REPORT

2022 Jackfish Groundwater Monitoring Report

As Part of Water Licence MV2019L1-001

Submitted to:

Northwest Territories Power Corporation

4 Capital Drive
Hay River, NT
X0E 1G2

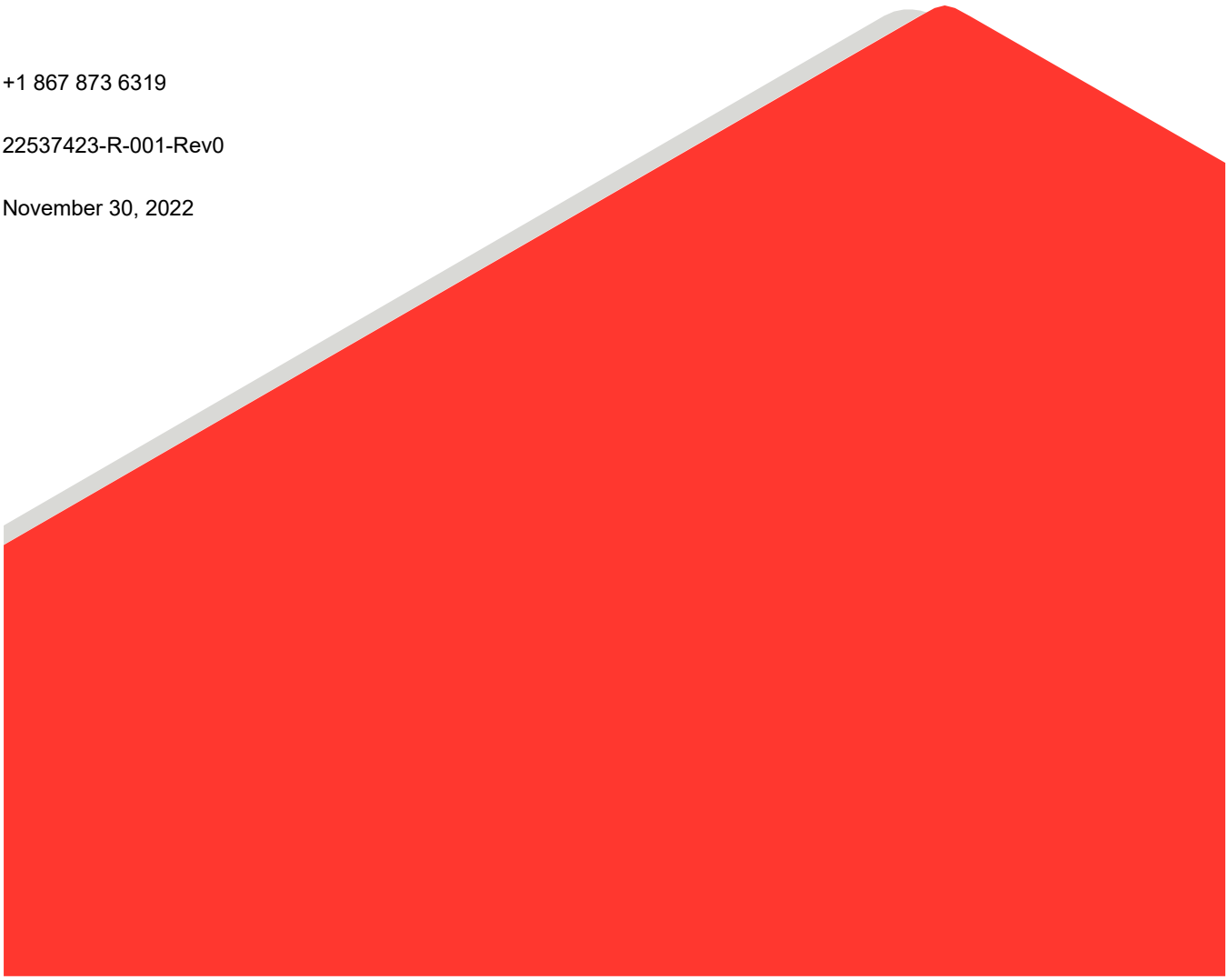
Submitted by:

Golder Associates Ltd.
9, 4905 - 48 Street, Yellowknife, Northwest Territories, X1A 3S3, Canada

+1 867 873 6319

22537423-R-001-Rev0

November 30, 2022



Distribution List

1 Copy Northwest Territories Power Corporation

1 Copy WSP Golder

Table of Contents

TABLES (in text)

TABLES (attached)

APPENDICES

APPENDIX A
Groundwater Sampling Forms

APPENDIX B
Calibration Forms

APPENDIX C
Laboratory Certificates of Analyses

1.0 INTRODUCTION

Golder Associates Ltd, a part of WSP (WSP Golder) was retained by Northwest Territories Power Corporation (NTPC) to complete groundwater monitoring at 18 monitoring wells at the Jackfish Power Plant Site (the Site) in Yellowknife, NT. Monitoring at the Site was conducted as per the requirements outlined in the Jackfish Lake 2021 Groundwater Monitoring Program Plan (GWMP) (NTPC, April 28, 2021) and the Water Licence (MV2019L1-0001), which was issued in 2019.

This report documents the groundwater sampling events conducted at the Site in 2022. Results of this sampling is submitted as part of the Jackfish Lake Annual Water License Report which is submitted before March 31 annually.

1.1 Background

On September 22, 2004, a diesel spill occurred at the NTPC Jackfish Power Plant Site in Yellowknife, NT. Remediation activities removed accessible impacted material, but as this is an active site, complete remediation was not possible. Since 2004, a network of monitoring wells has been installed across the site and along the lake shore to remove hydrocarbon-impacted groundwater and assess the migration of impacted groundwater. Groundwater removal was conducted until 2016, and the analysis of BTEX F1-F4 in groundwater samples from monitoring wells JF01-06 and MW-2 continued until 2020. In 2020, a Groundwater Monitoring Program Plan for 2021 was developed by NTPC to ensure that the 2021 sampling program was conducted in compliance with the requirements in the Water Licence, which stipulates sampling be conducted in June and September, and that a larger sampling set be collected for monitoring wells in JF01-06 and MW-2, as outlined in Table 1.

Table 1: Monitoring Locations and Parameters

Monitoring Well	Location	Monitoring Parameters(a)
PW1	North between K Plant and EMD Plant	BTEX, PHC F1-F4, water quality parameters, water level
PW2	North of EMD Plant	BTEX, PHC F1-F4, water quality parameters, water level
PW3	Southeast corner of EMD Plant	BTEX, PHC F1-F4, water quality parameters, water level
JF01-01	Northwest corner of Ruston Plant	BTEX, PHC F1-F4, water quality parameters, water level
JF01-02	Located at the Lease Boundary near the lakeshore, southwest of the Control Building	BTEX, PHC F1-F4, water quality parameters, water level
JF01-03	Located at the Lease Boundary near the lakeshore, south of CAT Plant	BTEX, PHC F1-F4, water quality parameters, water level
JF01-04	Located at the Lease Boundary near the lakeshore, south of EMD Plant	BTEX, PHC F1-F4, water quality parameters, water level
JF01-05	Located at the Lease Boundary near the lakeshore, south of K Plant	BTEX, PHC F1-F4, water quality parameters, water level
JF01-06	Located at the Lease Boundary near the lakeshore, south of the Warehouse	DO, Major Ions, TSS, Oil and Grease (Hexane Extractable), pH, PHC F1-F4, BTEX, Total and Dissolved Metals [(b)], water quality parameters, water level
MW1	Located at the Lease Boundary near the lakeshore, southeast of CAT Plant	BTEX, PHC F1-F4, water quality parameters, water level
MW2	Located at the Lease Boundary near the lakeshore, between EMD Plant and Cat Plant	DO, Major Ions, TSS, Oil and Grease (Hexane Extractable), pH, PHC F1-F4, BTEX, Total and Dissolved Metals [(b)], water quality parameters, water level
MW3	Located at the Lease Boundary near the lakeshore, southeast of K Plant and the Pump House	BTEX, PHC F1-F4, water quality parameters, water level

Table 1: Monitoring Locations and Parameters

Monitoring Well	Location	Monitoring Parameters(a)
MW4	Located at the Lease Boundary near the lakeshore, between K plant and the Warehouse	BTEX, PHC F1-F4, water quality parameters, water level
MW5	Northwest corner of Ruston Plant	BTEX, PHC F1-F4, water quality parameters, water level
MW6	West of Ruston Plant	BTEX, PHC F1-F4, water quality parameters, water level
MW7	Southwest corner of Ruston Plant	BTEX, PHC F1-F4, water quality parameters, water level
MW9	Southeast of Ruston Plant	BTEX, PHC F1-F4, water quality parameters, water level
MW10	Northwest corner of CAT Plant	BTEX, PHC F1-F4, water quality parameters, water level

a) BTEX – Benzene, Toluene, Ethylbenzene, Xylene, DO – Dissolved Oxygen, PHC – Petroleum Hydrocarbons, TSS – Total Suspended Solids
b) Metals include but may not be limited to analysis of the following: aluminum, antimony, arsenic, barium, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, thallium, uranium, and zinc.

1.2 Objective

The overall objective of the groundwater monitoring program at the Jackfish Power Plant site was to comply with the Water Licence and GWMP requirements for groundwater sampling by collecting groundwater samples at 18 monitoring wells in June and September 2022 for laboratory analysis.

1.3 Scope of Work

To support the objective outlined in Section 1.2, the following scope of work was completed:

- Water level monitoring and groundwater sampling at 18 monitoring wells, including an expanded analysis set at JF01-06 and MW2.
- Submission of groundwater samples for chemical analysis to ALS Laboratory.
- Chemistry data tabulation and screening.
- Preparation of this groundwater monitoring report.

1.3.1 Deviations from Scope of Work

The scope outlined in the Proposal for the Jackfish Power Plant Site in Yellowknife, NT 2022 Annual Groundwater Monitoring was adhered to with the following deviations:

- The June sampling event was completed on August 4, August 5, and August 11, 2022, due to the availability of staff in Yellowknife to complete the work.
- Monitoring well JF01-05 was not sampled in 2022 as the volume of water in the well was insufficient to allow for sampling during both field events.
- MW1 was not sampled in 2022 as the volume of water in the well was insufficient to allow for sampling during both field events.
- Only one duplicate sample was collected during the August field event, which does not meet the amount specified in the QA/QC program (10% of the total samples collected). A travel blank was not collected during the September field program.

2.0 FIELD METHODS

The field work was conducted over two events in August and September 2022. The methodology used during the field investigation is described in the following sub-sections.

2.1 Groundwater Sampling

Groundwater sampling was conducted at 18 monitoring wells at the Site on 4, 5, and 11 August 2022, and 29 September 2022. Prior to sampling, water levels and depth to bottom were measured at each monitoring well, and groundwater was purged from the monitoring wells. The water level measurements are provided in Table A.

The monitoring wells were purged, and samples collected, using a Waterra™ foot valve and new polyethylene tubing, with the exception of monitoring wells PW1 and PW3 which utilized disposable bailers. During each sampling event, three well-volumes were purged from the well prior to sample collection.

During purging, visual and olfactory observations of water clarity, colour, and odour were recorded along with measurements of temperature, pH, conductivity, oxidation reduction potential (ORP), dissolved oxygen, total dissolved solids (TDS), salinity, and turbidity using an AquaTroll multimeter. During the August 11 field visit, a SmartTroll and portable turbidity meter were used in place of the AquaTroll. The groundwater sampling sheets are included in Appendix A. Daily calibration forms for the AquaTroll and SmartTroll are attached in Appendix B. Field parameters measured prior to sampling are provided in Table B-1 and Table B-2.

Monitoring wells JF01-05 and MW1 could not be sampled during the August or September programs due to insufficient water volumes.

Dissolved metals samples were filtered in the field using 0.45 micrometre (µm) disk filters and syringes and preserved with nitric acid. Samples were labeled, registered on chain-of-custody forms, stored on ice packs or ice in coolers, and shipped to ALS for analysis. Samples for JF01-06 and MW2 were submitted for chemical analysis of BTEX, PHC F1-F4, TSS, routine chemistry, total and dissolved metals, total and dissolved mercury, oil and grease, and dissolved oxygen. All other samples were submitted for chemical analysis of BTEX and PHC F1-F4.

Purge water from the monitoring wells was put in a metal drum and left on site to be disposed of by the NTPC.

2.2 Quality Assurance/Quality Control

To document that the field and analytical data were interpretable, meaningful, and reproducible, conformance to a WSP Golder quality assurance/quality control (QA/QC) program was maintained. Standard industry field procedures were used during the investigation to help achieve reproducibility. This involved using QA/QC measures in both the collection (field program component) and analysis (laboratory component) of samples. A field blank and travel blank were collected during each sampling event (with the exception of the September program where a travel blank was not collected) and submitted to ALS for analysis. In addition, field duplicate samples were collected and submitted to ALS for analysis during each sampling event.

3.0 MONITORING RESULTS

3.1 Field Observations

Field observations noted evidence of contamination at several monitoring wells during both the August and September sampling events. A hydrocarbon-like sheen and diesel smell were noted at PW1 and PW2 during both the August and September field program. During purging at PW3, an organic odour was noted, and garbage was seen in the well including cigarette butts.

During the August field program, black particulate was observed in purge water from MW5, MW6, MW7, and MW10. An organic odour was noted in purge water from MW9 and MW10. During the September field program, a sheen was observed on the purge water at MW7. A diesel smell was noted in purge water from JF01-01, MW5, and MW7.

3.2 Analytical Results

During the September program, detectable concentrations of toluene were measured at JF01-02(1.7 ug/L), JF01-06 (0.76 ug/L), MW2 (0.78 ug/L), and MW7(0.53 ug/L), and a F3 was measured at MW9 (520 ug/L).

During both the August and September programs, detectable concentrations of total xylenes were measured at PW1 (7.2 ug/L, 7.5 ug/L respectively) and MW7 (m+p-xylene [0.46 ug/L, 0.92 ug/L]). F1 was measured at PW1 (860 ug/L, 150 ug/L) and MW7 (420 ug/L, 180 ug/L). F2 was measured at JF01-01 (530 ug/L, 500 ug/L), PW1 (15,600 ug/L, 3120 ug/L), PW2 (6,430 ug/L, 1,830 ug/L), MW5 (11,300 ug/L, 4,610 ug/L), MW6 (2,720 ug/L, 5,140 ug/L), MW7 (420 ug/L, 180 ug/L), MW9 (720 ug/L, 1320 ug/L), and MW10 (1,270 ug/L,750 ug/L). Concentrations of F3 were measured at PW1 (6,610 ug/L, 880 ug/L), PW2 (4,380 ug/L, 1,410 ug/L), MW5 (3,180 ug/L, 1,150 ug/L), MW6 (850 ug/L, 1,530 ug/L), and MW7 (1,960 ug/L, 4,220 ug/L).

BTEX and PHC concentrations at all other wells were below the laboratory method detection limits. Groundwater analytical data for the expanded sample sets at JF01-06 and MW2 are included in Table B-1. Analytical results for the standard sample set at all other wells are included in Table B-2. Laboratory certificates of analysis are provided in Appendix C.

The results of the field QA/QC program largely meet the program's data quality objectives (DQOs), with the duplicate results presented in Table C-1 and the field blank and travel blank results presented in Table C-2. The results of the laboratory QA/QC program also largely met the programs DQOs. Based on a review of the QA/QC program, the analytical data are considered reproducible and suitable for the purposes of the groundwater monitoring program.

4.0 CONCLUSIONS AND RECOMMENDATIONS

WSP Golder was retained by Northwest Territories Power Corporation (NTPC) to complete groundwater monitoring at 18 monitoring wells at the Jackfish Power Plant Site (the Site) in Yellowknife, NT. Monitoring at the Site was conducted as per the requirements outlined in the Jackfish Lake 2021 Groundwater Monitoring Program Plan (GWMP) (NTPC, April 28, 2021) and the Water Licence (MV2019L1-0001), which was issued in 2019.

Groundwater sampling was conducted at 18 monitoring wells at the Site in August and September 2022. Detectable concentrations of petroleum hydrocarbons (toluene, xylenes, F1, F2, and F3 hydrocarbons) were measured at 12 of the 18 monitoring wells.

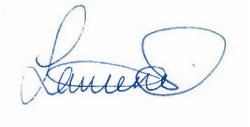
It is recommended that a locking cover be placed on PW3 to prevent garbage from being thrown in the well. It is also recommended that for the 2023 sampling program, a standard analytical program be outlined and ultimately provided to the analytical laboratory, that includes a parameter list for routine chemistry, metals, and anions. This would provide a consistent analytical report between the two sampling events.

5.0 CLOSURE

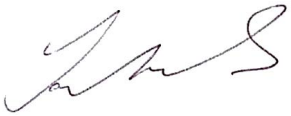
We trust the information contained in this report is sufficient for your present needs. Should you have any additional questions regarding the project, please do not hesitate to contact the undersigned.

Signature Page

Golder Associates Ltd.



