



EAGLE GOLD PROJECT

LDSP EXCEEDANCE REPORT

APRIL 20 AND APRIL 28, 2019

JUNE 2019

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1 INTRODUCTION

On April 20 2019, based on on-site TSS lab results that met discharge criteria, StrataGold Corporation (SGC) began discharging from the Lower Dublin South Pond (LDSP) at the Eagle Gold Mine site.

At the time of the discharge, while much of the mine site area was still under construction, SGC had begun depositing waste rock in the Platinum Gulch catchment, and so by definition in the Water Use Licence QZ14-041, began the production phase and so became subject to production phase effluent quality standards. Surface water runoff from construction areas (and Platinum Gulch) was conveyed to the LDSP via two primary ditches for settling out solids to the extent that it would meet effluent quality standards, prior to discharge. Discharge from the LDSP during normal pond operation is controlled at the Low-Level Outlet (LLO). When discharge occurs, it is sent to the the “LDSP Outlet” or LDSPO (64° 1'56.39"N, 135°50'42.43"W) into the receiving waterbody Haggart Creek at 64° 2'6.78"N and 135°51'22.33"W via Ditch C, shown in Figure 1-1.

During two separate events, and after on-site TSS lab results met discharge criteria, effluent was discharged from the LDSPO on April 20, and on April 27-29. Subsequent sampling and later off-site lab analyses indicated that the quality of water deposited through from LDSPO exceeded the WUL production effluent quality standards for TSS and arsenic (Table 1-1). All other effluent quality standards were met. No subsequent discharge from the LDSP has occurred since April 29 at 8:22 am.

Acute lethality results, described in Section 2.3 below, showed samples were not acutely lethal with 100% survival for both rainbow trout and *Daphnia magna*.

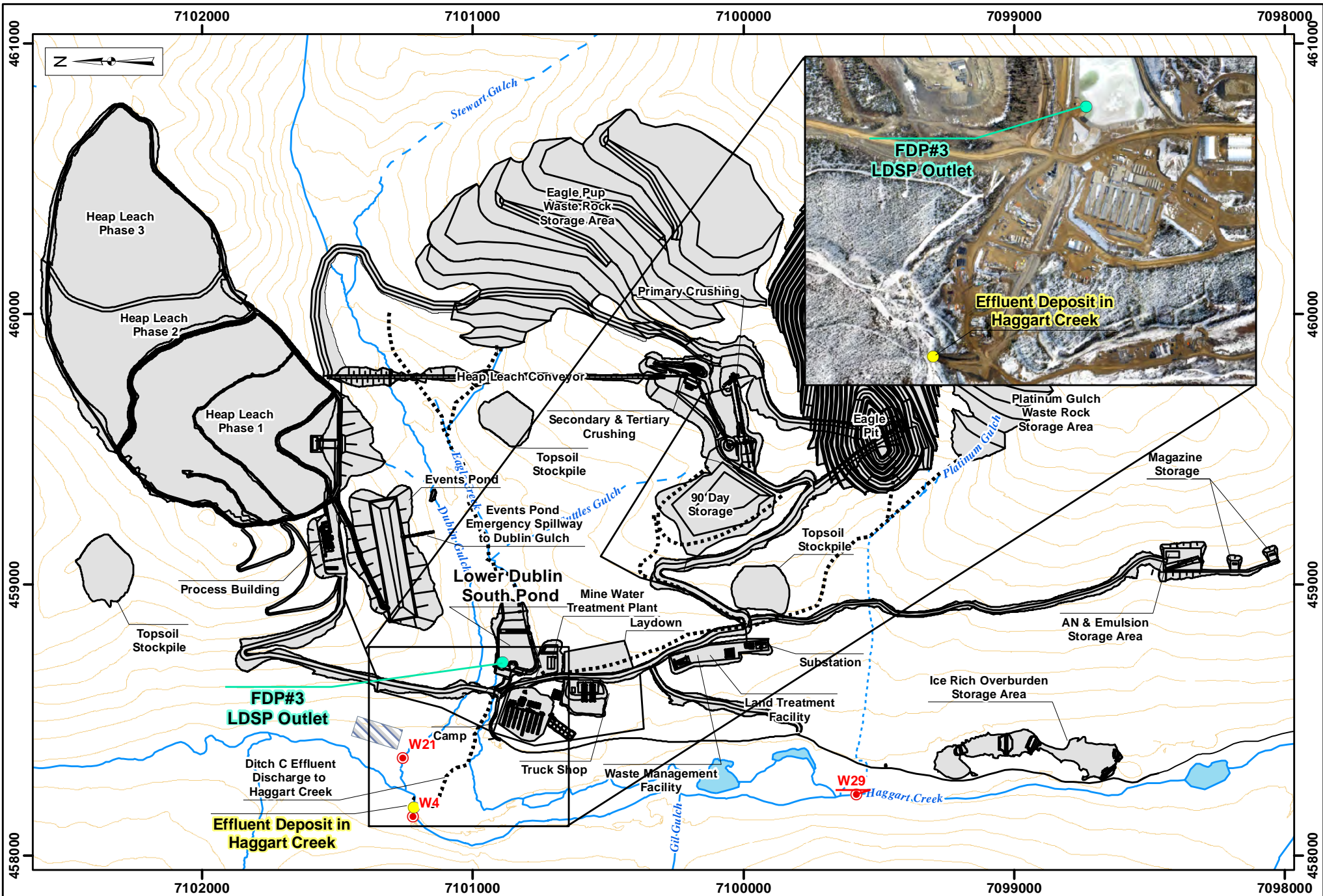
Table 1-1: Summary of Effluent Deposit Information

	Event 1	Event 2
Date of Deposit	April 20, 2019	April 27 – April 29, 2019
Time of Deposit (24hr) ^a	13:40 - 18:45	9:10 Apr 27 - 8:22 April 29
Grab Sample Concentration of Deleterious Substance Deposited		
TSS (mg/L) ^b	66.4	20.2 (Apr 27) 47.2 (Apr 28) 17.1 (Apr 29)
pH ^b	8.11	8.11 (Apr 27) 8.12 (Apr 28)
Arsenic (mg/L)	0.0827 ^a	0.0752 (Apr 27) ^a 0.0984 (Apr 28) ^a 0.0745 (Apr 29) ^a
Estimated Quantity Discharge ^c	3,186 m ³	12,229 m ³

indicated that the effluent met discharge criteria; also the discharge during Event 2 was not continuous over the 47 hr period.

^b. Results based on analysis by ALS Laboratories, and vary from in-situ and on-site TSS lab results.

^c. Note that the total effluent that was discharged that exceeded criteria is a smaller proportion of these estimated quantities



Legend:

Facility	Haggart Creek Receiving Point	Perennial	Waterbody
Water Conveyances	LDSP Outlet	Ephemeral	Contour (25m)
Reserved Area	Water Quality Monitoring Station	Intermittent	

StrataGold Corporation

0 125 250 500
Metres

Projection:	Drawn By:
NAD 83 UTM Zone 8N	JK
Date:	Figure:
2019/05/15	1

**EAGLE GOLD PROJECT
YUKON TERRITORY**

**Effluent Discharge Release
Locations**

2 RELEASE DETAILS

Prior to discharge, the site environmental coordinator collected water quality samples within the LDSP at the Control Pond along shore adjacent to the pump caisson (LDSPs) and from within a perforated pipe on the LDSP Embankment (LLO). Based on in-situ field results and TSS analysis conducted at the on-site laboratory, the decision to open the LLO and discharge was made. During the discharge subsequent sampling continued at the LDSPs, LDSPO and in downstream receiving waters as per conditions of SGC's Water Use Licence.

Table 2-1: Internal In-Situ Sampling Sites

Station	Location Description
LDSPs	Control Pond along shore adjacent to pump caisson
LLO	Within perforated pipe on LDSP embankment
LDSPO	LDSP outflow from weir

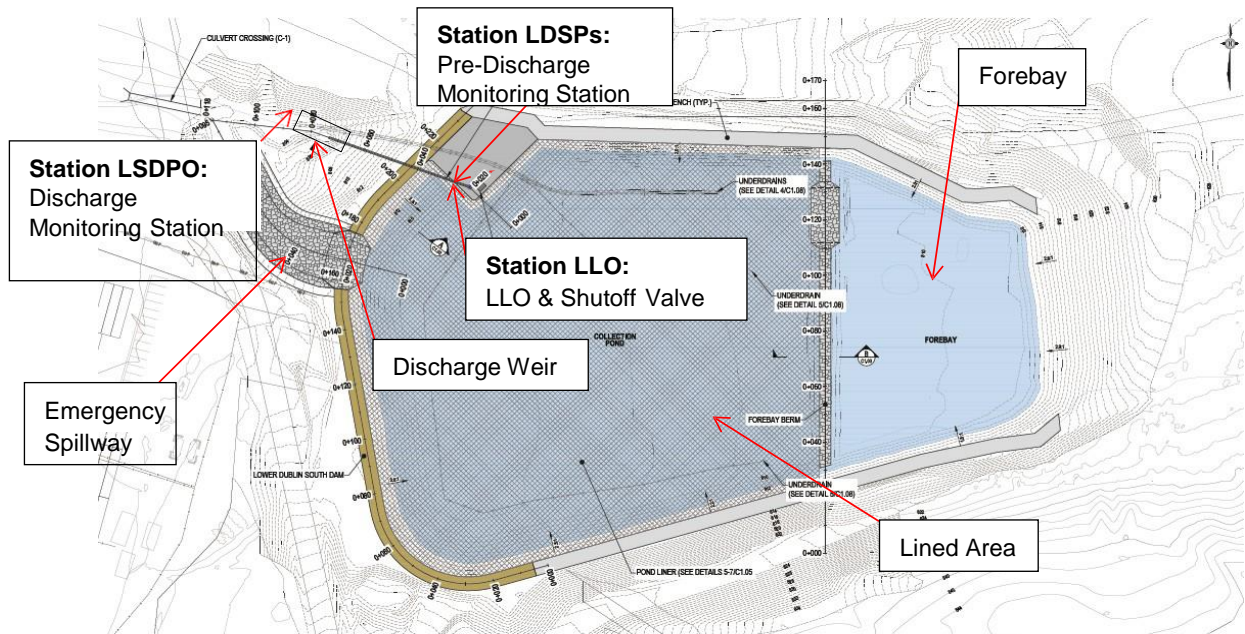


Figure 2-1: Control Pond Infrastructure and Internal In-Situ Sampling Sites

2.1 EVENT 1 DESCRIPTION

On April 20 2019 at 13:40, SGC began discharging from the LDSP.

