	mg/L	0.000005	0.00249	0.142	0.0955	0.014	0.007	0.00696	0.00296	<0.0000050
Copper, dissolved	ICP-MS	mg/L	0.0001	0.00265	0.00886	0.00563	0.00453	0.00319	0.00317	0.00489	0.00061
Iron, dissolved	ICP-MS	mg/L	0.002	0.013	0.0133	0.024	0.111	0.0275	0.0264	0.017	<0.0020
Lead, dissolved	ICP-MS	mg/L	0.00005	0.000085	0.000192	0.00016	0.000195	0.000125	0.000123	0.000128	<0.000050
Lithium, dissolved	ICP-MS	mg/L	0.00005	0.0137	0.0499	0.0289	0.0258	0.031	0.0308	0.0177	<0.000050
Magnesium, dissolved	ICP-MS	mg/L	0.01	11.1	72.400	33.600	23.800	14.400	14.200	11.5	<0.0050
Manganese, dissolved	ICP-MS	mg/L	0.00005	1.94	81.2	24.5	8.89	3.05	3.64	0.252	0.00023
Mercury, dissolved	ICP-MS	mg/L	0.00002	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Molybdenum, dissolved	ICP-MS	mg/L	0.00001	0.00184	0.0102	0.00438	0.00766	0.0111	0.011	0.00396	0.000015
Nickel, dissolved	ICP-MS	mg/L	0.00004	0.00614	0.66	0.142	0.0174	0.00855	0.00853	0.0134	<0.000040
Phosphorus, dissolved	ICP-MS	mg/L	0.01	0.056	0.109	0.154	0.086	0.043	0.045	0.121	<0.010
Potassium, dissolved	ICP-MS	mg/L	0.01	1.56	5.55	3.3	0.37	0.695	0.69	1.65	<0.010
Selenium, dissolved	ICP-MS	mg/L	0.0001	0.00152	0.00246	0.00173	0.00103	0.00104	0.00106	0.00248	<0.00010
Silicon, dissolved	ICP-MS	mg/L	0.10	4.08	19.4	10.3	10.5	8.04	7.94	1.94	<0.10
Silver, dissolved	ICP-MS	mg/L	0.00001	0.000038	<0.000010	<0.000010	0.000011	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, dissolved	ICP-MS	mg/L	0.02	1.68	6.5	3.8	2.47	1.53	1.51	2.47	<0.020
Strontium, dissolved	ICP-MS	mg/L	0.0001	0.222	1.22	0.608	0.442	0.334	0.333	0.325	<0.00010
Sulphur, dissolved	ICP-MS	mg/L	1.0	161	540	381	256	190	189	232	<1.00
Tellurium, dissolved	ICP-MS	mg/L	0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Thallium, dissolved	ICP-MS	mg/L	0.000004	0.0000172	0.0000083	0.0000061	<0.0000040	<0.0000040	<0.0000040	<0.0000040	<0.0000040
Thorium, dissolved	ICP-MS	mg/L	0.00001	<0.000010	<0.000010	<0.000010	0.000016	0.000011	0.000011	<0.000010	<0.000010
Tin, dissolved	ICP-MS	mg/L	0.00005	<0.000050	0.000073	<0.000050	<0.000050	0.000067	<0.000050	0.000285	<0.000050
Titanium, dissolved	ICP-MS	mg/L	0.0002	<0.00020	0.00033	0.00037	0.00087	0.00065	0.00063	0.00035	<0.00020
Tungsten, dissolved	ICP-MS	mg/L	0.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Uranium, dissolved	ICP-MS	mg/L	0.000001	0.000707	0.0118	0.00538	0.000306	0.000594	0.000593	0.0135	0.0000019
Vanadium, dissolved	ICP-MS	mg/L	0.0002	<0.00020	0.00026	0.00024	0.00171	0.00254	0.00253	<0.00020	<0.00020
Zinc, dissolved	ICP-MS	mg/L	0.001	0.0065	0.0606	0.0143	0.153	0.0535	0.053	0.0118	<0.0010
Zirconium, dissolved	ICP-MS	mg/L	0.00002	0.000076	0.00009	0.000112	0.000126	0.000093	0.0001	0.000096	<0.000020
Ion Balance											
Major Anions	Calc.	meq/L		11.21	35.31	21.83	15.42	12.16	12.16	8.32	
Major Cations	Calc.	meq/L		9.26	29.88	21.14	14.04	10.76	10.67	10.77	
Difference	Calc.	meq/L		1.95	5.43	0.69	1.38	1.40	1.50	-2.46	
Balance (%)	Calc.	%		9.5%	8.3%	1.6%	4.7%	6.1%	6.6%	-12.9%	
			SFE ID:	*9080225-01*	*9080225-02*	*9080225-03*	*9080225-04*	*9080225-05*	*9080225-05*	*9080225-06*	*9080225-07*