Laurence Bonin, M.Env., PMP
Project Manager



Tamra Reynolds, M.Sc., P.Geo (NT/NU)
Principal Hydrogeologist

LB/TR/bw/jlb

https://golderassociates.sharepoint.com/sites/165833/project files/5 technical work/reporting/22537423-r-001-rev0-2022 jackfish groundwater monitoring report_mv2019l1-001.docx

TABLES

Table A: Water Level Measurments, 2022

Monitoring Well	Date and Time	Stick-up (m)	Depth to Water (mbtor)	Depth to Bottom (mbtor)	Water Column Height (m)
PW1	2022-08-05 16:20	0.87	2.35	3.27	0.92
	2022-08-11 10:00	0.87	2.41	3.15	0.74
	2022-09-29 13:20	0.83	2.61	3.10	0.49
PW2	2022-08-05 13:00	0.60	2.01	4.89	2.88
	2022-08-11 11:50	0.60	2.07	4.72	2.65
	2022-09-29 13:40	0.74	2.28	4.66	2.38
PW3	2022-08-05 16:10	1.07	2.58	3.18	0.60
	2022-08-11 13:30	1.07	2.64	3.22	0.58
	2022-09-29 14:10	1.07	2.85	3.17	0.32
JF01-01	2022-08-05 14:15	0.95	1.99	2.72	0.73
	2022-09-29 12:50	0.91	2.26	2.89	0.63
JF01-02	2022-08-05 11:55	1.24	1.76	2.04	0.28
	2022-09-29 10:55	1.13	1.87	2.05	0.18
JF01-03	2022-08-05 11:30	1.17	2.22	3.09	0.87
	2022-09-29 10:35	1.15	2.46	3.10	0.64
JF01-04	2022-08-04 12:00	0.89	2.12	2.95	0.83
	2022-09-29 9:50	0.90	2.40	3.12	0.72
JF01-05	2022-08-04 15:45	0.68	2.05	2.10	0.05
	2022-09-29 9:30	0.70	-	2.11	-
JF01-06	2022-08-04 16:05	0.89	2.03	2.44	0.41
	2022-09-29 8:45	0.87	2.30	2.84	0.54
MW1	2022-08-05 11:50	-	-	-	-
	2022-09-29 10:50	0.94	-	1.69	-
MW2	2022-08-05 10:50	0.77	2.14	3.68	1.54
	2022-09-29 10:00	0.77	2.46	3.80	1.34
MW3	2022-08-04 15:30	0.92	2.19	2.69	0.50
	2022-09-29 9:35	0.93	2.52	3.46	0.94
MW4	2022-08-04 15:50	0.87	2.02	3.11	1.09
	2022-09-29 9:15	0.82	2.26	3.52	1.26
MW5	2022-08-05 13:45	1.14	2.22	2.89	0.67
	2022-09-29 12:40	1.12	2.50	2.85	0.35
MW6	2022-08-05 14:45	0.55	2.14	5.90	3.76
	2022-09-29 12:05	0.52	2.40	6.21	3.81
MW7	2022-08-05 13:30	0.86	1.99	5.15	3.16
	2022-09-29 11:50	0.83	2.33	5.13	2.80
MW9	2022-08-05 12:20	0.55	1.71	6.05	4.34
	2022-09-29 11:10	0.49	1.97	6.16	4.19
MW10	2022-08-05 12:50	0.92	2.39	4.74	2.35
	2022-09-29 11:30	0.89	2.64	4.82	2.18

Comments: m - meters; mbtor - meters below top of riser;

Table B-1: Results of Groundwater Analysis, Expanded Sample Set, 2022

Sample Location	Detection Limit	Unit	JF01-06		MW2	
Date Sampled			05-Aug-2022	29-Sep-22	05-Aug-2022	29-Sep-22
ALS Sample ID			YL2201159-005	YL2201730-019	YL2201159-006	YL2201730-005
Field Parameters						
Temperature	-	°C	20	12	20	11
Specific Conductivity	-	µS/cm	446	495	423	461
Electric Conductivity	-	µS/cm	446	351	422	341
Total dissolved solids (TDS) ppm	-	g/L	0.29	0.30	0.30	0.30
Salinity	-	ppt	0.24	0.22	0.23	0.22
Dissolved Oxygen	-	%	56	61	41	98
Dissolved Oxygen	-	mg/L	5.0	6.6	3.7	-
pH	-	-	7.1	7.1	6.8	7.1
ORP	-	mV	214	227	80	44
Turbidity	-	NTU/AU	12	N/A	21	N/A
Water appearance	-	-	brown,cloudy, no odour	clear with grey sediment, no odour	light brown, no odour	slightly couldy
Conventional Parameters						
Conductivity	2	µS/cm	-	479	-	470
Alkalinity, bicarbonate (as CaCO3)	1	mg/L	-	113	-	111
Alkalinity, carbonate (as CaCO3)	1	mg/L	-	<1.0	-	<1.0
Alkalinity, hydroxide (as CaCO3)	1	mg/L	-	<1.0	-	<1.0
Alkalinity, phenolphthalein (as CaCO3)	1	mg/L	-	<1.0	-	<1.0
Alkalinity, total (as CaCO3)	1	mg/L	-	113	-	111
Hardness (as CaCO3), dissolved	0.6	mg/L	148	163	140	151
Hardness (as CaCO3), from total Ca/Mg	0.6	mg/L	173	170	139	165
pH	0.1	pH units	7.9	8.3	7.9	8.2
Solids, total dissolved [TDS]	10	mg/L	-	289	-	295
Solids, total dissolved [TDS], calculated (APHA)	1	mg/L	-	258	-	249
Solids, total suspended [TSS] [(a)]	3	mg/L	-	87	-	46
Turbidity	0.1	NTU	-	14	-	21
Anions and Nutrients						
Ammonia, total (as N)	0.005	mg/L	-	0.048	-	0.22
Bromide	0.05	mg/L	<0.050	-	<0.050	-
Chloride	0.1	mg/L	62	62	62	62
Fluoride	0.01	mg/L	0.11	0.10	0.11	0.11
Nitrate (as N)	0.005	mg/L	0.38	0.34	0.015	0.037
Nitrate + nitrite (as N)	0.005	mg/L	-	0.34	-	0.052
Nitrite (as N)	0.001	mg/L	<0.0010	0.0015	0.012	0.015
Nitrogen, total	0.03	mg/L	-	0.82	-	-
Phosphorus, total	0.002	mg/L	-	0.081	-	0.074
Phosphorus, total dissolved	0.002	mg/L	-	0.045	-	0.016
Silicate (as SiO2)	0.5	mg/L	-	11	-	11
Sulfate (as SO4)	0.3	mg/L	26	28	24	29
Organic / Inorganic Carbon						
Carbon, dissolved organic [DOC]	0.5	mg/L	-	8.9	-	9.3
Total Metals						
Aluminum, total	0.003	mg/L	7.3	1.9	0.43	2.2
Antimony, total	0.0001	mg/L	0.0043	0.0011	0.00062	0.0015
Arsenic, total	0.0001	mg/L	0.32	0.23	0.23	0.21
Barium, total	0.0001	mg/L	0.28	0.050	0.047	0.051
Beryllium, total	0.0001	mg/L	0.00038	<0.000100	<0.000100	<0.000100
Bismuth, total	0.00005	mg/L	<0.000100	0.000075	<0.000050	0.000091
Boron, total	0.01	mg/L	0.029	0.026	0.025	0.019
Cadmium, total	0.000005	mg/L	0.00021	0.000023	0.000021	0.000037
Calcium, total	0.05	mg/L	42	44	36	44
Cesium, total	0.00001	mg/L	0.00043	0.00022	0.000054	0.00026
Chromium, total	0.0005	mg/L	0.028	0.0081	0.0020	0.0088
Cobalt, total	0.0001	mg/L	0.052	0.006	0.0020	0.0035
Copper, total	0.0005	mg/L	0.019	0.0046	0.0027	0.0057
Iron, total	0.01	mg/L	6.5	2.4	1.7	4.4
Lead, total	0.00005	mg/L	0.0045	0.0011	0.00079	0.0015
Lithium, total	0.001	mg/L	0.019	0.015	0.0062	0.017
Magnesium, total	0.005	mg/L	16	14	12	14
Manganese, total	0.0001	mg/L	8.01	0.88	0.078	0.095
Mercury, total	0.000005	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum, total	0.00005	mg/L	0.00035	0.00034	0.00062	0.00037
Nickel, total	0.0005	mg/L	0.046	0.0075	0.0028	0.0063
Phosphorus, total	0.05	mg/L	0.655	0.077	0.078	0.137

Table B-1: Results of Groundwater Analysis, Expanded Sample Set, 2022

Sample Location	Detection Limit	Unit	JF01-06		MW2	
Date Sampled			05-Aug-2022	29-Sep-22	05-Aug-2022	29-Sep-22
ALS Sample ID			YL2201159-005	YL2201730-019	YL2201159-006	YL2201730-005
Potassium, total	0.05	mg/L	6.3	3.9	4.6	4.2
Rubidium, total	0.0002	mg/L	0.0095	0.0041	0.0038	0.0049
Selenium, total	0.00005	mg/L	0.00014	0.000074	<0.000050	<0.000050
Silicon, total	0.1	mg/L	13	7.8	7.4	7.7
Silver, total	0.00001	mg/L	<0.000020	<0.000010	0.000010	0.000039
Sodium, total	0.05	mg/L	32	33	32	30
Strontium, total	0.0002	mg/L	0.109	0.094	0.093	0.103
Sulfur, total	0.5	mg/L	8.1	10	8.3	11
Tellurium, total	0.0002	mg/L	<0.00040	<0.00020	<0.00020	<0.00020
Thallium, total	0.00001	mg/L	<0.000020	0.000017	0.000014	0.000020
Thorium, total	0.0001	mg/L	0.00056	0.00019	0.0001	0.00022
Tin, total	0.0001	mg/L	0.00024	0.00037	0.00012	0.00077
Titanium, total	0.0003	mg/L	0.17	0.10	0.02	0.11
Tungsten, total	0.0001	mg/L	0.00023	0.00028	<0.00010	0.0001
Uranium, total	0.00001	mg/L	0.00232	0.00137	0.00035	0.00064
Vanadium, total	0.0005	mg/L	0.017	0.0064	0.0039	0.0086
Zinc, total	0.003	mg/L	0.0343	0.0086	0.0031	0.0103
zirconium, total	0.0002	mg/L	0.00048	<0.00020	0.00023	<0.00020
Dissolved Metals						
Aluminum, dissolved	0.001	mg/L	0.091	0.0068	0.017	0.011
Antimony, dissolved	0.0001	mg/L	0.0011	0.00049	0.00052	0.00052
Arsenic, dissolved	0.0001	mg/L	0.23	0.22	0.18	0.12
Barium, dissolved	0.0001	mg/L	0.043	0.033	0.043	0.037
Beryllium, dissolved	0.0001	mg/L	<0.000100	<0.000100	<0.000100	<0.000100
Bismuth, dissolved	0.00005	mg/L	<0.000050	<0.000050	<0.000050	<0.000050
Boron, dissolved	0.01	mg/L	0.027	0.027	0.025	0.016
Cadmium, dissolved	0.000005	mg/L	0.000010	0.0000078	0.000015	0.000015
Calcium, dissolved	0.05	mg/L	38	43	36	40
Cesium, dissolved	0.00001	mg/L	0.000044	0.000014	0.000015	0.000011
Chromium, dissolved	0.0005	mg/L	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, dissolved	0.0001	mg/L	0.00069	0.00046	0.0011	0.00088
Copper, dissolved	0.0002	mg/L	0.0011	0.00053	0.00046	<0.00020
Iron, dissolved	0.01	mg/L	0.078	<0.010	0.52	0.719
Lead, dissolved	0.00005	mg/L	0.00018	<0.000050	0.00010	0.000098
Lithium, dissolved	0.001	mg/L	0.0041	0.0027	0.0046	0.0033
Magnesium, dissolved	0.005	mg/L	13	14	12	13
Manganese, dissolved	0.0001	mg/L	0.20	0.10	0.06	0.06
Mercury, dissolved	0.000005	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum, dissolved	0.00005	mg/L	0.00058	0.00022	0.00043	0.00029
Nickel, dissolved	0.0005	mg/L	0.0032	0.0017	0.0017	0.0012
Phosphorus, dissolved	0.05	mg/L	<0.050	<0.050	<0.050	<0.050
Potassium, dissolved	0.05	mg/L	5.3	3.6	4.4	3.7
Rubidium, dissolved	0.0002	mg/L	0.0046	0.0020	0.0034	0.0025
Selenium, dissolved	0.00005	mg/L	0.000096	<0.000050	0.000065	<0.000050
Silicon, dissolved	0.05	mg/L	6.4	5.6	6.2	5.2
Silver, dissolved	0.00001	mg/L	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, dissolved	0.05	mg/L	32	32	31	29
Strontium, dissolved	0.0002	mg/L	0.097	0.093	0.093	0.099
Sulfur, dissolved	0.5	mg/L	9.0	10	8.5	11
Tellurium, dissolved	0.0002	mg/L	<0.00020	<0.00020	<0.00020	<0.00020
Thallium, dissolved	0.00001	mg/L	<0.000010	<0.000010	0.000011	<0.000010
Thorium, dissolved	0.0001	mg/L	0.00011	<0.00010	<0.00010	<0.00010
Tin, dissolved	0.0001	mg/L	0.0001	<0.00010	<0.00010	0.00011
Titanium, dissolved	0.0003	mg/L	0.0031	<0.00030	0.00058	0.00048
Tungsten, dissolved	0.0001	mg/L	<0.00010	<0.00010	<0.00010	<0.00010
Uranium, dissolved	0.00001	mg/L	0.00061	0.00114	0.00023	0.00038
Vanadium, dissolved	0.0005	mg/L	0.0015	0.00052	0.0016	0.0011
Zinc, dissolved	0.001	mg/L	0.0014	0.0011	<0.0010	0.0014
Zirconium, dissolved	0.0002	mg/L	0.00021	<0.00020	<0.00020	<0.00020

Table B-1: Results of Groundwater Analysis, Expanded Sample Set, 2022

Sample Location	Detection Limit	Unit	JF01-06		MW2	
Date Sampled			05-Aug-2022	29-Sep-22	05-Aug-2022	29-Sep-22
ALS Sample ID			YL2201159-005	YL2201730-019	YL2201159-006	YL2201730-005
Aggregate Organics						
Oil & Grease (gravimetric)	5	mg/L	<5.0	<5.0	<5.0	<5.0
Volatile Organic Compounds						
Benzene	0.5	µg/L	<0.50	<0.50	<0.50	<0.50
Ethylbenzene	0.5	µg/L	<0.50	<0.50	<0.50	<0.50
Methyl-tert-butyl ether [MTBE]	0.5	µg/L	<0.50	<0.50	<0.50	<0.50
Styrene	0.5	µg/L	<0.50	<0.50	<0.50	<0.50
Toluene	0.5	µg/L	<0.50	0.76	<0.50	0.78
Xylene, m+p-	0.4	µg/L	<0.40	<0.40	<0.40	<0.40
Xylene, o-	0.3	µg/L	<0.30	<0.30	<0.30	<0.30
Xylenes, total	0.5	µg/L	<0.50	<0.50	<0.50	<0.50
Hydrocarbons						
F1 (C6-C10)	100	µg/L	<100	<100	<100	<100
F2 (C10-C16)	300	µg/L	<300	<300	<300	<300
F3 (C16-C34)	300	µg/L	<300	<300	<300	<300
F4 (C34-C50)	300	µg/L	<300	<300	<300	<300
VHw (C6-C10)	100	µg/L	<100	<100	<100	<100
F1-BTEX	100	µg/L	<100	<100	<100	<100
VPHw	100	µg/L	<100	<100	<100	<100

Notes: (a) TSS was not collected in August, however the August turbidity results and TSS levels from the September program, along with visual observations, do not indicate that TSS is a parameter of concern

g/L - grams per litre; mg/L - milligrams per litre; mV - millivolts; NTU - nephelometric turbidity unit; ppt - parts per trillion; µS/cm - micro-siemens per centimeter

Table B-2: Results of Groundwater Analysis, Standard Sample Set, 2022

Sample Location	Detection Limit	Unit	JF01-01		JF01-02		JF01-03		JF01-04		PW1		PW2		PW3		MW3	
Date Sampled			05-Aug-2022	29-Sep-22	05-Aug-2022	29-Sep-22	05-Aug-2022	29-Sep-22	05-Aug-2022	29-Sep-22	11-Aug-22	29-Sep-22	11-Aug-22	29-Sep-22	11-Aug-22	29-Sep-22	05-Aug-2022	29-Sep-22
ALS Sample ID			YL2201159-001	YL2201730-011	YL2201159-002	YL2201730-003	YL2201159-003	YL2201730-004	YL2201159-004	YL2201730-007	YL2201195-001	YL2201730-010	YL2201195-002	YL2201730-012	YL2201195-003	YL2201730-009	YL2201159-007	YL2201730-008
Field Parameters																		
Temperature	-	°C	10	8.9	7.8	7.2	18	13	19	13	9.7	9.6	11	10	12	9.8	19	12
Specific Conductivity	-	µS/cm	378	360	426	521	419	443	469	468	477	456	618	582	498	473	436	472
Electric Conductivity	-	µS/cm	305	250	331	344	400	341	465	357	337	323	453	415	377	335	431	357
Total dissolved solids	-	g/L	0.25	0.23	0.28	0.34	0.27	0.26	0.31	0.31	0.31	0.30	0.40	0.38	0.32	0.31	0.28	0.31
Salinity	-	ppt	0.21	0.17	0.23	0.25	0.23	0.21	0.25	0.23	0.23	0.22	0.30	0.28	0.24	0.23	0.23	0.23
Dissolved Oxygen	-	%	99	86	95	93	58	79	61	62	21	41	16	36	45	-	75	60
Dissolved Oxygen	-	mg/L	11	-	8.6	-	5.5	-	5.5	-	2.3	-	1.7	3.8	4.7	5.3	6.8	-
pH	-	-	6.9	6.9	7.2	7.0	7.0	7.0	7.2	6.9	6.8	7.0	7.0	7.1	7.2	7.6	7.0	7.0
ORP	-	mV	39	23	9.1	24	180	110	201	226	-20	-25	-51	-48	117	74	208	232
Turbidity	-	NTU/AU	351	N/A	462	N/A	90	N/A	77	N/A	4.2	N/A	5.2	N/A	35	N/A	75	N/A
Water appearance	-	-	bown, no odour	slightly cloudy, diesel odour	light brown, no odour	slightly cloudy with brown sediment	turbid, no odour, dark brown	brown, slightly cludy	light brown. no odour	clear with some sediment	brown, strong strong PHC smell	sheen, clear, some black sediment	dark grey, oil odour	sheen, diesel smell,	light brown, organic odour	no odour, slightly cloudy	turbid, no odour	light brown, cloudy
Volatile Organic Compounds																		
Benzene	0.5	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Ethylbenzene	0.5	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.86	0.78	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl-tert-butyl ether [MTBE]	0.5	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	0.5	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Toluene	0.5	µg/L	<0.50	<0.50	<0.50	**1.7**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Xylene, m+p-	0.4	µg/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	4.5	4.7	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Xylene, o-	0.3	µg/L	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	2.8	2.8	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Xylenes, total	0.5	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	7.2	7.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Hydrocarbons																		
F1 (C6-C10)	100	µg/L	<100	<100	<100	<100	<100	<100	<100	<100	860	150	<100	<100	<100	<100	<100	<100
F2 (C10-C16)	300	µg/L	530	500	<300	<300	<300	<300	<300	<300	15600	3120	6430	1830	<300	<300	<300	<300
F3 (C16-C34)	300	µg/L	<300	<300	<300	<300	<300	<300	<300	<300	6610	880	4380	1410	<300	<300	<300	<300
F4 (C34-C50)	300	µg/L	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300
VHw (C6-C10)	100	µg/L	<100	<100	<100	<100	<100	<100	<100	<100	760	170	<100	<100	<100	<100	<100	<100
F1-BTEX	100	µg/L	<100	<100	<100	<100	<100	<100	<100	<100	852	142	<100	<100	<100	<100	<100	<100
VPHw	100	µg/L	<100	<100	<100	<100	<100	<100	<100	<100	750	160	<100	<100	<100	<100	<100	<100