Prior to opening the LLO, water quality samples were collected on April 18, April 19 and April 20 at stations LDSPs and LLO (i.e., internal monitoring locations) and analyzed in our on-site TSS lab. On-site lab results (provided in Table 2.1-1) indicated that TSS were below WUL effluent quality standards

Eagle Gold Project

April 20 and April 28, 2019

Section 2 Release Details

at all times until the last sample collected from LLO at 17:16 on April 20. When the 4/20/19 17:16 sample result was completed around 18:45, notice to cease discharge was given. Additionally, the most recent LDSPs sample, collected on April 14, 2019 prior to discharging, was analyzed at ALS laboratories in Burnaby, BC. Results indicated all effluent discharge criteria were met (Appendix A). Based on these results, discharge began at 13:40 on April 20.

Table 2.1-1: Event 1 - In-Situ Parameters and Internal Analysis

STATION	DATE	TIME 24 hours	Temp °C	DO mg/L	SPC uS/cm	pH	Turbidity NTU	TSS mg/L
LDSPs	18-Apr-19	08:20	1.8	11.99	180.50	8.69	10.8	2.0
LDSPs	18-Apr-19	12:00	2.0	8.40	399.20	7.59	39.6	8.0
LDSPs	19-Apr-19	08:22	1.4	10.09	288.50	8.17	20.7	5.0
LDSPs	19-Apr-19	16:41	1.4	9.38	501.30	7.65	39.7	8.5
LDSPs	20-Apr-19	08:41	0.6	10.13	485.50	7.79	31.5	11.0
LDSPs	20-Apr-19	17:13	1.6	11.59	526.00	7.88	49.1	8.5
STATION	DATE	TIME 24 hours	Temp °C	DO mg/L	SPC uS/cm	pH	Turbidity NTU	TSS mg/L
LLO	18-Apr-19	08:25	0.3	9.66	413.90	8.03	22.9	9.0
LLO	18-Apr-19	16:07	0.6	9.17	435.70	7.70	25	9.5
LLO	19-Apr-19	08:25	0.4	9.63	520.30	7.80	29.4	6.5
LLO	19-Apr-19	16:45	0.4	9.72	538.70	7.60	37.4	10.0
LLO	20-Apr-19	08:45	0.6	9.69	531.40	7.65	31.3	8.0
LLO	20-Apr-19	17:16	1.1	10.83	513.50	7.88	65.5	35.0
STATION	DATE	TIME 24 hours	Temp °C	DO Mg/L	SPC uS/cm	pH	Turbidity NTU	TSS mg/L
LDSPO*	20-Apr-19	15:00	0.40	12.44	518.30	7.60	nm	72.4
LDSPO*	20-Apr-19	17:00	2.20	14.78	538.80	7.88	nm	67.6

NOTE:

* Note ALS sample certificates incorrectly identify LDSPO results as LDSP.

A sample was collected on April 20 at 15:00 downstream of the LLO at the LDSPO station, and while TSS from the onsite lab indicated TSS was above criteria this was considered a first flush of the LLO pipe connection to the discharge weir and the weir itself. The subsequent sample taken at the LDSPO station at 17:00 (samples take about 1.5 to 2 hours to turnaround in the onsite lab) indicated TSS levels remained high. A sample was taken from the LLO at 17:16, during discharge. Onsite TSS laboratory results were completed at about 18:40 and indicated that TSS exceeded criteria (35.0 mg/L; Table 2.1-1). Discharge was ceased at 18:45.

The sample collected from the LDSPO on April 20 at 15:00 was sent to ALS laboratories in Burnaby, BC for further analysis. On April 30 results from ALS were received by Victoria Gold. The results

confirmed that there was an exceedance in TSS, arsenic and pH (66.4 mg/L, 0.0827 mg/L, pH of 8.11, respectively; Appendix A). All other effluent quality standards were met (Appendix A).

Between 13:40 and 18:45 an estimated 3,186 m³ of water was released into Haggart Creek via Ditch C as measured using the standard equation for a 90-deg V notch weir ($Q = 4.28 C * \tan(A/2) * H^{2.5}$). As noted above, this volume represents flow with water quality that met criteria, as well as flow exceeding criteria, however, based on data available, SGC cannot estimate the actual proportions.

2.2 EVENT 2 DESCRIPTION

Internal samples taken of the LDSPs on April 25 (1.6 mg/L TSS) and April 26 (2.5 mg/L TSS) indicated water quality was below effluent quality standards using TSS as an indicator. Internal lab TSS values at 8:10 am on April 27 were 4.7 mg/L (Table 2.2-1). Additionally, the most recent offsite ALS sample (April 23) indicated that all parameters including all metals met discharge criteria. Based on these results, discharge began at 9:10 on April 27.

Table 2.2-1: Event 2 - In-situ field parameters of samples taken from the LDSP

STATION	DATE	TIME 24 hours	Temp °C	DO mg/L	SPC uS/cm	pH	Turbidity NTU	TSS mg/L
LDSPs	25-Apr-19	9:50	nm	nm	nm	nm	8.95	1.6
LDSPs	26-Apr-19	17:30	4.7	8.71	346.9	7.71	10.7	2.5
LDSPs	27-Apr-19	8:10	nm	nm	nm	nm	11.2	4.7
LDSPs	28-Apr-19	10:00	nm	nm	nm	nm	73.2	26.2
LDSPs	28-Apr-19	17:20	3.6	7.7	519.0	10.8	97.6	65.5
LDSPs	29-Apr-19	8:00	0.1	7.7	nm	11.7	53.3	24.3
STATION	DATE	TIME 24 hours	Temp °C	DO mg/L	SPC uS/cm	pH	Turbidity NTU	TSS mg/L
LLO	25-Apr-19	9:45	nm	nm	nm	nm	25.6	9.2
LLO	26-Apr-19	15:20	1.8	10.14	553.0	7.59	25.4	7.0
LLO	27-Apr-19	17:00	nm	nm	nm	nm	71.3	18.7
LLO	28-Apr-19	10:07	nm	nm	nm	nm	74.7	23.3
LLO	28-Apr-19	16:25	nm	nm	nm	nm	79.8	28.0
LLO	29-Apr-19	8:05	nm	nm	nm	nm	64.1	18.0
LLO	29-Apr-19	17:05	nm	nm	nm	nm	53.4	14.2
STATION	DATE	TIME 24 hours	TEMP °C	pH	SPC uS/cm	DO mg/L	Turbidity NTU	TSS mg/L
LDSPO*	27-Apr-19	17:20	0.90	7.88	514.80	12.58	68.2	27.0
LDSPO*	28-Apr-19	10:00	nm	nm	nm	nm	97.6	65.5
LDSPO*	28-Apr-19	17:20	3.60	7.74	519.00	10.84	53.3	24.3
LDSPO*	29-Apr-19	8:00	1.10	7.69	nm	11.72	68.2	27.0

NOTE:

* Note ALS sample certificates incorrectly identify LDSPO results as LDSP.

While TSS from the onsite lab indicated TSS was above criteria on April 28, again it was thought that this was a flush of the system and investigations into the cause began. However, on April 29, while in-situ results were improving, TSS remained near the discharge criteria limit and visual observations of the water quality did not indicate improvement, and so the LLO valve was closed.

From 9:10 am Saturday April 27 to Monday 8:22 am April 29 Victoria Gold discharged approximately 12,229 m³ from the LDSP. Samples were collected on the April 27, 28 and 29 and sent to ALS laboratories on April 29. Again, as with Event 1, this volume represents flow with water quality that met criteria, as well as flow exceeding criteria, however, based on data available, SGC cannot estimate the actual proportions.

On May 2 and May 9, results from ALS laboratories were received by SGC. TSS, pH and arsenic exceeded limits for a grab sample on April 27 (at 20.2 mg/L, pH of 8.11, and 0.0752, respectively) on April 28 (at 47.2 mg/L, pH of 8.12 and 0.0984, respectively) and exceeded limits for TSS and arsenic on April 29th (at 17.1 mg/L and 0.0745 mg/L, respectively; Appendix A).

2.3 ACUTE LETHALITY TESTING

A pre-discharge sample including an acute lethality single concentration test for 96 hr rainbow trout (using the Protocol outlined by Environment Canada [2000], EPS 1/RM/13, with 2007 & 2016 amendments) and 48 hr Daphnia magna (using the protocol outlined by Environment Canada [2000], EPS 1/RM/14, with 2016 amendments) was taken on April 18 and sent to Nautilus Environmental Labs in Burnaby, BC. The results for these tests are included in Attachment A. The results for these tests were not acutely lethal, and showed 100% survival for both rainbow trout and Daphnia magna.

At 8:00 on April 29, in accordance with subsection 31.1(1) of MDMER, a full suite sample including an acute lethality single concentration test for 96 hr rainbow trout and 48 hr Daphnia magna was taken before discharging stopped at 8:22 am. Samples again were sent to and sent to Nautilus Environmental Labs in Burnaby, BC. The results for these tests are included in Attachment A. The results for these tests were not acutely lethal, with 100% survival for both rainbow trout and Daphnia magna.