NOTES:
CARO Job No: 9080225
Reported Detection Limit (RDL) may be higher than the Method Reporting Limit (MRL) due to various factors such as dilutions, limited sample volume, high moisture, or interferences.
Date of Analysis (24 h): July 28/29, 2019
pH of DI water used (pH Units): 5.61
EC of DI water used (µS/cm): 0.65
Abbreviations:
R / Rep = Replicate (which involves the analysis of the same Shake Flask Extract aliquot).
D / Dup = Duplicate (which involves the analysis of a separate SF extract, produced by processing a secopnd split of the original client sample received).
MRL: Method Reporting Limit
EC = Electrical Conductivity
ORP = Oxidation Reduction Potential
N/A = Not Applicable.
NR = Not Reported.
mg/L = Milligrams per Litre
Method Reference: Prediction Manual for Drainage Chemistry from Sulphidic Geologic Material, MEND Report 1.20.1; Version 0 - Dec. 2009. Section 11.5; P 11 (8-9).
Extraction Method used: Using gyratory shaker for 24h (± 2h; gentle agitation).
Liquid: Solid ratio used: 3: 1; L: S; 750 mL DI H_2O: 250 g of crushed sample (85% passing 1/4 inch - i.e. 6.3 mm)
ICP-MS Method Reference Descriptions (APHA): Standard Methods for the Examination of Water and Wastewater, 22nd Edition, American Public Health Association/American Water Works Association/Water Environment Federation.

Global
ARD Testing Services Inc.

GLOBAL PROJECT NO: 1934
CLIENT: CARO Analytical Services
PROJECT NAME / NO: NA / WO 9072065
REPORT VERSION: 1

SFE - Sulphate:

Certified Reference Material:	Parameter: Sulphate	% Recovery	Matrix Spike % Recovery	Units	QC Limits (%)
STD Mineral Water (29.7 mg/L)	29.9	100.7%		%	80 - 120
Spiked Blank (19.61 mg/L)	20.40		104.0%	%	80 - 120

SFE - Dissolved Metals by ICP-MS:

Sample Code	Parameter	Prefix	Result	Result Units	Total or Filtered	Method Type	Method Name	Date Analyzed	EQL	EQL Units	UCL	LCL
9080225_B9H0425-BLK1	Aluminum dissolved	<	0.001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.001	mg/L		
9080225_B9H0425-BLK1	Antimony dissolved	<	0.00005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-BLK1	Arsenic dissolved	<	0.00005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-BLK1	Barium dissolved	<	0.0001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-BLK1	Beryllium dissolved	<	0.00001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-BLK1	Bismuth dissolved	<	0.00001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-BLK1	Boron dissolved	<	0.002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.002	mg/L		
9080225_B9H0425-BLK1	Cadmium dissolved	<	0.000002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.000002	mg/L		
9080225_B9H0425-BLK1	Calcium dissolved	<	0.04	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.04	mg/L		
9080225_B9H0425-BLK1	Chromium dissolved	<	0.0001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-BLK1	Cobalt dissolved	<	0.000005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.000005	mg/L		
9080225_B9H0425-BLK1	Copper dissolved	<	0.0001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-BLK1	Iron dissolved	<	0.002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.002	mg/L		
9080225_B9H0425-BLK1	Lead dissolved	<	0.00005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-BLK1	Lithium dissolved	<	0.00005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-BLK1	Magnesium dissolved	<	0.005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.005	mg/L		
9080225_B9H0425-BLK1	Manganese dissolved	<	0.00005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-BLK1	Mercury dissolved	<	0.00002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00002	mg/L		
9080225_B9H0425-BLK1	Molybdenum dissolved	<	0.00001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-BLK1	Nickel dissolved	<	0.00002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00002	mg/L		
9080225_B9H0425-BLK1	Phosphorus dissolved	<	0.01	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.01	mg/L		
9080225_B9H0425-BLK1	Potassium dissolved	<	0.01	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.01	mg/L		
9080225_B9H0425-BLK1	Selenium dissolved	<	0.0001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-BLK1	Silicon dissolved	<	0.1	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.1	mg/L		
9080225_B9H0425-BLK1	Silver dissolved	<	0.00001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-BLK1	Sodium dissolved	<	0.02	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.02	mg/L		
9080225_B9H0425-BLK1	Strontium dissolved	<	0.0001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-BLK1	Sulfur dissolved	<	1	mg/L	F	Metals	EPA 6020B	11-Aug-19	1	mg/L		
9080225_B9H0425-BLK1	Tellurium dissolved	<	0.00005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-BLK1	Thallium dissolved	<	0.000004	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.000004	mg/L		
9080225_B9H0425-BLK1	Thorium dissolved	<	0.00001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-BLK1	Tin dissolved	<	0.00005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-BLK1	Titanium dissolved	<	0.0002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0002	mg/L		