Notes: g/L - grams per litre; mg/L - milligrams per litre; mV - millivolts; NTU - nephelometric turbidity unit; ppt - parts per trillion; µS/cm - micro-siemens per centimeter

Table B-2: Results of Groundwater Analysis, Standard Sample Set, 2022

Sample Location	Detection Limit	Unit	MW4		MW5		MW6		MW7		MW9		MW10	
Date Sampled			05-Aug-2022	29-Sep-22	05-Aug-2022	29-Sep-22	05-Aug-2022	29-Sep-22	05-Aug-2022	29-Sep-22	05-Aug-2022	29-Sep-22	05-Aug-2022	29-Sep-22
ALS Sample ID			YL2201159-008	YL2201730-017	YL2201159-009	YL2201730-013	YL2201159-010	YL2201730-014	YL2201159-011	YL2201730-016	YL2201159-012	YL2201730-002	YL2201159-013	YL2201730-001
Field Parameters														
Temperature	-	°C	19	10	11	8.6	5.7	7.7	6.3	7.9	7.7	6.7	11.8	10.4
Specific Conductivity	-	µS/cm	444	466	388	419	374	413	384	414	355	400	365	463
Electric Conductivity	-	µS/cm	437	344	321	291	272	278	283	280	273	262	308	335
Total dissolved solids	-	g/L	0.29	0.30	0.25	0.27	0.24	0.27	0.25	0.27	0.23	0.26	0.24	0.30
Salinity	-	ppt	0.24	0.22	0.21	0.20	0.21	0.20	0.21	0.20	0.20	0.19	0.20	0.22
Dissolved Oxygen	-	%	64	47	59	43	-	39	38	54	65	52	38	42
Dissolved Oxygen	-	mg/L	5.8	-	6.4	-	6.0	-	4.9	-	7.7	-	4.4	-
pH	-	-	7.0	7.1	7.07	6.9	7.2	7.0	6.9	6.9	7.1	7.0	7.1	6.8
ORP	-	mV	186	109	-47	-3.2	-23	-3.6	-23	0.4	-37.0	-16	-81	2.3
Turbidity	-	NTU/AU	252	N/A	1921	N/A	33	N/A	103	N/A	47	N/A	11	N/A
Water appearance	-	-	-	clear water	cloudy, black, no odour.	cloudy with grey sediment, slight diesel smell	mostly clean with black particulates	clear with grey sediment	no dour, black particulates	cloudy grey	light brown, sulfur smell	clear with some sediment	clear with black particulates, sulfur smell	cloudy with grey sediment
Volatile Organic Compounds														
Benzene	0.5	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Ethylbenzene	0.5	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl-tert-butyl ether [MTBE]	0.5	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	0.5	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Toluene	0.5	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.53	<0.50	<0.50	<0.50	<0.50
Xylene, m+p-	0.4	µg/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.46	0.92	<0.40	<0.40	<0.40	<0.40
Xylene, o-	0.3	µg/L	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Xylenes, total	0.5	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.92	<0.50	<0.50	<0.50	<0.50
Hydrocarbons														
F1 (C6-C10)	100	µg/L	<100	<100	<100	<100	<100	<100	420	180	<100	<100	<100	<100
F2 (C10-C16)	300	µg/L	<300	<300	11300	4610	2720	5140	8530	16400	720	1320	1270	750
F3 (C16-C34)	300	µg/L	<300	<300	3180	1150	850	1530	1960	4220	<300	520	<300	360
F4 (C34-C50)	300	µg/L	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300
VHw (C6-C10)	100	µg/L	<100	<100	<100	<100	<100	<100	380	190	<100	<100	<100	<100
F1-BTEX	100	µg/L	<100	<100	<100	<100	<100	<100	420	179	<100	<100	<100	<100
VPHw	100	µg/L	<100	<100	<100	<100	<100	<100	380	190	<100	<100	<100	<100

Notes: g/L - grams per litre; mg/L - milligrams per litre; mV - millivolts; NTU - nephelometric turbidity unit; ppt - parts per trillion; µS/cm - micro-siemens per centimeter

Table C-1: Duplicate Results for the Jackfish Groundwater Monitoring Program, 2022

Sample Location	Detection Limit	Unit	PW3		Relative Percent Difference (%)	MW06		Relative Percent Difference (%)	JF01-06		Relative Percent Difference (%)
			Sample	Duplicate		Sample	Duplicate		Sample	Duplicate	
Date Sampled			11-Aug-22	11-Aug-22		29-Sep-22	29-Sep-22		29-Sep-22	29-Sep-22	
ALS Sample ID			YL2201195-003	YL2201195-004		YL2201730-014	YL2201730-015		YL2201730-018	YL2201730-019	
Conventional Parameters											
Conductivity	2	µS/cm	-	-	-	-	-	-	479	478	0.21%
Alkalinity, bicarbonate (as CaCO3)	1	mg/L	-	-	-	-	-	-	113	113	0.00%
Alkalinity, carbonate (as CaCO3)	1	mg/L	-	-	-	-	-	-	<1.0	<1.0	-
Alkalinity, hydroxide (as CaCO3)	1	mg/L	-	-	-	-	-	-	<1.0	<1.0	-
Alkalinity, phenolphthalein (as CaCO3)	1	mg/L	-	-	-	-	-	-	<1.0	<1.0	-
Alkalinity, total (as CaCO3)	1	mg/L	-	-	-	-	-	-	113	113	0.00%
Hardness (as CaCO3), dissolved	0.6	mg/L	-	-	-	-	-	-	163	152	6.98%
Hardness (as CaCO3), from total Ca/Mg	0.6	mg/L	-	-	-	-	-	-	170	169	0.59%
pH	0.1	-	-	-	-	-	-	-	8.3	8.3	0.00%
Solids, total dissolved [TDS]	10	mg/L	-	-	-	-	-	-	289	309	6.69%
Solids, total dissolved [TDS], calculated (APHA)	1	mg/L	-	-	-	-	-	-	258	252	2.35%
Solids, total suspended [TSS]	3	mg/L	-	-	-	-	-	-	87	79	10.13%
Turbidity	0.1	NTU	-	-	-	-	-	-	14	17	16.67%
Anions and Nutrients											
Ammonia, total (as N)	0.005	mg/L	-	-	-	-	-	-	0.048	0.069	**36.00%**
Chloride	0.1	mg/L	-	-	-	-	-	-	62	62	0.32%
Fluoride	0.01	mg/L	-	-	-	-	-	-	0.098	0.096	2.06%
Nitrate (as N)	0.005	mg/L	-	-	-	-	-	-	0.34	0.35	2.92%
Nitrate + nitrite (as N)	0.005	mg/L	-	-	-	-	-	-	0.34	0.35	2.90%
Nitrite (as N)	0.001	mg/L	-	-	-	-	-	-	0.0015	0.0025	**50.00%**
Nitrogen, total	0.03	mg/L	-	-	-	-	-	-	0.82	0.84	1.93%
Phosphorus, total	0.002	mg/L	-	-	-	-	-	-	0.081	0.085	5.07%
Phosphorus, total dissolved	0.002	mg/L	-	-	-	-	-	-	0.045	0.079	**55.28%**
Silicate (as SiO2)	0.5	mg/L	-	-	-	-	-	-	11	11	2.67%
Sulfate (as SO4)	0.3	mg/L	-	-	-	-	-	-	28	28	0.00%
Organic / Inorganic Carbon											
Carbon, dissolved organic [DOC]	0.5	mg/L	-	-	-	-	-	-	8.9	9.3	4.19%

Table C-1: Duplicate Results for the Jackfish Groundwater Monitoring Program, 2022

Sample Location	Detection Limit	Unit	PW3		Relative Percent Difference (%)	MW06		Relative Percent Difference (%)	JF01-06		Relative Percent Difference (%)
			Sample	Duplicate		Sample	Duplicate		Sample	Duplicate	
Date Sampled			11-Aug-22	11-Aug-22		29-Sep-22	29-Sep-22		29-Sep-22	29-Sep-22	
ALS Sample ID			YL2201195-003	YL2201195-004		YL2201730-014	YL2201730-015		YL2201730-018	YL2201730-019	
Total Metals											
Aluminum, total	0.003	mg/L	-	-	-	-	-	-	1.9	1.6	19.02%
Antimony, total	0.0001	mg/L	-	-	-	-	-	-	0.0011	0.0012	11.45%
Arsenic, total	0.0001	mg/L	-	-	-	-	-	-	0.23	0.23	0.86%
Barium, total	0.0001	mg/L	-	-	-	-	-	-	0.050	0.051	2.98%
Beryllium, total	0.0001	mg/L	-	-	-	-	-	-	<0.000100	<0.000100	-
Bismuth, total	0.00005	mg/L	-	-	-	-	-	-	0.000075	0.000075	0.00%
Boron, total	0.01	mg/L	-	-	-	-	-	-	0.026	0.027	3.77%
Cadmium, total	0.000005	mg/L	-	-	-	-	-	-	0.000023	0.000026	12.06%
Calcium, total	0.05	mg/L	-	-	-	-	-	-	44	45	2.01%
Cesium, total	0.00001	mg/L	-	-	-	-	-	-	0.00022	0.00020	7.23%
Chromium, total	0.0005	mg/L	-	-	-	-	-	-	0.0081	0.0063	**25.21%**
Cobalt, total	0.0001	mg/L	-	-	-	-	-	-	0.0060	0.0058	4.26%
Copper, total	0.0005	mg/L	-	-	-	-	-	-	0.0046	0.0037	**21%**
Iron, total	0.01	mg/L	-	-	-	-	-	-	2.4	2.1	16.48%
Lead, total	0.00005	mg/L	-	-	-	-	-	-	0.0011	0.0010	2.90%
Lithium, total	0.001	mg/L	-	-	-	-	-	-	0.015	0.013	14.84%
Magnesium, total	0.005	mg/L	-	-	-	-	-	-	14	14	5.02%
Manganese, total	0.0001	mg/L	-	-	-	-	-	-	0.88	0.87	0.34%
Mercury, total	0.000005	mg/L	-	-	-	-	-	-	<0.0000050	<0.0000050	-
Molybdenum, total	0.00005	mg/L	-	-	-	-	-	-	0.00034	0.00036	5.80%
Nickel, total	0.0005	mg/L	-	-	-	-	-	-	0.0075	0.0067	11.10%
Phosphorus, total	0.05	mg/L	-	-	-	-	-	-	0.077	0.075	2.63%
Potassium, total	0.05	mg/L	-	-	-	-	-	-	3.9	4.0	4.05%
Rubidium, total	0.0002	mg/L	-	-	-	-	-	-	0.0041	0.0038	6.79%
Selenium, total	0.00005	mg/L	-	-	-	-	-	-	0.000074	0.000051	**36.80%**
Silicon, total	0.1	mg/L	-	-	-	-	-	-	7.8	7.3	7.15%
Silver, total	0.00001	mg/L	-	-	-	-	-	-	<0.000010	<0.000010	-
Sodium, total	0.05	mg/L	-	-	-	-	-	-	33	33	0.61%
Strontium, total	0.0002	mg/L	-	-	-	-	-	-	0.094	0.103	8.82%
Sulfur, total	0.5	mg/L	-	-	-	-	-	-	10	11	1.90%
Tellurium, total	0.0002	mg/L	-	-	-	-	-	-	<0.00020	<0.00020	-
Thallium, total	0.00001	mg/L	-	-	-	-	-	-	0.000017	0.000015	12.50%
Thorium, total	0.0001	mg/L	-	-	-	-	-	-	0.00019	0.00016	17.14%
Tin, total	0.0001	mg/L	-	-	-	-	-	-	0.00037	0.00041	10.26%
Titanium, total	0.0003	mg/L	-	-	-	-	-	-	0.102	0.083	**20.66%**
Tungsten, total	0.0001	mg/L	-	-	-	-	-	-	0.00028	0.00030	6.90%
Uranium, total	0.00001	mg/L	-	-	-	-	-	-	0.0014	0.0014	4.98%
Vanadium, total	0.0005	mg/L	-	-	-	-	-	-	0.0064	0.0056	14.31%
zZinc, total	0.003	mg/L	-	-	-	-	-	-	0.0086	0.0071	19.11%
Zirconium, total	0.0002	mg/L	-	-	-	-	-	-	<0.00020	<0.00020	-

Table C-1: Duplicate Results for the Jackfish Groundwater Monitoring Program, 2022

Sample Location	Detection Limit	Unit	PW3		Relative Percent Difference (%)	MW06		Relative Percent Difference (%)	JF01-06		Relative Percent Difference (%)
Date Sampled			Sample	Duplicate		Sample	Duplicate		Sample	Duplicate	
			11-Aug-22	11-Aug-22		29-Sep-22	29-Sep-22		29-Sep-22	29-Sep-22	
ALS Sample ID			YL2201195-003	YL2201195-004		YL2201730-014	YL2201730-015		YL2201730-018	YL2201730-019	
Dissolved Metals											
Aluminum, dissolved	0.001	mg/L	-	-	-	-	-	-	0.0068	0.0064	6.06%
Antimony, dissolved	0.0001	mg/L	-	-	-	-	-	-	0.00049	0.00051	4.00%
Arsenic, dissolved	0.0001	mg/L	-	-	-	-	-	-	0.22	0.20	9.84%
Barium, dissolved	0.0001	mg/L	-	-	-	-	-	-	0.033	0.033	0.92%
Beryllium, dissolved	0.0001	mg/L	-	-	-	-	-	-	<0.000100	<0.000100	-
Bismuth, dissolved	0.00005	mg/L	-	-	-	-	-	-	<0.000050	<0.000050	-
Boron, dissolved	0.01	mg/L	-	-	-	-	-	-	0.027	0.022	**20.41%**
Cadmium, dissolved	0.000005	mg/L	-	-	-	-	-	-	0.0000078	0.0000063	**21.28%**
Calcium, dissolved	0.05	mg/L	-	-	-	-	-	-	43	40	5.31%
Cesium, dissolved	0.00001	mg/L	-	-	-	-	-	-	0.000014	0.000016	13.33%
Chromium, dissolved	0.0005	mg/L	-	-	-	-	-	-	<0.00050	<0.00050	-
Cobalt, dissolved	0.0001	mg/L	-	-	-	-	-	-	0.00046	0.00045	2.20%
Copper, dissolved	0.0002	mg/L	-	-	-	-	-	-	0.00053	0.00050	5.83%
Iron, dissolved	0.01	mg/L	-	-	-	-	-	-	<0.010	<0.010	-
Lead, dissolved	0.00005	mg/L	-	-	-	-	-	-	<0.000050	<0.000050	-
Lithium, dissolved	0.001	mg/L	-	-	-	-	-	-	0.0027	0.0026	3.77%
Magnesium, dissolved	0.005	mg/L	-	-	-	-	-	-	14	13	9.09%
Manganese, dissolved	0.0001	mg/L	-	-	-	-	-	-	0.102	0.102	0.00%
Mercury, dissolved	0.000005	mg/L	-	-	-	-	-	-	<0.0000050	<0.0000050	-
Molybdenum, dissolved	0.00005	mg/L	-	-	-	-	-	-	0.00022	0.00021	4.16%
Nickel, dissolved	0.0005	mg/L	-	-	-	-	-	-	0.0017	0.0016	9.76%
Phosphorus, dissolved	0.05	mg/L	-	-	-	-	-	-	<0.050	<0.050	-
pPotassium, dissolved	0.05	mg/L	-	-	-	-	-	-	3.6	3.4	5.70%
Rubidium, dissolved	0.0002	mg/L	-	-	-	-	-	-	0.0020	0.0019	5.08%
Selenium, dissolved	0.00005	mg/L	-	-	-	-	-	-	<0.000050	<0.000050	-
Silicon, dissolved	0.05	mg/L	-	-	-	-	-	-	5.6	5.1	8.40%
Silver, dissolved	0.00001	mg/L	-	-	-	-	-	-	<0.000010	<0.000010	-
Sodium, dissolved	0.05	mg/L	-	-	-	-	-	-	32	31	4.80%
Strontium, dissolved	0.0002	mg/L	-	-	-	-	-	-	0.093	0.097	4.31%
Sulfur, dissolved	0.5	mg/L	-	-	-	-	-	-	10.3	9.7	6.21%
Tellurium, dissolved	0.0002	mg/L	-	-	-	-	-	-	<0.00020	<0.00020	-
Thallium, dissolved	0.00001	mg/L	-	-	-	-	-	-	<0.000010	<0.000010	-
Thorium, dissolved	0.0001	mg/L	-	-	-	-	-	-	<0.00010	<0.00010	-
Tin, dissolved	0.0001	mg/L	-	-	-	-	-	-	<0.00010	<0.00010	-
Titanium, dissolved	0.0003	mg/L	-	-	-	-	-	-	<0.00030	<0.00030	-
Tungsten, dissolved	0.0001	mg/L	-	-	-	-	-	-	<0.00010	<0.00010	-
Uranium, dissolved	0.00001	mg/L	-	-	-	-	-	-	0.0011	0.0012	3.45%
Vanadium, dissolved	0.0005	mg/L	-	-	-	-	-	-	0.00052	<0.00050	3.92%
Zinc, dissolved	0.001	mg/L	-	-	-	-	-	-	0.0011	<0.0010	9.52%
Zirconium, dissolved	0.0002	mg/L	-	-	-	-	-	-	<0.00020	<0.00020	-

Table C-1: Duplicate Results for the Jackfish Groundwater Monitoring Program, 2022

Sample Location	Detection Limit	Unit	PW3		Relative Percent Difference (%)	MW06		Relative Percent Difference (%)	JF01-06		Relative Percent Difference (%)
			Sample	Duplicate		Sample	Duplicate		Sample	Duplicate	
Date Sampled			11-Aug-22	11-Aug-22		29-Sep-22	29-Sep-22		29-Sep-22	29-Sep-22	
ALS Sample ID			YL2201195-003	YL2201195-004		YL2201730-014	YL2201730-015		YL2201730-018	YL2201730-019	
Aggregate Organics											
Oil & Grease (gravimetric)	5	mg/L	-	-	-	-	-	-	<5.0	<5.0	-
Volatile Organic Compounds											
Benzene	0.5	µg/L	<0.50	<0.50	-	<0.50	<0.50	-	<0.50	<0.50	-
Ethylbenzene	0.5	µg/L	<0.50	<0.50	-	<0.50	<0.50	-	<0.50	<0.50	-
Methyl-tert-butyl ether [MTBE]	0.5	µg/L	<0.50	<0.50	-	<0.50	<0.50	-	<0.50	<0.50	-
Styrene	0.5	µg/L	<0.50	<0.50	-	<0.50	<0.50	-	<0.50	<0.50	-
Toluene	0.5	µg/L	<0.50	<0.50	-	<0.50	<0.50	-	0.76	0.73	4.03%
Xylene, m+p-	0.4	µg/L	<0.40	<0.40	-	<0.40	<0.40	-	<0.40	<0.40	-
Xylene, o-	0.3	µg/L	<0.30	<0.30	-	<0.30	<0.30	-	<0.30	<0.30	-
Xylenes, total	0.5	µg/L	<0.50	<0.50	-	<0.50	<0.50	-	<0.50	<0.50	-
Hydrocarbons											
F1 (C6-C10)	100	µg/L	<100	<100	-	<100	<100	-	<100	<100	-
F2 (C10-C16)	300	µg/L	<300	<300	-	5140	2530	**68.06%**	<300	<300	-
F3 (C16-C34)	300	µg/L	<300	<300	-	1530	690	**75.68%**	<300	<300	-
F4 (C34-C50)	300	µg/L	<300	<300	-	<300	<300	-	<300	<300	-
VHw (C6-C10)	100	µg/L	<100	<100	-	<100	<100	-	<100	<100	-
F1-BTEX	100	µg/L	<100	<100	-	<100	<100	-	<100	<100	-
VPHw	100	µg/L	<100	<100	-	<100	<100	-	<100	<100	-

Notes: Bolded relative percent difference values are greater than 20%.

