
To:	Charles Hunt, Senior Associate McMillen Jacobs Associates	Date:	October 19, 2021
c:		Memo No.:	001
From:	Nigel Cavanagh, Elyse Hofs	File:	704-ENG.VGEO03612-03.004 FEI #: P-00763-ENV-MEM-2005
Subject:	Eagle Mountain – Woodfibre Gas Pipeline Project Surface Water Quality Sampling along the Bedrock Tunnel Alignment – Revision 1		

1.0 INTRODUCTION

Tetra Tech Canada Inc. (Tetra Tech) was retained by McMillen Jacobs Associates (MJA) to conduct surface water quality sampling and analysis of various drainages along a section of the proposed Eagle Mountain – Woodfibre Gas Pipeline (EGP) Project in Squamish, BC.

FortisBC Energy Inc. (FortisBC) has proposed the construction of approximately 48 km of nominal pipe size (NPS) 24 gas pipeline beginning from a location north of the Coquitlam Watershed in Metro Vancouver to the former Woodfibre pulp mill site (the Woodfibre site) located southwest of Squamish, BC. Approximately 9 km of the proposed alignment from Squamish to Woodfibre, is proposed for installation within the EGP Tunnel, under the Squamish River Estuary and through the bedrock on Monmouth Ridge. Approximately 4.9 km of this tunnel will be excavated in bedrock using a tunnel boring machine (TBM) and is identified as the Bedrock Tunnel. The Bedrock Tunnel extends from the Woodfibre Portal at Ch. 8+708m to the Interface Reach at approximately Ch. 3+746 m.

The objective of the surface water quality sampling and analysis was to determine the baseline water quality of the drainages for use during tunnel inflow water quality modeling, and Potentially Acid Generating (PAG) rock stockpile modeling. Water from the drainages that intersect with the tunnel alignment could infiltrate into the tunnel during excavation and may require treatment before being released into the environment as determined by future water quality sampling and analysis.

An additional aim of the testing was to assess the natural dissolved metal content of the drainages, at a time of year when flow was very low and predominantly sourced from groundwater springs rather than run off. The intent of this sampling is to conduct a high level, qualitative assessment on the likelihood of dissolved metals being present within groundwater inflows into the Bedrock Tunnel.

2.0 METHODS

The surface water quality sampling was conducted by Tetra Tech personnel on August 19, 2021. The methodology for completing the investigation is found in the subsections below.

2.1 Study Area

The study area is located along the Bedrock Tunnel section of the proposed EGP Project in Squamish, BC (Figure 1). Samples were collected from drainages present on the Woodfibre site (including Mill Creek, the Quarry Entrance, Quarry Drainage and the Portal Site), and from drainages located along the coast between the Woodfibre site and the Squamish River (including WC-A, WC-K, WC-U, WC-V, and WC-N and WC-R).

2.2 Surface Water Sampling

The surface water quality sampling was conducted on August 19, 2021 during the driest time of year (late summer) to maximize the likelihood that any water flowing through the drainages was sourced from groundwater springs/seeps and not from rainfall or surface run-off.

Drainages on the Woodfibre site were accessed by truck, and drainages along the coast were accessed by boat. A georeferenced map showing all the mapped drainages in the area was used to navigate to each potential sampling sites (Figure 1), and presence of flow was determined visually. If flow was observed, the drainage was sampled.

At each drainage, in-situ parameters including water temperature (°C), dissolved oxygen (mg/L), total dissolved solids (mg/L), electrical conductivity (µS/cm), salinity (ppt), oxidation-reduction potential (mV) and pH (relative units), were measured using a YSI ProPlus Quattro multiparameter meter. Instruments used for field in-situ sampling were calibrated according to manufacturer's specifications prior to the sampling event.

Surface water samples for laboratory analysis were collected at each site according to the methods described in the BC Field Sampling Manual, Part E, Water and Wastewater Sampling¹. Collected samples were sent under chain-of-custody (CoC) protocol to ALS Environmental in Burnaby, BC and underwent laboratory analysis for acidity, alkalinity, anions, dissolved and total metals, and dissolved mercury.

One trip blank, one field blank, and sample duplicates taken every ten samples were collected and submitted for quality assurance/quality control (QA/QC) purposes. The objective of the QA QC program is to assess that all water samples are collected in a similar manner, using standardized protocols designed to maintain accuracy and precision and to monitor for and identify sources of contamination or sampling errors. Trip blanks are meant to detect contamination from within the sample bottle (including caps). Field blanks mimic the sampling and preservative process of the field-collected samples but do not come in contact with surface water. Consequently, they provide information on contamination resulting from the handling technique, preservation and exposure to the atmosphere or sampling environment. Duplicate samples are two independent samples that are collected as close as possible to the same point in space and time (i.e., in quick succession) and are intended to be identical. A comparison of the duplicate samples involved calculating the Relative Percent Difference (RPD) between the duplicate pair. Results were calculated as follows:

$$RPD (\%) = 2 \times 100 \times |X - Y| / (X + Y)$$

Where:

X = the measured concentration in the original sample

Y = the measured concentration in the duplicate sample.

¹ B.C. Ministry of Environment & Climate Change Strategy. 2013. BC Field Sampling Manual, Part E, Water and Wastewater Sampling. Prov. B.C., Victoria B.C.

Per the BC Environmental Laboratory Manual (2020), RPDs should be calculated and assessed only when both the sample and the duplicate concentration is greater than five times the method detection limit (MDL), referred to as the Practical Quantification Limit (PQL). When evaluating the RPD for the duplicate sample, a threshold of 20% was applied to assess if samples were considered within acceptable limit of variation. Should the RPD exceed the threshold value, an explanation for the variation is required.

3.0 RESULTS

Surface water was able to be sampled from the ten locations shown on Figure 1. It should be noted that the drainage at WC-A did not have sufficient water depth to take YSI measurements. At this location there was a small seepage flowing over the rockface and the bottles were filled up by holding them under seepage and letting water trickle into the bottle which effectively equates to collecting a sample from within a flowing watercourse.

The results of the analyses were compared against the 2019 British Columbia Approved Water Quality Guidelines (BCAWQG) and the 2020 Working Water Quality Guidelines for freshwater aquatic life and marine aquatic life^{2,3}. Given that the results consisted of a single sampling event, the short-term guidelines were used for comparison.

The surface water analytical results are provided in Table 1, and cells with exceedances of the BCAWQG are bolded and shaded. Table 2 provides the results of the quality assurance/quality control samples. A copy of the laboratory report from ALS is included in Appendix A.

Tetra Tech's primary findings after review of the analytical data were as follows:

- **Quarry Drainage** had exceedances for pH and dissolved copper.
- **Quarry Entrance** had exceedances for dissolved oxygen, pH, dissolved aluminum, and dissolved copper.
- **Mill Creek** had exceedances for pH and alkalinity.
- The **Portal Site** had exceedances for temperature, pH, alkalinity, and dissolved copper.
- **WC-A (unmapped)** had exceedances for total beryllium, total iron and total uranium. These exceedances are likely associated with the fact the water was collected directly from a rockface seepage.
- **WC-K** had exceedances for temperature and dissolved copper.
- **WC-U** and **WC-V** had exceedances for temperature.
- No exceedances were detected at **WC-N** or **WC-R**.

Unless stated above, all other parameters tested for at the ten sample locations were at levels acceptable under the BCAWQGs.

With respect to QA/QC, the analytical results for the field and trip blank were below the analytical detection limit for all parameters, indicative that no contamination was introduced via the sample bottles nor during the sampling process. All RPD values of parameters that met the PQL requirement within the duplicate samples were below the 20% threshold, indicative that the duplicate sample pair was within acceptable limit of variation. Therefore, the analytical results obtained during the surface water quality sampling and analysis were considered representative of natural surface water quality conditions.

² B.C. Ministry of Environment & Climate Change Strategy. 2019. British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture. Prov. B.C., Victoria B.C.

³ B.C. Ministry of Environment and Climate Change Strategy 2020. Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture. Water Quality Guideline Series, WQG-08. Prov. B.C., Victoria B.C.

4.0 INITIAL INTERPRETATION OF RESULTS

The water quality results provided in this memo were obtained during a single sampling event conducted during an atypically dry season. As such, the results are only able to provide very limited insight into baseline water quality within the drainages sampled. However, these results did indicate that a number of the drainages sampled had naturally occurring exceedances of dissolved and total metals to which the aquatic ecosystem has likely adapted. Pending further baseline sampling to confirm if these parameters are, in fact, naturally elevated, if similar exceedances are detected in future sampling events (i.e., during construction), baseline findings would serve as a basis for comparison to assess if construction related impacts are occurring.

It was noted that from the drainages that cross the alignment in the western section of the tunnel (WC-U, WC-V, WC-N and WC-R) that there were no exceedances, with the exception of temperature, which was likely elevated due to extended periods of warm weather and low flows.

The results indicate there are naturally elevated levels of dissolved and total metals within a number of drainages along the alignment including the Quarry Drainage, Quarry Entrance, the Portal Site, WC-A and WC-K. It is noted that the WC-K drainage which emanates into Howe Sound at Tantalus Landing, drains a much larger upslope area in comparison to the other creeks, which has been termed the "Central Domain". Based on previous studies, the Central Domain is known to contain PAG rock. In examining the results from the Portal Site, it should be noted that the creek partly drains and is adjacent to a landfill. There is also notable rubbish, garbage and scrap metal in the creek.

During construction, routine water sampling will occur within the tunnel from sustained inflows greater than 10 litres per minute, and should exceedances be found, then a decision will be made if these water inflows should be grouted up and effectively sealed. Based on the results of the sampling and testing program, this strategy may be required because exceedances were found during this sampling program.

One of the purposes of this initial sampling program was to undertake a high level, qualitative assessment of the likelihood of dissolved metals being elevated within watercourses that could contribute inflows into the Bedrock Tunnel. Given that only drainages that were observed to be flowing were able to be sampled on August 19, it is recommended that additional samples be taken during a wetter time of year when all the drainages are flowing to provide more conclusive findings as well as to provide a more robust baseline data set of surface watercourses potentially interacting with the Bedrock Tunnel and associated infrastructure.

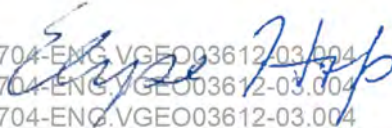
5.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of McMillen Jacobs Associates and their agents, including FortisBC Energy Inc. Tetra Tech Canada Inc. (Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than McMillen Jacobs Associates, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this document is subject to the Limitations on the Use of this Document attached in the Appendix or Contractual Terms and Conditions executed by both parties.

6.0 CLOSURE

We trust this technical memo meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
Tetra Tech Canada Inc.


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Enclosure: Tables (2)
 Figures (1)
 Appendix A – ALS Certificate of Analysis and Analytical Results
 Appendix B – Limitations on the Use of This Document