9080225_B9H0425-BLK1	Tungsten dissolved	<	0.2	ug/L	F	Metals	EPA 6020B	11-Aug-19	0.2	ug/L		
9080225_B9H0425-BLK1	Uranium dissolved	<	0.000001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.000001	mg/L		
9080225_B9H0425-BLK1	Vanadium dissolved	<	0.0002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0002	mg/L		
9080225_B9H0425-BLK1	Zinc dissolved	<	0.001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.001	mg/L		
9080225_B9H0425-BLK1	Zirconium dissolved	<	0.00002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00002	mg/L		
9080225_B9H0425-BLK2	Aluminum dissolved	<	0.001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.001	mg/L		
9080225_B9H0425-BLK2	Antimony dissolved	<	0.00005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-BLK2	Arsenic dissolved	<	0.00005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-BLK2	Barium dissolved	<	0.0001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-BLK2	Beryllium dissolved	<	0.00001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-BLK2	Bismuth dissolved	<	0.00001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-BLK2	Boron dissolved	<	0.002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.002	mg/L		
9080225_B9H0425-BLK2	Cadmium dissolved	<	0.000002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.000002	mg/L		
9080225_B9H0425-BLK2	Calcium dissolved	<	0.04	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.04	mg/L		
9080225_B9H0425-BLK2	Chromium dissolved	<	0.0001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-BLK2	Cobalt dissolved	<	0.000005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.000005	mg/L		
9080225_B9H0425-BLK2	Copper dissolved	<	0.0001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-BLK2	Iron dissolved	<	0.002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.002	mg/L		
9080225_B9H0425-BLK2	Lead dissolved	<	0.00005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-BLK2	Lithium dissolved	<	0.00005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-BLK2	Magnesium dissolved	<	0.005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.005	mg/L		
9080225_B9H0425-BLK2	Manganese dissolved	<	0.00005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-BLK2	Mercury dissolved	<	0.00002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00002	mg/L		
9080225_B9H0425-BLK2	Molybdenum dissolved	<	0.00001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-BLK2	Nickel dissolved	<	0.00002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00002	mg/L		
9080225_B9H0425-BLK2	Phosphorus dissolved	<	0.01	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.01	mg/L		
9080225_B9H0425-BLK2	Potassium dissolved	<	0.01	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.01	mg/L		
9080225_B9H0425-BLK2	Selenium dissolved	<	0.0001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-BLK2	Silicon dissolved	<	0.1	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.1	mg/L		
9080225_B9H0425-BLK2	Silver dissolved	<	0.00001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-BLK2	Sodium dissolved	<	0.02	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.02	mg/L		
9080225_B9H0425-BLK2	Strontium dissolved	<	0.0001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-BLK2	Sulfur dissolved	<	1	mg/L	F	Metals	EPA 6020B	11-Aug-19	1	mg/L		
9080225_B9H0425-BLK2	Tellurium dissolved	<	0.00005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		