The relative percent difference is calculated for duplicate samples using the following formula: RPD = (absolute value(difference in concentration between duplicate or split sample) / average concentration) x 100%.

g/L - grams per litre; mg/L - milligrams per litre; mV - millivolts; NTU - nephelometric turbidity unit; ppt - parts per trillion; µS/cm - micro-siemens per centimeter;

Table C-2: Field Blank and Travel Blank Results for the Jackfish Groundwater Monitoring Program, 2022

Sample Location	Detection Limit	Unit	Field Blank		Travel Blank
Date Sampled			05-Aug-2022	29-Sep-22	05-Aug-2022
ALS Sample ID			YL2201159-014	YL2201730-006	YL2201159-015
Conventional Parameters					
Conductivity	2	µS/cm	-	<2.0	-
Alkalinity, bicarbonate (as CaCO3)	1	mg/L	-	<1.0	-
Alkalinity, carbonate (as CaCO3)	1	mg/L	-	<1.0	-
Alkalinity, hydroxide (as CaCO3)	1	mg/L	-	<1.0	-
Alkalinity, phenolphthalein (as CaCO3)	1	mg/L	-	<1.0	-
Alkalinity, total (as CaCO3)	1	mg/L	-	<1.0	-
Hardness (as CaCO3), dissolved	0.6	mg/L	<0.60	<0.60	<0.60
Hardness (as CaCO3), from total Ca/Mg	0.6	mg/L	<0.60	<0.60	<0.60
pH	0.1	-	5.6	5.4	5.5
Solids, total dissolved [TDS]	10	mg/L	-	<10	-
Solids, total dissolved [TDS], calculated (APHA)	1	mg/L	-	<1.0	-
Solids, total suspended [TSS]	3	mg/L	-	<3.0	-
Turbidity	0.1	NTU	-	<0.10	-
Anions and Nutrients					
Ammonia, total (as N)	0.005	mg/L	-	<0.0050	-
Bromide	0.05	mg/L	<0.050	-	<0.050
Chloride	0.1	mg/L	<0.10	<0.10	<0.10
Fluoride	0.01	mg/L	<0.010	<0.010	<0.010
Nitrate (as N)	0.005	mg/L	<0.0050	<0.0050	<0.0050
Nitrate + Nitrite (as N)	0.005	mg/L	-	<0.0051	-
Nitrite (as N)	0.001	mg/L	<0.0010	<0.0010	<0.0010
Nitrogen, total	0.03	mg/L	-	-	-
Phosphorus, total	0.002	mg/L	-	<0.0020	-
Phosphorus, total dissolved	0.002	mg/L	-	<0.0020	-
Silicate (as SiO2)	0.5	mg/L	-	<0.50	-
Sulfate (as SO4)	0.3	mg/L	<0.30	<0.30	<0.30
Organic / Inorganic Carbon					
Carbon, dissolved organic [DOC]	0.5	mg/L	-	<0.50	-
Total Metals					
Aluminum, total	0.003	mg/L	<0.0030	<0.0030	<0.0030
Antimony, total	0.0001	mg/L	<0.00010	<0.00010	<0.00010
Arsenic, total	0.0001	mg/L	<0.00010	<0.00010	<0.00010
Barium, total	0.0001	mg/L	<0.00010	<0.00010	<0.00010
Beryllium, total	0.0001	mg/L	<0.000100	<0.000100	<0.000100
Bismuth, total	0.00005	mg/L	<0.000050	<0.000050	<0.000050
Boron, total	0.01	mg/L	<0.010	<0.010	<0.010
Cadmium, total	0.000005	mg/L	<0.0000050	<0.0000050	<0.0000050
Calcium, total	0.05	mg/L	<0.050	<0.050	<0.050
Cesium, total	0.00001	mg/L	<0.000010	<0.000010	<0.000010
Chromium, total	0.0005	mg/L	<0.00050	<0.00050	<0.00050
Cobalt, total	0.0001	mg/L	<0.00010	<0.00010	<0.00010
Copper, total	0.0005	mg/L	<0.00050	<0.00050	<0.00050
Iron, total	0.01	mg/L	<0.010	<0.010	<0.010
Lead, total	0.00005	mg/L	<0.000050	<0.000050	<0.000050
Lithium, total	0.001	mg/L	<0.0010	<0.0010	<0.0010
Magnesium, total	0.005	mg/L	<0.0050	<0.0050	<0.0050
Manganese, total	0.0001	mg/L	<0.00010	<0.00010	<0.00010
Mercury, total	0.000005	mg/L	<0.0000050	<0.0000050	<0.0000050
Molybdenum, total	0.00005	mg/L	<0.000050	<0.000050	<0.000050
Nickel, total	0.0005	mg/L	<0.00050	<0.00050	<0.00050
Phosphorus, total	0.05	mg/L	<0.050	<0.050	<0.050
Potassium, total	0.05	mg/L	<0.050	<0.050	<0.050
Rubidium, total	0.0002	mg/L	<0.00020	<0.00020	<0.00020
Selenium, total	0.00005	mg/L	<0.000050	<0.000050	<0.000050
Silicon, total	0.1	mg/L	<0.10	<0.10	<0.10
Silver, total	0.00001	mg/L	<0.000010	<0.000010	<0.000010
Sodium, total	0.05	mg/L	<0.050	<0.050	<0.050
Strontium, total	0.0002	mg/L	<0.00020	<0.00020	<0.00020
Sulfur, total	0.5	mg/L	<0.50	<0.50	<0.50
Tellurium, total	0.0002	mg/L	<0.00020	<0.00020	<0.00020
Thallium, total	0.00001	mg/L	<0.000010	<0.000010	<0.000010
Thorium, total	0.0001	mg/L	<0.00010	<0.00010	<0.00010

Table C-2: Field Blank and Travel Blank Results for the Jackfish Groundwater Monitoring Program, 2022

Sample Location	Detection Limit	Unit	Field Blank		Travel Blank
Date Sampled			05-Aug-2022	29-Sep-22	05-Aug-2022
ALS Sample ID			YL2201159-014	YL2201730-006	YL2201159-015
Tin, total	0.0001	mg/L	<0.00010	<0.00010	<0.00010
Titanium, total	0.0003	mg/L	<0.00030	<0.00030	<0.00030
Tungsten, total	0.0001	mg/L	<0.00010	<0.00010	<0.00010
Uranium, total	0.00001	mg/L	<0.000010	<0.000010	<0.000010
Vanadium, total	0.0005	mg/L	<0.00050	<0.00050	<0.00050
Zinc, total	0.003	mg/L	<0.0030	<0.0030	<0.0030
zirconium, total	0.0002	mg/L	<0.00020	<0.00020	<0.00020
Dissolved Metals					
Aluminum, dissolved	0.001	mg/L	<0.0010	<0.0010	<0.0010
Antimony, dissolved	0.0001	mg/L	<0.00010	<0.00010	<0.00010
Arsenic, dissolved	0.0001	mg/L	<0.00010	<0.00010	<0.00010
Barium, dissolved	0.0001	mg/L	<0.00010	<0.00010	<0.00010
Beryllium, dissolved	0.0001	mg/L	<0.000100	<0.000100	<0.000100
Bismuth, dissolved	0.00005	mg/L	<0.000050	<0.000050	<0.000050
Boron, dissolved	0.01	mg/L	<0.010	<0.010	<0.010
Cadmium, dissolved	0.000005	mg/L	<0.0000050	<0.0000050	<0.0000050
Calcium, dissolved	0.05	mg/L	<0.050	<0.050	<0.050
Cesium, dissolved	0.00001	mg/L	<0.000010	<0.000010	<0.000010
Chromium, dissolved	0.0005	mg/L	<0.00050	<0.00050	<0.00050
Cobalt, dissolved	0.0001	mg/L	<0.00010	<0.00010	<0.00010
Copper, dissolved	0.0002	mg/L	<0.00020	<0.00020	<0.00020
Iron, dissolved	0.01	mg/L	<0.010	<0.010	<0.010
Lead, dissolved	0.00005	mg/L	<0.000050	<0.000050	<0.000050
Lithium, dissolved	0.001	mg/L	<0.0010	<0.0010	<0.0010
Magnesium, dissolved	0.005	mg/L	<0.0050	<0.0050	<0.0050
Manganese, dissolved	0.0001	mg/L	<0.00010	<0.00010	<0.00010
Mercury, dissolved	0.000005	mg/L	<0.0000050	<0.0000050	<0.0000050
Molybdenum, dissolved	0.00005	mg/L	<0.000050	<0.000050	<0.000050
Nickel, dissolved	0.0005	mg/L	<0.00050	<0.00050	<0.00050
Phosphorus, dissolved	0.05	mg/L	<0.050	<0.050	<0.050
Potassium, dissolved	0.05	mg/L	<0.050	<0.050	<0.050
Rubidium, dissolved	0.0002	mg/L	<0.00020	<0.00020	<0.00020
Selenium, dissolved	0.00005	mg/L	<0.000050	<0.000050	<0.000050
Silicon, dissolved	0.05	mg/L	<0.050	<0.050	<0.050
Silver, dissolved	0.00001	mg/L	<0.000010	<0.000010	<0.000010
Sodium, dissolved	0.05	mg/L	<0.050	<0.050	<0.050
Strontium, dissolved	0.0002	mg/L	<0.00020	<0.00020	<0.00020
Sulfur, dissolved	0.5	mg/L	<0.50	<0.50	<0.50
Tellurium, dissolved	0.0002	mg/L	<0.00020	<0.00020	<0.00020
Thallium, dissolved	0.00001	mg/L	<0.000010	<0.000010	<0.000010
Thorium, dissolved	0.0001	mg/L	<0.00010	<0.00010	<0.00010
Tin, dissolved	0.0001	mg/L	<0.00010	<0.00010	<0.00010
Titanium, dissolved	0.0003	mg/L	<0.00030	<0.00030	<0.00030
Tungsten, dissolved	0.0001	mg/L	<0.00010	<0.00010	<0.00010
Uranium, dissolved	0.00001	mg/L	<0.000010	<0.000010	<0.000010
Vanadium, dissolved	0.0005	mg/L	<0.00050	<0.00050	<0.00050
Zinc, dissolved	0.001	mg/L	<0.0010	<0.0010	<0.0010
Zirconium, dissolved	0.0002	mg/L	<0.00020	<0.00020	<0.00020

Table C-2: Field Blank and Travel Blank Results for the Jackfish Groundwater Monitoring Program, 2022

Sample Location	Detection Limit	Unit	Field Blank		Travel Blank
Date Sampled			05-Aug-2022	29-Sep-22	05-Aug-2022
ALS Sample ID			YL2201159-014	YL2201730-006	YL2201159-015
Aggregate Organics					
Oil & Grease (gravimetric)	5	mg/L	<5.0	<5.0	<5.0
Volatile Organic Compounds					
Benzene	0.5	µg/L	<0.50	<0.50	<0.50
Ethylbenzene	0.5	µg/L	<0.50	<0.50	<0.50
Methyl-tert-butyl ether [MTBE]	0.5	µg/L	<0.50	<0.50	<0.50
Styrene	0.5	µg/L	<0.50	<0.50	<0.50
Toluene	0.5	µg/L	<0.50	<0.50	<0.50
Xylene, m+p-	0.4	µg/L	<0.40	<0.40	<0.40
Xylene, o-	0.3	µg/L	<0.30	<0.30	<0.30
Xylenes, total	0.5	µg/L	<0.50	<0.50	<0.50
Hydrocarbons					
F1 (C6-C10)	100	µg/L	<100	<100	<100
F2 (C10-C16)	300	µg/L	<300	<300	<300
F3 (C16-C34)	300	µg/L	<300	<300	<300
F4 (C34-C50)	300	µg/L	<300	<300	<300
VHw (C6-C10)	100	µg/L	<100	<100	<100
F1-BTEX	100	µg/L	<100	<100	<100
VPHw	100	µg/L	<100	<100	<100

Notes: g/L - grams per litre; mg/L - milligrams per litre; mV - millivolts; NTU - nephelometric turbidity unit; ppt - parts per trillion; µS/cm - micro-siemens per centimeter;

APPENDIX A

Groundwater Sampling Forms

883 141 351 TF

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
PW1

Project Number:	22537423 / 1000/101 0
Project Name:	Jackfish GW
Location:	Jackfish
Contractor / Rig No.:	—

Date:	Aug 11 2022
Personnel:	BWD KS
Weather:	15°C sunny, 15 km/hr west
Client Contact:	NTPC

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	✓						✓		

Stick-up (m)	0.87
Depth to LNAPL: (m)	—
Depth to Water: (m)	2.41
Depth to DNAPL: (m)	—
Total Depth: (m)	3.15
Submerged Depth: (m)	0.74
Est. Water Volume: (L)	9.8L
Est. 3 x Water Volume: (L)	~30L
Decontamination:	Y
2" Casing: 2.032 L/m	
1" Casing: 0.508 L/m	
8" Sand pack: 9.271 L/m	
6 5/8" Sand pack: 6.35 L/m	

Calculations:

$= \pi (0.165)^2 (0.74)^{\times 1000}$

$= 9.8\ L$

Purge Start Time:	10:05	Purge End Time:	11:00

Parameter	1	2	3	4
Volume (L)	10	20	30	
Temperature (°C)	12.66	11.50	9.72	
Sp. Conductivity (µS/cm°)	465.91	470.45	476.90	
E. Conductivity (µS/cm)	357.03	336.58	337.46	
TDS (g/L)	302.74	305.85	310.13	
Salinity (ppt) PSU	0.23	0.23	0.23	
Dissolved O_2 (% / mg/L)	68.44 / 7.12	32.49 / 3.60	20.85 / 2.32	
pH	6.60	6.76	6.75	
ORP (mV)	31.4	+12.7	-19.6	
Appearance and Odour	Brown, strong PHC/oil smell	→	→	
Turbidity (NTU)	Lighter: 4.88/4.79/5.14	5.24, 4.89	4.32, 4.09	
Total Volume Purged (L)	30 L	4.99		

→ black flecks

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
							✓		

Sample ID	Analysis	Time	Container	Preservative	Comments
PW1	BTEX, PHC F1-F4	11:35	4	✓	
					Lead recharge.

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
PW2

Project Number:	2A537423 / 1000 / 1010
Project Name:	Jackfish GW
Location:	Jackfish
Contractor / Rig No.:	—

Date:	Aug 11 2022
Personnel:	BW KS
Weather:	15°C, sunny, 20Km/hr West.
Client Contact:	NTPC

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other: Bailer for first 75 L, Waterra for last 30 L
	✓						—		

Stick-up (m)	0.60
Depth to LNAPL: (m)	—
Depth to Water: (m)	2.07
Depth to DNAPL: (m)	—
Total Depth: (m)	4.72
Submerged Depth: (m)	2.65
Est. Water Volume: (L)	35.00
Est. 3 x Water Volume: (L)	105.10
Decontamination:	Y
2" Casing: 2.032 L/m	
1" Casing: 0.508 L/m	
8" Sand pack: 9.271 L/m	
6 5/8" Sand pack: 6.35 L/m	

Calculations:

$= \pi (0.065)^2 (2.65) \times 1000$

$= 35.17\ L$

Purge Start Time:	11:55	Purge End Time:		13:00
Parameter	1	2	3	4
Volume (L)	35.2	35	35	
Temperature (°C)	10.43	9.58	11.02	
Sp. Conductivity (µS/cm°)	609.72	614.34	618.17	
E. Conductivity (µS/cm)	440.27	433.51	453.34	
TDS (g/L) ppm	396.47	399.75	401.87	
Salinity (ppt) PSU	0.30	0.30	0.30	
Dissolved O_2 (% mg/L)	112.48 / 12.32	2284 / 25	5.83 / 1.71	
pH	6.97	7.01	6.98	
ORP (mV)	-47.5	-46.6	-50.5	
Appearance and Odour	grey, pHC odour	light brown, no odour	Dark grey,	
Turbidity (NTU)	4.36, 4.25, 4.14	1.26, 1.26	5.34, 5.26, 4.93	
Total Volume Purged (L)	105 L	1.20		

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	✓								

Sample ID	Analysis	Time	Container	Preservative	Comments
PW2	BTEX, PHC F1-F4	13:10	4	✓	
					Load Range

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
PW3

Project Number:	22537423 / 1000 / 1010
Project Name:	Jackfish GW
Location:	Jackfish
Contractor / Rig No.:	—

Date:	Aug 11 2022
Personnel:	BQ KS
Weather:	19°C Sunny, 20km/hr West
Client Contact:	NTPC

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
							✓		

Stick-up (m)	1.07
Depth to LNAPL: (m)	/
Depth to Water: (m)	2.64
Depth to DNAPL: (m)	/
Total Depth: (m)	3.22
Submerged Depth: (m)	0.58
Est. Water Volume: (L)	80.4
Est. 3 x Water Volume: (L)	241
Decontamination:	
2" Casing: 2.032 L/m	
1" Casing: 0.508 L/m	
8" Sand pack: 9.271 L/m	
6 5/8" Sand pack: 6.35 L/m	

Calculations:

$= \pi (0.21)^2 0.58 \times 1000$

$= 80.4$

Garbage in well
4 chip bags, plastic, cigarette butts
Good Recharge.