3 SPILL PREVENTION AND RESPONSE

These events represent the first time SGC discharged from the LDSP, and the first opportunity to test and flush the system since mine construction started and the LDSP construction was completed. It is not expected that discharge will have to occur from this location under normal conditions in the future, as the water detained within the LDSP is planned to be used for process water.

4 SPILL REPORTING

4.1 YUKON GOVERNMENT

On May 3rd, Victoria Gold reported the two separate exceedance events at the LDSPO to the Yukon Spill Reporting line and Compliance, Monitoring and Inspections department of the Yukon Government Department of Energy, Mines and Resources.

APPENDIX A

External Laboratory Results



STRATAGOLD CORPORATION
ATTN: Hugh Coyle
Suite 1000 - 1050 W. Pender St
Vancouver BC V6E 3S7

Date Received: 16-APR-19
Report Date: 25-APR-19 17:51 (MT)
Version: FINAL

Client Phone: 604-682-5122

Certificate of Analysis

Lab Work Order #: L2258760
Project P.O. #: NOT SUBMITTED
Job Reference: TSS MONITORING
C of C Numbers: 17-20190415B
Legal Site Desc:

Joanne Lee
Account Manager

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

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L2258760-6 WATER 14-APR-19 14:20 LDSPS	L2258760-7 WATER 14-APR-19 14:40 UND		
Grouping	Analyte				
WATER					
Physical Tests	Conductivity (uS/cm)	369	500		
	Hardness (as CaCO3) (mg/L)	166	257		
	pH (pH)	8.00	7.89		
	Total Suspended Solids (mg/L)	7.0	10.2		
	TDS (Calculated) (mg/L)	210	291		
	Turbidity (NTU)	5.85	5.80		
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	95.4	162		
	Ammonia, Total (as N) (mg/L)	0.0123	0.0436		
	Bromide (Br) (mg/L)	<0.050	<0.050		
	Chloride (Cl) (mg/L)	13.7	6.65		
	Fluoride (F) (mg/L)	0.115	0.147		
	Nitrate (as N) (mg/L)	0.117	0.189 ^{HTD}		
	Nitrite (as N) (mg/L)	0.0054	0.0013		
	Total Kjeldahl Nitrogen (mg/L)	0.108	0.113		
	Total Nitrogen (mg/L)	0.230	0.303		
	Orthophosphate-Dissolved (as P) (mg/L)	0.0019	0.0020		
	Phosphorus (P)-Total Dissolved (mg/L)	0.0038	0.0035		
	Phosphorus (P)-Total (mg/L)	0.0085	0.0032		
	Sulfate (SO4) (mg/L)	68.9	91.2		
	Anion Sum (meq/L)	3.74	5.35		
	Cation Sum (meq/L)	3.79	5.48		
	Cation - Anion Balance (%)	0.7	1.2		
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050		
	Cyanide, Total (mg/L)	<0.0050	<0.0050		
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	2.79	2.03		
	Total Organic Carbon (mg/L)	2.46	1.91		
Total Metals	Aluminum (Al)-Total (mg/L)	0.231	0.122		
	Antimony (Sb)-Total (mg/L)	0.00364	0.00280		
	Arsenic (As)-Total (mg/L)	0.0230	0.0229		
	Barium (Ba)-Total (mg/L)	0.0513	0.0714		
	Beryllium (Be)-Total (mg/L)	<0.000020	<0.000020		
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050		
	Boron (B)-Total (mg/L)	<0.010	<0.010		
	Cadmium (Cd)-Total (mg/L)	0.0000310	0.0000173		
	Calcium (Ca)-Total (mg/L)	36.4	55.2		
	Chromium (Cr)-Total (mg/L)	0.00031	0.00023		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2258760-6	L2258760-7		
		Description	WATER	WATER		
		Sampled Date	14-APR-19	14-APR-19		
		Sampled Time	14:20	14:40		
		Client ID	LDSPS	UND		
Grouping	Analyte					
WATER						
Total Metals	Cobalt (Co)-Total (mg/L)		0.00031	0.00013		
	Copper (Cu)-Total (mg/L)		0.00130	0.00115		
	Iron (Fe)-Total (mg/L)		0.227	0.227		
	Lead (Pb)-Total (mg/L)		0.000558	0.000600		
	Lithium (Li)-Total (mg/L)		0.0090	0.0129		
	Magnesium (Mg)-Total (mg/L)		19.1	28.7		
	Manganese (Mn)-Total (mg/L)		0.0511	0.00977		
	Mercury (Hg)-Total (mg/L)		<0.0000050	<0.0000050		
	Molybdenum (Mo)-Total (mg/L)		0.000907	0.000918		
	Nickel (Ni)-Total (mg/L)		0.00164	0.00083		
	Phosphorus (P)-Total (mg/L)		<0.050	<0.050		
	Potassium (K)-Total (mg/L)		2.58	2.52		
	Selenium (Se)-Total (mg/L)		0.000334	0.000485		
	Silicon (Si)-Total (mg/L)		3.90	5.31		
	Silver (Ag)-Total (mg/L)		<0.000010	<0.000010		
	Sodium (Na)-Total (mg/L)		10.4	6.10		
	Strontium (Sr)-Total (mg/L)		0.232	0.361		
	Sulfur (S)-Total (mg/L)		25.9	32.6		
	Thallium (Tl)-Total (mg/L)		<0.000010	0.000015		
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010		
	Titanium (Ti)-Total (mg/L)		0.00648	0.00576		
	Uranium (U)-Total (mg/L)		0.00441	0.00606		
	Vanadium (V)-Total (mg/L)		<0.00050	<0.00050		
	Zinc (Zn)-Total (mg/L)		<0.0030	<0.0030		
	Zirconium (Zr)-Total (mg/L)		<0.00030	<0.00030		
Dissolved Metals	Dissolved Mercury Filtration Location		FIELD	FIELD		
	Dissolved Metals Filtration Location		FIELD	FIELD		
	Aluminum (Al)-Dissolved (mg/L)		0.0076	0.0018		
	Antimony (Sb)-Dissolved (mg/L)		0.00313	0.00269		
	Arsenic (As)-Dissolved (mg/L)		0.0192	0.0192		
	Barium (Ba)-Dissolved (mg/L)		0.0491	0.0679		
	Beryllium (Be)-Dissolved (mg/L)		<0.000020	<0.000020		
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050	<0.000050		
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010		
	Cadmium (Cd)-Dissolved (mg/L)		0.0000315	0.0000105		
	Calcium (Ca)-Dissolved (mg/L)		36.3	54.0		
	Chromium (Cr)-Dissolved (mg/L)		0.00021	<0.00010		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2258760-6	L2258760-7		
		Description	WATER	WATER		
		Sampled Date	14-APR-19	14-APR-19		
		Sampled Time	14:20	14:40		
		Client ID	LDSPS	UND		
Grouping	Analyte					
WATER						
Dissolved Metals	Cobalt (Co)-Dissolved (mg/L)	0.00021	<0.00010			
	Copper (Cu)-Dissolved (mg/L)	0.00090	0.00082			
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010			
	Lead (Pb)-Dissolved (mg/L)	<0.000050	0.000274			
	Lithium (Li)-Dissolved (mg/L)	0.0089	0.0125			
	Magnesium (Mg)-Dissolved (mg/L)	18.3	29.6			
	Manganese (Mn)-Dissolved (mg/L)	0.0463	0.00443			
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050			
	Molybdenum (Mo)-Dissolved (mg/L)	0.000805	0.000878			
	Nickel (Ni)-Dissolved (mg/L)	0.00126	0.00061			
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050			
	Potassium (K)-Dissolved (mg/L)	2.64	2.56			
	Selenium (Se)-Dissolved (mg/L)	0.000307	0.000479			
	Silicon (Si)-Dissolved (mg/L)	3.33	4.75			
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010			
	Sodium (Na)-Dissolved (mg/L)	9.31	6.46			
	Strontium (Sr)-Dissolved (mg/L)	0.207	0.327			
	Sulfur (S)-Dissolved (mg/L)	25.6	30.1			
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000012			
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010			
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030			
	Uranium (U)-Dissolved (mg/L)	0.00421	0.00612			
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050			
	Zinc (Zn)-Dissolved (mg/L)	0.0012	0.0019			
	Zirconium (Zr)-Dissolved (mg/L)	<0.00030	<0.00030			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2258760-1, -2, -3, -4, -5, -7
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2258760-6
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2258760-1, -2, -3, -4, -5, -7
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2258760-6
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2258760-1, -2, -3, -4, -5, -7
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2258760-6
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2258760-1, -2, -3, -4, -5, -7
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2258760-6
Matrix Spike	Potassium (K)-Dissolved	MS-B	L2258760-1, -2, -3, -4, -5, -7
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2258760-1, -2, -3, -4, -5, -7
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2258760-6
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2258760-1, -2, -3, -4, -5, -7
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2258760-6
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L2258760-6
Matrix Spike	Uranium (U)-Dissolved	MS-B	L2258760-6
Matrix Spike	Barium (Ba)-Total	MS-B	L2258760-1, -2, -3, -4, -5, -7
Matrix Spike	Calcium (Ca)-Total	MS-B	L2258760-1, -2, -3, -4, -5, -7
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2258760-1, -2, -3, -4, -5, -7
Matrix Spike	Sodium (Na)-Total	MS-B	L2258760-1, -2, -3, -4, -5, -7
Matrix Spike	Strontium (Sr)-Total	MS-B	L2258760-1, -2, -3, -4, -5, -7
Matrix Spike	Sulfur (S)-Total	MS-B	L2258760-1, -2, -3, -4, -5, -7
Matrix Spike	Phosphorus (P)-Total	MS-B	L2258760-7

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
HTD	Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)
Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.			
BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)
Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.			
BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.			
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
CL-IC-N-VA	Water	Chloride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			