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TABLES

Table 1: Surface Water Analytical Results

Table 2: Surface Water Quality Assurance / Quality Control Analytical Results

Table 1: Surface Water Analytical Results

Parameter	Unit	BCWQG AW - Fresh		BCWQG AW - Marine		Quarrey Drainage		Quarrey Entrance		Mill Creek		Portal	WC-A Unmapped	WC-K	WC-N	WC-R	WC-U	WC-V	
		Approved	Working	Approved	Working	Quarrey Drainage	Quarrey Entrance	Mill Creek	Dup-1	Portal	WC-A Unmapped	WC-K	WC-N	WC-R	WC-U	WC-V			
		Sample Date	Sample Date	Sample Date	Sample Date	Sample Date	Sample Date	Sample Date	Sample Date	Sample Date	Sample Date	Sample Date	Sample Date	Sample Date	Sample Date	Sample Date	Sample Date	Sample Date	Sample Date
		Laboratory Report Number	Laboratory Report Number	Laboratory Report Number	Laboratory Report Number	Laboratory Report Number	Laboratory Report Number	Laboratory Report Number	Laboratory Report Number	Laboratory Report Number	Laboratory Report Number	Laboratory Report Number	Laboratory Report Number	Laboratory Report Number	Laboratory Report Number	Laboratory Report Number	Laboratory Report Number	Laboratory Report Number	Laboratory Report Number
Field Temperature	°C	15	-	-	-	13.2	14.2	14.3	-	16.0	-	17.5	13.5	13.00	15.6	16.3			
Field Electric Conductivity (EC)	µS/cm	-	-	-	-	110.1	33.6	24	-	19.7	-	35.4	37.6	40.3	50.8	32.4			
Field Dissolved Oxygen (DO)	mg/L	Minimum 5	-	Minimum 5	-	6.48	3.62	11.09	-	9.10	-	7.85	11.78	10.01	10.81	9.32			
Field Total Dissolved Solids (TDS)	mg/L	-	-	-	-	92.3	27.3	19.5	-	15.6	-	26.55	31.2	33.6	40.3	23.35			
Field Oxidation Reduction Potential (ORP)	mV	-	-	-	-	186.6	144.9	152.8	-	158.9	-	172.3	169.9	169.1	172	164.8			
Field pH	pH Units	6.5-9.0	-	7.0-8.7	-	6.26	5.63	6.71	-	6.80	-	7.54	7.39	7.40	7.63	7.27			
Field Salinity	ppt	-	-	-	-	0.07	0.02	0.01	-	0.01	-	0.02	0.02	0.02	0.03	0.02			
Physical Parameters																			
Hardness as CaCO ₃	µg/L	-	-	-	-	62,900	11,300	6880	6940	6880	27,800	14,700	18,700	19,700	26,100	14,000			
Alkalinity (total)	µg/L	-	Minimum 10,000 ^{#1}	-	-	65,000	12,600	3700	4000	6600	30,700	13,000	18,000	21,100	28,300	15,100			
Bromide	µg/L	-	-	-	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50			
Chloride	µg/L	600,000	-	-	-	<500	540	2560	2550	560	850	700	580	780	590	580			
Fluoride	µg/L	400-1148 ^{#2}	-	1500	-	22	<20	<20	<20	21	48	31	57	55	53	26			
Sulphate	µg/L	128,000-218,000 ^{#2}	-	-	-	2450	880	4000	3970	2250	2150	4140	3340	3960	1850	1850			
Acidity	µg/L	-	-	-	-	6600	16,800	2200	2200	2400	4600	2000	2200	2200	<2000	<2000			
Nutrients																			
Nitrate (as N)	µg/L	32,800	-	-	-	161	39	140	142	65.9	56.2	60.6	10.5	<5.0	5.6	11.7			
Nitrite (as N)	µg/L	60-120 ^{#3}	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			
Dissolved Metals																			
Aluminum	µg/L	34-100 ^{#3}	-	-	-	11.5	41.1	23.4	22.6	35.9	3.2	44.8	11.6	16.5	15.7	43.1			
Antimony	µg/L	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10			
Arsenic	µg/L	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.37	0.26	0.37	0.18	<0.10			
Barium	µg/L	-	-	-	-	18.0	12.3	4.73	4.96	4.41	1.80	8.22	4.00	14.1	7.78	6.12			
Beryllium	µg/L	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10			
Bismuth	µg/L	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050			
Boron	µg/L	-	-	-	-	11	<10	39	38	<10	<10	<10	<10	<10	<10	<10			
Cadmium	µg/L	0.04-0.37 ^{#2}	-	-	-	<0.0050	0.0134	0.0089	0.0080	0.0079	<0.0050	0.0166	0.0238	0.0261	0.0133	0.0055			
Calcium	µg/L	-	-	-	-	23,300	3920	2290	2300	2350	10,300	5130	6740	7030	9390	4830			
Cesium	µg/L	-	-	-	-	0.031	<0.010	0.026	0.027	<0.010	0.010	<0.010	<0.010	<0.010	<0.010	<0.010			
Chromium	µg/L	-	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50			
Cobalt	µg/L	-	-	-	-	<0.10	0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10			
Copper	µg/L	0.2 ^{#5}	-	-	-	0.31	0.51	<0.20	<0.20	0.41	<0.20	0.85	<0.20	<0.20	<0.20	<0.20			
Iron	µg/L	350	-	-	-	<10	302	<10	<10	23	<10	<10	<10	<10	<10	<10			
Lead	µg/L	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050			
Lithium	µg/L	-	-	-	-	<1.0	<1.0	2	2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			
Magnesium	µg/L	-	-	-	-	1150	379	281	290	246	506	464	462	514	653	459			
Manganese	µg/L	-	-	-	-	5.99	27.5	0.40	0.41	0.63	0.54	1.02	1.73	0.18	0.14	0.22			
Mercury	µg/L	-	-	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050			
Molybdenum	µg/L	-	-	-	-	0.432	0.155	0.555	0.560	0.634	2.10	4.52	4.59	3.35	2.91	2.13			
Nickel	µg/L	-	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50			
Phosphorus	µg/L	-	-	-	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50			
Potassium	µg/L	-	-	-	-	1120	153	431	456	122	352	218	180	246	246	166			
Rubidium	µg/L	-	-	-	-	2.17	0.39	1.14	1.30	0.23	0.25	0.48	0.22	0.26	0.22	0.29			
Selenium	µg/L	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050			
Silicon	µg/L	-	-	-	-	4630	3190	2590	2600	4680	4820	4960	5060	5220	5590	4540			
Silver	µg/L	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010			
Sodium	µg/L	-	-	-	-	2570	1600	2630	2750	1750	2200	2270	2100	2560	2370	2180			
Strontium	µg/L	-	-	-	-	101	19.3	13.1	14.0	13.6	32.6	18.8	24.6	24.7	27.2	17.7			
Sulphur	µg/L	-	-	-	-	850	<500	1200	1220	730	680	1030	1010	1280	540	680			
Tellurium	µg/L	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20			
Thallium	µg/L	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010			
Thorium	µg/L	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10			
Tin	µg/L	-	-	-	-	<0.10	0.13	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10			
Titanium	µg/L	-	-	-	-	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30			
Tungsten	µg/L	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10			
Uranium	µg/L	-	-	-	-	0.039	0.059	0.082	0.081	0.054	0.327	0.041	0.198	0.337	0.647	0.14			
Vanadium	µg/L	-	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50			
Zinc	µg/L	-	-	-	-	1.5	7.0	<1.0	<1.0	1.1	<1.0	1.2	2.1	2.4	<1.0	<1.0			
Zirconium	µg/L	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20			

Notes:

- #1 Waterbodies are highly sensitive to acid inputs below 10 mg/L alkalinity
- #2 Guideline varies with hardness. Values shown based on hardness range of 6.9 mg/L to 63 mg/L
- #3 Guideline varies with chloride concentration. Value shown based on chloride range of <0.5 mg/L to 2.56 mg/L
- #4 Guideline for varies with pH. Values shown based on field pH range of 5.63 to 7.63
- #5 Guideline varies with pH, temperature, hardness and DOC. Values calculated based on field pH range of 5.63 to 7.63, temperature range of 13.0 °C to 17.5 °C, hardness range of 6.9 mg/L to 63 mg/L, and most conservative DOC values.
- #6 Guideline is for Antimony III
- #7 Guideline is for Chromium VI
- Not analyzed or no applicable guideline
- < Concentration is less than the laboratory detection limit indicated.
- BC WQG - Approved British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture (August 2019).
- BC WQG - Working British Columbia Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture (July 2020).
- AW Freshwater and marine aquatic life
- Bold** Bold and shaded indicates an exceedance of the BCWQG guidelines.



Table 1: Surface Water Analytical Results

Parameter	Unit	BCWQG AW - Fresh		BCWQG AW - Marine		Location										
		Approved	Working	Approved	Working	Quarrey Drainage	Quarrey Entrance	Mill Creek		Portal	WC-A Unmapped	WC-K	WC-N	WC-R	WC-U	WC-V
						Quarrey Drainage	Quarrey Entrance	Mill Creek	Dup-1	Portal	WC-A Unmapped	WC-K	WC-N	WC-R	WC-U	WC-V
		Sample Date	Sample Date	Sample Date	Sample Date	Sample Date	Sample Date	Sample Date	Sample Date	Sample Date	Sample Date	Sample Date	Sample Date	Sample Date	Sample Date	Sample Date
						19-Aug-2021	19-Aug-2021	19-Aug-2021	19-Aug-2021	19-Aug-2021	19-Aug-2021	19-Aug-2021	19-Aug-2021	19-Aug-2021	19-Aug-2021	19-Aug-2021
						VA21B7621	VA21B7621	VA21B7621	VA21B7621	VA21B7621	VA21B7621	VA21B7621	VA21B7621	VA21B7621	VA21B7621	VA21B7621
						VA21B7621-001	VA21B7621-002	VA21B7621-003	VA21B7621-004	VA21B7621-005	VA21B7621-011	VA21B7621-010	VA21B7621-009	VA21B7621-008	VA21B7621-007	VA21B7621-006
Total Metals																
Aluminum	µg/L	-	-	-	-	54.2	209	25.5	26.7	44.2	4160	46.1	20.1	348	20.7	46.1
Antimony	µg/L	-	9 ^{#6}	-	270 ^{#6}	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic	µg/L	5	-	12.5	-	<0.10	0.16	<0.10	<0.10	<0.10	0.83	0.36	0.32	0.66	0.21	<0.10
Barium	µg/L	-	1000	-	-	19.7	13.4	4.78	4.83	4.47	29.7	8.20	4.12	16.1	7.75	6.34
Beryllium	µg/L	-	0.13	-	100	<0.020	<0.020	<0.020	<0.020	<0.020	0.171	<0.020	<0.020	0.022	<0.020	<0.020
Bismuth	µg/L	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	0.057	<0.050	<0.050	<0.050	<0.050	<0.050
Boron	µg/L	1200	-	1200	-	11	<10	38	39	<10	<10	<10	<10	<10	<10	<10
Cadmium	µg/L	-	-	-	0.12	0.0053	0.0168	0.0071	0.0071	0.0056	0.0199	0.0143	0.0232	0.0954	0.0106	<0.0050
Calcium	µg/L	-	-	-	-	20,800	3900	2180	2170	2370	11,000	4830	6340	6720	8890	4630
Cesium	µg/L	-	-	-	-	0.028	0.011	0.023	0.021	<0.010	0.931	<0.010	<0.010	<0.010	<0.010	<0.010
Chromium	µg/L	-	1 ^{#7}	-	1.5 ^{#7}	<0.50	<0.50	<0.50	<0.50	<0.50	0.75	<0.50	<0.50	<0.50	<0.50	<0.50
Cobalt	µg/L	110	-	-	-	<0.10	0.24	<0.10	<0.10	<0.10	0.77	<0.10	<0.10	0.47	<0.10	<0.10
Copper	µg/L	-	-	3	-	<0.50	0.91	<0.50	<0.50	<0.50	2.02	0.87	<0.50	<0.50	<0.50	<0.50
Iron	µg/L	1000	-	-	-	425	908	<10	<10	35	2080	<10	39	80	<10	<10
Lead	µg/L	3-45 ^{#2}	-	140	-	0.099	0.304	<0.050	<0.050	<0.050	5.68	<0.050	<0.050	0.144	<0.050	<0.050
Lithium	µg/L	-	-	-	-	<1.0	<1.0	1.9	1.9	<1.0	5.7	<1.0	<1.0	<1.0	<1.0	<1.0
Magnesium	µg/L	-	-	-	-	1190	380	264	277	237	851	439	450	508	624	437
Manganese	µg/L	816-1233 ^{#2}	-	-	100	24.1	31.1	0.38	0.39	1.05	47.7	1.43	3.52	30.3	0.28	0.55
Molybdenum	µg/L	2000	-	-	-	0.500	0.193	0.596	0.617	0.690	2.86	4.65	4.65	3.67	3.18	2.27
Nickel	µg/L	-	25-67 ^{#2}	-	8.3	<0.50	<0.50	<0.50	<0.50	<0.50	1.47	<0.50	<0.50	0.73	<0.50	<0.50
Phosphorus	µg/L	-	-	-	-	<50	<50	<50	<50	<50	155	<50	<50	<50	<50	<50
Potassium	µg/L	-	-	-	-	1160	145	400	413	115	725	187	262	162	218	152
Rubidium	µg/L	-	-	-	-	2.04	0.44	1.08	1.03	0.30	4.11	0.34	0.23	0.24	<0.20	0.26
Selenium	µg/L	2	-	2	-	<0.050	<0.050	<0.050	<0.050	<0.050	0.139	<0.050	<0.050	<0.050	<0.050	<0.050
Silicon	µg/L	-	-	-	-	4670	3570	2690	2670	4700	8210	5070	5270	5320	5890	4570
Silver	µg/L	0.1 ^{#2}	-	3	-	<0.010	<0.010	<0.010	<0.010	<0.010	0.048	<0.010	<0.010	<0.010	<0.010	<0.010
Sodium	µg/L	-	-	-	-	2630	1520	2470	2590	1650	2300	2090	2020	2330	2240	2050
Strontium	µg/L	-	-	-	-	92.3	18.3	12.3	12.2	12.9	43.1	17.6	22.9	23.7	26.4	16.3
Sulphur	µg/L	-	-	-	-	840	<500	1240	1270	620	770	1310	1030	1240	530	610
Tellurium	µg/L	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thallium	µg/L	-	0.8	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	0.026	<0.010	<0.010	<0.010	<0.010	<0.010
Thorium	µg/L	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	0.12	<0.10	<0.10	<0.10	<0.10	<0.10
Tin	µg/L	-	-	-	-	<0.10	0.18	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	µg/L	-	-	-	-	1.05	4.38	<0.30	<0.30	0.31	138	<0.30	0.43	3.48	<0.30	<0.30
Tungsten	µg/L	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	0.87	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium	µg/L	-	8.5	-	-	0.071	0.117	0.082	0.079	0.058	9.11	0.045	0.274	2.48	0.700	0.140
Vanadium	µg/L	-	-	-	50	<0.50	0.89	<0.50	<0.50	<0.50	2.61	<0.50	<0.50	<0.50	<0.50	<0.50
Zinc	µg/L	33 ^{#2}	-	55	-	<3.0	5.3	<3.0	<3.0	<3.0	4.6	<3.0	3.8	7.2	<3.0	<3.0
Zirconium	µg/L	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	0.26	<0.20	<0.20	<0.20	<0.20	<0.20

Notes:

- #1 Waterbodies are highly sensitive to acid inputs below 10 mg/L alkalinity
- #2 Guideline varies with hardness. Values shown based on hardness range of 6.9 mg/L to 63 mg/L
- #3 Guideline varies with chloride concentration. Value shown based on chloride range of <0.5 mg/L to 2.56 mg/L
- #4 Guideline varies with pH. Values shown based on field pH range of 5.63 to 7.63
- #5 Guideline varies with pH, temperature, hardness and DOC. Values calculated based on field pH range of 5.63 to 7.63, temperature range of 13.0 °C to 17.5 °C, hardness range of 6.9 mg/L to 63 mg/L, and most conservative DOC values.
- #6 Guideline is for Antimony III
- #7 Guideline is for Chromium VI
- Not analyzed or no applicable guideline
- < Concentration is less than the laboratory detection limit indicated.
- BC WQG - Approved British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture (August 2019).
- BC WQG - Working British Columbia Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture (July 2020).
- AW Freshwater and marine aquatic life
- Bold** Bold and shaded indicates an exceedance of the BCWQG guidelines.