Purge Start Time:	13:40	Purge End Time:	15:25	
Parameter	1	2	3	4
Volume (L)	80	80		
Temperature (°C)	12.28	12.27		
Sp. Conductivity (µS/cm°)	509.10	498.23		
E. Conductivity (µS/cm)	385.78	376.99		
TDS (g/L) ppm	381.28	323.98		
Salinity (ppt) PSU	0.25	0.24		
Dissolved O_2 (% / mg/L)	44.19/4.64	44.74/4.71		
pH	7.21	7.22		
ORP (mV)	44.2	117.1		
Appearance and Odour	light brown, organic odour	→		
Turbidity (NTU)	25.7, 25.6, 28.9	37.5, 34.2		
Total Volume Purged (L)	160 L	32.3		

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
							✓		

Sample ID	Analysis	Time	Container	Preservative	Comments
PW3	BTEX, PHC F1-F4	15:30	4	✓	
PW3-01	BTEX, PHC F1-F4	15:35	4	✓	Duplicate

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
PW01

Project Number:	22537423/1000/1020
Project Name:	Jackfish GW
Location:	Jackfish

Date:	29 Sept 22
Sampler:	DC MMN
Weather:	10°C Sunny

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up	0.83
Depth to LNAPL:	
Depth to Water:	2.61
Depth to DNAPL:	
Total Depth:	3.10
Submerged Depth:	0.49
Est. Water Volume:	6.9L
Est. 3 x Water Volume:	20.7
Decontamination:	
2" Casing has 2.032 L/m:	
1" Casing has 0.508 L/m:	
6" Sand pack has 9.271 L/m:	
6 5/8" Sand pack has 6.35 L/m:	

Calculations:

No PVC

$V = \pi r^2 h$

$= \pi (0.067_m)^2 (0.49_m)$

$= 0.0067\ m^3$

$= 6.9\ L$

- Tubing cut too short.
- open/no cap

Purge Start Time:	13:20	Purge End Time:	13:46

Parameter	1	2	3	4
Volume (L)	7	7	7	
Temperature (°C)	10.81	9.98	9.64	
Sp. Conductivity (µS/cm°)	440.16	448.53	455.94	
E. Conductivity (µS/cm)	321.61	319.47	322.79	
TDS (g/L)	0.29	0.29	0.30	
Salinity (ppt)	0.21	0.22	0.22	
Dissolved O_2 (% / mg/L)	42.70	45.64	41.48	
pH	6.90	7.01	6.99	
ORP (mV)	-8.7	-25.0	-25.4	
Appearance and Odour	Sheen, clear, some black sed			
Total Volume Purged	21L			

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Sample ID	Analysis	Time	Container	Preservative	Comments
PW01	BTEX	13:20	2	✓	
	TPH	13:20	2	✓	

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
PW02

Project Number:	22537423 | 1000 | 1020
Project Name:	Jackfish GW
Location:	Jackfish

Date:	29 Sept 22
Sampler:	DC MMW
Weather:	9° Sunny

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up	0.74
Depth to LNAPL:	
Depth to Water:	2.28
Depth to DNAPL:	
Total Depth:	4.66
Submerged Depth:	2.38
Est. Water Volume:	33L
Est. 3 x Water Volume:	99L
Decontamination:	
2" Casing has 2.032 L/m:	
1" Casing has 0.508 L/m:	
8" Sand pack has 9.271 L/m:	
6 5/8" Sand pack has 6.35 L/m:	0.133 m/ ~5"

Calculations:

Box 0.95 Tall

$V = \pi r^2 h \times 1000$

$= \pi (0.067)^2 \times 2.38 \times 1000$

$= 33L$

Purging 75L Total

- No Lap/cover
- Well pipe is slotted above ground

Purge Start Time:	13:40	Purge End Time:	14:00

Parameter	1	2	3	4
Volume (L)	25	25	25	
Temperature (°C)	10.44	9.88	10.06	
Sp. Conductivity (µS/cm)	560.44	570.94	582.10	
E. Conductivity (µS/cm)	415.07	418.52	415.39	
TDS (ppt) PPT	0.38	0.38	0.38	
Salinity (ppt) PSU	0.28	0.28	0.28	
Dissolved O_2 (%) mg/L	49.95	25.98	35.72 / 3.79 mg/L	
pH	7.08	7.15	7.16	
ORP (mV)	-48.7	-51.8	-48.3	
Appearance and Odour	Sheen	sheen	sheen	
Total Volume Purged	75L		Diesel smell	

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Sample ID	Analysis	Time	Container	Preservative	Comments
PW02	BTEX	13:40	2	✓	
	TPH	13:40	2	✓	

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
PW03

Project Number:	22537423/1000/10 20
Project Name:	Jackfish GW
Location:	Jackfish

Date:	29 Sept 22
Sampler:	BC MMW
Weather:	8°C Cloudy

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up	1.07
Depth to LNAPL:	
Depth to Water:	2.85
Depth to DNAPL:	
Total Depth:	3.17
Submerged Depth:	0.32
Est. Water Volume:	44L
Est. 3 x Water Volume:	132
Decontamination:	
2" Casing has 2.032 L/m:	
1" Casing has 0.508 L/m:	
8" Sand pack has 9.271 L/m:	
6 5/8" Sand pack has 6.35 L/m:	

Calculations:

$V = \pi (0.21)^2 \times 0.32 \times 1000$

$= 44\,L$

Purging 75L

No cap, garbage in well

Purge Start Time:	14:10	Purge End Time:	14:50

Parameter	1	2	3	4
Volume (L)	25L	25L	25L	
Temperature (°C)	10.05	9.85	9.82	
Sp. Conductivity (µS/cm°)	477.13	474.71	472.71	
E. Conductivity (µS/cm)	340.78	337.45	335.36	
TDS (g/L)	0.31	0.31	0.31	
Salinity (ppt)	0.23	0.23	0.23	
Dissolved O_2 (% / mg/L)	6.47	6.49	5.32	
pH	7.43	7.58	7.57	
ORP (mV)	48.2	66.8	74.2	
Appearance and Odour	No odour, slightly cloudy			
Total Volume Purged	75L			

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Sample ID	Analysis	Time	Container	Preservative	Comments
PW03	BTEX	14:10	2	✓	
	TPH	14:10	2	✓	

GROUNDWATER SAMPLE COLLECTION FORM

Golder Associates

Well Number:
JF01-01

Project Number:	22537423/1000/1020
Project Name:	Jackfish GW
Location:	Jackfish

Date:	29 Sept 22
Sampler:	DC MMN
Weather:	9°C Sunny

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up	0.91
Depth to LNAPL:	
Depth to Water:	2.26
Depth to DNAPL:	
Total Depth:	2.89
Submerged Depth:	0.63
Est. Water Volume:	1.3
Est. 3 x Water Volume:	
Decontamination:	
2" Casing has 2.032 L/m:	
1" Casing has 0.508 L/m:	
8" Sand pack has 9.271 L/m:	
6 5/8" Sand pack has 6.35 L/m:	

Calculations:
0.81 Casing
Tubing too short

Purge Start Time:	12:50	Purge End Time:	12:55

Parameter	1	2	3	4
Volume (L)	1.5	1.5	1.5	
Temperature (°C)	8.98	8.82	8.92	
Sp. Conductivity (µS/cm)	353.82	355.71	359.61	
E. Conductivity (µS/cm)	245.60	245.98	249.58	
TDS (g/L)	0.23	0.23	0.23	
Salinity (ppt)	0.17	0.17	0.17	
Dissolved O_2 (% / mg/L)	82.40	80.87	86.16	
pH	6.86	6.89	6.94	
ORP (mV)	17.9	29.6	23.3	
Appearance and Odour	Slightly	Cloudy	Strong diesel smell	
Total Volume Purged	4.5			

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Sample ID	Analysis	Time	Container	Preservative	Comments
JF01-01	BTEX	12:50	2	✓	
	TPH	12:50	2	✓	

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
JF01-02

Project Number:	22537423/1000/1020
Project Name:	Jackfish GW
Location:	Jackfish

Date:	29 Sept 22
Sampler:	DC MMN
Weather:	8°C Sunny

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up	1.13
Depth to LNAPL:	
Depth to Water:	1.87
Depth to DNAPL:	
Total Depth:	2.05
Submerged Depth:	0.18
Est. Water Volume:	0.4 L
Est. 3 x Water Volume:	1.0
Decontamination:	
2" Casing has 2.032 L/m:	
1" Casing has 0.508 L/m:	
8" Sand pack has 9.271 L/m:	
6 5/8" Sand pack has 6.35 L/m:	

Calculations:

Purge Start Time:	10:55	Purge End Time:		11:05
Parameter	1	2	3	4
Volume (L)	0.4	0.8	0.9	
Temperature (°C)	7.46	7.40	7.19	
Sp. Conductivity (µS/cm°)	533.10	517.74	520.86	
E. Conductivity (µS/cm)	354.72	343.86	343.75	
TDS (g/L)	0.35	0.34	0.34	
Salinity (ppt)	0.26	0.25	0.25	
Dissolved O_2 (% / mg/L)	91.82	91.88	92.63	
pH	6.82	6.96	7.04	
ORP (mV)	43.5	28.4	24.2	
Appearance and Odour	Slightly cloudy		to brown sed.	
Total Volume Purged	4.2L			

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Sample ID	Analysis	Time	Container	Preservative	Comments
JF01-02	BTEX	10:55	2	✓	
	TPH	10:55	2	✓	

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
JF01-03

Project Number:	22537423/1000/1020
Project Name:	Jackfish GW
Location:	Jackfish

Date:	29 Sept 22
Sampler:	DC MMN
Weather:	8°C Sunny

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up	1.15
Depth to LNAPL:	
Depth to Water:	2.46
Depth to DNAPL:	
Total Depth:	3.10
Submerged Depth:	0.64
Est. Water Volume:	1.3
Est. 3 x Water Volume:	3.9
Decontamination:	
2" Casing has 2.032 L/m:	
1" Casing has 0.508 L/m:	
8" Sand pack has 9.271 L/m:	
6 5/8" Sand pack has 6.35 L/m:	

Calculations:
- Well is angled

Purge Start Time:	10:40	Purge End Time:	
Parameter	1	2	3	4
Volume (L)	1.5	3.5	1.5	
Temperature (°C)	11.67	12.55	12.80	
Sp. Conductivity (µS/cm°)	460.55	459.96	462.76	
E. Conductivity (µS/cm)	343.97	343.51	340.65	
TDS (g/L)	0.30	0.29	0.29	
Salinity (ppt)	0.22	0.22	0.21	
Dissolved O_2 (% / mg/L)	81.40	70.80	79.07	
pH	6.82	6.90	6.98	
ORP (mV)	128.4	114.8	110.3	
Appearance and Odour	Brown,	slightly	cloudy	
Total Volume Purged	4.5			

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Sample ID	Analysis	Time	Container	Preservative	Comments
JF01-03	BTEX	10:40	2	✓	
	TPH	10:40	2	✓	

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
JF01-04

Project Number:	22537423/1000/1020
Project Name:	Jackfish GW
Location:	Jackfish

Date:	29 Sept 22
Sampler:	DC MMN
Weather:	5°C sunny

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up	0.90
Depth to LNAPL:	
Depth to Water:	2.40
Depth to DNAPL:	
Total Depth:	3.12
Submerged Depth:	0.70
Est. Water Volume:	1.46
Est. 3 x Water Volume:	4.4
Decontamination:	
2" Casing has 2.032 L/m:	
1" Casing has 0.508 L/m:	
8" Sand pack has 9.271 L/m:	
6 5/8" Sand pack has 6.35 L/m:	

Calculations:
V= 1.46L

-tubing is short

Purge Start Time:	9:50	Purge End Time:	
Parameter	1	2	3	4
Volume (L)	1.5	1.5	1.5	
Temperature (°C)	11.56	12.31	12.54	
Sp. Conductivity (µS/cm°)	484.72	470.59	468.31	
E. Conductivity (µS/cm)	358.11	355.91	357.03	
TDS (g/L)	0.31	0.31	0.31	
Salinity (ppt)	0.23	0.23	0.23	
Dissolved O_2 (% / mg/L)	51.55	33.94	61.89	
pH	6.71	6.79	6.86	
ORP (mV)	245.5	229.4	226.4	
Appearance and Odour	Clear	some sediment		
Total Volume Purged	4.5L			

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Sample ID	Analysis	Time	Container	Preservative	Comments
JF01-04	BTEX	9:50	2	✓	
	TPH	9:50	2	✓	

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
JF01-05

Project Number:	22537423/1000/1020
Project Name:	Jackfish GW
Location:	Jackfish

Date:	29 Sept 22
Sampler:	MWN DC
Weather:	5°C sunny

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up	0.70
Depth to LNAPL:	
Depth to Water:	
Depth to DNAPL:	
Total Depth:	2.11
Submerged Depth:	
Est. Water Volume:	
Est. 3 x Water Volume:	
Decontamination:	
2" Casing has 2.032 L/m:	
1" Casing has 0.508 L/m:	
8" Sand pack has 9.271 L/m:	
6 5/8" Sand pack has 6.35 L/m:	

Calculations:

well is dry

Purge Start Time:	9:30	Purge End Time:		
Parameter	1	2	3	4
Volume (L)				
Temperature (°C)				
Sp. Conductivity (µS/cm°)				
E. Conductivity (µS/cm)				
TDS (g/L)				
Salinity (ppt)				
Dissolved O_2 (% / mg/L)				
pH				
ORP (mV)				
Appearance and Odour				
Total Volume Purged				

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Sample ID	Analysis	Time	Container	Preservative	Comments
	None.				

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
JF01-06

Project Number:	22537423/1000/1020
Project Name:	Jackfish GW
Location:	Jackfish

Date:	29 Sept 22
Sampler:	DC MMN
Weather:	5°C Sunny

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Baller	Centrif. Pump	Disp. Baller	Sub. Pump	Other:
	X								

Stick-up	0.87
Depth to LNAPL:	
Depth to Water:	2.30
Depth to DNAPL:	
Total Depth:	2.84
Submerged Depth:	
Est. Water Volume:	1.08L
Est. 3 x Water Volume:	3.00L
Decontamination:	
2" Casing has 2.032 L/m:	
1" Casing has 0.508 L/m:	
8" Sand pack has 9.271 L/m:	
6 5/8" Sand pack has 6.35 L/m:	

Calculations:

V = 1.08L

Sediment in the GW

- 5L purged.
- sampled
- duplicate

Purge Start Time:	8:45	Purge End Time:	9:00	
Parameter	1	2	3	4
Volume (L)	1.00L	1.00L	1.00L	
Temperature (°C)			12.08	
Sp. Conductivity (µS/cm°)			494.65	
E. Conductivity (µS/cm)			350.93	
TDS (g/L)			0.30	
Salinity (ppt)			0.22	
Dissolved O_2 (% / mg/L)			61.1% 6.5L	
pH			7.06	
ORP (mV)			227.1	
Appearance and Odour			None.	
Total Volume Purged	5.00L			

clear with grey sediment

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Baller	Centrif. Pump	Disp. Baller	Sub. Pump	Other:
	X								

Sample ID	Analysis	Time	Container	Preservative	Comments
JF01-06	Routine	8:45	1		
	Oil and Grease	8:45	2	✓	
	Total Metals	8:45	1	✓	
	Dissolved Metals	8:45	1	✓	
	Total Mercury	8:45	1	✓	
	Dissolved Mercury	8:45	1	✓	
	BTEX	8:45	2	✓	
	TPH	8:45	2	✓	

JF01-06 -DUP called at 8:50

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
MW01

Project Number:	2253723/1000/1020
Project Name:	Jackfish GW
Location:	Jackfish

Date:	29 Sept 22
Sampler:	DC MMN
Weather:	8°C Sunny

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up	0.94
Depth to LNAPL:	
Depth to Water:	
Depth to DNAPL:	
Total Depth:	1.69
Submerged Depth:	
Est. Water Volume:	
Est. 3 x Water Volume:	
Decontamination:	
2" Casing has 2.032 L/m:	
1" Casing has 0.508 L/m:	
8" Sand pack has 9.271 L/m:	
6 5/8" Sand pack has 6.35 L/m:	

Calculations:
- well is angled.
- well is dry.