Reference Information

CN-T-CFA-VA	Water	Total Cyanide in water by CFA	ISO 14403:2002
<p>This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.</p>			
CN-WAD-CFA-VA	Water	Weak Acid Diss. Cyanide in water by CFA	APHA 4500-CN CYANIDE
<p>This analysis is carried out using procedures adapted from APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by in-line sample distillation with final determination by colourimetric analysis.</p>			
EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
<p>This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.</p>			
EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510
<p>Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.</p>			
F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)
<p>Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.</p>			
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
<p>Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO₃ equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.</p>			
HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)
<p>Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.</p>			
HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)
<p>Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.</p>			
IONBALANCE-VA	Water	Ion Balance Calculation	APHA 1030E
<p>Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.</p>			
<p>Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:</p>			
<p>Ion Balance (%) = $\frac{[\text{Cation Sum} - \text{Anion Sum}]}{[\text{Cation Sum} + \text{Anion Sum}]}$</p>			
MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)
<p>Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.</p>			
<p>Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.</p>			
MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)
<p>Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.</p>			
<p>Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.</p>			
NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
<p>This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.</p>			
NO2-L-IC-N-VA	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)
<p>Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.</p>			
NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)
<p>Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.</p>			
P-T-PRES-COL-VA	Water	Total P in Water by Colour	APHA 4500-P Phosphorus
<p>This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.</p>			
<p>Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.</p>			

Reference Information

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

P-TD-PRES-COL-VA Water Total Dissolved P in Water by Colour APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter. Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-CALC-VA Water TDS (Calculated) APHA 1030E (20TH EDITION)

This analysis is carried out using procedures adapted from APHA 1030E "Checking Correctness of Analyses". The Total Dissolved Solids result is calculated from measured concentrations of anions and cations in the sample.

TKN-F-VA Water TKN in Water by Fluorescence APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TN-CALC-VA Water Total Nitrogen (Calculation) BC MOE LABORATORY MANUAL (2005)

Total Nitrogen is a calculated parameter. Total Nitrogen = Total Kjeldahl Nitrogen + [Nitrate and Nitrite (as N)]

TSS-VA Water Total Suspended Solids by Gravimetric APHA 2540 D - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

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

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

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

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

17-20190415B

Reference Information

GLOSSARY OF REPORT TERMS

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

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

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

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

mg/L - milligrams per litre.

< - Less than.

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

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

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

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

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



STRATAGOLD CORPORATION
ATTN: Hugh Coyle
Suite 1000 - 1050 W. Pender St
Vancouver BC V6E 3S7

Date Received: 22-APR-19
Report Date: 08-MAY-19 14:27 (MT)
Version: FINAL

Client Phone: 604-682-5122

Certificate of Analysis

Lab Work Order #: L2261027
Project P.O. #: NOT SUBMITTED
Job Reference: STR125-EAGLEGOLD-VA
C of C Numbers: 14-2019-0418
Legal Site Desc:

Joanne Lee
Account Manager

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ALS CANADA LTD Part of the ALS Group An ALS Limited Company

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L2261027-1			
		Grab			
		18-APR-19			
		LDSPS			
Grouping	Analyte				
WATER					
Physical Tests	Conductivity (uS/cm)	554			
	Hardness (as CaCO3) (mg/L)	202			
	pH (pH)	8.06			
	pH at 15C, WSER (pH)	7.84			
	Total Suspended Solids (mg/L)	15.8			
	TDS (Calculated) (mg/L)	298			
	Turbidity (NTU)	22.8			
	Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	153		
Ammonia, Total (as N) (mg/L)		<0.0050			
Ammonia, Un-ionized (as N), 15C, WSER (mg/L)		<0.000093			
Bromide (Br) (mg/L)		<0.050			
Chloride (Cl) (mg/L)		19.2			
Fluoride (F) (mg/L)		0.160			
Nitrate (as N) (mg/L)		0.137			
Nitrite (as N) (mg/L)		0.0043			
Phosphorus (P)-Total (mg/L)		0.0283			
Sulfate (SO4) (mg/L)		108			
Anion Sum (meq/L)		5.86			
Cation Sum (meq/L)		4.46			
Cation - Anion Balance (%)		-13.6			
Cyanides		Cyanide, Total (mg/L)	<0.0050 ^{HTP}		
Total Metals	Aluminum (Al)-Total (mg/L)	0.810			
	Antimony (Sb)-Total (mg/L)	0.00414			
	Arsenic (As)-Total (mg/L)	0.0507			
	Barium (Ba)-Total (mg/L)	0.0673			
	Beryllium (Be)-Total (mg/L)	0.000044			
	Bismuth (Bi)-Total (mg/L)	0.000136			
	Boron (B)-Total (mg/L)	<0.010			
	Cadmium (Cd)-Total (mg/L)	0.0000643			
	Calcium (Ca)-Total (mg/L)	47.0			
	Chromium (Cr)-Total (mg/L)	0.00126			
	Cobalt (Co)-Total (mg/L)	0.00081			
	Copper (Cu)-Total (mg/L)	0.00394			
	Iron (Fe)-Total (mg/L)	1.13			
	Lead (Pb)-Total (mg/L)	0.00337			
	Lithium (Li)-Total (mg/L)	0.0113			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L2261027-1			
		Grab			
		18-APR-19			
		LDSPS			
Grouping	Analyte				
WATER					
Total Metals	Magnesium (Mg)-Total (mg/L)	21.1			
	Manganese (Mn)-Total (mg/L)	0.0925			
	Mercury (Hg)-Total (mg/L)	0.0000063			
	Molybdenum (Mo)-Total (mg/L)	0.000966			
	Nickel (Ni)-Total (mg/L)	0.00311			
	Phosphorus (P)-Total (mg/L)	<0.050			
	Potassium (K)-Total (mg/L)	3.36			
	Selenium (Se)-Total (mg/L)	0.000445			
	Silicon (Si)-Total (mg/L)	4.95			
	Silver (Ag)-Total (mg/L)	0.000030			
	Sodium (Na)-Total (mg/L)	7.99			
	Strontium (Sr)-Total (mg/L)	0.261			
	Sulfur (S)-Total (mg/L)	30.3			
	Thallium (Tl)-Total (mg/L)	0.000023			
	Tin (Sn)-Total (mg/L)	<0.00010			
	Titanium (Ti)-Total (mg/L)	0.0260			
	Uranium (U)-Total (mg/L)	0.00531			
	Vanadium (V)-Total (mg/L)	0.00162			
	Zinc (Zn)-Total (mg/L)	0.0059			
	Zirconium (Zr)-Total (mg/L)	0.00062			
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD			
	Dissolved Metals Filtration Location	FIELD			
	Aluminum (Al)-Dissolved (mg/L)	0.0093			
	Antimony (Sb)-Dissolved (mg/L)	0.00329			
	Arsenic (As)-Dissolved (mg/L)	0.0259			
	Barium (Ba)-Dissolved (mg/L)	0.0556			
	Beryllium (Be)-Dissolved (mg/L)	<0.000020			
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050			
	Boron (B)-Dissolved (mg/L)	<0.010			
	Cadmium (Cd)-Dissolved (mg/L)	0.0000357			
	Calcium (Ca)-Dissolved (mg/L)	45.9			
	Chromium (Cr)-Dissolved (mg/L)	0.00016			
	Cobalt (Co)-Dissolved (mg/L)	0.00030			
	Copper (Cu)-Dissolved (mg/L)	0.00176			
	Iron (Fe)-Dissolved (mg/L)	0.022			
	Lead (Pb)-Dissolved (mg/L)	0.000072			
	Lithium (Li)-Dissolved (mg/L)	0.0101			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2261027-1				
		Description	Grab				
		Sampled Date	18-APR-19				
		Sampled Time					
		Client ID	LDSPS				
Grouping	Analyte						
WATER							
Dissolved Metals	Magnesium (Mg)-Dissolved (mg/L)		21.2				
	Manganese (Mn)-Dissolved (mg/L)		0.0716				
	Mercury (Hg)-Dissolved (mg/L)		<0.0000050				
	Molybdenum (Mo)-Dissolved (mg/L)		0.000902				
	Nickel (Ni)-Dissolved (mg/L)		0.00168				
	Phosphorus (P)-Dissolved (mg/L)		<0.050				
	Potassium (K)-Dissolved (mg/L)		3.05				
	Selenium (Se)-Dissolved (mg/L)		0.000428				
	Silicon (Si)-Dissolved (mg/L)		3.63				
	Silver (Ag)-Dissolved (mg/L)		<0.000010				
	Sodium (Na)-Dissolved (mg/L)		7.87				
	Strontium (Sr)-Dissolved (mg/L)		0.266				
	Sulfur (S)-Dissolved (mg/L)		28.8				
	Thallium (Tl)-Dissolved (mg/L)		<0.000010				
	Tin (Sn)-Dissolved (mg/L)		<0.00010				
	Titanium (Ti)-Dissolved (mg/L)		0.00030				
	Uranium (U)-Dissolved (mg/L)		0.00490				
	Vanadium (V)-Dissolved (mg/L)		<0.00050				
	Zinc (Zn)-Dissolved (mg/L)		<0.0010				
	Zirconium (Zr)-Dissolved (mg/L)		<0.00030				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Zinc (Zn)-Dissolved	B	L2261027-1
Laboratory Control Sample	Silver (Ag)-Dissolved	MBS	L2261027-1
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2261027-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2261027-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2261027-1
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2261027-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2261027-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2261027-1
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L2261027-1
Matrix Spike	Uranium (U)-Dissolved	MS-B	L2261027-1
Matrix Spike	Aluminum (Al)-Total	MS-B	L2261027-1
Matrix Spike	Arsenic (As)-Total	MS-B	L2261027-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2261027-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2261027-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2261027-1
Matrix Spike	Manganese (Mn)-Total	MS-B	L2261027-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2261027-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2261027-1
Matrix Spike	Sulfur (S)-Total	MS-B	L2261027-1
Matrix Spike	Uranium (U)-Total	MS-B	L2261027-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
HTP	Sample preparation or preservation hold time was exceeded.
MBS	Surrogate recovery in Method Blank was outside ALS DQO. Moderately low-biased results in the MB do not significantly affect its purpose.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)
Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.			
BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)
Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.			
BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
CL-IC-N-VA	Water	Chloride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
CN-T-CFA-VA	Water	Total Cyanide in water by CFA	ISO 14403:2002
This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.			
EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.			