Table 2: Surface Water Quality Assurance/Quality Control Analytical Results

Parameter	Unit	RDL	QAQC Type		Blanks		Duplicate		RPD (%)	
			Field ID	Sample Date	Travel Blank	Field Blank	Mill Creek	Dup-1		
			Laboratory Report Number	Laboratory Sample ID	19-Aug-2021	19-Aug-2021	19-Aug-2021	19-Aug-2021		
					VA21B7621	VA21B7621	VA21B7621	VA21B7621		
						VA21B7621-014	VA21B7621-012	VA21B7621-003	VA21B7621-004	
Physical Parameters										
Hardness as CaCO ₃	µg/L	600	<600	<600	6880	6940	1			
Alkalinity (total)	µg/L	1000	<1000	<1000	3700	4000	-			
Bromide	µg/L	50	<50	<50	<50	<50	-			
Chloride	µg/L	500	<500	<500	2560	2550	0.4			
Fluoride	µg/L	20	<20	<20	<20	<20	-			
Sulphate	µg/L	300	<300	<300	4000	3970	1			
Acidity	µg/L	2000	<2000	<2000	2200	2200	-			
Nutrients										
Nitrate (as N)	µg/L	5	<5.0	<5.0	140	142	1			
Nitrite (as N)	µg/L	1	<1.0	<1.0	<1.0	<1.0	-			
Dissolved Metals										
Aluminum	µg/L	1	-	<1.0	23.4	22.6	3			
Antimony	µg/L	0.1	-	<0.10	<0.10	<0.10	-			
Arsenic	µg/L	0.1	-	<0.10	<0.10	<0.10	-			
Barium	µg/L	0.1	-	<0.10	4.73	4.96	5			
Beryllium	µg/L	0.1	-	<0.10	<0.10	<0.10	-			
Bismuth	µg/L	0.05	-	<0.050	<0.050	<0.050	-			
Boron	µg/L	10	-	<10	39	38	-			
Cadmium	µg/L	0.005	-	<0.0050	0.0089	0.0080	-			
Calcium	µg/L	50	-	<50	2290	2300	0.4			
Cesium	µg/L	0.01	-	<0.010	0.026	0.027	-			
Chromium	µg/L	0.5	-	<0.50	<0.50	<0.50	-			
Cobalt	µg/L	0.1	-	<0.10	<0.10	<0.10	-			
Copper	µg/L	0.2	-	<0.20	<0.20	<0.20	-			
Iron	µg/L	10	-	<10	<10	<10	-			
Lead	µg/L	0.05	-	<0.050	<0.050	<0.050	-			
Lithium	µg/L	1	-	<1.0	2	2	-			
Magnesium	µg/L	5	-	<5.0	281	290	3			
Manganese	µg/L	0.1	-	<0.10	0.40	0.41	-			
Mercury	µg/L	0.005	-	<0.0050	<0.0050	<0.0050	-			
Molybdenum	µg/L	0.05	-	<0.050	0.555	0.560	1			
Nickel	µg/L	0.5	-	<0.50	<0.50	<0.50	-			
Phosphorus	µg/L	50	-	<50	<50	<50	-			
Potassium	µg/L	50	-	<50	431	456	6			
Rubidium	µg/L	0.2	-	<0.20	1.14	1.30	13			
Selenium	µg/L	0.05	-	<0.050	<0.050	<0.050	-			
Silicon	µg/L	50	-	<50	2590	2600	0.4			
Silver	µg/L	0.01	-	<0.010	<0.010	<0.010	-			
Sodium	µg/L	50	-	<50	2630	2750	4			
Strontium	µg/L	0.2	-	<0.20	13.1	14.0	7			
Sulphur	µg/L	500	-	<500	1200	1220	-			
Tellurium	µg/L	0.2	-	<0.20	<0.20	<0.20	-			
Thallium	µg/L	0.01	-	<0.010	<0.010	<0.010	-			
Thorium	µg/L	0.1	-	<0.10	<0.10	<0.10	-			
Tin	µg/L	0.1	-	<0.10	<0.10	<0.10	-			
Titanium	µg/L	0.3	-	<0.30	<0.30	<0.30	-			
Tungsten	µg/L	0.1	-	<0.10	<0.10	<0.10	-			
Uranium	µg/L	0.01	-	<0.010	0.082	0.081	1			
Vanadium	µg/L	0.5	-	<0.50	<0.50	<0.50	-			
Zinc	µg/L	1	-	<1.0	<1.0	<1.0	-			
Zirconium	µg/L	0.2	-	<0.20	<0.20	<0.20	-			
Total Metals										
Aluminum	µg/L	3	<3.0	<3.0	25.5	26.7	5			
Antimony	µg/L	0.1	<0.10	<0.10	<0.10	<0.10	-			
Arsenic	µg/L	0.1	<0.10	<0.10	<0.10	<0.10	-			
Barium	µg/L	0.1	<0.10	<0.10	4.78	4.83	1			
Beryllium	µg/L	0.02	<0.10	<0.020	<0.020	<0.020	-			
Bismuth	µg/L	0.05	<0.050	<0.050	<0.050	<0.050	-			
Boron	µg/L	10	<10	<10	38	39	-			
Cadmium	µg/L	0.005	<0.0050	<0.0050	0.0071	0.0071	-			
Calcium	µg/L	50	<50	<50	2180	2170	0.5			
Cesium	µg/L	0.01	<0.010	<0.010	0.023	0.021	-			
Chromium	µg/L	0.5	<0.50	<0.50	<0.50	<0.50	-			
Cobalt	µg/L	0.1	<0.10	<0.10	<0.10	<0.10	-			
Copper	µg/L	0.5	<0.50	<0.50	<0.50	<0.50	-			
Iron	µg/L	10	<10	<10	<10	<10	-			
Lead	µg/L	0.05	<0.050	<0.050	<0.050	<0.050	-			
Lithium	µg/L	1	<1.0	<1.0	1.9	1.9	-			
Magnesium	µg/L	5	<5.0	<5.0	264	277	5			
Manganese	µg/L	0.1	<0.10	<0.10	0.38	0.39	-			
Mercury	µg/L	0.005	<0.0050	-	-	-	-			
Molybdenum	µg/L	0.05	<0.050	<0.050	0.596	0.617	3			
Nickel	µg/L	0.5	<0.50	<0.50	<0.50	<0.50	-			
Phosphorus	µg/L	50	<50	<50	<50	<50	-			
Potassium	µg/L	50	<50	<50	400	413	3			
Rubidium	µg/L	0.2	<0.20	<0.20	1.08	1.03	5			
Selenium	µg/L	0.05	<0.050	<0.050	<0.050	<0.050	-			
Silicon	µg/L	100	<100	<100	2690	2670	1			
Silver	µg/L	0.01	<0.010	<0.010	<0.010	<0.010	-			
Sodium	µg/L	50	<50	<50	2470	2590	5			
Strontium	µg/L	0.2	<0.20	<0.20	12.3	12.2	1			
Sulphur	µg/L	500	<500	<500	1240	1270	-			
Tellurium	µg/L	0.2	<0.20	<0.20	<0.20	<0.20	-			
Thallium	µg/L	0.01	<0.010	<0.010	<0.010	<0.010	-			
Thorium	µg/L	0.1	<0.10	<0.10	<0.10	<0.10	-			
Tin	µg/L	0.1	<0.10	<0.10	<0.10	<0.10	-			
Titanium	µg/L	0.3	<0.30	<0.30	<0.30	<0.30	-			
Tungsten	µg/L	0.1	<0.10	<0.10	<0.10	<0.10	-			
Uranium	µg/L	0.01	<0.010	<0.010	0.082	0.079	4			
Vanadium	µg/L	0.5	<0.50	<0.50	<0.50	<0.50	-			
Zinc	µg/L	3	<3.0	<3.0	<3.0	<3.0	-			
Zirconium	µg/L	0.2	<0.20	<0.20	<0.20	<0.20	-			

Notes:

- Not analyzed or RPD not calculated.
- < Concentration is less than the laboratory detection limit indicated.
- RDL Laboratory Reportable Detection Limit
- RPD RPD is Relative Percentage Difference calculated as $RPD(\%) = \frac{|V1-V2|}{(V1+V2)/2} * 100$ where V1, V2 = concentrations of parent and duplicate sample, respectively.
- RPDs have only been calculated where a concentration is greater than 5 times the RDL
- BOLD** High RPDs are in bold (groundwater metals and general inorganics were compared against a 30% screening threshold and groundwater VOCs and other organics were compared to a 45% screening threshold as recommended by BC Ministry of Environment Q&A, and BC Environmental Laboratory Manual).
- Shaded** Detect Value in Blank Sample

FIGURES

Figure 1 – Water Quality Sample Locations



LEGEND

- ✕ Water Quality Sample
- ▭ Study Catchment (Jacobs 2020)
- ▭ Woodfibre Portal Area
- Tunnel Alignment (MJA 2019)
- ~ Study Stream (Jacobs 2020)
- ~ Provincial Watercourse

NOTES
 Base data source:
 Imagery from Google Earth (2019)

STATUS
 ISSUED FOR USE

EGP TUNNEL PROJECT

Water Quality Sample Locations

PROJECTION UTM Zone 10	DATUM NAD83	CLIENT
Scale: 1:16,787 300 150 0 300 Metres		
FILE NO. VGEO03612-03_Fig01_WaterQuality.mxd		
OFFICE Tl-VANC	DWN DS	CKD SL
APVD EH	REV 0	
DATE October 19, 2021	PROJECT NO. ENG.VGEO03612-03	

Figure 1

Q:\Vancouver\GIS\ENGINEERING\VGEO\03612-03\Maps\VGEO03612-03_Fig01_WaterQuality.mxd modified 2021-10-19 by Darren Schouls

APPENDIX A

ALS CERTIFICATE OF ANALYSIS AND ANALYTICAL RESULTS

CERTIFICATE OF ANALYSIS

Work Order : **VA21B7621**
Client : **Tetra Tech Canada Inc.**
Contact : Elyse Hofs
Address : 1000 - 885 Dunsmuir Street, 10th floor
 Vancouver BC Canada V6E 1N5
Telephone : ----
Project : ENG.VGE003612-03.004
PO : ----
C-O-C number : 17-866829/830
Sampler : EH
Site : ----
Quote number : VA21-EBAE100-004
No. of samples received : 14
No. of samples analysed : 13

Page : 1 of 14
Laboratory : Vancouver - Environmental
Account Manager : Brent Mack
Address : 8081 Lougheed Highway
 Burnaby BC Canada V5A 1W9
Telephone : 778-370-3279
Date Samples Received : 19-Aug-2021 18:55
Date Analysis Commenced : 23-Aug-2021
Issue Date : 31-Aug-2021 10:20

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Ilnaz Badbezanchi	Team Leader - Metals preparation	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Sristika Chand	Lab Analyst	Metals, Burnaby, British Columbia



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
mg/L	milligrams per litre

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior 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.

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

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.