Purge Start Time:		Purge End Time:		
Parameter	1	2	3	4
Volume (L)				
Temperature (°C)				
Sp. Conductivity (µS/cm°)				
E. Conductivity (µS/cm)				
TDS (g/L)				
Salinity (ppt)				
Dissolved O_2 (% / mg/L)				
pH				
ORP (mV)				
Appearance and Odour				
Total Volume Purged				

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Sample ID	Analysis	Time	Container	Preservative	Comments

None

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
MW02

Project Number:	22537423/1000/1020
Project Name:	Jackfish GW
Location:	Jackfish

Date:	29 Sept 22
Sampler:	DC MMN
Weather:	8°C Sunny

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up	~~0.77~~
Depth to LNAPL:	
Depth to Water:	2.46
Depth to DNAPL:	
Total Depth:	3.80
Submerged Depth:	1.34
Est. Water Volume:	2.7L
Est. 3 x Water Volume:	8.0L
Decontamination:	
2" Casing has 2.032 L/m:	
1" Casing has 0.508 L/m:	
8" Sand pack has 9.271 L/m:	
6 5/8" Sand pack has 6.35 L/m:	

Calculations:
V = 2.7

Purge Start Time:	16:10	Purge End Time:	
Parameter	1	2	3	4
Volume (L)	3.0	3.0	3.0	
Temperature (°C)	10.65	11.04	11.19	
Sp. Conductivity (µS/cm)	495.92	463.55	460.99	
E. Conductivity (µS/cm)	360.81	338.52	341.04	
TDS (g/L)	0.32	0.30	0.30	
Salinity (ppt)	0.24	0.22	0.22	
Dissolved O_2 (% / mg/L)	88.55	96.47	97.61	
pH	6.60	6.90	7.05	
ORP (mV)	773	50.5	44.0	
Appearance and Odour	[redacted], cloudy slightly			
Total Volume Purged	9L			

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Sample ID	Analysis	Time	Container	Preservative	Comments
MW02	Routine	10:10	1		
	Oil + Grease	10:10	2	✓	
	Total Metals	10:10	1	✓	
	Dissolved Metals	10:10	1	✓	
	Total Mercury	10:10	1	✓	
	Dissolved Mercury	10:10	1	✓	
	BTEX	10:10	2	✓	
	TPH	10:10	2	✓	

Field blank collected at 10:15

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
MW03

Project Number:	22537423/1000/1020
Project Name:	Jackfish GW
Location:	Jackfish

Date:	29 Sept 22
Sampler:	MMN DC
Weather:	5°C sunny

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up	0.93 top of casing
Depth to LNAPL:	
Depth to Water:	2.52
Depth to DNAPL:	
Total Depth:	3.46
Submerged Depth:	
Est. Water Volume:	1.91
Est. 3 x Water Volume:	5.73
Decontamination:	
2" Casing has 2.032 L/m:	
1" Casing has 0.508 L/m:	
8" Sand pack has 9.271 L/m:	
6 5/8" Sand pack has 6.35 L/m:	

Calculations:
2" well - PVC is far down
-0.56 below top of casing.
-measurements are from top of casing

Purge Start Time:	9:35	Purge End Time:	9:50

Parameter	1	2	3	4
Volume (L)	3.0	3.0	3.0	
Temperature (°C)	11.15	12.13	12.30	
Sp. Conductivity (µS/cm)	469.35	477.19	471.91	
E. Conductivity (µS/cm)	358.01	358.02	356.74	
TDS (g/L)	0.32	0.31	0.31	
Salinity (ppt)	0.24	0.23	0.23	
Dissolved O_2 (% / mg/L)	83.49	46.09	59.60	
pH	6.60	6.83	6.96	
ORP (mV)	229.6	221.7	232.3	
Appearance and Odour	Light brown, cloudy			
Total Volume Purged	6.0L			

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Sample ID	Analysis	Time	Container	Preservative	Comments
MW03	BTEX	9:35	2	✓	
	TPH	9:35	2	✓	

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
MW04

Project Number:	22537423/1000/1020
Project Name:	Jackfish GW
Location:	Jackfish

Date:	29 Sept 22
Sampler:	DC MMN
Weather:	5°C Sunny

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up	0.82
Depth to LNAPL:	/
Depth to Water:	2.26
Depth to DNAPL:	/
Total Depth:	3.52
Submerged Depth:	1.26
Est. Water Volume:	
Est. 3 x Water Volume:	3.78L
Decontamination:	
2" Casing has 2.032 L/m:	
1" Casing has 0.508 L/m:	
8" Sand pack has 9.271 L/m:	
6 5/8" Sand pack has 6.35 L/m:	

Calculations:

V = 1.26L

① Well Volume
Murky brown

Purge Start Time:	9:15	Purge End Time:		
Parameter	1	2	3	4
Volume (L)	1.20	1.20	1.20	
Temperature (°C)	10.80	11.16	9.31	
Sp. Conductivity (µS/cm)	469.90	472.91	466.06	
E. Conductivity (µS/cm)	343.08	332.56	343.89	
TDS (g/L)	0.31	0.30	0.30	
Salinity (ppt)	0.23	0.22	0.22	
Dissolved O_2 (% / mg/L)	46.93	47.56	46.55	
pH	7.01	6.99	7.08	
ORP (mV)	142.4	123.2	108.7	
Appearance and Odour	Clear water			
Total Volume Purged	3.0L			

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Sample ID	Analysis	Time	Container	Preservative	Comments
MW04	BTEX	9:15	2	✓	
	TPH	9:15	2	✓	

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
MW05

Project Number:	22537423/1000/1020
Project Name:	
Location:	

Date:	29 Sept 22
Sampler:	DC MMN
Weather:	9°C Sunny

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up	1.12
Depth to LNAPL:	
Depth to Water:	2.50
Depth to DNAPL:	
Total Depth:	2.85
Submerged Depth:	0.35
Est. Water Volume:	0.71
Est. 3 x Water Volume:	2.1
Decontamination:	
2" Casing has 2.032 L/m:	
1" Casing has 0.508 L/m:	
8" Sand pack has 9.271 L/m:	
6 5/8" Sand pack has 6.35 L/m:	

Calculations:

Purge Start Time:	12:40	Purge End Time:	
Parameter	1	2	3	4
Volume (L)	1L	1L	1L	
Temperature (°C)	9.09	8.77	8.64	
Sp. Conductivity (µS/cm°)	411.50	429.26	419.40	
E. Conductivity (µS/cm)	298.50	295.80	290.53	
TDS (g/L)	0.29	0.28	0.27	
Salinity (ppt)	0.21	0.21	0.20	
Dissolved O_2 (% / mg/L)	16602	40.20	43.00	
pH	6.90	6.91	6.85	
ORP (mV)	-22.9	-19.1	-3.2	
Appearance and Odour	Cloudy with grey sediment			
Total Volume Purged	3L			

Slight diesel smell

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Sample ID	Analysis	Time	Container	Preservative	Comments
MW05	BTEX	12:40	2	✓	
	TPH	12:40	2	✓	

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:	Project Number:	22537423/1000/1020	Date:	29 Sept 22
MW06	Project Name:	Jackfish GW	Sampler:	MMN DC
	Location:	Jackfish	Weather:	8°C Sunny

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

		Calculations:
Stick-up	0.52	
Depth to LNAPL:		
Depth to Water:	2.40	
Depth to DNAPL:		
Total Depth:	6.21	
Submerged Depth:	3.81	
Est. Water Volume:	9.74	
Est. 3 x Water Volume:	23.2	
Decontamination:		
2" Casing has 2.032 L/m:		
1" Casing has 0.508 L/m:		
8" Sand pack has 9.271 L/m:		
6 5/8" Sand pack has 6.35 L/m:		

Purge Start Time:	1205	Purge End Time:	1220
Parameter	1	2	3	4
Volume (L)	8L	8L	8L	
Temperature (°C)	7.80	7.35	7.74	
Sp. Conductivity (µS/cm°)	403.12	414.32	412.81	
E. Conductivity (µS/cm)	269.86	275.80	278.12	
TDS (g/L)	0.26	0.27	0.27	
Salinity (ppt)	0.19	0.20	0.20	
Dissolved O_2 (% / mg/L)	51.55	32.32	38.74	
pH	6.96	6.92	6.96	
ORP (mV)	1.2	-8.2	-3.6	
Appearance and Odour	Clear	with gritty sediment		
Total Volume Purged	32L			

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Sample ID	Analysis	Time	Container	Preservative	Comments
MW06	12:40	BTEX	2	✓	
	12:40	TPH	2	✓	

Dup collected at 12:10

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:	Project Number:	22537423/1000/1020	Date:	29 Sept 22
MW07	Project Name:	Jackfish GW	Sampler:	DC MMN
	Location:	Jackfish	Weather:	8°C Sunny

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up	0.83
Depth to LNAPL:	
Depth to Water:	2.33
Depth to DNAPL:	
Total Depth:	5.13
Submerged Depth:	2.8
Est. Water Volume:	5
Est. 3 x Water Volume:	18L
Decontamination:	
2" Casing has 2.032 L/m:	
1" Casing has 0.508 L/m:	
8" Sand pack has 9.271 L/m:	
6 5/8" Sand pack has 6.35 L/m:	

Calculations:

- bottom is silty with bentonite
- clear when sampled
- sheen on surface.

Purge Start Time:	11:50	Purge End Time:	
Parameter	1	2	3	4
Volume (L)	6	6	6	
Temperature (°C)	7.82	7.80	7.90	
Sp. Conductivity (µS/cm°)	420.34	416.60	414.19	
E. Conductivity (µS/cm)	283.51	280.33	279.70	
TDS (g/L)	0.27	0.27	0.27	
Salinity (ppt)	0.20	0.20	0.20	
Dissolved O_2 (% / mg/L)	51.45	53.85	53.64	
pH	6.85	6.85	6.85	
ORP (mV)	5.4	1.6	0.4	
Appearance and Odour	Cloudy Grey			
Total Volume Purged	18L			

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Sample ID	Analysis	Time	Container	Preservative	Comments
MW07	BTEX	11:50	2	✓	
	TPH	11:50	2	✓	

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
MW9

Project Number:	2253 7423 / 1000 / 1020
Project Name:	Jackfish ON
Location:	Jackfish
Contractor / Rig No.:	/

Date:	29 Sept 22
Personnel:	MMN DC
Weather:	8°C Sunny
Client Contact:	/

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	Y								

Stick-up (m)	0.49
Depth to LNAPL: (m)	
Depth to Water: (m)	1.97
Depth to DNAPL: (m)	
Total Depth: (m)	6.16
Submerged Depth: (m)	4.19
Est. Water Volume: (L)	8.5
Est. 3 x Water Volume: (L)	25L
Decontamination:	
2" Casing: 2.032 L/m	
1" Casing: 0.508 L/m	
8" Sand pack: 9.271 L/m	
6 5/8" Sand pack: 6.35 L/m	

Calculations:

Purge Start Time:	11:10	Purge End Time:	11:25

Parameter	1	2	3	4
Volume (L)	8.5	8.5	8.5	
Temperature (°C)	6.31	6.35	6.74	
Sp. Conductivity (µS/cm°)	410.30	403.94	400.34	
E. Conductivity (µS/cm)	263.37	261.21	261.72	
TDS (g/L)	0.27	0.26	0.26	
Salinity (ppt)	0.20	0.19	0.19	
Dissolved O_2 (% / mg/L)	55.27	28.41	52.34	
pH	6.99	7.01	7.02	
ORP (mV)	-4.4	-15.1	-15.5	
Appearance and Odour	Clear with some sed.			
Turbidity (NTU)				
Total Volume Purged (L)	25			

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	Y								

Sample ID	Analysis	Time	Container	Preservative	Comments
MW09	BTEX	11:10	2	✓	
	TPH	11:10	2	✓	

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
MW10

Project Number:	22537423 / 1000 / 1020
Project Name:	Jackfish GW
Location:	Jackfish
Contractor / Rig No.:	

Date:	29 Sept 22
Personnel:	MMN DC
Weather:	8°C sunny
Client Contact:	

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up (m)	0.89
Depth to LNAPL: (m)	
Depth to Water: (m)	2.64
Depth to DNAPL: (m)	
Total Depth: (m)	4.82
Submerged Depth: (m)	2.18
Est. Water Volume: (L)	4.5L
Est. 3 x Water Volume: (L)	13.5
Decontamination:	
2" Casing: 2.032 L/m	
1" Casing: 0.508 L/m	
8" Sand pack: 9.271 L/m	
6 5/8" Sand pack: 6.35 L/m	

Calculations:

Purge Start Time:	11:30	Purge End Time:	11:40
Parameter	1	2	3	4
Volume (L)	4.5	4.5	4.5	
Temperature (°C)	9.97	9.92	10.42	
Sp. Conductivity (µS/cm°)	464.67	424.76	463.39	
E. Conductivity (µS/cm)	331.00	308.95	334.61	
TDS (g/L)	0.30	0.28	0.30	
Salinity (ppt)	0.22	0.20	0.22	
Dissolved O_2 (% / mg/L)	60.28	64.86	41.71	
pH	6.95	6.98	6.79	
ORP (mV)	18.5	0.9	2.3	
Appearance and Odour	Cloudy	in grey sediment		
Turbidity (NTU)				
Total Volume Purged (L)	14L			

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Sample ID	Analysis	Time	Container	Preservative	Comments
MW10	BTEX	11:30	2	✓	
	TPH	11:30	2	✓	

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
~~PW1~~

Project Number:	22537403
Project Name:	Jackfish GW
Location:	Jackfish
Contractor / Rig No.:	

Date:	Aug 5
Personnel:	MMM / KS
Weather:	18. Sunny
Client Contact:	

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:

Stick-up (m)	0.87
Depth to LNAPL: (m)	/
Depth to Water: (m)	2.35
Depth to DNAPL: (m)	/
Total Depth: (m)	3.27
Submerged Depth: (m)	0.92
Est. Water Volume: (L)	12.2
Est. 3 x Water Volume: (L)	36.6
Decontamination:	
2" Casing: 2.032 L/m	
1" Casing: 0.508 L/m	
8" Sand pack: 9.271 L/m	
6 5/8" Sand pack: 6.35 L/m	

Calculations:

$= \pi (0.065)^2 (0.92) \times 1000$

$= 12.2\,L$

Not sampled.

Purge Start Time:		Purge End Time:		
Parameter	1	2	3	4
Volume (L)				
Temperature (°C)				
Sp. Conductivity (µS/cm°)				
E. Conductivity (µS/cm)				
TDS (g/L)				
Salinity (ppt)				
Dissolved O_2 (% / mg/L)				
pH				
ORP (mV)				
Appearance and Odour				
Turbidity (NTU)				
Total Volume Purged (L)				

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:

Sample ID	Analysis	Time	Container	Preservative	Comments

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
PW3

Project Number:	22537423
Project Name:	Jackfish GW
Location:	Jackfish
Contractor / Rig No.:	

Date:	Aug 5
Personnel:	MMN KS
Weather:	18 Sunny
Client Contact:	

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
									Need new purging equip

Stick-up (m)	1.07
Depth to LNAPL: (m)	—
Depth to Water: (m)	2.58m
Depth to DNAPL: (m)	~~3.10m~~
Total Depth: (m)	3.15mm
Submerged Depth: (m)	0.6m
Est. Water Volume: (L)	83L
Est. 3 x Water Volume: (L)	249L
Decontamination:	
2" Casing: 2.032 L/m	
1" Casing: 0.508 L/m	
5" Sand pack: 9.271 L/m	
6 5/8" Sand pack: 6.35 L/m	

Calculations:

$= \pi (0.21)^2 \times 0.6 \times 1000$

$= 83\,L$

Did not sample

Purge Start Time:		Purge End Time:		
Parameter	1	2	3	4
Volume (L)				
Temperature (°C)				
Sp. Conductivity (µS/cm)				
E. Conductivity (µS/cm)				
TDS (g/L)				
Salinity (ppt)				
Dissolved O_2 (% / mg/L)				
pH				
ORP (mV)				
Appearance and Odour				
Turbidity (NTU)				
Total Volume Purged (L)				

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:

Sample ID	Analysis	Time	Container	Preservative	Comments

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
PW2

Project Number:	22537423
Project Name:	Jackfish GW Monitoring
Location:	Jackfish
Contractor / Rig No.:	

Date:	Aug 5
Personnel:	LWN
Weather:	18°C Sunny
Client Contact:	

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up (m)	0.16
Depth to LNAPL: (m)	/
Depth to Water: (m)	2.01
Depth to DNAPL: (m)	/
Total Depth: (m)	4.89
Submerged Depth: (m)	2.88
Est. Water Volume: (L)	38
Est. 3 x Water Volume: (L)	114
Decontamination:	
2" Casing: 2.032 L/m	
1" Casing: 0.508 L/m	
8" Sand pack: 9.271 L/m	
6 5/8" Sand pack: 6.35 L/m	

Calculations:

D = 13 cm

$= \pi(0.065)^2 2.88 \times 1000$

$= 38L$

Purge Start Time:	13:20	Purge End Time:		
Parameter	1	2	3	4
Volume (L)	38L	76L	114	
Temperature (°C)				
Sp. Conductivity (µS/cm°)				
E. Conductivity (µS/cm)				
TDS (g/L)				
Salinity (ppt)				
Dissolved O_2 (% / mg/L)				
pH				
ORP (mV)				
Appearance and Odour				
Turbidity (NTU)				
Total Volume Purged (L)				

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Sample ID	Analysis	Time	Container	Preservative	Comments

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
JF01-01

Project Number:	22537423
Project Name:	Jackfish GW
Location:	Jackfish
Contractor / Rig No.:	

Date:	Aug 5
Personnel:	MNW/KS
Weather:	18°C Sunny
Client Contact:	

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up (m)	0.95
Depth to LNAPL: (m)	/
Depth to Water: (m)	1.99
Depth to DNAPL: (m)	/
Total Depth: (m)	2.72
Submerged Depth: (m)	0.73
Est. Water Volume: (L)	1.43
Est. 3 x Water Volume: (L)	4.29
Decontamination:	
2" Casing: 2.032 L/m	
1" Casing: 0.508 L/m	
8" Sand pack: 9.271 L/m	
6 5/8" Sand pack: 6.35 L/m	

Calculations:

$= \pi (0.02^2) 0.73 \times 1000$

$= 1.43$

Purge Start Time:	14:20	Purge End Time:	14:30

Parameter	1	2	3	4
Volume (L)	1.5	1.5	1.5	
Temperature (°C)	11.39	10.39	9.87	
Sp. Conductivity (µS/cm°)	373.38	373.69	378.11	
E. Conductivity (µS/cm)	311.65	304.83	305.07	
TDS (g/L) ppm	243.05	242.95	245.80	
Salinity (ppt)	0.20	0.20	0.21	
Dissolved O_2 (% / mg/L)	9.11/84.85	10.09/91.88	11.01/99.40	
pH	6.87	6.84	6.87	
ORP (mV)	42.3	42.1	38.8	
Appearance and Odour	Brown, no odour			
Turbidity (NTU)	650.00	541.42	351.19	
Total Volume Purged (L)	4.5			

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Sample ID	Analysis	Time	Container	Preservative	Comments
JF01-01	BTEX	14:30		✓	
	F1-F4	14:30		✓	

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
JF01-02

Project Number:	22537403
Project Name:	Jackfish GW
Location:	Jackfish
Contractor / Rig No.:	

Date:	Aug 5
Personnel:	MW/JN/KS
Weather:	18 Sunny, 10km/h wind
Client Contact:	

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up (m)	1.24
Depth to LNAPL: (m)	/
Depth to Water: (m)	1.176
Depth to DNAPL: (m)	/
Total Depth: (m)	2.04
Submerged Depth: (m)	0.128
Est. Water Volume: (L)	0.55
Est. 3 x Water Volume: (L)	1.65
Decontamination:	
2" Casing: 2.032 L/m	
1" Casing: 0.508 L/m	
#8" Sand pack: 9.271 L/m	
#6 5/8" Sand pack: 6.35 L/m	

Calculations:

$= \pi (0.025)^2 (0.128) 1000$

$= 0.55L$

Purge Start Time:	12:00	Purge End Time:	12:10
Parameter	1	2	3	4
Volume (L)	0.5L	0.5L	0.5L	0.5L
Temperature (°C)	11.62	8.82	8.43	7.84
Sp. Conductivity (µS/cm)	433.29	429.69	427.17	425.82
E. Conductivity (µS/cm)	365.72	339.08	337.98	330.61
TDS (g/L)	281.45	277.03	276.24	276.15
Salinity (ppt)	0.22	0.23	0.23	0.23
Dissolved O_2 (% / mg/L)	9.76/93.81	9.40/84.55	8.34/74.51	8.57/75.37
pH	7.03	7.8	7.22	7.20
ORP (mV)	58.4	15.8	10.3	9.1
Appearance and Odour	No odour	light brown	/fine particles	
Turbidity (NTU)	294.09	142.16	158.97	461.85
Total Volume Purged (L)	1.7L			