Reference Information

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.			
F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.			
HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)
Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.			
HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)
Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.			
IONBALANCE-VA	Water	Ion Balance Calculation	APHA 1030E
Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.			
Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:			
Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]			
MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)
Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.			
Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			
MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)
Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.			
Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			
NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Weston et al.			
NH3-UNION-15-CALC-VA	Water	Un-ionized Ammonia at 15C, WSER	WSER 29June2012
Un-ionized Ammonia at 15C is calculated from test results for Total Ammonia and for pH at 15C, as per the federal Wastewater Systems Effluent Regulation, and is expressed in units of mg/L "as N".			
NO2-L-IC-N-VA	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
P-T-PRES-COL-VA	Water	Total P in Water by Colour	APHA 4500-P Phosphorus
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.			
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.			
Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.			
PH-15C-MAN-VA	Water	pH in Water (at 15C)	APHA 4500-H+ B (2000)
pH at 15C is determined by the electrometric method after equilibration of test samples and pH buffer solutions to 15 +/- 1 C, and is used to calculate Un-Ionized Ammonia for the federal Wastewater Systems Effluent Regulation. A 5 day recommended hold time is based on the trout acute lethality test, which pH at 15C is intended to represent.			
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value

Reference Information

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-CALC-VA Water TDS (Calculated) APHA 1030E (20TH EDITION)

This analysis is carried out using procedures adapted from APHA Method 1030E "Checking Correctness of Analyses".

The Total Dissolved Solids result is calculated from measured concentrations of anions and cations in the sample.

TSS-VA Water Total Suspended Solids by Gravimetric APHA 2540 D - GRAVIMETRIC

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

Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

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

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

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

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

14-2019-0418

GLOSSARY OF REPORT TERMS

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

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

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

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

mg/L - milligrams per litre.

< - Less than.

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

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

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

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

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



Tuesday, May 07, 2019

Joanne Lee
ALS Environmental
8081 Lougheed Hwy, Suite 100
Burnaby, BC V5A 1W9

Re: ALS Workorder: 1904489
Project Name:
Project Number: L2261027

Dear Ms. Lee:

One water sample was received from ALS Environmental, on 4/24/2019. The sample was scheduled for the following analysis:

Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. O'Brien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280



1904489

Radium-226:

The sample was prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1904489

Client Name: ALS Environmental

Client Project Name:

Client Project Number: L2261027

Client PO Number: L2261027

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2261027-1	1904489-1		WATER	18-Apr-19	



L2261027

VANCOUVER

Subcontract Request Form

1904489

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS, CO 80524

NOTES: Please reference on final report and invoice: PO# L2261027
ALS requires QC data to be provided with your final results.

Please see enclosed 1 sample(s) in 2 Container(s)

Table with columns: SAMPLE NUMBER, ANALYTICAL REQUIRED, DATE SAMPLED DUE DATE, Priority Flag. Row 1: L2261027-1 LDSPS, Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1), 4/18/2019, 5/13/2019, P

Subcontract Info Contact: Walter Lin (604) 253-4188
Analysis and reporting info contact: Joanne Lee
8081 LOUGHEED HWY
SUITE 100
BURNABY, BC V5A 1W9
Phone: (604) 253-4188

NEW Reporting Contacts:
1. Account Manager Listed Below
2. ALSEVDataSublet@ALSGlobal.com (PDF / EXCEL)
3. ALSE.CASDG@ALSGlobal.com (EDD/Database Formats)

Email: joanne.lee@alsglobal.com

Please email confirmation of receipt to: joanne.lee@alsglobal.com

Shipped By: Date Shipped:
Received By: Emily Lyons Date Received: 04.24.19 0930
Verified By: Date Verified:
Temperature:

Sample Integrity Issues:



ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS - Burnaby
Project Manager: KMO

Workorder No: 1904489
Initials: Eme Date: 04.24.19

1. Are airbills / shipping documents present and/or removable?		DROP OFF	<input checked="" type="radio"/> YES	NO
2. Are custody seals on shipping containers intact?		<input checked="" type="radio"/> NONE	YES	NO *
3. Are custody seals on sample containers intact?		<input checked="" type="radio"/> NONE	YES	NO *
4. Is there a COC (chain-of-custody) present?			<input checked="" type="radio"/> YES	NO *
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)			<input checked="" type="radio"/> YES	NO *
6. Are short-hold samples present?			YES	<input checked="" type="radio"/> NO
7. Are all samples within holding times for the requested analyses?			<input checked="" type="radio"/> YES	NO *
8. Were all sample containers received intact? (not broken or leaking)			<input checked="" type="radio"/> YES	NO *
9. Is there sufficient sample for the requested analyses?			<input checked="" type="radio"/> YES	NO *
10. Are all samples in the proper containers for the requested analyses?			<input checked="" type="radio"/> YES	NO *
11. Are all aqueous samples preserved correctly, if required? (excluding volatiles)		N/A	YES	<input checked="" type="radio"/> NO *
12. Are all aqueous non-preserved samples pH 4-9?		<input checked="" type="radio"/> N/A	YES	NO *
13. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)		<input checked="" type="radio"/> N/A	YES	NO
14. Were the samples shipped on ice?			<input checked="" type="radio"/> YES	NO
15. Were cooler temperatures measured at 0.1-6.0°C?	IR gun used*:	#1	<input checked="" type="radio"/> #3	#4
	Cooler #:	<u>1</u>		
	Temperature (°C):	<u>5.5</u>		
	No. of custody seals on cooler:	<u>0</u>		
DOT Survey Acceptance Information	External µR/hr reading:	<u>10</u>		
	Background µR/hr reading:	<u>10</u>		
Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)				

* Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.

COC was not relinquished by client.

#11) Both bottles had an initial pH of 3. 1mL of HNO₃ (lot #197345) was added to each bottle. The final pH for each bottle is 1.6.

All client bottle ID's vs ALS lab ID's double-checked by: Eme

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: [Signature] 4/25/19

Client: ALS Environmental

Date: 07-May-19

Project: L2261027

Work Order: 1904489

Sample ID: L2261027-1

Lab ID: 1904489-1

Legal Location:

Matrix: WATER

Collection Date: 4/18/2019

Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1			SOP 783		Prep Date: 4/25/2019	PrepBy: JXH
Ra-226	0.0043 (+/- 0.0051)	U	0.0079	BQ/l	NA	5/7/2019 11:55
Carr: <i>BARIUM</i>	93.5		40-110	%REC	DL = NA	5/7/2019 11:55



STRATAGOLD CORPORATION
ATTN: Hugh Coyle
Suite 1000 - 1050 W. Pender St
Vancouver BC V6E 3S7

Date Received: 23-APR-19
Report Date: 30-APR-19 14:56 (MT)
Version: FINAL

Client Phone: 604-682-5122

Certificate of Analysis

Lab Work Order #: L2261528
Project P.O. #: NOT SUBMITTED
Job Reference: SWQ
C of C Numbers: 17-20190421
Legal Site Desc:

Comments: Cyanide analysis could not be done due to appropriate containers not received.

Joanne Lee
Account Manager

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

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2261528-1	L2261528-2	L2261528-3	L2261528-4
		Description	Water	Water	Water	Water
		Sampled Date	19-APR-19	19-APR-19	20-APR-19	20-APR-19
		Sampled Time	13:18	14:16	15:00	18:30
		Client ID	W20	W26	LDSP	W29
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)		77.1	357	559	434
	Hardness (as CaCO3) (mg/L)		32.8	184	260	195
	pH (pH)		7.63	8.15	8.11	8.12
	Total Suspended Solids (mg/L)		12.8	<3.0	66.4	75.6
	TDS (Calculated) (mg/L)		40.5	203	336	253
	Turbidity (NTU)		1.42	0.19	68.1	62.0
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)		30.3	150	155	124
	Ammonia, Total (as N) (mg/L)		0.0082	<0.0050	<0.0050	0.0076
	Bromide (Br) (mg/L)		<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)		<0.50	<0.50	20.6	8.12
	Fluoride (F) (mg/L)		0.053	0.119	0.168	0.135
	Nitrate (as N) (mg/L)		0.120	<0.0050	0.138	0.0984
	Nitrite (as N) (mg/L)		<0.0010	<0.0010	0.0042	0.0017
	Total Kjeldahl Nitrogen (mg/L)		<0.050	0.117	0.233	0.210
	Total Nitrogen (mg/L)		0.120	0.117	0.375	0.310
	Orthophosphate-Dissolved (as P) (mg/L)		0.0015	0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total Dissolved (mg/L)		0.0048	0.0064	0.0059	0.0056
	Phosphorus (P)-Total (mg/L)		0.0118	0.0129	0.0674	0.0441
	Sulfate (SO4) (mg/L)		6.28	44.1	111	91.1
	Anion Sum (meq/L)		0.75	3.92	6.01	4.61
	Cation Sum (meq/L)		0.75	3.81	5.92	4.27
	Cation - Anion Balance (%)		0.5	-1.5	-0.8	-3.8
Cyanides	Cyanide, Weak Acid Diss (mg/L)			<0.0050	<0.0050	<0.0050
	Cyanide, Total (mg/L)			<0.0050	<0.0050	<0.0050
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)		0.82	4.11	7.45 ^{RRV}	5.75
	Total Organic Carbon (mg/L)		0.97	4.23	6.42 ^{RRV}	5.14
Total Metals	Aluminum (Al)-Total (mg/L)		0.0807	0.0058	1.32	2.12
	Antimony (Sb)-Total (mg/L)		0.00061	0.00072	0.00587	0.00333
	Arsenic (As)-Total (mg/L)		0.0663	0.0247	0.0827	0.0625
	Barium (Ba)-Total (mg/L)		0.0329	0.0746	0.100	0.0728
	Beryllium (Be)-Total (mg/L)		<0.000020	<0.000020	0.000071	0.000101
	Bismuth (Bi)-Total (mg/L)		<0.000050	<0.000050	0.000204	0.000168
	Boron (B)-Total (mg/L)		<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)		0.0000134	0.0000297	0.0000973	0.0000971
	Calcium (Ca)-Total (mg/L)		10.4	42.5	55.8	43.1
	Chromium (Cr)-Total (mg/L)		0.00030	0.00011	0.00261	0.00329