Sample Code	Parameter	Prefix	Result	Result Units	Total or Filtered	Method Type	Method Name	Date Analyzed	EQL	EQL Units	UCL	LCL
9080225_B9H0425-BLK2	Thallium dissolved	<	0.000004	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.000004	mg/L		
9080225_B9H0425-BLK2	Thorium dissolved	<	0.00001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-BLK2	Tin dissolved	<	0.00005	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-BLK2	Titanium dissolved	<	0.0002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0002	mg/L		
9080225_B9H0425-BLK2	Tungsten dissolved	<	0.2	ug/L	F	Metals	EPA 6020B	11-Aug-19	0.2	ug/L		
9080225_B9H0425-BLK2	Uranium dissolved	<	0.000001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.000001	mg/L		
9080225_B9H0425-BLK2	Vanadium dissolved	<	0.0002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0002	mg/L		
9080225_B9H0425-BLK2	Zinc dissolved	<	0.001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.001	mg/L		
9080225_B9H0425-BLK2	Zirconium dissolved	<	0.00002	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00002	mg/L		
9080225_B9H0425-BS1	Aluminum dissolved		109	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Antimony dissolved		104	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Arsenic dissolved		102	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Barium dissolved		101	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Beryllium dissolved		104	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Bismuth dissolved		108	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Boron dissolved		110	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Cadmium dissolved		106	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Calcium dissolved		88	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Chromium dissolved		100	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Cobalt dissolved		101	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Copper dissolved		105	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Iron dissolved		95	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Lead dissolved		107	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Lithium dissolved		103	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Magnesium dissolved		102	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Manganese dissolved		102	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Mercury dissolved		89	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Molybdenum dissolved		101	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Nickel dissolved		104	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Phosphorus dissolved		100	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Potassium dissolved		98	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Selenium dissolved		107	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Silicon dissolved		107	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Silver dissolved		102	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Sodium dissolved		100	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Strontium dissolved		102	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Sulfur dissolved		88	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Tellurium dissolved		112	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Thallium dissolved		108	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Thorium dissolved		104	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Tin dissolved		106	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Titanium dissolved		99	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Tungsten dissolved		99	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Uranium dissolved		118	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Vanadium dissolved		98	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Zinc dissolved		111	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-BS1	Zirconium dissolved		104	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	80
9080225_B9H0425-DUP1 = 9080225-05 = 9072065-08:												
9080225_B9H0425-DUP1	Aluminum dissolved		0.0067	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.001	mg/L		
9080225_B9H0425-DUP1	Antimony dissolved		0.0127	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-DUP1	Arsenic dissolved		0.159	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-DUP1	Barium dissolved		0.0908	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-DUP1	Beryllium dissolved	<	<0.000010	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-DUP1	Bismuth dissolved	<	<0.000010	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-DUP1	Boron dissolved		0.0429	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.002	mg/L		
9080225_B9H0425-DUP1	Cadmium dissolved		0.0000056	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.000002	mg/L		
9080225_B9H0425-DUP1	Calcium dissolved		185	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.04	mg/L		
9080225_B9H0425-DUP1	Chromium dissolved		0.00018	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-DUP1	Cobalt dissolved		0.00696	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.000005	mg/L		
9080225_B9H0425-DUP1	Copper dissolved		0.00317	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-DUP1	Iron dissolved		0.0264	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.002	mg/L		
9080225_B9H0425-DUP1	Lead dissolved		0.000123	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-DUP1	Lithium dissolved		0.0308	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-DUP1	Magnesium dissolved		14.2	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.005	mg/L		
9080225_B9H0425-DUP1	Manganese dissolved		3.64	mg/L	F	Metals	EPA 6020B	12-Aug-19	0.005	mg/L		
9080225_B9H0425-DUP1	Mercury dissolved	<	<0.000020	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00002	mg/L		
9080225_B9H0425-DUP1	Molybdenum dissolved		0.011	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-DUP1	Nickel dissolved		0.00853	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00002	mg/L		
9080225_B9H0425-DUP1	Phosphorus dissolved		0.045	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.01	mg/L		
9080225_B9H0425-DUP1	Potassium dissolved		0.69	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.01	mg/L		
9080225_B9H0425-DUP1	Selenium dissolved		0.00106	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-DUP1	Silicon dissolved		7.94	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.1	mg/L		
9080225_B9H0425-DUP1	Silver dissolved	<	<0.000010	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-DUP1	Sodium dissolved		1.51	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.02	mg/L		
9080225_B9H0425-DUP1	Strontium dissolved		0.333	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0001	mg/L		
9080225_B9H0425-DUP1	Sulfur dissolved		189	mg/L	F	Metals	EPA 6020B	11-Aug-19	1	mg/L		
9080225_B9H0425-DUP1	Tellurium dissolved	<	<0.000050	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-DUP1	Thallium dissolved	<	<0.0000040	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.000004	mg/L		
9080225_B9H0425-DUP1	Thorium dissolved		0.000011	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00001	mg/L		
9080225_B9H0425-DUP1	Tin dissolved	<	<0.000050	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00005	mg/L		
9080225_B9H0425-DUP1	Titanium dissolved		0.00063	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0002	mg/L		
9080225_B9H0425-DUP1	Tungsten dissolved	<	<0.20	ug/L	F	Metals	EPA 6020B	11-Aug-19	0.2	ug/L		