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Sample ID	Analysis	Time	Container	Preservative	Comments
JF01	BTEX	2.5			
	1 4	2.5			

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
JF01-03

Project Number:	22537423
Project Name:	Jackfish GW
Location:	Jackfish
Contractor / Rig No.:	

Date:	Aug 5/22
Personnel:	MMN/KS
Weather:	18°C Sunny
Client Contact:	

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up (m)	1.17
Depth to LNAPL: (m)	—
Depth to Water: (m)	2.22
Depth to DNAPL: (m)	—
Total Depth: (m)	3.09
Submerged Depth: (m)	0.87
Est. Water Volume: (L)	1.708
Est. 3 x Water Volume: (L)	5.12
Decontamination:	
2" Casing: 2.032 L/m	
1" Casing: 0.508 L/m	
8" Sand pack: 9.271 L/m	
6 5/8" Sand pack: 6.35 L/m	

Calculations:

$= \pi r^2 h \times 1000$

$= \pi (0.025)^2 (0.87) 1000$

$= 1.708$

Purge Start Time:	11:30	Purge End Time:	11:46

Parameter	1	2	3	4
Volume (L)	1.5L	3.0L	5.0L	
Temperature (°C)	18.12	17.68	17.51	
Sp. Conductivity (µS/cm)	412.14	403.80	419.49	
E. Conductivity (µS/cm)	397.37	405.08	399.59	
TDS (g/L) ppm	268.68	275.51	272.76	
Salinity (ppt)	0.20	0.23	0.23	
Dissolved O_2 (% / mg/L)	3.59/37.10	2.40/25.27	5.53/57.96	
pH	6.86	6.89	6.97	
ORP (mV)	183.3	184.4	180.4	
Appearance and Odour	Turbid, no odour		dark brown	
Turbidity (NTU)	198.31	82.12	90.43	
Total Volume Purged (L)				

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Sample ID	Analysis	Time	Container	Preservative	Comments
JF01-03	BTEX	11:40		✓	
	F1-F4	11:40		✓	

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
JF01-04

Project Number:	22537423
Project Name:	Jackfish GW
Location:	Jackfish
Contractor / Rig No.:	

Date:	Aug 4/22
Personnel:	MKN KS
Weather:	18° Rainy
Client Contact:	Anthony

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up (m)	0.89
Depth to LNAPL: (m)	/
Depth to Water: (m)	2.12
Depth to DNAPL: (m)	/
Total Depth: (m)	2.95
Submerged Depth: (m)	
Est. Water Volume: (L)	1.043
Est. 3 x Water Volume: (L)	3.129
Decontamination:	X
2" Casing: 2.032 L/m	
1" Casing: 0.508 L/m	
8" Sand pack: 9.271 L/m	
6 5/8" Sand pack: 6.35 L/m	

Calculations:

$= \pi r^2 \times (2.95 - 2.12) \times 1000$

$= \pi (1.75)^2 (0.83)(1000)$

$= 0.007985\ m^3$

$= \pi (0.02m)^2 (0.83m)$

$= 0.00104\ m^3 \times 1000\ \frac{L}{m^3}$

$= 1.043\ L$

Purge Start Time:	12:50	Purge End Time:	13:10	
Parameter	1	2	3	4
Volume (L)	1.00L	2.00L	3.00L	
Temperature (°C)	24.88	20.19	19.29	
Sp. Conductivity (µS/cm°)	490.44	468.84	469.45	
E. Conductivity (µS/cm)	507.95	470.75	464.89	
TDS (g/L) ppm	325.11	304.92	305.38	
Salinity (ppt)	0.27	0.25	0.25	
Dissolved O_2 (% / mg/L)	65.21/5.70	6.29/70.5	5.50/60.8	
pH	6.92	7.23	7.15	
ORP (mV)	220.1	202.2	200.5	
Appearance and Odour	Light brown	no odour		
Turbidity (NTU)	185.0	118.0	77.29	
Total Volume Purged (L)	1.00L	2.00L	3.00L	

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Sample ID	Analysis	Time	Container	Preservative	Comments
JF01-04	BTEX	15:55		✓	Samples Kg S
JF01-04	F1-F4	15:55			

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
JF01-05

Project Number:	22537423
Project Name:	Jackfish GW
Location:	" "
Contractor / Rig No.:	

Date:	August 4, 2022 15:44
Personnel:	MM KS
Weather:	16°C
Client Contact:	

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:

Stick-up (m)	0.68m
Depth to LNAPL: (m)	–
Depth to Water: (m)	2.05m
Depth to DNAPL: (m)	–
Total Depth: (m)	2.10m
Submerged Depth: (m)	0.05m
Est. Water Volume: (L)	
Est. 3 x Water Volume: (L)	
Decontamination:	
2" Casing: 2.032 L/m	
1" Casing: 0.508 L/m	
8" Sand pack: 9.271 L/m	
6 5/8" Sand pack: 6.35 L/m	

Calculations:

Not enough water to purge

Returned Aug 5 to not enough water to sample

Purge Start Time:		Purge End Time:		
Parameter	1	2	3	4
Volume (L)				
Temperature (°C)				
Sp. Conductivity (µS/cm°)				
E. Conductivity (µS/cm)				
TDS (g/L) ppm				
Salinity (ppt)				
Dissolved O_2 (% / mg/L)				
pH				
ORP (mV)				
Appearance and Odour				
Turbidity (NTU)				
Total Volume Purged (L)				

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:

Sample ID	Analysis	Time	Container	Preservative	Comments
					Not enough water to purge
					Confirmed not enough water to sample

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
JF01-06

Project Number:	22537423
Project Name:	Jackfish GW
Location:	" "
Contractor / Rig No.:	

Date:	Aug 4/22
Personnel:	MMcL) KS
Weather:	14°C cloudy
Client Contact:	

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up (m)	0.89
Depth to LNAPL: (m)	—
Depth to Water: (m)	2.63
Depth to DNAPL: (m)	—
Total Depth: (m)	2.44
Submerged Depth: (m)	0.41
Est. Water Volume: (L)	1.15
Est. 3 x Water Volume: (L)	3.48
Decontamination:	
2" Casing: 2.032 L/m	
1" Casing: 0.508 L/m	
8" Sand pack: 9.271 L/m	
6 5/8" Sand pack: 6.35 L/m	

Calculations:

$= \pi r^2 h \times 1000$

$= \pi (0.03)^2 (0.41) \times 1000$

$= 0.5\,L$

Purge Start Time:	16:12	Purge End Time:	16:20

Parameter	1	2	3	4
Volume (L)	1.15	1.15	1.15	
Temperature (°C)	20.09	19.84	19.93	
Sp. Conductivity (µS/cm)	447.21	444.18	446.37	
E. Conductivity (µS/cm)	447.65	442.80	445.70	
TDS (g/L) ppm	290.69	288.72	290.14	
Salinity (ppt)	0.25	0.24	0.24	
Dissolved O_2 (% / mg/L)	4.79/53.89	5.17/57.93	4.97/55.82	
pH	7.10	7.07	7.06	
ORP (mV)	211.6	216.1	213.7	
Appearance and Odour	Brown/Cloudy/No Odour			
Turbidity (NTU)	48.34	58.62	11.91	
Total Volume Purged (L)	3.5 L			

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Sample ID	Analysis	Time	Container	Preservative	Comments
JF01-06	Routine	15:20			Sampled Aug 5
	Oil + Grease				
	BTEX			✓	
	F1-F4			✓	
	Metals (T+D)			✓	
	Mercury (T+D)			✓	

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
MW1

Project Number:	22537423
Project Name:	Jackfish GW
Location:	Jackfish
Contractor / Rig No.:	

Date:	Aug 5
Personnel:	MKIN/KS
Weather:	18 Sunny
Client Contact:	

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up (m)	
Depth to LNAPL: (m)	
Depth to Water: (m)	
Depth to DNAPL: (m)	
Total Depth: (m)	
Submerged Depth: (m)	
Est. Water Volume: (L)	
Est. 3 x Water Volume: (L)	
Decontamination:	
2" Casing: 2.032 L/m	
1" Casing: 0.508 L/m	
8" Sand pack: 9.271 L/m	
6 5/8" Sand pack: 6.35 L/m	

Calculations:

Well was dry
No samples

Purge Start Time:		Purge End Time:		
Parameter	1	2	3	4
Volume (L)				
Temperature (°C)				
Sp. Conductivity (µS/cm^c)				
E. Conductivity (µS/cm)				
TDS (g/L)				
Salinity (ppt)				
Dissolved O_2 (% / mg/L)				
pH				
ORP (mV)				
Appearance and Odour				
Turbidity (NTU)				
Total Volume Purged (L)				

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:

Sample ID	Analysis	Time	Container	Preservative	Comments

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
MW2

Project Number:	22537423
Project Name:	
Location:	
Contractor / Rig No.:	

Date:	Aug 5/22
Personnel:	MMN/KS
Weather:	15°C sunny
Client Contact:	

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up (m)	0.77
Depth to LNAPL: (m)	—
Depth to Water: (m)	2.14
Depth to DNAPL: (m)	—
Total Depth: (m)	3.68
Submerged Depth: (m)	1.54
Est. Water Volume: (L)	3.02L
Est. 3 x Water Volume: (L)	9.07L
Decontamination:	
2" Casing: 2.032 L/m	
1" Casing: 0.508 L/m	
8" Sand pack: 9.271 L/m	
6 5/8" Sand pack: 6.35 L/m	

Calculations:

$= \pi r^2 h \times 1000$

$= \pi(0.025)^2(1.54)(1000)$

$= 3.02L$

Purge Start Time:	11:00	Purge End Time:	11:15

Parameter	1	2	3	4
Volume (L)	3.00	6.00	9.00	
Temperature (°C)	20.48	19.79	19.78	
Sp. Conductivity (µS/cm°)	438.79	431.62	423.41	
E. Conductivity (µS/cm)	442.55	430.36	421.68	
TDS (g/L) ppm	285.47	280.67	275.12	
Salinity (ppt)	0.24	0.23	0.23	
Dissolved O_2 (% / mg/L)	4.14/46.04	2.96/32.7%	3.66/40.61	
pH	6.65	6.72	6.76	
ORP (mV)	183.4	109.0	79.5	
Appearance and Odour	Light brown	Light ↓		
Turbidity (NTU)	13693	5401	21.26	
Total Volume Purged (L)				

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Sample ID	Analysis	Time	Container	Preservative	Comments
MW2	O. Areas	11 5			
↓	BTEX	↓			
	F				
	Metals ID				
	Mercury ID				
	Partial				

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
MW03

Project Number:	22537403
Project Name:	Jackfish GW
Location:	Jackfish
Contractor / Rig No.:	

Date:	Aug 4/22
Personnel:	MNW / ES
Weather:	16°C
Client Contact:	

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up (m)	0.92
Depth to LNAPL: (m)	-
Depth to Water: (m)	2.19
Depth to DNAPL: (m)	-
Total Depth: (m)	2.69
Submerged Depth: (m)	0.5
Est. Water Volume: (L)	3.18L
Est. 3 x Water Volume: (L)	9.5L
Decontamination:	Y
2" Casing: 2.032 L/m	
1" Casing: 0.508 L/m	
8" Sand pack: 9.271 L/m	
6 5/8" Sand pack: 6.35 L/m	

Calculations:

$= \pi r^2 h$

$= \pi (0.045)^2 (0.5) \times 1000$

$= 3.18L$

Purge Start Time:	15:30	Purge End Time:	15:40

Parameter	1	2	3	4
Volume (L)	3.00L	6.00L	9.00L	
Temperature (°C)	20.41	17.72	19.46	
Sp. Conductivity (µS/cm°)	426.77	436.33	435.79	
E. Conductivity (µS/cm)	430.19	433.59	430.74	
TDS (g/L) ppm	278.80	283.64	283.35	
Salinity (ppt)	0.23	0.23	0.23	
Dissolved O_2 (% / mg/L)	5.53/60.08	7.52/84.5	6.78/75.89	
pH	6.90	6.87	6.98	
ORP (mV)	198.0	207.3	207.9	
Appearance and Odour	No odour Turbid.			
Turbidity (NTU)	31.97	79.03	75.44	
Total Volume Purged (L)	Well was dry after 9L			

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Sample ID	Analysis	Time	Container	Preservative	Comments
MW03	BTEX	15 45		✓	Samp d Aug 5
MW03	1 F4			✓	

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
MW 04

Project Number:	a2537423
Project Name:	Jackfish GW
Location:	" "
Contractor / Rig No.:	

Date:	August 4, 2022 15:46
Personnel:	MM KS
Weather:	16°C
Client Contact:	

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:

Stick-up (m)	0.87m
Depth to LNAPL: (m)	—
Depth to Water: (m)	2.02m
Depth to DNAPL: (m)	—
Total Depth: (m)	3.11m
Submerged Depth: (m)	1.09
Est. Water Volume: (L)	2.14L
Est. 3 x Water Volume: (L)	6.42L
Decontamination:	
2" Casing: 2.032 L/m	
1" Casing: 0.508 L/m	
8" Sand pack: 9.271 L/m	
6 5/8" Sand pack: 6.35 L/m	

Calculations:

$\pi \times r^2 \times h$

$= \pi \times (0.075)^2 \times (1.09)(1000)$

$= 2.14L$

Purge Start Time:	15:50	Purge End Time:	16:00

Parameter	1	2	3	4
Volume (L)	2.14	2.14	2.14	
Temperature (°C)	19.69	19.36	19.17	
Sp. Conductivity (µS/cm)	450.03	446.01	443.98	
E. Conductivity (µS/cm)	447.39	440.56	436.98	
TDS (g/L) ppm		289.94 ppm	288.61 ppm	
Salinity (ppt)		0.24	0.24	
Dissolved O_2 (% / mg/L)	58.27% / 5.21 mg/L	61.80% / 5.57 mg/L	61.10% / 5.79 mg/L	
pH	6.98	7.03	7.04	
ORP (mV)		195.3	185.7	
Appearance and Odour				
Turbidity (NTU)	286.69	276.29	252.47	
Total Volume Purged (L)	6.42L			

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:

Sample ID	Analysis	Time	Container	Preservative	Comments
MW04	BTEX	15:35		✓	Sampled Aug 5
MW04	P1-F4	15:35		✓	

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
MW5

Project Number:	22537423
Project Name:	Jackfish GW
Location:	Jackfish
Contractor / Rig No.:	

Date:	Aug 5
Personnel:	MDYN KS
Weather:	18°C Windy, Sunny
Client Contact:	

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up (m)	1.14
Depth to LNAPL: (m)	/
Depth to Water: (m)	2.22
Depth to DNAPL: (m)	/
Total Depth: (m)	2.87
Submerged Depth: (m)	0.67
Est. Water Volume: (L)	1.32
Est. 3 x Water Volume: (L)	3.95
Decontamination:	
2" Casing: 2.032 L/m	
1" Casing: 0.508 L/m	
8" Sand pack: 9.271 L/m	
6 5/8" Sand pack: 6.35 L/m	

Calculations:

$= \pi (0.0\overline{55})^2 (0.67) 1000$

$=$

Purge Start Time:	14:00	Purge End Time:		14:10
Parameter	1	2	3	4
Volume (L)	1.5	1.5	1.5	
Temperature (°C)	11.03	11.27	10.85	
Sp. Conductivity (µS/cm°)	410.63	395.93	388.01	
E. Conductivity (µS/cm)	345.00	329.23	321.18	
TDS (g/L) ppm	266.99	256.66	250.80	
Salinity (ppt)	0.22	0.21	0.21	
Dissolved O_2 (% / mg/L)	5.60/58.10	5.87/54.50	6.42/59.91	
pH	7.01	7.04	7.07	
ORP (mV)	-47.5	-47.8	-47.4	
Appearance and Odour	Cloudy, black, no odour			
Turbidity (NTU)	1030.2	1904.4	1921.2	
Total Volume Purged (L)	4.0L			

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Sample ID	Analysis	Time	Container	Preservative	Comments
MW5	BTEX	14:16		J	
MW5	F1 - F4	14:16		J	

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
MW6

Project Number:	22537423
Project Name:	Jackfish GW
Location:	Jackfish
Contractor / Rig No.:	

Date:	Aug 5
Personnel:	MW/NJ KS
Weather:	18 Sunny
Client Contact:	

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up (m)	~~0.340~~ 0.55
Depth to LNAPL: (m)	/
Depth to Water: (m)	2.14
Depth to DNAPL: (m)	/
Total Depth: (m)	5.90
Submerged Depth: (m)	3.76
Est. Water Volume: (L)	7.38
Est. 3 x Water Volume: (L)	22.14
Decontamination:	
2" Casing: 2.032 L/m	
1" Casing: 0.508 L/m	
8" Sand pack: 9.271 L/m	
6 5/8" Sand pack: 6.35 L/m	

Calculations:

$= \pi (0.025)^2 3.76 \times 1000$

$= 7.39$

Purge Start Time:	14:45	Purge End Time:		14155
Parameter	1	2	3	4
Volume (L)	7.5	7.5	7.5	
Temperature (°C)	7.39	5.65	5.71	
Sp. Conductivity (µS/cm°)	369.36	374.67	374.06	
E. Conductivity (µS/cm)	280.02	271.01	270.17	
TDS (g/L)	240.15	243.92	243.89	
Salinity (ppt)	0.20	0.20	0.21	
Dissolved O_2 (% / mg/L)	5.72	5.26	6.02	
pH	7.33	7.20	7.16	
ORP (mV)	-18.6	-22.5	-22.7	
Appearance and Odour	Mostly Clear w. m	el black	circulate	
Turbidity (NTU)	12.10	23.04	32.82	
Total Volume Purged (L)	22.5			

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Sample ID	Analysis	Time	Container	Preservative	Comments
MW6	BTEX	15:00		V	
MW6	F1-F4	5.00		V	

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
MW07

Project Number:	22537423
Project Name:	Jackfish GW
Location:	Jackfish
Contractor / Rig No.:	

Date:	Aug 5
Personnel:	MMN
Weather:	15°C Sunny
Client Contact:	