Analytical Results

Sub-Matrix: Water					Client sample ID	Quarrey Drainage	Quarrey Entrance	Mill Creek	Dup-1	Portal
(Matrix: Water)					Client sampling date / time	19-Aug-2021 10:15	19-Aug-2021 10:45	19-Aug-2021 11:15	19-Aug-2021 11:15	19-Aug-2021 12:00
Analyte	CAS Number	Method	LOR	Unit	VA21B7621-001	VA21B7621-002	VA21B7621-003	VA21B7621-004	VA21B7621-005	
					Result	Result	Result	Result	Result	
Physical Tests										
acidity (as CaCO3)	----	E283	2.0	mg/L	6.6	16.8	2.2	2.2	2.4	
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	65.0	12.6	3.7	4.0	6.6	
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	62.9	11.3	6.88	6.94	6.88	
Anions and Nutrients										
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	0.54	2.56	2.55	0.56	
fluoride	16984-48-8	E235.F	0.020	mg/L	0.022	<0.020	<0.020	<0.020	0.021	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.161	0.0390	0.140	0.142	0.0659	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	2.45	0.88	4.00	3.97	2.25	
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0542	0.209	0.0255	0.0267	0.0442	
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
arsenic, total	7440-38-2	E420	0.00010	mg/L	<0.00010	0.00016	<0.00010	<0.00010	<0.00010	
barium, total	7440-39-3	E420	0.00010	mg/L	0.0197	0.0134	0.00478	0.00483	0.00447	
beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, total	7440-42-8	E420	0.010	mg/L	0.011	<0.010	0.038	0.039	<0.010	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000053	0.0000168	0.0000071	0.0000071	0.0000056	
calcium, total	7440-70-2	E420	0.050	mg/L	20.8	3.90	2.18	2.17	2.37	
cesium, total	7440-46-2	E420	0.000010	mg/L	0.000028	0.000011	0.000023	0.000021	<0.000010	
chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	0.00024	<0.00010	<0.00010	<0.00010	
copper, total	7440-50-8	E420	0.00050	mg/L	<0.00050	0.00091	<0.00050	<0.00050	<0.00050	
iron, total	7439-89-6	E420	0.010	mg/L	0.425	0.908	<0.010	<0.010	0.035	
lead, total	7439-92-1	E420	0.000050	mg/L	0.000099	0.000304	<0.000050	<0.000050	<0.000050	
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	0.0019	0.0019	<0.0010	
magnesium, total	7439-95-4	E420	0.0050	mg/L	1.19	0.380	0.264	0.277	0.237	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.0241	0.0311	0.00038	0.00039	0.00105	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000500	0.000193	0.000596	0.000617	0.000690	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Quarrey Drainage	Quarrey Entrance	Mill Creek	Dup-1	Portal
Client sampling date / time					19-Aug-2021 10:15	19-Aug-2021 10:45	19-Aug-2021 11:15	19-Aug-2021 11:15	19-Aug-2021 12:00	
Analyte	CAS Number	Method	LOR	Unit	VA21B7621-001	VA21B7621-002	VA21B7621-003	VA21B7621-004	VA21B7621-005	
					Result	Result	Result	Result	Result	
Total Metals										
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
potassium, total	7440-09-7	E420	0.050	mg/L	1.16	0.145	0.400	0.413	0.115	
rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00204	0.00044	0.00108	0.00103	0.00030	
selenium, total	7782-49-2	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
silicon, total	7440-21-3	E420	0.10	mg/L	4.67	3.57	2.69	2.67	4.70	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
sodium, total	17341-25-2	E420	0.050	mg/L	2.63	1.52	2.47	2.59	1.65	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.0923	0.0183	0.0123	0.0122	0.0129	
sulfur, total	7704-34-9	E420	0.50	mg/L	0.84	<0.50	1.24	1.27	0.62	
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	0.00018	<0.00010	<0.00010	<0.00010	
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00105	0.00438	<0.00030	<0.00030	0.00031	
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000071	0.000117	0.000082	0.000079	0.000058	
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	0.00089	<0.00050	<0.00050	<0.00050	
zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	0.0053	<0.0030	<0.0030	<0.0030	
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0115	0.0411	0.0234	0.0226	0.0359	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0180	0.0123	0.00473	0.00496	0.00441	
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, dissolved	7440-42-8	E421	0.010	mg/L	0.011	<0.010	0.039	0.038	<0.010	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	0.0000134	0.0000089	0.0000080	0.0000079	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	23.3	3.92	2.29	2.30	2.35	
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000031	<0.000010	0.000026	0.000027	<0.000010	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Quarrey Drainage	Quarrey Entrance	Mill Creek	Dup-1	Portal
Client sampling date / time					19-Aug-2021 10:15	19-Aug-2021 10:45	19-Aug-2021 11:15	19-Aug-2021 11:15	19-Aug-2021 12:00	
Analyte	CAS Number	Method	LOR	Unit	VA21B7621-001	VA21B7621-002	VA21B7621-003	VA21B7621-004	VA21B7621-005	
					Result	Result	Result	Result	Result	
Dissolved Metals										
chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	0.00020	<0.00010	<0.00010	<0.00010	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00031	0.00051	<0.00020	<0.00020	0.00041	
iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	0.302	<0.010	<0.010	0.023	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0.0020	0.0020	<0.0010	
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	1.15	0.379	0.281	0.290	0.246	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00599	0.0275	0.00040	0.00041	0.00063	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000432	0.000155	0.000555	0.000560	0.000634	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	1.12	0.153	0.431	0.456	0.122	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00217	0.00039	0.00114	0.00130	0.00023	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	4.63	3.19	2.59	2.60	4.68	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
sodium, dissolved	17341-25-2	E421	0.050	mg/L	2.57	1.60	2.63	2.75	1.75	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.101	0.0193	0.0131	0.0140	0.0136	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	0.85	<0.50	1.20	1.22	0.73	
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	0.00013	<0.00010	<0.00010	<0.00010	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000039	0.000059	0.000082	0.000081	0.000054	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0015	0.0070	<0.0010	<0.0010	0.0011	
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					<i>Client sample ID</i>	Quarrey Drainage	Quarrey Entrance	Mill Creek	Dup-1	Portal
<i>Client sampling date / time</i>					19-Aug-2021 10:15	19-Aug-2021 10:45	19-Aug-2021 11:15	19-Aug-2021 11:15	19-Aug-2021 12:00	
<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	VA21B7621-001	VA21B7621-002	VA21B7621-003	VA21B7621-004	VA21B7621-005	
					Result	Result	Result	Result	Result	
Dissolved Metals										
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field	

Please refer to the General Comments section for an explanation of any qualifiers detected.



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	WC-V	WC-U	WC-R	WC-N	WC-K
Client sampling date / time					19-Aug-2021 12:50	19-Aug-2021 13:12	19-Aug-2021 13:44	19-Aug-2021 14:09	19-Aug-2021 14:40	
Analyte	CAS Number	Method	LOR	Unit	VA21B7621-006	VA21B7621-007	VA21B7621-008	VA21B7621-009	VA21B7621-010	
					Result	Result	Result	Result	Result	
Physical Tests										
acidity (as CaCO3)	----	E283	2.0	mg/L	<2.0	<2.0	2.2	2.2	2.0	
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	15.1	28.3	21.1	18.0	13.0	
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	14.0	26.1	19.7	18.7	14.7	
Anions and Nutrients										
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
chloride	16887-00-6	E235.Cl	0.50	mg/L	0.58	0.59	0.78	0.58	0.70	
fluoride	16984-48-8	E235.F	0.020	mg/L	0.026	0.053	0.055	0.057	0.031	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0117	0.0056	<0.0050	0.0105	0.0606	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	1.85	1.85	3.96	3.34	4.14	
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0461	0.0207	0.348	0.0201	0.0461	
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
arsenic, total	7440-38-2	E420	0.00010	mg/L	<0.00010	0.00021	0.00066	0.00032	0.00036	
barium, total	7440-39-3	E420	0.00010	mg/L	0.00634	0.00775	0.0161	0.00412	0.00820	
beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0.000022	<0.000020	<0.000020	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	0.0000106	0.0000954	0.0000232	0.0000143	
calcium, total	7440-70-2	E420	0.050	mg/L	4.63	8.89	6.72	6.34	4.83	
cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	<0.00010	0.00047	<0.00010	<0.00010	
copper, total	7440-50-8	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00087	
iron, total	7439-89-6	E420	0.010	mg/L	<0.010	<0.010	0.080	0.039	<0.010	
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	0.000144	<0.000050	<0.000050	
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
magnesium, total	7439-95-4	E420	0.0050	mg/L	0.437	0.624	0.508	0.450	0.439	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.00055	0.00028	0.0303	0.00352	0.00143	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00227	0.00318	0.00367	0.00465	0.00465	
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	0.00073	<0.00050	<0.00050	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	WC-V	WC-U	WC-R	WC-N	WC-K
Client sampling date / time					19-Aug-2021 12:50	19-Aug-2021 13:12	19-Aug-2021 13:44	19-Aug-2021 14:09	19-Aug-2021 14:40	
Analyte	CAS Number	Method	LOR	Unit	VA21B7621-006	VA21B7621-007	VA21B7621-008	VA21B7621-009	VA21B7621-010	
					Result	Result	Result	Result	Result	
Total Metals										
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
potassium, total	7440-09-7	E420	0.050	mg/L	0.152	0.218	0.162	0.262	0.187	
rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00026	<0.00020	0.00024	0.00023	0.00034	
selenium, total	7782-49-2	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
silicon, total	7440-21-3	E420	0.10	mg/L	4.57	5.89	5.32	5.27	5.07	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
sodium, total	17341-25-2	E420	0.050	mg/L	2.05	2.24	2.33	2.02	2.09	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.0163	0.0264	0.0237	0.0229	0.0176	
sulfur, total	7704-34-9	E420	0.50	mg/L	0.61	0.53	1.24	1.03	1.31	
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	<0.00030	0.00348	0.00043	<0.00030	
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000140	0.000700	0.00248	0.000274	0.000045	
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0.0072	0.0038	<0.0030	
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0431	0.0157	0.0165	0.0116	0.0448	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	0.00018	0.00037	0.00026	0.00037	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.00612	0.00778	0.0141	0.00400	0.00822	
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000055	0.0000133	0.0000261	0.0000238	0.0000166	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	4.83	9.39	7.03	6.74	5.13	
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	WC-V	WC-U	WC-R	WC-N	WC-K
Client sampling date / time					19-Aug-2021 12:50	19-Aug-2021 13:12	19-Aug-2021 13:44	19-Aug-2021 14:09	19-Aug-2021 14:40	
Analyte	CAS Number	Method	LOR	Unit	VA21B7621-006	VA21B7621-007	VA21B7621-008	VA21B7621-009	VA21B7621-010	
					Result	Result	Result	Result	Result	
Dissolved Metals										
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00085	
iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	0.459	0.653	0.514	0.462	0.464	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00022	0.00014	0.00018	0.00173	0.00102	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00213	0.00291	0.00335	0.00459	0.00452	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.166	0.246	0.180	0.261	0.218	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00029	0.00022	0.00026	0.00022	0.00048	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	4.54	5.59	5.22	5.06	4.96	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
sodium, dissolved	17341-25-2	E421	0.050	mg/L	2.18	2.37	2.56	2.10	2.27	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0177	0.0272	0.0247	0.0246	0.0188	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	0.68	0.54	1.28	1.01	1.03	
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000140	0.000647	0.000337	0.000198	0.000041	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0.0024	0.0021	0.0012	
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field	
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field	



Please refer to the General Comments section for an explanation of any qualifiers detected.