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2261528-1	L2261528-2	L2261528-3	L2261528-4
		Description	Water	Water	Water	Water
		Sampled Date	19-APR-19	19-APR-19	20-APR-19	20-APR-19
		Sampled Time	13:18	14:16	15:00	18:30
		Client ID	W20	W26	LDSP	W29
Grouping	Analyte					
WATER						
Total Metals	Cobalt (Co)-Total (mg/L)		<0.00010	<0.00010	0.00173	0.00195
	Copper (Cu)-Total (mg/L)		<0.00050	<0.00050	0.00724	0.00569
	Iron (Fe)-Total (mg/L)		0.110	0.023	3.15	3.36
	Lead (Pb)-Total (mg/L)		0.000328	<0.000050	0.00680	0.00623
	Lithium (Li)-Total (mg/L)		0.0015	0.0062	0.0153	0.0111
	Magnesium (Mg)-Total (mg/L)		1.78	21.4	27.5	21.7
	Manganese (Mn)-Total (mg/L)		0.00355	0.0317	0.136	0.177
	Mercury (Hg)-Total (mg/L)		<0.0000050	<0.0000050	0.0000108	<0.0000050
	Molybdenum (Mo)-Total (mg/L)		0.000896	0.00228	0.00129	0.000611
	Nickel (Ni)-Total (mg/L)		<0.00050	0.00054	0.00522	0.00551
	Phosphorus (P)-Total (mg/L)		<0.050	<0.050	0.064	<0.050
	Potassium (K)-Total (mg/L)		0.58	1.85	4.19	3.17
	Selenium (Se)-Total (mg/L)		0.000083	0.000479	0.000495	0.000319
	Silicon (Si)-Total (mg/L)		6.22	5.73	6.62	7.45
	Silver (Ag)-Total (mg/L)		<0.000010	<0.000010	0.000052	0.000054
	Sodium (Na)-Total (mg/L)		1.82	1.79	14.1	7.69
	Strontium (Sr)-Total (mg/L)		0.0662	0.329	0.318	0.248
	Sulfur (S)-Total (mg/L)		2.43	16.3	40.6	31.1
	Thallium (Tl)-Total (mg/L)		<0.000010	<0.000010	0.000043	0.000050
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	0.00017
	Titanium (Ti)-Total (mg/L)		0.00437	<0.00030	0.0779	0.0926
	Uranium (U)-Total (mg/L)		0.000384	0.00500	0.00663	0.00333
	Vanadium (V)-Total (mg/L)		<0.00050	<0.00050	0.00322	0.00390
	Zinc (Zn)-Total (mg/L)		<0.0030	<0.0030	0.0112	0.0159
	Zirconium (Zr)-Total (mg/L)		<0.00030	<0.00030	0.00062	0.00132
Dissolved Metals	Dissolved Mercury Filtration Location		FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location		FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)		0.0053	0.0054	0.0067	0.0095
	Antimony (Sb)-Dissolved (mg/L)		0.00053	0.00068	0.00405	0.00153
	Arsenic (As)-Dissolved (mg/L)		0.0608	0.0237	0.0277	0.00939
	Barium (Ba)-Dissolved (mg/L)		0.0310	0.0787	0.0736	0.0437
	Beryllium (Be)-Dissolved (mg/L)		<0.000020	<0.000020	<0.000020	<0.000020
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.0000093	0.0000303	0.0000390	0.0000285
	Calcium (Ca)-Dissolved (mg/L)		10.2	41.7	57.9	43.0
	Chromium (Cr)-Dissolved (mg/L)		<0.00010	<0.00010	0.00012	0.00010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	Description	Sampled Date	Sampled Time	Client ID	L2261528-1	L2261528-2	L2261528-3	L2261528-4
					Water	Water	Water	Water
		19-APR-19	13:18	W20	19-APR-19	14:16	20-APR-19	20-APR-19
					W20	W26	LDSP	W29
Grouping	Analyte							
WATER								
Dissolved Metals	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010 ^{DLB}	0.00034	0.00032			
	Copper (Cu)-Dissolved (mg/L)	<0.00080	<0.0014 ^{DLB}	0.00174	0.00101			
	Iron (Fe)-Dissolved (mg/L)	<0.010	0.021	0.019	0.035			
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	0.000056	0.000067			
	Lithium (Li)-Dissolved (mg/L)	0.0013	0.0056	0.0143	0.0091			
	Magnesium (Mg)-Dissolved (mg/L)	1.79	19.4	28.0	21.2			
	Manganese (Mn)-Dissolved (mg/L)	0.00084	0.0304	0.0813	0.0937			
	Mercury (Hg)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	0.000090 ^{DTC}			
	Molybdenum (Mo)-Dissolved (mg/L)	0.000832	0.00212	0.00127	0.000501			
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	0.00191	0.00191			
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050			
	Potassium (K)-Dissolved (mg/L)	0.52	1.80	3.76	2.33			
	Selenium (Se)-Dissolved (mg/L)	0.000089	0.000404	0.000585	0.000287			
	Silicon (Si)-Dissolved (mg/L)	5.88	5.42	4.48	4.12			
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010			
	Sodium (Na)-Dissolved (mg/L)	1.96	1.90	14.4	7.33			
	Strontium (Sr)-Dissolved (mg/L)	0.0654	0.339	0.329	0.245			
	Sulfur (S)-Dissolved (mg/L)	1.79	15.2	40.6	31.7			
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010			
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010			
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030			
	Uranium (U)-Dissolved (mg/L)	0.000304	0.00473	0.00621	0.00309			
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050			
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	0.0019	0.0017	<0.0030 ^{DLB}			
	Zirconium (Zr)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Manganese (Mn)-Total	B	L2261528-1, -2
Method Blank	Copper (Cu)-Dissolved	MB-LOR	L2261528-1, -2
Method Blank	Zinc (Zn)-Dissolved	MB-LOR	L2261528-4
Matrix Spike	Dissolved Organic Carbon	MS-B	L2261528-3
Matrix Spike	Dissolved Organic Carbon	MS-B	L2261528-1, -2
Matrix Spike	Total Organic Carbon	MS-B	L2261528-3, -4
Matrix Spike	Total Organic Carbon	MS-B	L2261528-1, -2
Matrix Spike	Arsenic (As)-Dissolved	MS-B	L2261528-1, -2
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2261528-3
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2261528-1, -2
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2261528-3
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2261528-1, -2
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2261528-3
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2261528-1, -2
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2261528-3
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2261528-3
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2261528-3
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2261528-1, -2
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L2261528-3
Matrix Spike	Arsenic (As)-Total	MS-B	L2261528-3
Matrix Spike	Barium (Ba)-Total	MS-B	L2261528-3
Matrix Spike	Calcium (Ca)-Total	MS-B	L2261528-3
Matrix Spike	Calcium (Ca)-Total	MS-B	L2261528-1, -2
Matrix Spike	Iron (Fe)-Total	MS-B	L2261528-3
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2261528-3
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2261528-1, -2
Matrix Spike	Manganese (Mn)-Total	MS-B	L2261528-3
Matrix Spike	Manganese (Mn)-Total	MS-B	L2261528-1, -2
Matrix Spike	Strontium (Sr)-Total	MS-B	L2261528-3
Matrix Spike	Strontium (Sr)-Total	MS-B	L2261528-1, -2
Matrix Spike	Sulfur (S)-Total	MS-B	L2261528-3
Matrix Spike	Sulfur (S)-Total	MS-B	L2261528-1, -2
Matrix Spike	Zinc (Zn)-Total	MS-B	L2261528-1, -2

Qualifiers for Individual Parameters Listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
DLB	Detection Limit Raised. Analyte detected at comparable level in Method Blank.
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)
Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.			
BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Reference Information

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

BR-L-IC-N-VA Water Bromide in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CARBONS-DOC-VA Water Dissolved organic carbon by combustion APHA 5310B

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA Water Total organic carbon by combustion APHA 5310B TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-IC-N-VA Water Chloride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CN-T-CFA-VA Water Total Cyanide in water by CFA ISO 14403:2002

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

CN-WAD-CFA-VA Water Weak Acid Diss. Cyanide in water by CFA APHA 4500-CN CYANIDE

This analysis is carried out using procedures adapted from APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by in-line sample distillation with final determination by colourimetric analysis.

EC-PCT-VA Water Conductivity (Automated) APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA Water Conductivity Screen (Internal Use Only) APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO₃ equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Reference Information

NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.			
NO2-L-IC-N-VA	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
P-T-PRES-COL-VA	Water	Total P in Water by Colour	APHA 4500-P Phosphorus
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample. Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.			
Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.			
P-TD-PRES-COL-VA	Water	Total Dissolved P in Water by Colour	APHA 4500-P Phosphorous
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter. Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.			
Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.			
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
It is recommended that this analysis be conducted in the field.			
PO4-DO-COL-VA	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P Phosphorus
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.			
Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.			
SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
TDS-CALC-VA	Water	TDS (Calculated)	APHA 1030E (20TH EDITION)
This analysis is carried out using procedures adapted from APHA 1030E "Checking Correctness of Analyses". The Total Dissolved Solids result is calculated from measured concentrations of anions and cations in the sample.			
TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.
This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.			
TN-CALC-VA	Water	Total Nitrogen (Calculation)	BC MOE LABORATORY MANUAL (2005)
Total Nitrogen is a calculated parameter. Total Nitrogen = Total Kjeldahl Nitrogen + [Nitrate and Nitrite (as N)]			
TSS-VA	Water	Total Suspended Solids by Gravimetric	APHA 2540 D - GRAVIMETRIC
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.			
TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity
This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.			