Sample Code	Parameter	Prefix	Result	Result Units	Total or Filtered	Method Type	Method Name	Date Analyzed	EQL	EQL Units	UCL	LCL
9080225_B9H0425-DUP1	Uranium dissolved		0.000593	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.000001	mg/L		
9080225_B9H0425-DUP1	Vanadium dissolved		0.00253	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.0002	mg/L		
9080225_B9H0425-DUP1	Zinc dissolved		0.053	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.001	mg/L		
9080225_B9H0425-DUP1	Zirconium dissolved		0.0001	mg/L	F	Metals	EPA 6020B	11-Aug-19	0.00002	mg/L		
9080225_B9H0425-SRM1	Aluminum dissolved		97	%	F	Metals	EPA 6020B	11-Aug-19	1	%	114	79
9080225_B9H0425-SRM1	Antimony dissolved		109	%	F	Metals	EPA 6020B	11-Aug-19	1	%	123	89
9080225_B9H0425-SRM1	Arsenic dissolved		105	%	F	Metals	EPA 6020B	11-Aug-19	1	%	113	87
9080225_B9H0425-SRM1	Barium dissolved		98	%	F	Metals	EPA 6020B	11-Aug-19	1	%	114	85
9080225_B9H0425-SRM1	Beryllium dissolved		106	%	F	Metals	EPA 6020B	11-Aug-19	1	%	122	79
9080225_B9H0425-SRM1	Boron dissolved		104	%	F	Metals	EPA 6020B	11-Aug-19	1	%	117	79
9080225_B9H0425-SRM1	Cadmium dissolved		105	%	F	Metals	EPA 6020B	11-Aug-19	1	%	112	89
9080225_B9H0425-SRM1	Calcium dissolved		92	%	F	Metals	EPA 6020B	11-Aug-19	1	%	120	85
9080225_B9H0425-SRM1	Chromium dissolved		102	%	F	Metals	EPA 6020B	11-Aug-19	1	%	113	87
9080225_B9H0425-SRM1	Cobalt dissolved		103	%	F	Metals	EPA 6020B	11-Aug-19	1	%	117	90
9080225_B9H0425-SRM1	Copper dissolved		107	%	F	Metals	EPA 6020B	11-Aug-19	1	%	115	90
9080225_B9H0425-SRM1	Iron dissolved		98	%	F	Metals	EPA 6020B	11-Aug-19	1	%	112	86
9080225_B9H0425-SRM1	Lead dissolved		107	%	F	Metals	EPA 6020B	11-Aug-19	1	%	113	90
9080225_B9H0425-SRM1	Lithium dissolved		105	%	F	Metals	EPA 6020B	11-Aug-19	1	%	127	77
9080225_B9H0425-SRM1	Magnesium dissolved		103	%	F	Metals	EPA 6020B	11-Aug-19	1	%	116	84
9080225_B9H0425-SRM1	Manganese dissolved		101	%	F	Metals	EPA 6020B	11-Aug-19	1	%	113	85
9080225_B9H0425-SRM1	Molybdenum dissolved		106	%	F	Metals	EPA 6020B	11-Aug-19	1	%	112	87
9080225_B9H0425-SRM1	Nickel dissolved		105	%	F	Metals	EPA 6020B	11-Aug-19	1	%	114	90
9080225_B9H0425-SRM1	Phosphorus dissolved		111	%	F	Metals	EPA 6020B	11-Aug-19	1	%	119	74
9080225_B9H0425-SRM1	Potassium dissolved		100	%	F	Metals	EPA 6020B	11-Aug-19	1	%	119	78
9080225_B9H0425-SRM1	Selenium dissolved		110	%	F	Metals	EPA 6020B	11-Aug-19	1	%	123	89
9080225_B9H0425-SRM1	Sodium dissolved		101	%	F	Metals	EPA 6020B	11-Aug-19	1	%	117	81
9080225_B9H0425-SRM1	Strontium dissolved		101	%	F	Metals	EPA 6020B	11-Aug-19	1	%	111	82
9080225_B9H0425-SRM1	Thallium dissolved		108	%	F	Metals	EPA 6020B	11-Aug-19	1	%	113	90
9080225_B9H0425-SRM1	Uranium dissolved		100	%	F	Metals	EPA 6020B	11-Aug-19	1	%	113	87
9080225_B9H0425-SRM1	Vanadium dissolved		99	%	F	Metals	EPA 6020B	11-Aug-19	1	%	110	85
9080225_B9H0425-SRM1	Zinc dissolved		106	%	F	Metals	EPA 6020B	11-Aug-19	1	%	114	88

NOTES:
CARO Job No: 9080225

Abbreviations & Descriptions:
Method Blank (Blk): A blank sample that undergoes sample processing identical to that carried out for the test samples.
Method Blank results are used to assess contamination from the laboratory environment and reagents.

•Duplicate (Dup): An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process.
Duplicates provide a measure of the analytical method's precision (reproducibility).

Blank Spike (BS): A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS).
Blank spikes provide a measure of the analytical method's accuracy.

Matrix Spike (MS): A second aliquot of sample is fortified with a known concentration of target analytes and carried through the entire analytical process.
Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.

Standard Reference Material (SRM): A homogenous material of similar matrix to the samples, certified for the parameter(s) listed.
Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples.
For all types of QC, specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

EQL = Estimated Quantitation Limits
PQL = Practical Quantitation Limits
UCL = Upper Control Limit
LCL = Lower Control Limit
BLK = Blank
BS = Blank Spike
MS = Matrix Spike
DUP = Duplicate
SRM = Standard Reference Materials