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	WC-A Unmapped	Field Blank	Travel Blank	----	----
Client sampling date / time					19-Aug-2021 16:00	19-Aug-2021 16:30	19-Aug-2021	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21B7621-011 Result	VA21B7621-012 Result	VA21B7621-014 Result	----- ----	----- ----	
Physical Tests										
acidity (as CaCO3)	----	E283	2.0	mg/L	4.6	<2.0	<2.0	----	----	
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	30.7	<1.0	<1.0	----	----	
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	27.8	<0.60	----	----	----	
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	----	----	<0.60	----	----	
Anions and Nutrients										
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	----	----	
chloride	16887-00-6	E235.Cl	0.50	mg/L	0.85	<0.50	<0.50	----	----	
fluoride	16984-48-8	E235.F	0.020	mg/L	0.048	<0.020	<0.020	----	----	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0562	<0.0050	<0.0050	----	----	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	2.15	<0.30	<0.30	----	----	
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L	4.16	<0.0030	<0.0030	----	----	
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00083	<0.00010	<0.00010	----	----	
barium, total	7440-39-3	E420	0.00010	mg/L	0.0297	<0.00010	<0.00010	----	----	
beryllium, total	7440-41-7	E420	0.000020	mg/L	0.000171	<0.000020	----	----	----	
beryllium, total	7440-41-7	E420	0.000100	mg/L	----	----	<0.000100	----	----	
bismuth, total	7440-69-9	E420	0.000050	mg/L	0.000057	<0.000050	<0.000050	----	----	
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	<0.010	----	----	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000199	<0.0000050	<0.0000050	----	----	
calcium, total	7440-70-2	E420	0.050	mg/L	11.0	<0.050	<0.050	----	----	
cesium, total	7440-46-2	E420	0.000010	mg/L	0.000931	<0.000010	<0.000010	----	----	
chromium, total	7440-47-3	E420	0.00050	mg/L	0.00075	<0.00050	<0.00050	----	----	
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00077	<0.00010	<0.00010	----	----	
copper, total	7440-50-8	E420	0.00050	mg/L	0.00202	<0.00050	<0.00050	----	----	
iron, total	7439-89-6	E420	0.010	mg/L	2.08	<0.010	<0.010	----	----	
lead, total	7439-92-1	E420	0.000050	mg/L	0.00568	<0.000050	<0.000050	----	----	
lithium, total	7439-93-2	E420	0.0010	mg/L	0.0057	<0.0010	<0.0010	----	----	
magnesium, total	7439-95-4	E420	0.0050	mg/L	0.851	<0.0050	<0.0050	----	----	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.0477	<0.00010	<0.00010	----	----	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	WC-A Unmapped	Field Blank	Travel Blank	----	----
Client sampling date / time					19-Aug-2021 16:00	19-Aug-2021 16:30	19-Aug-2021	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21B7621-011 Result	VA21B7621-012 Result	VA21B7621-014 Result	-----	-----	
Total Metals										
mercury, total	7439-97-6	E508	0.000050	mg/L	----	----	<0.000050	----	----	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00286	<0.000050	<0.000050	----	----	
nickel, total	7440-02-0	E420	0.00050	mg/L	0.00147	<0.00050	<0.00050	----	----	
phosphorus, total	7723-14-0	E420	0.050	mg/L	0.155	<0.050	<0.050	----	----	
potassium, total	7440-09-7	E420	0.050	mg/L	0.725	<0.050	<0.050	----	----	
rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00411	<0.00020	<0.00020	----	----	
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000139	<0.000050	<0.000050	----	----	
silicon, total	7440-21-3	E420	0.10	mg/L	8.21	<0.10	<0.10	----	----	
silver, total	7440-22-4	E420	0.000010	mg/L	0.000048	<0.000010	<0.000010	----	----	
sodium, total	17341-25-2	E420	0.050	mg/L	2.30	<0.050	<0.050	----	----	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.0431	<0.00020	<0.00020	----	----	
sulfur, total	7704-34-9	E420	0.50	mg/L	0.77	<0.50	<0.50	----	----	
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	----	----	
thallium, total	7440-28-0	E420	0.000010	mg/L	0.000026	<0.000010	<0.000010	----	----	
thorium, total	7440-29-1	E420	0.00010	mg/L	0.00012	<0.00010	<0.00010	----	----	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
titanium, total	7440-32-6	E420	0.00030	mg/L	0.138	<0.00030	<0.00030	----	----	
tungsten, total	7440-33-7	E420	0.00010	mg/L	0.00087	<0.00010	<0.00010	----	----	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.00911	<0.000010	<0.000010	----	----	
vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00261	<0.00050	<0.00050	----	----	
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0046	<0.0030	<0.0030	----	----	
zirconium, total	7440-67-7	E420	0.00020	mg/L	0.00026	<0.00020	<0.00020	----	----	
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0032	<0.0010	----	----	----	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	----	----	----	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	<0.00010	----	----	----	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.00180	<0.00010	----	----	----	
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	----	----	----	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	----	----	----	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	----	----	----	
cadmium, dissolved	7440-43-9	E421	0.000050	mg/L	<0.000050	<0.000050	----	----	----	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	WC-A Unmapped	Field Blank	Travel Blank	----	----
Client sampling date / time					19-Aug-2021 16:00	19-Aug-2021 16:30	19-Aug-2021	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21B7621-011 Result	VA21B7621-012 Result	VA21B7621-014 Result	-----	-----	
Dissolved Metals										
calcium, dissolved	7440-70-2	E421	0.050	mg/L	10.3	<0.050	----	----	----	
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000010	<0.000010	----	----	----	
chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	----	----	----	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	----	----	----	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	<0.00020	----	----	----	
iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	----	----	----	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	----	----	----	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	----	----	----	
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	0.506	<0.0050	----	----	----	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00054	<0.00010	----	----	----	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	----	----	----	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00210	<0.000050	----	----	----	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	----	----	----	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	----	----	----	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.352	<0.050	----	----	----	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00025	<0.00020	----	----	----	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	----	----	----	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	4.82	<0.050	----	----	----	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
sodium, dissolved	17341-25-2	E421	0.050	mg/L	2.20	<0.050	----	----	----	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0326	<0.00020	----	----	----	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	0.68	<0.50	----	----	----	
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	----	----	----	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	----	----	----	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	----	----	----	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	----	----	----	
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	----	----	----	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000327	<0.000010	----	----	----	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	----	----	----	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	----	----	----	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	WC-A Unmapped	Field Blank	Travel Blank	----	----
Client sampling date / time					19-Aug-2021 16:00	19-Aug-2021 16:30	19-Aug-2021	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21B7621-011	VA21B7621-012	VA21B7621-014	-----	-----	
					Result	Result	Result	---	---	
Dissolved Metals										
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	----	----	----	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	----	----	----	
dissolved metals filtration location	----	EP421	-	-	Field	Field	----	----	----	

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA21B7621	Page	: 1 of 22
Client	: Tetra Tech Canada Inc.	Laboratory	: Vancouver - Environmental
Contact	: Elyse Hofs	Account Manager	: Brent Mack
Address	: 1000 - 885 Dunsmuir Street, 10th floor Vancouver BC Canada V6E 1N5	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: 778-370-3279
Project	: ENG.VGE003612-03.004	Date Samples Received	: 19-Aug-2021 18:55
PO	: ----	Issue Date	: 31-Aug-2021 10:20
C-O-C number	: 17-866829/830		
Sampler	: EH		
Site	: ----		
Quote number	: VA21-EBAE100-004		
No. of samples received	: 14		
No. of samples analysed	: 13		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

- Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE Dup-1	E235.Br-L	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE Field Blank	E235.Br-L	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE Mill Creek	E235.Br-L	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE Portal	E235.Br-L	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE Quarrey Drainage	E235.Br-L	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE Quarrey Entrance	E235.Br-L	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE Travel Blank	E235.Br-L	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE WC-A Unmapped	E235.Br-L	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE WC-K	E235.Br-L	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE WC-N	E235.Br-L	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE WC-R	E235.Br-L	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE WC-U	E235.Br-L	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE WC-V	E235.Br-L	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE Dup-1	E235.Cl	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE Field Blank	E235.Cl	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE Mill Creek	E235.Cl	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Chloride in Water by IC										
HDPE Portal	E235.CI	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE Quarrey Drainage	E235.CI	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE Quarrey Entrance	E235.CI	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE Travel Blank	E235.CI	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE WC-A Unmapped	E235.CI	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE WC-K	E235.CI	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE WC-N	E235.CI	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE WC-R	E235.CI	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE WC-U	E235.CI	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Chloride in Water by IC										
HDPE WC-V	E235.Cl	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE Dup-1	E235.F	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE Field Blank	E235.F	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE Mill Creek	E235.F	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE Portal	E235.F	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE Quarrey Drainage	E235.F	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE Quarrey Entrance	E235.F	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE Travel Blank	E235.F	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE WC-A Unmapped	E235.F	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Fluoride in Water by IC										
HDPE WC-K	E235.F	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE WC-N	E235.F	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE WC-R	E235.F	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE WC-U	E235.F	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE WC-V	E235.F	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Dup-1	E235.NO3-L	19-Aug-2021	----	----	----		23-Aug-2021	3 days	4 days	* EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Field Blank	E235.NO3-L	19-Aug-2021	----	----	----		23-Aug-2021	3 days	4 days	* EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Mill Creek	E235.NO3-L	19-Aug-2021	----	----	----		23-Aug-2021	3 days	4 days	* EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Portal	E235.NO3-L	19-Aug-2021	----	----	----		23-Aug-2021	3 days	4 days	* EHT



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE Quarrey Drainage	E235.NO3-L	19-Aug-2021	----	----	----		23-Aug-2021	3 days	4 days	*	EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE Quarrey Entrance	E235.NO3-L	19-Aug-2021	----	----	----		23-Aug-2021	3 days	4 days	*	EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE Travel Blank	E235.NO3-L	19-Aug-2021	----	----	----		23-Aug-2021	3 days	4 days	*	EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE WC-A Unmapped	E235.NO3-L	19-Aug-2021	----	----	----		23-Aug-2021	3 days	4 days	*	EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE WC-K	E235.NO3-L	19-Aug-2021	----	----	----		23-Aug-2021	3 days	4 days	*	EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE WC-N	E235.NO3-L	19-Aug-2021	----	----	----		23-Aug-2021	3 days	4 days	*	EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE WC-R	E235.NO3-L	19-Aug-2021	----	----	----		23-Aug-2021	3 days	4 days	*	EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE WC-U	E235.NO3-L	19-Aug-2021	----	----	----		23-Aug-2021	3 days	4 days	*	EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE WC-V	E235.NO3-L	19-Aug-2021	----	----	----		23-Aug-2021	3 days	4 days	*	EHT



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE Dup-1	E235.NO2-L	19-Aug-2021	----	----	----		23-Aug-2021	3 days	4 days	*	EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE Field Blank	E235.NO2-L	19-Aug-2021	----	----	----		23-Aug-2021	3 days	4 days	*	EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE Mill Creek	E235.NO2-L	19-Aug-2021	----	----	----		23-Aug-2021	3 days	4 days	*	EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE Portal	E235.NO2-L	19-Aug-2021	----	----	----		23-Aug-2021	3 days	4 days	*	EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE Quarrey Drainage	E235.NO2-L	19-Aug-2021	----	----	----		23-Aug-2021	3 days	4 days	*	EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE Quarrey Entrance	E235.NO2-L	19-Aug-2021	----	----	----		23-Aug-2021	3 days	4 days	*	EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE Travel Blank	E235.NO2-L	19-Aug-2021	----	----	----		23-Aug-2021	3 days	4 days	*	EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE WC-A Unmapped	E235.NO2-L	19-Aug-2021	----	----	----		23-Aug-2021	3 days	4 days	*	EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE WC-K	E235.NO2-L	19-Aug-2021	----	----	----		23-Aug-2021	3 days	4 days	*	EHT



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE WC-N	E235.NO2-L	19-Aug-2021	----	----	----		23-Aug-2021	3 days	4 days	*	EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE WC-R	E235.NO2-L	19-Aug-2021	----	----	----		23-Aug-2021	3 days	4 days	*	EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE WC-U	E235.NO2-L	19-Aug-2021	----	----	----		23-Aug-2021	3 days	4 days	*	EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE WC-V	E235.NO2-L	19-Aug-2021	----	----	----		23-Aug-2021	3 days	4 days	*	EHT
Anions and Nutrients : Sulfate in Water by IC											
HDPE Dup-1	E235.SO4	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Field Blank	E235.SO4	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Mill Creek	E235.SO4	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Portal	E235.SO4	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Quarrey Drainage	E235.SO4	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Sulfate in Water by IC										
HDPE Quarrey Entrance	E235.S04	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Sulfate in Water by IC										
HDPE Travel Blank	E235.S04	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Sulfate in Water by IC										
HDPE WC-A Unmapped	E235.S04	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Sulfate in Water by IC										
HDPE WC-K	E235.S04	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Sulfate in Water by IC										
HDPE WC-N	E235.S04	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Sulfate in Water by IC										
HDPE WC-R	E235.S04	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Sulfate in Water by IC										
HDPE WC-U	E235.S04	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Anions and Nutrients : Sulfate in Water by IC										
HDPE WC-V	E235.S04	19-Aug-2021	----	----	----		23-Aug-2021	28 days	4 days	✔
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) Dup-1	E509	19-Aug-2021	23-Aug-2021	----	----		23-Aug-2021	28 days	4 days	✔



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) Field Blank	E509	19-Aug-2021	23-Aug-2021	----	----		23-Aug-2021	28 days	4 days	✓	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) Mill Creek	E509	19-Aug-2021	23-Aug-2021	----	----		23-Aug-2021	28 days	4 days	✓	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) Portal	E509	19-Aug-2021	23-Aug-2021	----	----		23-Aug-2021	28 days	4 days	✓	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) Quarrey Drainage	E509	19-Aug-2021	23-Aug-2021	----	----		23-Aug-2021	28 days	4 days	✓	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) Quarrey Entrance	E509	19-Aug-2021	23-Aug-2021	----	----		23-Aug-2021	28 days	4 days	✓	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) WC-A Unmapped	E509	19-Aug-2021	23-Aug-2021	----	----		23-Aug-2021	28 days	4 days	✓	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) WC-K	E509	19-Aug-2021	23-Aug-2021	----	----		23-Aug-2021	28 days	4 days	✓	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) WC-N	E509	19-Aug-2021	23-Aug-2021	----	----		23-Aug-2021	28 days	4 days	✓	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
Glass vial dissolved (hydrochloric acid) WC-R	E509	19-Aug-2021	23-Aug-2021	----	----		23-Aug-2021	28 days	4 days	✓	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) WC-U	E509	19-Aug-2021	23-Aug-2021	----	----		23-Aug-2021	28 days	4 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) WC-V	E509	19-Aug-2021	23-Aug-2021	----	----		23-Aug-2021	28 days	4 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) Dup-1	E421	19-Aug-2021	25-Aug-2021	----	----		27-Aug-2021	180 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) Field Blank	E421	19-Aug-2021	25-Aug-2021	----	----		27-Aug-2021	180 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) Mill Creek	E421	19-Aug-2021	25-Aug-2021	----	----		27-Aug-2021	180 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) Portal	E421	19-Aug-2021	25-Aug-2021	----	----		27-Aug-2021	180 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) Quarrey Drainage	E421	19-Aug-2021	25-Aug-2021	----	----		27-Aug-2021	180 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) Quarrey Entrance	E421	19-Aug-2021	25-Aug-2021	----	----		27-Aug-2021	180 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) WC-A Unmapped	E421	19-Aug-2021	25-Aug-2021	----	----		27-Aug-2021	180 days	8 days	✓