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

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

Laboratory Definition Code	Laboratory Location
----------------------------	---------------------

Reference Information

VA

ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

17-20190421

GLOSSARY OF REPORT TERMS

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

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

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

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

mg/L - milligrams per litre.

< - Less than.

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

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

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

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

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



STRATAGOLD CORPORATION
ATTN: Hugh Coyle
Suite 1000 - 1050 W. Pender St
Vancouver BC V6E 3S7

Date Received: 30-APR-19
Report Date: 22-MAY-19 12:25 (MT)
Version: FINAL

Client Phone: 604-682-5122

Certificate of Analysis

Lab Work Order #: L2264977
Project P.O. #: NOT SUBMITTED
Job Reference: LDSP
C of C Numbers: 17-2019-0429B
Legal Site Desc:

Comments:

Joanne Lee
Account Manager

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

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ALS CANADA LTD Part of the ALS Group An ALS Limited Company

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L2264977-1				
		Grab				
		29-APR-19				
		08:00				
		LDSP				
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	492				
	Hardness (as CaCO3) (mg/L)	216				
	pH (pH)	7.86				
	pH at 15C, WSER (pH)	7.94				
	Total Suspended Solids (mg/L)	17.1				
	TDS (Calculated) (mg/L)	287				
	Turbidity (NTU)	53.6				
	Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	138			
Ammonia, Total (as N) (mg/L)		<0.0050				
Ammonia, Un-ionized (as N), 15C, WSER (mg/L)		<0.00012				
Bromide (Br) (mg/L)		<0.050				
Chloride (Cl) (mg/L)		14.7				
Fluoride (F) (mg/L)		0.166				
Nitrate (as N) (mg/L)		0.103				
Nitrite (as N) (mg/L)		0.0042				
Phosphorus (P)-Total (mg/L)		0.0269				
Sulfate (SO4) (mg/L)		102				
Anion Sum (meq/L)		5.30				
Cation Sum (meq/L)		4.90				
Cation - Anion Balance (%)		-4.0				
Cyanides		Cyanide, Total (mg/L)	<0.0050			
Total Metals		Aluminum (Al)-Total (mg/L)	1.91			
	Antimony (Sb)-Total (mg/L)	0.00528				
	Arsenic (As)-Total (mg/L)	0.0745				
	Barium (Ba)-Total (mg/L)	0.0832				
	Beryllium (Be)-Total (mg/L)	0.000082				
	Bismuth (Bi)-Total (mg/L)	0.000255				
	Boron (B)-Total (mg/L)	<0.010				
	Cadmium (Cd)-Total (mg/L)	0.0000913				
	Calcium (Ca)-Total (mg/L)	54.2				
	Chromium (Cr)-Total (mg/L)	0.00269				
	Cobalt (Co)-Total (mg/L)	0.00121				
	Copper (Cu)-Total (mg/L)	0.00570				
	Iron (Fe)-Total (mg/L)	2.07				
	Lead (Pb)-Total (mg/L)	0.00619				
	Lithium (Li)-Total (mg/L)	0.0135				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L2264977-1			
		Grab			
		29-APR-19			
		08:00			
		LDSP			
Grouping	Analyte				
WATER					
Total Metals	Magnesium (Mg)-Total (mg/L)	21.6			
	Manganese (Mn)-Total (mg/L)	0.114			
	Mercury (Hg)-Total (mg/L)	<0.000025 ^{DLM}			
	Molybdenum (Mo)-Total (mg/L)	0.00167			
	Nickel (Ni)-Total (mg/L)	0.00408			
	Phosphorus (P)-Total (mg/L)	<0.050			
	Potassium (K)-Total (mg/L)	4.15			
	Selenium (Se)-Total (mg/L)	0.000504			
	Silicon (Si)-Total (mg/L)	7.17			
	Silver (Ag)-Total (mg/L)	0.000053			
	Sodium (Na)-Total (mg/L)	10.7			
	Strontium (Sr)-Total (mg/L)	0.302			
	Sulfur (S)-Total (mg/L)	36.7			
	Thallium (Tl)-Total (mg/L)	0.000037			
	Tin (Sn)-Total (mg/L)	0.00013			
	Titanium (Ti)-Total (mg/L)	0.0607			
	Uranium (U)-Total (mg/L)	0.00586			
	Vanadium (V)-Total (mg/L)	0.00316			
	Zinc (Zn)-Total (mg/L)	0.0095			
	Zirconium (Zr)-Total (mg/L)	0.00148			
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD			
	Dissolved Metals Filtration Location	FIELD			
	Aluminum (Al)-Dissolved (mg/L)	0.0158			
	Antimony (Sb)-Dissolved (mg/L)	0.00321			
	Arsenic (As)-Dissolved (mg/L)	0.0301			
	Barium (Ba)-Dissolved (mg/L)	0.0599			
	Beryllium (Be)-Dissolved (mg/L)	<0.000020			
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050			
	Boron (B)-Dissolved (mg/L)	<0.010			
	Cadmium (Cd)-Dissolved (mg/L)	0.0000514			
	Calcium (Ca)-Dissolved (mg/L)	50.1			
	Chromium (Cr)-Dissolved (mg/L)	0.00020			
	Cobalt (Co)-Dissolved (mg/L)	0.00039			
	Copper (Cu)-Dissolved (mg/L)	0.00226			
	Iron (Fe)-Dissolved (mg/L)	0.047			
	Lead (Pb)-Dissolved (mg/L)	0.000127			
	Lithium (Li)-Dissolved (mg/L)	0.0124			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L2264977-1			
Grouping	Analyte				
WATER					
Dissolved Metals	Magnesium (Mg)-Dissolved (mg/L)	22.1			
	Manganese (Mn)-Dissolved (mg/L)	0.0950			
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050			
	Molybdenum (Mo)-Dissolved (mg/L)	0.00106			
	Nickel (Ni)-Dissolved (mg/L)	0.00208			
	Phosphorus (P)-Dissolved (mg/L)	<0.050			
	Potassium (K)-Dissolved (mg/L)	3.45			
	Selenium (Se)-Dissolved (mg/L)	0.000479			
	Silicon (Si)-Dissolved (mg/L)	4.15			
	Silver (Ag)-Dissolved (mg/L)	<0.000010			
	Sodium (Na)-Dissolved (mg/L)	11.0			
	Strontium (Sr)-Dissolved (mg/L)	0.289			
	Sulfur (S)-Dissolved (mg/L)	35.3			
	Thallium (Tl)-Dissolved (mg/L)	<0.000010			
	Tin (Sn)-Dissolved (mg/L)	<0.00010			
	Titanium (Ti)-Dissolved (mg/L)	0.00046			
	Uranium (U)-Dissolved (mg/L)	0.00523			
	Vanadium (V)-Dissolved (mg/L)	<0.00050			
	Zinc (Zn)-Dissolved (mg/L)	0.0011			
	Zirconium (Zr)-Dissolved (mg/L)	<0.00030			
Radiological Parameters	Ra-226 (Bq/L)	<0.0068			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Total	MS-B	L2264977-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2264977-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2264977-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2264977-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2264977-1
Matrix Spike	Uranium (U)-Total	MS-B	L2264977-1
Matrix Spike	Sulfate (SO4)	MS-B	L2264977-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)
Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.			
BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)
Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.			
BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
CL-IC-N-VA	Water	Chloride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
CN-T-CFA-VA	Water	Total Cyanide in water by CFA	ISO 14403:2002
This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.			
EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.			
EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.			
F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.			
HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)
Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.			
HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)
Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.			
IONBALANCE-VA	Water	Ion Balance Calculation	APHA 1030E
Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions)			

Reference Information

should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NH3-UNION-15-CALC-VA Water Un-ionized Ammonia at 15C, WSER WSER 29June2012

Un-ionized Ammonia at 15C is calculated from test results for Total Ammonia and for pH at 15C, as per the federal Wastewater Systems Effluent Regulation, and is expressed in units of mg/L "as N".

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-15C-MAN-VA Water pH in Water (at 15C) APHA 4500-H+ B (2000)

pH at 15C is determined by the electrometric method after equilibration of test samples and pH buffer solutions to 15 +/- 1 C, and is used to calculate Un-ionized Ammonia for the federal Wastewater Systems Effluent Regulation. A 5 day recommended hold time is based on the trout acute lethality test, which pH at 15C is intended to represent.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

RA226-MMER-FC Water Ra226 by Alpha Scint, MDC=0.01 Bq/L EPA 903.1

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-CALC-VA Water TDS (Calculated) APHA 1030E (20TH EDITION)

This analysis is carried out using procedures adapted from APHA 1030E "Checking Correctness of Analyses".

The Total Dissolved Solids result is calculated from measured concentrations of anions and cations in the sample.

TSS-VA Water Total Suspended Solids by Gravimetric APHA 2540 D - GRAVIMETRIC

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

Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

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

Reference Information

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

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

Laboratory Definition Code	Laboratory Location
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

17-2019-0429B

GLOSSARY OF REPORT TERMS

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

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

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

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

mg/L - milligrams per litre.

< - Less than.