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) WC-K	E421	19-Aug-2021	25-Aug-2021	----	----		27-Aug-2021	180 days	8 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) WC-N	E421	19-Aug-2021	25-Aug-2021	----	----		27-Aug-2021	180 days	8 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) WC-R	E421	19-Aug-2021	25-Aug-2021	----	----		27-Aug-2021	180 days	8 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) WC-U	E421	19-Aug-2021	25-Aug-2021	----	----		27-Aug-2021	180 days	8 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) WC-V	E421	19-Aug-2021	25-Aug-2021	----	----		27-Aug-2021	180 days	8 days	✓	
Physical Tests : Acidity by Titration											
HDPE Dup-1	E283	19-Aug-2021	----	----	----		23-Aug-2021	14 days	4 days	✓	
Physical Tests : Acidity by Titration											
HDPE Field Blank	E283	19-Aug-2021	----	----	----		23-Aug-2021	14 days	4 days	✓	
Physical Tests : Acidity by Titration											
HDPE Mill Creek	E283	19-Aug-2021	----	----	----		23-Aug-2021	14 days	4 days	✓	
Physical Tests : Acidity by Titration											
HDPE Portal	E283	19-Aug-2021	----	----	----		23-Aug-2021	14 days	4 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : Acidity by Titration										
HDPE Quarrey Drainage	E283	19-Aug-2021	----	----	----		23-Aug-2021	14 days	4 days	✔
Physical Tests : Acidity by Titration										
HDPE Quarrey Entrance	E283	19-Aug-2021	----	----	----		23-Aug-2021	14 days	4 days	✔
Physical Tests : Acidity by Titration										
HDPE Travel Blank	E283	19-Aug-2021	----	----	----		23-Aug-2021	14 days	4 days	✔
Physical Tests : Acidity by Titration										
HDPE WC-A Unmapped	E283	19-Aug-2021	----	----	----		23-Aug-2021	14 days	4 days	✔
Physical Tests : Acidity by Titration										
HDPE WC-K	E283	19-Aug-2021	----	----	----		23-Aug-2021	14 days	4 days	✔
Physical Tests : Acidity by Titration										
HDPE WC-N	E283	19-Aug-2021	----	----	----		23-Aug-2021	14 days	4 days	✔
Physical Tests : Acidity by Titration										
HDPE WC-R	E283	19-Aug-2021	----	----	----		23-Aug-2021	14 days	4 days	✔
Physical Tests : Acidity by Titration										
HDPE WC-U	E283	19-Aug-2021	----	----	----		23-Aug-2021	14 days	4 days	✔
Physical Tests : Acidity by Titration										
HDPE WC-V	E283	19-Aug-2021	----	----	----		23-Aug-2021	14 days	4 days	✔



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : Alkalinity Species by Titration										
HDPE Dup-1	E290	19-Aug-2021	----	----	----		24-Aug-2021	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Field Blank	E290	19-Aug-2021	----	----	----		24-Aug-2021	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Mill Creek	E290	19-Aug-2021	----	----	----		24-Aug-2021	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Portal	E290	19-Aug-2021	----	----	----		24-Aug-2021	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Quarrey Drainage	E290	19-Aug-2021	----	----	----		24-Aug-2021	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Quarrey Entrance	E290	19-Aug-2021	----	----	----		24-Aug-2021	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Travel Blank	E290	19-Aug-2021	----	----	----		24-Aug-2021	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE WC-A Unmapped	E290	19-Aug-2021	----	----	----		24-Aug-2021	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE WC-K	E290	19-Aug-2021	----	----	----		24-Aug-2021	14 days	5 days	✓



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
Physical Tests : Alkalinity Species by Titration										
HDPE WC-N	E290	19-Aug-2021	----	----	----		24-Aug-2021	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE WC-R	E290	19-Aug-2021	----	----	----		24-Aug-2021	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE WC-U	E290	19-Aug-2021	----	----	----		24-Aug-2021	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE WC-V	E290	19-Aug-2021	----	----	----		24-Aug-2021	14 days	5 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial - total (lab preserved) Travel Blank	E508	19-Aug-2021	----	----	----		25-Aug-2021	28 days	6 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) Dup-1	E420	19-Aug-2021	----	----	----		28-Aug-2021	180 days	9 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) Field Blank	E420	19-Aug-2021	----	----	----		28-Aug-2021	180 days	9 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) Mill Creek	E420	19-Aug-2021	----	----	----		28-Aug-2021	180 days	9 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) Portal	E420	19-Aug-2021	----	----	----		28-Aug-2021	180 days	9 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) Quarrey Drainage	E420	19-Aug-2021	----	----	----		28-Aug-2021	180 days	9 days	✔	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) Quarrey Entrance	E420	19-Aug-2021	----	----	----		28-Aug-2021	180 days	9 days	✔	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE - total (lab preserved) Travel Blank	E420	19-Aug-2021	----	----	----		28-Aug-2021	180 days	9 days	✔	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) WC-A Unmapped	E420	19-Aug-2021	----	----	----		28-Aug-2021	180 days	9 days	✔	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) WC-K	E420	19-Aug-2021	----	----	----		28-Aug-2021	180 days	9 days	✔	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) WC-N	E420	19-Aug-2021	----	----	----		28-Aug-2021	180 days	9 days	✔	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) WC-R	E420	19-Aug-2021	----	----	----		28-Aug-2021	180 days	9 days	✔	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) WC-U	E420	19-Aug-2021	----	----	----		28-Aug-2021	180 days	9 days	✔	
Total Metals : Total Metals in Water by CRC ICPMS											
HDPE total (nitric acid) WC-V	E420	19-Aug-2021	----	----	----		28-Aug-2021	180 days	9 days	✔	

Legend & Qualifier Definitions

EHT: Exceeded ALS recommended hold time prior to analysis.

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Work Order : VA21B7621
Client : Tetra Tech Canada Inc.
Project : ENG.VGE003612-03.004



Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: * = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Duplicates (DUP)							
Acidity by Titration	E283	273867	1	13	7.6	5.0	✓
Alkalinity Species by Titration	E290	273857	1	16	6.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	273862	1	13	7.6	5.0	✓
Chloride in Water by IC	E235.Cl	273861	1	16	6.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	274165	1	15	6.6	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	275690	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	273860	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	273863	1	13	7.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	273864	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	273865	1	16	6.2	5.0	✓
Total Mercury in Water by CVAAS	E508	275441	1	11	9.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	276659	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Acidity by Titration	E283	273867	1	13	7.6	5.0	✓
Alkalinity Species by Titration	E290	273857	1	16	6.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	273862	1	13	7.6	5.0	✓
Chloride in Water by IC	E235.Cl	273861	1	16	6.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	274165	1	15	6.6	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	275690	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	273860	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	273863	1	13	7.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	273864	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	273865	1	16	6.2	5.0	✓
Total Mercury in Water by CVAAS	E508	275441	1	11	9.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	276659	1	20	5.0	5.0	✓
Method Blanks (MB)							
Acidity by Titration	E283	273867	1	13	7.6	5.0	✓
Alkalinity Species by Titration	E290	273857	1	16	6.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	273862	1	13	7.6	5.0	✓
Chloride in Water by IC	E235.Cl	273861	1	16	6.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	274165	1	15	6.6	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	275690	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	273860	1	16	6.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	273863	1	13	7.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	273864	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	273865	1	16	6.2	5.0	✓
Total Mercury in Water by CVAAS	E508	275441	1	11	9.0	5.0	✓



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
<i>Method Blanks (MB) - Continued</i>							
Total Metals in Water by CRC ICPMS	E420	276659	1	20	5.0	5.0	✔
<i>Matrix Spikes (MS)</i>							
Bromide in Water by IC (Low Level)	E235.Br-L	273862	1	13	7.6	5.0	✔
Chloride in Water by IC	E235.Cl	273861	1	16	6.2	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	274165	1	15	6.6	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	275690	1	19	5.2	5.0	✔
Fluoride in Water by IC	E235.F	273860	1	16	6.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	273863	1	13	7.6	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	273864	1	16	6.2	5.0	✔
Sulfate in Water by IC	E235.SO4	273865	1	16	6.2	5.0	✔
Total Mercury in Water by CVAAS	E508	275441	1	11	9.0	5.0	✔
Total Metals in Water by CRC ICPMS	E420	276659	1	20	5.0	5.0	✔



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Bromide in Water by IC (Low Level)	E235.Br-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Acidity by Titration	E283 Vancouver - Environmental	Water	APHA 2310 B (mod)	Acidity is determined by potentiometric titration to pH 8.3
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	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.
Total Metals in Water by CRC ICPMS	E420 Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAAS	E508 Vancouver - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Dissolved Mercury in Water by CVAAS	E509 Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO ₃), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO ₃), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO ₃ .
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.

QUALITY CONTROL REPORT

Work Order : **VA21B7621**

Page : 1 of 14

Client : Tetra Tech Canada Inc.
Contact : Elyse Hofs
Address : 1000 - 885 Dunsmuir Street, 10th floor
 Vancouver BC Canada V6E 1N5
Telephone : ----
Project : ENG.VGE003612-03.004
PO : ----
C-O-C number : 17-866829/830
Sampler : EH
Site : ----
Quote number : VA21-EBAE100-004
No. of samples received : 14
No. of samples analysed : 13

Laboratory : Vancouver - Environmental
Account Manager : Brent Mack
Address : 8081 Lougheed Highway
 Burnaby, British Columbia Canada V5A 1W9
Telephone : 778-370-3279
Date Samples Received : 19-Aug-2021 18:55
Date Analysis Commenced : 23-Aug-2021
Issue Date : 31-Aug-2021 10:20

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Ilnaz Badbezanchi	Team Leader - Metals preparation	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Sristika Chand	Lab Analyst	Metals, Burnaby, British Columbia



General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

= Indicates a QC result that did not meet the ALS DQO.



Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 273857)											
VA21B7808-001	Anonymous	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	87.3	87.0	0.344%	20%	----
Physical Tests (QC Lot: 273867)											
VA21B7621-002	Quarrey Entrance	acidity (as CaCO3)	----	E283	2.0	mg/L	16.8	12.9	3.9	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 273860)											
VA21B7621-001	Quarrey Drainage	fluoride	16984-48-8	E235.F	0.020	mg/L	0.022	0.021	0.0010	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 273861)											
VA21B7621-001	Quarrey Drainage	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 273862)											
VA21B7621-001	Quarrey Drainage	bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 273863)											
VA21B7621-001	Quarrey Drainage	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.161	0.160	0.508%	20%	----
Anions and Nutrients (QC Lot: 273864)											
VA21B7621-001	Quarrey Drainage	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 273865)											
VA21B7621-001	Quarrey Drainage	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	2.45	2.44	0.008	Diff <2x LOR	----
Total Metals (QC Lot: 275441)											
VA21B7545-006	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Total Metals (QC Lot: 276659)											
VA21B7621-001	Quarrey Drainage	aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0542	0.0499	8.34%	20%	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.0197	0.0189	3.84%	20%	----
		beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.010	mg/L	0.011	0.011	0.0002	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000053	<0.0000050	0.0000003	Diff <2x LOR	----
		calcium, total	7440-70-2	E420	0.050	mg/L	20.8	21.1	1.45%	20%	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	0.000028	0.000028	0.0000006	Diff <2x LOR	----
		chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		copper, total	7440-50-8	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Total Metals (QC Lot: 276659) - continued											
VA21B7621-001	Quarrey Drainage	iron, total	7439-89-6	E420	0.010	mg/L	0.425	0.416	2.20%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	0.000099	0.000096	0.000002	Diff <2x LOR	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	1.19	1.15	3.37%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.0241	0.0234	3.20%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000500	0.000492	0.000008	Diff <2x LOR	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.050	mg/L	1.16	1.11	4.81%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00204	0.00206	0.549%	20%	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	4.67	4.75	1.67%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, total	17341-25-2	E420	0.050	mg/L	2.63	2.48	5.74%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.0923	0.0934	1.19%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	0.84	0.89	0.05	Diff <2x LOR	----
		tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	0.00105	0.00106	0.000007	Diff <2x LOR	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.000071	0.000068	0.000002	Diff <2x LOR	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 274165)											
VA21B7545-012	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 275690)											
VA21B7582-003	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 275690) - continued											
VA21B7582-003	Anonymous	boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, dissolved	17341-25-2	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
		tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 273857)						
alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
Physical Tests (QCLot: 273867)						
acidity (as CaCO3)	---	E283	2	mg/L	2.0	---
Anions and Nutrients (QCLot: 273860)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 273861)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
Anions and Nutrients (QCLot: 273862)						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	---
Anions and Nutrients (QCLot: 273863)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
Anions and Nutrients (QCLot: 273864)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 273865)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
Total Metals (QCLot: 275441)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	---
Total Metals (QCLot: 276659)						
aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	---
antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	---
arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	---
barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	---
beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	---
bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	---
boron, total	7440-42-8	E420	0.01	mg/L	<0.010	---
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	---
calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	---
cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	---
chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	---
cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	---
copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	---
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	---
lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	---



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 276659) - continued						
lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	---
magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	---
manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	---
molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	---
nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	---
phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	---
potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	---
rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	---
selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	---
silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	---
silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	---
sodium, total	17341-25-2	E420	0.05	mg/L	<0.050	---
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	---
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	---
tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	---
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	---
thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	---
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	---
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	---
tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	---
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	---
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	---
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	---
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	---
Dissolved Metals (QCLot: 274165)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	---
Dissolved Metals (QCLot: 275690)						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	---
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	---
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	---
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	---
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	---
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	---
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	---
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	---
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	---



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 275690) - continued						
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	<0.050	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----



Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Physical Tests (QCLot: 273857)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	104	85.0	115	----
Physical Tests (QCLot: 273867)									
acidity (as CaCO3)	----	E283	2	mg/L	50 mg/L	90.7	85.0	115	----
Anions and Nutrients (QCLot: 273860)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 273861)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	99.0	90.0	110	----
Anions and Nutrients (QCLot: 273862)									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	99.2	85.0	115	----
Anions and Nutrients (QCLot: 273863)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	100.0	90.0	110	----
Anions and Nutrients (QCLot: 273864)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	97.4	90.0	110	----
Anions and Nutrients (QCLot: 273865)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	101	90.0	110	----
Total Metals (QCLot: 275441)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	97.2	80.0	120	----
Total Metals (QCLot: 276659)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	98.3	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	101	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	98.2	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	92.2	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	98.2	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	94.8	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	98.3	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	97.2	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	94.6	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	97.3	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	98.4	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	96.7	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	99.5	80.0	120	----



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 276659) - continued									
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	97.9	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	91.6	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	99.0	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	98.1	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	100	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	95.6	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	101	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	104	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	98.8	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	96.4	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	102	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	97.1	80.0	120	----
sodium, total	17341-25-2	E420	0.05	mg/L	50 mg/L	99.1	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	96.0	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	97.4	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	99.2	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	96.8	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	91.6	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	98.0	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	95.0	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	97.5	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	96.0	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	99.8	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	96.5	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	93.5	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	101	80.0	120	----
Dissolved Metals (QCLot: 275690)									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	94.6	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	106	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	99.9	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	100.0	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	103	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	88.8	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	102	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	101	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	102	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	107	80.0	120	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Dissolved Metals (QCLot: 275690) - continued									
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	100	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	98.7	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	92.9	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	96.0	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	95.4	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	95.6	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	99.3	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	99.5	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	97.4	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	102	80.0	120	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	101	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	108	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	106	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	85.5	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	104	80.0	120	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	50 mg/L	100	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	105	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	90.1	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	116	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	94.6	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	87.1	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	95.3	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	99.9	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	98.3	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	101	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	100	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	106	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	102	80.0	120	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 273860)										
VA21B7621-002	Quarrey Entrance	fluoride	16984-48-8	E235.F	1.20 mg/L	1 mg/L	120	75.0	125	----
Anions and Nutrients (QCLot: 273861)										
VA21B7621-002	Quarrey Entrance	chloride	16887-00-6	E235.Cl	112 mg/L	100 mg/L	112	75.0	125	----
Anions and Nutrients (QCLot: 273862)										
VA21B7621-002	Quarrey Entrance	bromide	24959-67-9	E235.Br-L	0.555 mg/L	0.5 mg/L	111	75.0	125	----
Anions and Nutrients (QCLot: 273863)										
VA21B7621-002	Quarrey Entrance	nitrate (as N)	14797-55-8	E235.NO3-L	2.84 mg/L	2.5 mg/L	114	75.0	125	----
Anions and Nutrients (QCLot: 273864)										
VA21B7621-002	Quarrey Entrance	nitrite (as N)	14797-65-0	E235.NO2-L	0.558 mg/L	0.5 mg/L	112	75.0	125	----
Anions and Nutrients (QCLot: 273865)										
VA21B7621-002	Quarrey Entrance	sulfate (as SO4)	14808-79-8	E235.SO4	122 mg/L	100 mg/L	122	75.0	125	----
Total Metals (QCLot: 275441)										
VA21B7545-007	Anonymous	mercury, total	7439-97-6	E508	0.0000991 mg/L	0.0001 mg/L	99.1	70.0	130	----
Total Metals (QCLot: 276659)										
VA21B7621-002	Quarrey Entrance	aluminum, total	7429-90-5	E420	ND mg/L	0.2 mg/L	ND	70.0	130	----
		antimony, total	7440-36-0	E420	0.0186 mg/L	0.02 mg/L	93.1	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0186 mg/L	0.02 mg/L	93.2	70.0	130	----
		barium, total	7440-39-3	E420	0.0185 mg/L	0.02 mg/L	92.5	70.0	130	----
		beryllium, total	7440-41-7	E420	0.0352 mg/L	0.04 mg/L	88.1	70.0	130	----
		bismuth, total	7440-69-9	E420	0.00913 mg/L	0.01 mg/L	91.3	70.0	130	----
		boron, total	7440-42-8	E420	0.091 mg/L	0.1 mg/L	91.1	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00380 mg/L	0.004 mg/L	95.0	70.0	130	----
		calcium, total	7440-70-2	E420	3.50 mg/L	4 mg/L	87.4	70.0	130	----
		cesium, total	7440-46-2	E420	0.00908 mg/L	0.01 mg/L	90.8	70.0	130	----
		chromium, total	7440-47-3	E420	0.0378 mg/L	0.04 mg/L	94.6	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0189 mg/L	0.02 mg/L	94.6	70.0	130	----
		copper, total	7440-50-8	E420	0.0183 mg/L	0.02 mg/L	91.6	70.0	130	----
		iron, total	7439-89-6	E420	1.79 mg/L	2 mg/L	89.7	70.0	130	----
		lead, total	7439-92-1	E420	0.0183 mg/L	0.02 mg/L	91.5	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 276659) - continued										
VA21B7621-002	Quarrey Entrance	lithium, total	7439-93-2	E420	0.0868 mg/L	0.1 mg/L	86.8	70.0	130	----
		magnesium, total	7439-95-4	E420	0.916 mg/L	1 mg/L	91.6	70.0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0184 mg/L	0.02 mg/L	92.2	70.0	130	----
		nickel, total	7440-02-0	E420	0.0374 mg/L	0.04 mg/L	93.5	70.0	130	----
		phosphorus, total	7723-14-0	E420	9.20 mg/L	10 mg/L	92.0	70.0	130	----
		potassium, total	7440-09-7	E420	3.93 mg/L	4 mg/L	98.2	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0191 mg/L	0.02 mg/L	95.4	70.0	130	----
		selenium, total	7782-49-2	E420	0.0369 mg/L	0.04 mg/L	92.3	70.0	130	----
		silicon, total	7440-21-3	E420	8.67 mg/L	10 mg/L	86.7	70.0	130	----
		silver, total	7440-22-4	E420	0.00371 mg/L	0.004 mg/L	92.8	70.0	130	----
		sodium, total	17341-25-2	E420	1.85 mg/L	2 mg/L	92.5	70.0	130	----
		strontium, total	7440-24-6	E420	0.0191 mg/L	0.02 mg/L	95.7	70.0	130	----
		sulfur, total	7704-34-9	E420	18.8 mg/L	20 mg/L	94.3	70.0	130	----
		tellurium, total	13494-80-9	E420	0.0378 mg/L	0.04 mg/L	94.4	70.0	130	----
		thallium, total	7440-28-0	E420	0.00356 mg/L	0.004 mg/L	88.9	70.0	130	----
		thorium, total	7440-29-1	E420	0.0191 mg/L	0.02 mg/L	95.7	70.0	130	----
		tin, total	7440-31-5	E420	0.0185 mg/L	0.02 mg/L	92.7	70.0	130	----
		titanium, total	7440-32-6	E420	0.0368 mg/L	0.04 mg/L	92.0	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0182 mg/L	0.02 mg/L	90.8	70.0	130	----
		uranium, total	7440-61-1	E420	0.00368 mg/L	0.004 mg/L	92.0	70.0	130	----
		vanadium, total	7440-62-2	E420	0.0943 mg/L	0.1 mg/L	94.3	70.0	130	----
		zinc, total	7440-66-6	E420	0.382 mg/L	0.4 mg/L	95.5	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0370 mg/L	0.04 mg/L	92.6	70.0	130	----
Dissolved Metals (QCLot: 274165)										
VA21B7545-013	Anonymous	mercury, dissolved	7439-97-6	E509	0.000101 mg/L	0.0001 mg/L	101	70.0	130	----
Dissolved Metals (QCLot: 275690)										
VA21B7582-004	Anonymous	aluminum, dissolved	7429-90-5	E421	0.377 mg/L	0.4 mg/L	94.2	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0414 mg/L	0.04 mg/L	103	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0392 mg/L	0.04 mg/L	98.0	70.0	130	----
		barium, dissolved	7440-39-3	E421	0.0397 mg/L	0.04 mg/L	99.4	70.0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0833 mg/L	0.08 mg/L	104	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.0172 mg/L	0.02 mg/L	86.3	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.205 mg/L	0.2 mg/L	102	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00812 mg/L	0.008 mg/L	101	70.0	130	----
		calcium, dissolved	7440-70-2	E421	ND mg/L	8 mg/L	ND	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 275690) - continued										
VA21B7582-004	Anonymous	cesium, dissolved	7440-46-2	E421	0.0216 mg/L	0.02 mg/L	108	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0787 mg/L	0.08 mg/L	98.4	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0384 mg/L	0.04 mg/L	96.1	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0374 mg/L	0.04 mg/L	93.4	70.0	130	----
		iron, dissolved	7439-89-6	E421	3.73 mg/L	4 mg/L	93.2	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0368 mg/L	0.04 mg/L	92.0	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.209 mg/L	0.2 mg/L	104	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E421	ND mg/L	0.04 mg/L	ND	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0397 mg/L	0.04 mg/L	99.3	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0747 mg/L	0.08 mg/L	93.4	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	21.0 mg/L	20 mg/L	105	70.0	130	----
		potassium, dissolved	7440-09-7	E421	7.96 mg/L	8 mg/L	99.6	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0419 mg/L	0.04 mg/L	105	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0870 mg/L	0.08 mg/L	109	70.0	130	----
		silicon, dissolved	7440-21-3	E421	17.5 mg/L	20 mg/L	87.4	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00782 mg/L	0.008 mg/L	97.7	70.0	130	----
		sodium, dissolved	17341-25-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.04 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	ND mg/L	40 mg/L	ND	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0866 mg/L	0.08 mg/L	108	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00726 mg/L	0.008 mg/L	90.8	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0385 mg/L	0.04 mg/L	96.2	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0379 mg/L	0.04 mg/L	94.6	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0801 mg/L	0.08 mg/L	100	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0393 mg/L	0.04 mg/L	98.2	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00776 mg/L	0.008 mg/L	97.0	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.200 mg/L	0.2 mg/L	99.9	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.799 mg/L	0.8 mg/L	99.9	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0903 mg/L	0.08 mg/L	113	70.0	130	----



www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

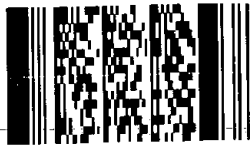
Affix ALS barcode label here (lab use only)

COC Number: 17 - 866829

Page of

Report To Contact and company name below will appear on the final report		Report Format / Distribution		Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)			
Company: <u>Tetra Tech Canada Inc</u>		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL EDD (DIGITAL)		Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply			
Contact: <u>Elyse Hofs</u>		Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Priority (Business Days)		EMERGENCY	
Phone: <u>778 879 9183</u>		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked		4 day [P4-20%] <input type="checkbox"/>		1 Business day [E - 100%] <input type="checkbox"/>	
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL MAIL <input type="checkbox"/> FAX		3 day [P3-25%] <input type="checkbox"/>		Same Day, Weekend or Statutory holiday [E2 - 200% (Laboratory opening fees may apply)] <input type="checkbox"/>	
Street: <u>1000-885 Dunsmuir Street</u>		Email 1 or Fax: <u>elyse.hofs@tetratech.com</u>		Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm			
City/Province: <u>Vancouver, BC</u>		Email 2		For tests that can not be performed according to the service level selected, you will be contacted.			
Postal Code: <u>V6C 1N5</u>		Email 3		Analysis Request			
Invoice To: Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Invoice Distribution		Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below			
Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX					
Company: <u>Tetra Tech</u>		Email 1 or Fax: <u>elyse.hofs@tetratech.com</u>		NUMBER OF CONTAINERS			
Contact: <u>Elyse Hofs</u>		Email 2					
Project Information		Oil and Gas Required Fields (client use)		Acidity Alkalinity Anions (Cl, F, SO4) Anions (NO2, NO3) Dissolved Metal Dissolved Mercury TBD			
ALS Account # / Quote #:		AFE/Cost Center:					
Job #: <u>ENG.VGE003612-03.004</u>		Major/Minor Code:		PO#			
PO / AFE:		Requisitioner:					
LSD:		Location:		ROUTING CODE			
ALS Lab Work Order # (lab use only):		ALS Contact: <u>Brent Mack</u>					
ALS Sample # (lab use only)		Date (dd-mmm-yy)		Time (hh:mm)		Sample Type	
Sample Identification and/or Coordinates (This description will appear on the report)		ALS Contact: <u>Brent Mack</u>		Sampler: <u>Elyse Hofs</u>		NUMBER OF CONTAINERS	
Quarry Drainage		19-08-21		10:15		Water	
Quarry Entrance				10:45			
MILL CREEK				11:15			
DWP 1				11:15			
Portal				12:00			
WC-V				12:50			
WC-W				13:12			
WC-R				13:44			
WC-N				14:09			
WC-K				14:40			
WC-A unmapped				16:00			
-Field blank				16:30			
Drinking Water (DW) Samples (client use)		Special instructions / specify criteria to add on report by clicking on the drop-down list below (electronic COC only)		SAMPLE CONDITION AS RECEIVED (lab use only)			
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		All samples ON HOLD will email COC with requested analysis Friday morning		Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>			
Are samples for human consumption / use? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO				Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>			
SHIPPING RELEASE (client use)		INITIAL SHIPMENT RECEPTION (lab use only)		Cooling Initiated <input type="checkbox"/>			
Released by: <u>Elyse Hofs</u>		Received by: <u>[Signature]</u>		INITIAL COOLER TEMPERATURES °C			
Date: <u>19-08-21</u>		Date: <u>[Signature]</u>		FINAL COOLER TEMPERATURES °C			
Time: <u>[Signature]</u>		Time: <u>[Signature]</u>		Time: <u>[Signature]</u>			
Time: <u>[Signature]</u>		Time: <u>[Signature]</u>		Time: <u>[Signature]</u>			

Environmental Division Vancouver Work Order Reference VA21B7621



Telephone: +1 604 253 4188

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Report To Contact and company name below will appear on the final report		Report Format / Distribution			Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)			
Company: Tetra Tech		Select Report Format: <input checked="" type="checkbox"/> PDF <input type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply			
Contact: Elyse Hofs		Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			4 day [P4-20%] <input type="checkbox"/>		1 Business day [E - 100%] <input type="checkbox"/>	
Phone: 778 879 9183		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			3 day [P3-25%] <input type="checkbox"/>		Same Day, Weekend or Statutory holiday [E2-200% (Laboratory opening fees may apply)] <input type="checkbox"/>	
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			2 day [P2-50%] <input type="checkbox"/>			
Street: 885 DUNSMUIR ST		Email 1 or Fax: elyse.hofs@tetra.tech.com			Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm			
City/Province: Vancouver		Email 2			For tests that can not be performed according to the service level selected, you will be contacted.			
Postal Code: V6C 1N5		Email 3			Analysis Request			
Invoice To		Invoice Distribution			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below			
Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			<div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">NUMBER OF CONTAINERS</div> <div style="border: 1px solid black; padding: 10px; width: 80%;"> <p style="font-size: 2em; text-align: center;">TBD</p> <p style="text-align: center;">will send email tomorrow</p> </div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">SAMPLES ON HOLD</div> </div>			
Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Email 1 or Fax: elyse.hofs@tetra.tech.com						
Company:		Email 2						
Contact:		Email 3						
Project Information		Oil and Gas Required Fields (client use)						
ALS Account # / Quote #:		AFE/Cost Center:	PO#					
Job #: ENG.VGEO03612-03.004		Major/Minor Code:	Routing Code:					
PO / AFE:		Requisitioner:						
LSD:		Location:						
ALS Lab Work Order # (lab use only):		ALS Contact:	Sampler:					
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)		Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	<div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">NUMBER OF CONTAINERS</div> <div style="border: 1px solid black; padding: 10px; width: 80%;"> <p style="font-size: 2em; text-align: center;">TBD</p> <p style="text-align: center;">will send email tomorrow</p> </div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">SAMPLES ON HOLD</div> </div>	<div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">SUSPECTED HAZARD (see Special Instructions)</div> </div>	
	DUP-2		19-08-21	14:40	Water			
	Travel blank		↓	N/A	↓			
Drinking Water (DW) Samples¹ (client use)		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)			SAMPLE CONDITION AS RECEIVED (lab use only)			
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO		<p style="font-size: 1.5em;">All samples on HOLD</p> <p>will email complete Coc with requested analysis tomorrow</p>			Frozen <input type="checkbox"/>		SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>	
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/>		Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>	
					Cooling Initiated <input type="checkbox"/>		INITIAL COOLER TEMPERATURES °C	
							FINAL COOLER TEMPERATURES °C	
							18	
SHIPMENT RELEASE (client use)		INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)			
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
						L	AUG 19 2021	GSS



Chain of Custody (COC) / Analytical Request Form

COC Number: 17 - 866832

Affix ALS barcode label here (lab use only)

Page 1 of 2

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Report To Contact and company name below will appear on the final report		Report Format / Distribution			Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)																																																																	
Company: <u>Tetra Tech Canada Inc</u>		Select Report Format: <input checked="" type="checkbox"/> PDF <input type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply																																																																	
Contact: <u>Elyse Hofs</u>		Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			4 day [P4-20%] <input type="checkbox"/>		1 Business day [E - 100%] <input type="checkbox"/>																																																															
Phone: <u>778 879-9183</u>		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			3 day [P3-25%] <input type="checkbox"/>		Same Day, Weekend or Statutory holiday [E2 - 200%] <input type="checkbox"/>																																																															
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			2 day [P2-50%] <input type="checkbox"/>		(Laboratory opening fees may apply)																																																															
Street: <u>1000-885 Dunsmuir Street</u>		Email 1 or Fax: <u>elyse.hofs@tetratech.com</u>			Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm																																																																	
City/Province: <u>Vancouver, BC</u>		Email 2			For tests that can not be performed according to the service level selected, you will be contacted.																																																																	
Postal Code: <u>V6C 1N5</u>		Email 3			Analysis Request																																																																	
Invoice To: Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Invoice Distribution			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (FP) below																																																																	
Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			<table border="1"> <tr> <td rowspan="6">NUMBER OF CONTAINERS</td> <td>Acidity</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Alkalinity</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>ANIONS</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Dissolved Metals</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Dissolved Hg</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Total Metals</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>					NUMBER OF CONTAINERS	Acidity										Alkalinity										ANIONS										Dissolved Metals										Dissolved Hg										Total Metals									
NUMBER OF CONTAINERS	Acidity																																																																					
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Company: <u>see above</u>		Email 1 or Fax: <u>elyse.hofs@tetratech.com</u>			<table border="1"> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>																																																																	
Contact:		Email 2			<table border="1"> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>																																																																	
Project Information		Oil and Gas Required Fields (client use)			<table border="1"> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>																																																																	
ALS Account # / Quote #:		APE/Cost Center:			PO#																																																																	
Job # <u>704-ENG VGEO 03612-03-004</u>		Major/Minor Code:			Routing Code:																																																																	
PO/APE:		Requisitioner:																																																																				
LSD:		Location:																																																																				
ALS Lab Work Order # (lab use only):		ALS Contact: <u>Brent Mack</u>		Sampler: <u>Elyse Hofs</u>																																																																		
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)			Date (dd-mmm-yy)	Time (hh:mm)	Sample Type																																																																
	<u>Quarry Drainage</u>			<u>19-08-21</u>	<u>10:15</u>	<u>Water</u>	<u>5</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>																																																								
	<u>Quarry Entrance</u>				<u>10:45</u>		<u>5</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>																																																								
	<u>Mill Creek</u>				<u>11:15</u>		<u>5</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>																																																								
	<u>DUP-1</u>				<u>11:15</u>		<u>5</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>																																																								
	<u>Portal</u>				<u>12:00</u>		<u>5</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>																																																								
	<u>WC-V</u>				<u>12:50</u>		<u>5</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>																																																								
	<u>WC-U</u>				<u>13:12</u>		<u>5</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>																																																								
	<u>WC-R</u>				<u>13:44</u>		<u>5</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>																																																								
	<u>WC-N</u>				<u>14:09</u>		<u>5</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>																																																								
	<u>WC-K</u>				<u>14:40</u>		<u>5</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>																																																								
	<u>WC-A unmapped</u>				<u>16:00</u>		<u>5</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>																																																								
	<u>Field Blank</u>				<u>16:30</u>		<u>5</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>																																																								
Drinking Water (DW) Samples (client use)		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)																																																																				
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		<u>Do not analyze Dup-2</u>																																																																				
Are samples for human consumption/ use? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO																																																																						
SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			SAMPLE CONDITION AS RECEIVED (lab use only)																																																																
Released by: <u>Elyse Hofs</u>		Date: <u>19 Aug 21</u>	Time: <u>19:00</u>	Received by:		Date:	Time:	Received by:		Date:	Time:																																																											
Frozen <input type="checkbox"/>		SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>	Ice Packs <input type="checkbox"/>	Ice Cubes <input type="checkbox"/>	Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>	Cooling Initiated <input type="checkbox"/>	INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C																																																														
REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION																																																																						

SAMPLES ON HOLD

SUSPECTED HAZARD (see Special Instructions)

Environmental Division
Vancouver
Work Order Reference
VA21B7621



Telephone: +1 604 253 4188

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Report To Contact and company name below will appear on the final report		Report Format / Distribution			Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)								
Company: See page 1 for all		Select Report Format: <input type="checkbox"/> PDF <input type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply								
Contact: this info.		Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			4 day [P4-20%] <input type="checkbox"/>		1 Business day [E - 100%] <input type="checkbox"/>						
Phone:		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			3 day [P3-25%] <input type="checkbox"/>		Same Day, Weekend or Statutory holiday [E2 - 200%] <input type="checkbox"/>						
Company address below will appear on the final report		Select Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			2 day [P2-35%] <input type="checkbox"/>		(Laboratory opening hours may apply)						
Street:		Email 1 or Fax			Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm								
City/Province:		Email 2			For tests that can not be performed according to the service level selected, you will be contacted.								
Postal Code:		Email 3			Analysis Request								
Invoice To		Invoice Distribution			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below								
Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			NUMBER OF CONTAINERS						SAMPLES ON HOLD		
Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		Email 1 or Fax											
Company:		Email 2											
Contact:		Oil and Gas Required Fields (client use)											
Project Information		Oil and Gas Required Fields (client use)											
ALS Account # / Quote #:		AFE/Cost Center: PO#											
Job #:		Major/Minor Code: Routing Code:											
PO / AFE:		Requisitioner:											
LSD:		Location:											
ALS Lab Work Order # (lab use only):		ALS Contact:		Sampler:									
ALS Sample # (lab use only):	Sample Identification and/or Coordinates (This description will appear on the report)			Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Acidity	Alkalinity	Anions	Dissolved Metal	Dissolved Hg	Total Metal	SUSPECTED HAZARD (see Special Instructions)
	Trip Blank			19-08-21	N/A	water	3	X	X	X	X	X	
	Dup-2			1	14:40	1	5						
Drinking Water (DW) Samples (client use)		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)			SAMPLE CONDITION AS RECEIVED (lab use only)								
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO					Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>								
Are samples for human consumption/ use? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Ice Packs <input type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>											
		Cooling Initiated <input type="checkbox"/>											
		INITIAL COOLER TEMPERATURES °C											
		FINAL COOLER TEMPERATURES °C											
SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)							
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:					

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

APPENDIX B

LIMITATIONS ON THE USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

GEOENVIRONMENTAL

1.1 USE OF DOCUMENT AND OWNERSHIP

This document pertains to a specific site, a specific development, and a specific scope of work. The document may include plans, drawings, profiles and other supporting documents that collectively constitute the document (the "Professional Document").

The Professional Document is intended for the sole use of TETRA TECH's Client (the "Client") as specifically identified in the TETRA TECH Services Agreement or other Contractual Agreement entered into with the Client (either of which is termed the "Contract" herein). TETRA TECH does not accept any responsibility for the accuracy of any of the data, analyses, recommendations or other contents of the Professional Document when it is used or relied upon by any party other than the Client, unless authorized in writing by TETRA TECH.

Any unauthorized use of the Professional Document is at the sole risk of the user. TETRA TECH accepts no responsibility whatsoever for any loss or damage where such loss or damage is alleged to be or, is in fact, caused by the unauthorized use of the Professional Document.

Where TETRA TECH has expressly authorized the use of the Professional Document by a third party (an "Authorized Party"), consideration for such authorization is the Authorized Party's acceptance of these Limitations on Use of this Document as well as any limitations on liability contained in the Contract with the Client (all of which is collectively termed the "Limitations on Liability"). The Authorized Party should carefully review both these Limitations on Use of this Document and the Contract prior to making any use of the Professional Document. Any use made of the Professional Document by an Authorized Party constitutes the Authorized Party's express acceptance of, and agreement to, the Limitations on Liability.

The Professional Document and any other form or type of data or documents generated by TETRA TECH during the performance of the work are TETRA TECH's professional work product and shall remain the copyright property of TETRA TECH.

The Professional Document is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of TETRA TECH. Additional copies of the Document, if required, may be obtained upon request.

1.2 ALTERNATIVE DOCUMENT FORMAT

Where TETRA TECH submits electronic file and/or hard copy versions of the Professional Document or any drawings or other project-related documents and deliverables (collectively termed TETRA TECH's "Instruments of Professional Service"), only the signed and/or sealed versions shall be considered final. The original signed and/or sealed electronic file and/or hard copy version archived by TETRA TECH shall be deemed to be the original. TETRA TECH will archive a protected digital copy of the original signed and/or sealed version for a period of 10 years.

Both electronic file and/or hard copy versions of TETRA TECH's Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH's Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

Electronic files submitted by TETRA TECH have been prepared and submitted using specific software and hardware systems. TETRA TECH makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

1.3 STANDARD OF CARE

Services performed by TETRA TECH for the Professional Document have been conducted in accordance with the Contract, in a manner

consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Professional Document. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Professional Document.

If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by persons other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present, or variation in assumed conditions which might form the basis of design or recommendations as outlined in this report, at or on the development proposed as of the date of the Professional Document requires a supplementary investigation and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

1.7 NOTIFICATION OF AUTHORITIES

In certain instances, the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by TETRA TECH in its reasonably exercised discretion.