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

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

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

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

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



STRATAGOLD CORPORATION
ATTN: Hugh Coyle
Suite 1000 - 1050 W. Pender St
Vancouver BC V6E 3S7

Date Received: 30-APR-19
Report Date: 09-MAY-19 11:06 (MT)
Version: FINAL

Client Phone: 604-682-5122

Certificate of Analysis

Lab Work Order #: L2264980
Project P.O. #: NOT SUBMITTED
Job Reference: TSS MONITORING
C of C Numbers: 17-20190429
Legal Site Desc:

Joanne Lee
Account Manager

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

ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700
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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2264980-11	L2264980-12			
		Description	Water	Water			
		Sampled Date	28-APR-19	27-APR-19			
		Sampled Time	17:20				
		Client ID	LDSP	SW DUP			
Grouping	Analyte						
WATER							
Physical Tests	Conductivity (uS/cm)		497	505			
	Hardness (as CaCO3) (mg/L)		226	233			
	pH (pH)		8.12	8.09			
	Total Suspended Solids (mg/L)		47.2	21.4			
	TDS (Calculated) (mg/L)		301	305			
	Turbidity (NTU)		85.9	53.1			
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)		139	140			
	Ammonia, Total (as N) (mg/L)		0.0090	0.0057			
	Bromide (Br) (mg/L)		<0.050	<0.050			
	Chloride (Cl) (mg/L)		15.7	16.6			
	Fluoride (F) (mg/L)		0.156	0.165			
	Nitrate (as N) (mg/L)		0.108	0.115			
	Nitrite (as N) (mg/L)		0.0042	0.0048			
	Total Kjeldahl Nitrogen (mg/L)		0.324	0.302			
	Total Nitrogen (mg/L)		0.436	0.421			
	Orthophosphate-Dissolved (as P) (mg/L)		0.0013	0.0012			
	Phosphorus (P)-Total Dissolved (mg/L)		0.0075	0.0075			
	Phosphorus (P)-Total (mg/L)		0.0694	0.0422			
	Sulfate (SO4) (mg/L)		101	103			
	Anion Sum (meq/L)		5.35	5.42			
	Cation Sum (meq/L)		5.08	5.24			
	Cation - Anion Balance (%)		-2.6	-1.8			
	Cyanides	Cyanide, Weak Acid Diss (mg/L)		<0.0050	<0.0050		
Cyanide, Total (mg/L)			<0.0050	<0.0050			
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)		16.9 ^{RRV}	13.8 ^{RRV}			
	Total Organic Carbon (mg/L)		10.4 ^{RRV}	8.58 ^{RRV}			
Total Metals	Aluminum (Al)-Total (mg/L)		1.41	2.02			
	Antimony (Sb)-Total (mg/L)		0.00595	0.00535			
	Arsenic (As)-Total (mg/L)		0.0984	0.0744			
	Barium (Ba)-Total (mg/L)		0.0835	0.0850			
	Beryllium (Be)-Total (mg/L)		0.000087	0.000082			
	Bismuth (Bi)-Total (mg/L)		0.000352	0.000239			
	Boron (B)-Total (mg/L)		<0.010	<0.010			
	Cadmium (Cd)-Total (mg/L)		0.000127	0.0000881			
	Calcium (Ca)-Total (mg/L)		52.0	52.4			
	Chromium (Cr)-Total (mg/L)		0.00276	0.00277			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L2264980-11 Water 28-APR-19 17:20 LDSP	L2264980-12 Water 27-APR-19 SW DUP		
Grouping	Analyte				
WATER					
Total Metals	Cobalt (Co)-Total (mg/L)	0.00197	0.00131		
	Copper (Cu)-Total (mg/L)	0.00839	0.00593		
	Iron (Fe)-Total (mg/L)	3.60	2.28		
	Lead (Pb)-Total (mg/L)	0.0111	0.00592		
	Lithium (Li)-Total (mg/L)	0.0135	0.0137		
	Magnesium (Mg)-Total (mg/L)	23.1	23.9		
	Manganese (Mn)-Total (mg/L)	0.160	0.117		
	Mercury (Hg)-Total (mg/L)	<0.000025 ^{DLM}	0.0000107		
	Molybdenum (Mo)-Total (mg/L)	0.00115	0.00124		
	Nickel (Ni)-Total (mg/L)	0.00589	0.00427		
	Phosphorus (P)-Total (mg/L)	0.060	<0.050		
	Potassium (K)-Total (mg/L)	4.09	4.42		
	Selenium (Se)-Total (mg/L)	0.000431	0.000482		
	Silicon (Si)-Total (mg/L)	5.92	7.33		
	Silver (Ag)-Total (mg/L)	0.000063	0.000061		
	Sodium (Na)-Total (mg/L)	12.1	12.7		
	Strontium (Sr)-Total (mg/L)	0.299	0.307		
	Sulfur (S)-Total (mg/L)	36.0	35.8		
	Thallium (Tl)-Total (mg/L)	0.000041	0.000038		
	Tin (Sn)-Total (mg/L)	<0.00010	0.00014		
	Titanium (Ti)-Total (mg/L)	0.0566	<0.090 ^{DLM}		
	Uranium (U)-Total (mg/L)	0.00585	0.00577		
	Vanadium (V)-Total (mg/L)	0.00342	0.00358		
	Zinc (Zn)-Total (mg/L)	0.0148	0.0099		
	Zirconium (Zr)-Total (mg/L)	0.00066	0.00172		
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD		
	Dissolved Metals Filtration Location	FIELD	FIELD		
	Aluminum (Al)-Dissolved (mg/L)	0.0150	0.0131		
	Antimony (Sb)-Dissolved (mg/L)	0.00359	0.00363		
	Arsenic (As)-Dissolved (mg/L)	0.0289	0.0274		
	Barium (Ba)-Dissolved (mg/L)	0.0620	0.0659		
	Beryllium (Be)-Dissolved (mg/L)	<0.000020	<0.000020		
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050		
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010		
	Cadmium (Cd)-Dissolved (mg/L)	0.0000517	0.0000427		
	Calcium (Ca)-Dissolved (mg/L)	50.6	53.3		
	Chromium (Cr)-Dissolved (mg/L)	0.00014	0.00028		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L2264980-11 Water 28-APR-19 17:20 LDSP	L2264980-12 Water 27-APR-19 SW DUP		
Grouping	Analyte				
WATER					
Dissolved Metals	Cobalt (Co)-Dissolved (mg/L)	0.00039	0.00037		
	Copper (Cu)-Dissolved (mg/L)	0.00240	0.00247		
	Iron (Fe)-Dissolved (mg/L)	0.047	0.038		
	Lead (Pb)-Dissolved (mg/L)	0.000148	0.000104		
	Lithium (Li)-Dissolved (mg/L)	0.0119	0.0130		
	Magnesium (Mg)-Dissolved (mg/L)	24.2	24.3		
	Manganese (Mn)-Dissolved (mg/L)	0.0918	0.0866		
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050		
	Molybdenum (Mo)-Dissolved (mg/L)	0.00115	0.00120		
	Nickel (Ni)-Dissolved (mg/L)	0.00199	0.00203		
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050		
	Potassium (K)-Dissolved (mg/L)	3.51	3.57		
	Selenium (Se)-Dissolved (mg/L)	0.000456	0.000475		
	Silicon (Si)-Dissolved (mg/L)	3.88	3.88		
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010		
	Sodium (Na)-Dissolved (mg/L)	10.8	11.1		
	Strontium (Sr)-Dissolved (mg/L)	0.327	0.308		
	Sulfur (S)-Dissolved (mg/L)	34.9	34.8		
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010		
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010		
	Titanium (Ti)-Dissolved (mg/L)	0.00044	0.00035		
	Uranium (U)-Dissolved (mg/L)	0.00547	0.00554		
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050		
	Zinc (Zn)-Dissolved (mg/L)	0.0030	0.0012		
	Zirconium (Zr)-Dissolved (mg/L)	<0.00030	<0.00030		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Dissolved Organic Carbon	MS-B	L2264980-1, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2264980-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2264980-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2264980-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2264980-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2264980-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2264980-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L2264980-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Total	MS-B	L2264980-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Total	MS-B	L2264980-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2264980-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Total	MS-B	L2264980-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Total	MS-B	L2264980-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Uranium (U)-Total	MS-B	L2264980-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)
Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.			
BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)
Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.			
BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.			
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
CL-IC-N-VA	Water	Chloride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
CN-T-CFA-VA	Water	Total Cyanide in water by CFA	ISO 14403:2002
This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.			
CN-WAD-CFA-VA	Water	Weak Acid Diss. Cyanide in water by CFA	APHA 4500-CN CYANIDE
This analysis is carried out using procedures adapted from APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by in-line sample distillation with final determination by colourimetric analysis.			
EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

Reference Information

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA Water Conductivity Screen (Internal Use Only) APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO₃ equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 µm), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

$$\text{Ion Balance (\%)} = \frac{[\text{Cation Sum} - \text{Anion Sum}]}{[\text{Cation Sum} + \text{Anion Sum}]}$$

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 µm), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

P-TD-PRES-COL-VA Water Total Dissolved P in Water by Colour APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Dissolved Phosphorus is determined colourimetrically after persulphate digestion of a sample that has been lab or field filtered through a 0.45 micron membrane filter.

Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

Reference Information

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-CALC-VA Water TDS (Calculated) APHA 1030E (20TH EDITION)

This analysis is carried out using procedures adapted from APHA 1030E "Checking Correctness of Analyses".

The Total Dissolved Solids result is calculated from measured concentrations of anions and cations in the sample.

TKN-F-VA Water TKN in Water by Fluorescence APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TN-CALC-VA Water Total Nitrogen (Calculation) BC MOE LABORATORY MANUAL (2005)

Total Nitrogen is a calculated parameter. Total Nitrogen = Total Kjeldahl Nitrogen + [Nitrate and Nitrite (as N)]

TSS-VA Water Total Suspended Solids by Gravimetric APHA 2540 D - GRAVIMETRIC

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

Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

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

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

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

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

17-20190429

GLOSSARY OF REPORT TERMS

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

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

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

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

mg/L - milligrams per litre.

< - Less than.

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

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

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

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

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