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up (m)	0.86
Depth to LNAPL: (m)	—
Depth to Water: (m)	1.99
Depth to DNAPL: (m)	—
Total Depth: (m)	5.15
Submerged Depth: (m)	3.16
Est. Water Volume: (L)	6.20
Est. 3 x Water Volume: (L)	18.60L
Decontamination:	
2" Casing: 2.032 L/m	
1" Casing: 0.508 L/m	
8" Sand pack: 9.271 L/m	
6 5/8" Sand pack: 6.35 L/m	

Calculations:

$= \pi (0.025)^2 3.16 \times 1000$

$= 6.20$

Purge Start Time:	13:35	Purge End Time:	13:50

Parameter	1	2	3	4
Volume (L)	6.2	12.4	18.6	
Temperature (°C)	6.67	6.09	6.26	
Sp. Conductivity (µS/cm°)	375.58	337.83	383.84	
E. Conductivity (µS/cm)	280.03	249.41	283.35	
TDS (g/L) ppm	245.17	219.20	250.18	
Salinity (ppt)	0.21	0.18	0.21	
Dissolved O_2 (% / mg/L)	2.79/22.44	3.56/29.02	4.87/38.12	
pH	7.02	6.94	6.93	
ORP (mV)	-37.9	-27.6	-22.8	
Appearance and Odour	No odour	Black particulates		
Turbidity (NTU)	264.44	153.11	103.10	
Total Volume Purged (L)				

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Sample ID	Analysis	Time	Container	Preservative	Comments
MW07	BTEX	13:50		✓	
MW07	F1-F4	13:50		✓	

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
MW9

Project Number:	22537423
Project Name:	Jackfish GW
Location:	Jackfish
Contractor / Rig No.:	

Date:	Aug 5
Personnel:	MMN/KS
Weather:	18°C Sunny somewhat
Client Contact:	

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up (m)	0.55
Depth to LNAPL: (m)	/
Depth to Water: (m)	1.71
Depth to DNAPL: (m)	/
Total Depth: (m)	6.05
Submerged Depth: (m)	4.34
Est. Water Volume: (L)	8.5L
Est. 3 x Water Volume: (L)	25.5L
Decontamination:	
2" Casing: 2.032 L/m	
1" Casing: 0.508 L/m	
8" Sand pack: 9.271 L/m	
6 5/8" Sand pack: 6.35 L/m	

Calculations:

$= \pi (0.025)^2 (4.34) 1000$

$= 8.5\,L$

Purge Start Time:	12:20	Purge End Time:	12:45

Parameter	1	2	3	4
Volume (L)	9L	9L	9L	
Temperature (°C)	10.13	9.15	7.68	
Sp. Conductivity (µS/cm°)	356.29	365.19	355.34	
E. Conductivity (µS/cm)	287.75	288.62	272.75	
TDS (g/L) ppm	231.59	237.37	233.00	
Salinity (ppt)	0.19	0.20	0.20	
Dissolved O_2 (% / mg/L)	7.67/69.27	7.80/68.94	7.68/64.73	
pH	6.80	7.13	7.14	
ORP (mV)	65.1	-27.7	-37.0	
Appearance and Odour	98.74	72.81	46.93	
Turbidity (NTU)	Light brown	sulfur smell		
Total Volume Purged (L)	~27L			

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:

Sample ID	Analysis	Time	Container	Preservative	Comments
MW9	BTEX	12:45		✓	
MW9	F1-F4	12:45		✓	

GROUNDWATER SAMPLE COLLECTION FORM

Well Number:
MW10

Project Number:	22537423
Project Name:	Jackfish GW
Location:	Jackfish
Contractor / Rig No.:	

Date:	Aug 5/22
Personnel:	MHN/KS
Weather:	18°C sunny
Client Contact:	

Purging

Purge Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:
	X								

Stick-up (m)	0.92
Depth to LNAPL: (m)	/
Depth to Water: (m)	2.39
Depth to DNAPL: (m)	/
Total Depth: (m)	4.74
Submerged Depth: (m)	2.35
Est. Water Volume: (L)	4.6
Est. 3 x Water Volume: (L)	13.8
Decontamination:	
2" Casing: 2.032 L/m	
1" Casing: 0.508 L/m	
8" Sand pack: 9.271 L/m	
6 5/8" Sand pack: 6.35 L/m	

Calculations:

$= \pi (0.028)^2 (2.35)\ 1000$

≤ 4.6

Purge Start Time:	12:50	Purge End Time:	13:05

Parameter	1	2	3	4
Volume (L)	5	10	15	
Temperature (°C)	12.09	11.62	11.80	
Sp. Conductivity (µS/cm°)	366.88	364.19	364.71	
E. Conductivity (µS/cm)	311.48	305.18	307.67	
TDS (g/L) ppm	238.56	236.89	237.28	
Salinity (ppt)	0.20	0.20	0.20	
Dissolved O_2 (% / mg/L)	4.43/37.07	3.84/34.96	4.35/38.32	
pH	7.10	7.13	7.14	
ORP (mV)	-34.7	-36.0	-31.1	
Appearance and Odour	Clear w black particulate, sulfur smell			
Turbidity (NTU)	16.20	13.17	11.14	
Total Volume Purged (L)	15L			

Sample Collection

Sample Method	Waterra 5/8"	Waterra 1"	Air Lift	BK Pump	S. Steel Bailer	Centrif. Pump	Disp. Bailer	Sub. Pump	Other:

Sample ID	Analysis	Time	Container	Preservative	Comments
MW 10	BTEX	13:10		✓	
MW 10	F1 F4	13:16		✓	

APPENDIX B

Calibration Forms

TROLL FULL CALIBRATION SHEET

Name and Serial #: ATS00 SN637837
Project Number: Jackfish GW
Date of Calibration: Sept 29 22
Technician: MMN
DO membrane changed? No
Calibration accepted?

Record the following Sonde Parameters BEFORE and AFTER calibration and check TROLL reading in reference solutions at end of sampling day:

Parameter	Before	After	End-of-Day Check
Specific Conductivity (µS/cm)	1805.7	1413.0	1325.43
pH in 7.00 reference solution	6.98	7.02	7.28 *
pH in 4.00 reference solution	3.97	4.00	4.22 *
pH in 10.0 reference solution	10.06	10.05	10.14 *
DO % saturation	98.84	100	
DO mg/L	8.85	8.16	
ORP (mV)	036.5	2354	
Depth (m)	~	~	

*record pH and mV.

Record the following diagnostic numbers AFTER calibration:

Diagnostic Number	Value	Target	Acceptable Range
Conductivity cell constant	0.979	1.0	0.7 to 1.3
pH mV in 7.00 reference solution	-20.8	0	-50 to 50
pH mV in 4.00 reference solution	144.7	pH 7 value + 177	+165 to +180 from pH 7 mV value
pH mV in 10.0 reference solution	-190.9	pH 7 value - 177	-165 to -180 from pH 7 mV value
DO offset	0	0	0
DO slope	1.09	1.0	0.7 to 1.4

Notes:

TROLL FULL CALIBRATION SHEET

YSI Name and Serial #:
Project Number:
Date of Calibration:
Technician:
DO membrane changed?
Calibration accepted?

Record the following Sonde Parameters BEFORE and AFTER calibration and check TROLL reading in reference solutions at end of sampling day:

Parameter	Before	After	End-of-Day Check
Specific Conductivity (µS/cm)			
pH in 7.00 reference solution			*
pH in 4.00 reference solution			*
pH in 10.0 reference solution			*
DO % saturation			
DO mg/L			
ORP (mV)			
Depth (m)			

*record pH and mV.

Record the following diagnostic numbers AFTER calibration:

Diagnostic Number	Value	Target	Acceptable Range
Conductivity cell constant		1.0	0.7 to 1.3
pH mV in 7.00 reference solution		0	-50 to 50
pH mV in 4.00 reference solution		pH 7 value + 177	+165 to +180 from pH 7 mV value
pH mV in 10.0 reference solution		pH 7 value - 177	-165 to -180 from pH 7 mV value
DO offset		0	0
DO slope		1.0	0.7 to 1.4

Notes:

YSI FULL CALIBRATION SHEET

YSI Name and Serial #: 637837
Project Number: Jackfish GW
Date of Calibration: Aug 4 '22
Technician: RK
DO membrane changed? No
Calibration accepted? Y

Record the following Sonde Parameters BEFORE and AFTER calibration and check YSI reading in reference solutions at end of sampling day:

Parameter	Before	After	Check
Specific Conductivity	1325.5	1284.0	1097.6
pH in 7.00 reference	7.04	7.02	7.34
pH in 4.00 reference	4.01	4.00	4.32
pH in 10.0 reference	10.02	10.05	10.19
DO % saturation	104.84	100.00	
DO mg/L	9.47	8.13	
ORP (mV)	238.6	237.5	
Depth (m)	—	—	

Record the following diagnostic numbers AFTER calibration:

Diagnostic Number	Value	Target	Acceptable Range
Conductivity cell constant	0.65	5.0	4.3 to 5.7
pH mV in 7.00 reference solution	-12.1	0	-50 to 50
pH mV in 4.00 reference solution	159.6	**pH 7 value + 177**	+165 to +180 from pH 7 mV value
pH mV in 10.0 reference solution	-182.7	**pH 7 value - 177**	-165 to -180 from pH 7 mV value
DO charge	—	50	25 to 75
DO gain	—	1.0	0.7 to 1.4
Pressure offset non-vented	—	-14.7	-20.7 to -8.7

Notes:

YSI FULL CALIBRATION SHEET

YSI Name and Serial #: 637837
Project Number: JackfishGW
Date of Calibration: 5 August 2022
Technician: RK
DO membrane changed? No
Calibration accepted? Y

Record the following Sonde Parameters BEFORE and AFTER calibration and check YSI reading in reference solutions at end of sampling day:

Parameter	Before	After	Check
Specific Conductivity	1331.5	1284.0	1216.0
pH in 7.00 reference	7.03	7.02	7.05
pH in 4.00 reference	4.04	4.00	4.03
pH in 10.0 reference	10.04	10.05	10.08
DO % saturation	100.44	100.00	
DO mg/L	9.02	8.11	
ORP (mV)	237.0	237.5	
Depth (m)	-0.01 psi	0.00	

Record the following diagnostic numbers AFTER calibration:

Diagnostic Number	Value	Target	Acceptable Range
Conductivity cell constant	0.65	5.0	4.3 to 5.7
pH mV in 7.00 reference solution	-12.9	0	-50 to 50
pH mV in 4.00 reference solution	157.6	**pH 7 value + 177**	+165 to +180 from pH 7 mV value
pH mV in 10.0 reference solution	-182.4	**pH 7 value - 177**	-165 to -180 from pH 7 mV value
DO charge	—	50	25 to 75
DO gain	—	1.0	0.7 to 1.4
Pressure offset non-vented	—	-14.7	-20.7 to -8.7

Notes:

offset: 0.00 mg/L
Level: 1, 106427

TROLL FULL CALIBRATION SHEET

Troll Name and Serial #: SmarTroll 533314
Project Number: 22537475 / 1000 / 1010 JL GW
Date of Calibration: Aug. 11 2022
Technician: GW
DO membrane changed? No
Calibration accepted? Yes.

Record the following Sonde Parameters BEFORE and AFTER calibration and check TROLL reading in reference solutions at end of sampling day:

Parameter	Before	After	End-of-Day Check
Specific Conductivity (µS/cm)	990.94	1413.0	1462.1
pH in 7.00 reference solution	7.33	7.04	7.06 *
pH in 4.00 reference solution	4.22	4.00	3.99 *
pH in 10.0 reference solution	10.49	10.11	10.19 *
DO % saturation	100.10	100.00	
DO mg/L	9.55	10.23	
ORP (mV)	162.5	237.5	
Depth (m) ps	0.08	0.00	

*record pH and mV.

Record the following diagnostic numbers AFTER calibration:

Diagnostic Number	Value	Target	Acceptable Range
Conductivity cell constant	1.106	1.0	0.7 to 1.3
pH mV in 7.00 reference solution	-49.5	0	-50 to 50
pH mV in 4.00 reference solution	120.5	pH 7 value + 177	+165 to +180 from pH 7 mV value
pH mV in 10.0 reference solution	-214.2	pH 7 value - 177	-165 to -180 from pH 7 mV value
DO offset	0.00	0	0
DO slope	0A320273.	1.0	0.7 to 1.4

Turbidity meter.

Notes:

0	16	100	200	400
0.00	9.53	96.3	190	375
-0.11	9.56	94.5	192	381
-0.16	9.60	95.6	193	383

TROLL FULL CALIBRATION SHEET

Troll Name and Serial #: _____
Project Number: _____
Date of Calibration: _____
Technician: _____
DO membrane changed? _____
Calibration accepted? _____

Record the following Sonde Parameters BEFORE and AFTER calibration and check TROLL reading in reference solutions at end of sampling day:

Parameter	Before	After	End-of-Day Check
Specific Conductivity (µS/cm)			
pH in 7.00 reference solution			*
pH in 4.00 reference solution			*
pH in 10.0 reference solution			*
DO % saturation			
DO mg/L			
ORP (mV)			
Depth (m)			

*record pH and mV.

Record the following diagnostic numbers AFTER calibration:

Diagnostic Number	Value	Target	Acceptable Range
Conductivity cell constant		1.0	0.7 to 1.3
pH mV in 7.00 reference solution		0	-50 to 50
pH mV in 4.00 reference solution		pH 7 value + 177	+165 to +180 from pH 7 mV value
pH mV in 10.0 reference solution		pH 7 value - 177	-165 to -180 from pH 7 mV value
DO offset		0	0
DO slope		1.0	0.7 to 1.4

Notes:

APPENDIX C

Laboratory Certificates of Analyses

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **YL2201159**	Page	: 1 of 14
Amendment	: **2**		
Client	: **Golder Associates Ltd.**	Laboratory	: Yellowknife - Environmental
Contact	: Laurence Bonin	Account Manager	: Oliver Gregg
Address	: 9 - 4905 48th Street Yellowknife NT Canada X1A 3S3	Address	: 314 Old Airport Road, Unit 116 Yellowknife NT Canada X1A 3T3
Telephone	: ----	Telephone	: 1 867 446 5593
Project	: 22537423-Jackfish	Date Samples Received	: 08-Aug-2022 11:33
PO	: ----	Date Analysis Commenced	: 10-Aug-2022
C-O-C number	: Jackfish-16072021	Issue Date	: 08-Sep-2022 14:09
Sampler	: ----		
Site	: Jackfish NTPC		
Quote number	: YL21-GOLD100-008		
No. of samples received	: 15		
No. of samples analysed	: 15		

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
- Surrogate Control Limits

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.

Signatories	*Position*	*Laboratory Department*
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Ann Joby	Lab Assistant	Metals, Burnaby, British Columbia
Benjamin Oke	Lab Assistant	Metals, Burnaby, British Columbia
Dan Gebert	Laboratory Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Qammar Almas	Lab Assistant	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).

Unit	*Description*
-	No Unit
µg/L	micrograms per litre
mg/L	milligrams per litre
pH units	pH units

<: 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.

Qualifiers

Qualifier	*Description*
DTMF	*Dissolved concentration exceeds total for field-filtered metals sample. Metallic contaminants may have been introduced to dissolved sample during field filtration.*

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	JF01-01	JF01-02	JF01-03	JF01-04	JF01-06
					Client sampling date / time	05-Aug-2022 14:30	05-Aug-2022 12:15	05-Aug-2022 11:40	05-Aug-2022 15:55	05-Aug-2022 15:20
						YL2201159-001	YL2201159-002	YL2201159-003	YL2201159-004	YL2201159-005
						Result	Result	Result	Result	Result
Physical Tests										
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		----	----	----	----	148
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L		----	----	----	----	214
pH	----	E108	0.10	pH units		----	----	----	----	7.90
Anions and Nutrients										
bromide	24959-67-9	E235.Br-L	0.050	mg/L		----	----	----	----	<0.050
chloride	16887-00-6	E235.Cl-L	0.10	mg/L		----	----	----	----	61.6
fluoride	16984-48-8	E235.F-L	0.010	mg/L		----	----	----	----	0.110
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		----	----	----	----	0.377
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		----	----	----	----	<0.0010
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		----	----	----	----	26.4
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L		----	----	----	----	32.7
antimony, total	7440-36-0	E420	0.00010	mg/L		----	----	----	----	0.00759
arsenic, total	7440-38-2	E420	0.00010	mg/L		----	----	----	----	0.469
barium, total	7440-39-3	E420	0.00010	mg/L		----	----	----	----	0.377
beryllium, total	7440-41-7	E420	0.000100	mg/L		----	----	----	----	0.000979
bismuth, total	7440-69-9	E420	0.000050	mg/L		----	----	----	----	0.00106
boron, total	7440-42-8	E420	0.010	mg/L		----	----	----	----	0.030
cadmium, total	7440-43-9	E420	0.0000050	mg/L		----	----	----	----	0.000249
calcium, total	7440-70-2	E420	0.050	mg/L		----	----	----	----	42.0
cesium, total	7440-46-2	E420	0.000010	mg/L		----	----	----	----	0.00385
chromium, total	7440-47-3	E420	0.00050	mg/L		----	----	----	----	0.133
cobalt, total	7440-48-4	E420	0.00010	mg/L		----	----	----	----	0.101
copper, total	7440-50-8	E420	0.00050	mg/L		----	----	----	----	0.0588
iron, total	7439-89-6	E420	0.010	mg/L		----	----	----	----	42.2
lead, total	7439-92-1	E420	0.000050	mg/L		----	----	----	----	0.0178
lithium, total	7439-93-2	E420	0.0010	mg/L		----	----	----	----	0.220
magnesium, total	7439-95-4	E420	0.0050	mg/L		----	----	----	----	26.5
manganese, total	7439-96-5	E420	0.00010	mg/L		----	----	----	----	11.9
mercury, total	7439-97-6	E508	0.0000050	mg/L		----	----	----	----	<0.0000050

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	JF01-01	JF01-02	JF01-03	JF01-04	JF01-06
					Client sampling date / time	05-Aug-2022 14:30	05-Aug-2022 12:15	05-Aug-2022 11:40	05-Aug-2022 15:55	05-Aug-2022 15:20
						YL2201159-001	YL2201159-002	YL2201159-003	YL2201159-004	YL2201159-005
						Result	Result	Result	Result	Result
Total Metals										
molybdenum, total	7439-98-7	E420	0.000050	mg/L		----	----	----	----	0.00255
nickel, total	7440-02-0	E420	0.00050	mg/L		----	----	----	----	0.112
phosphorus, total	7723-14-0	E420	0.050	mg/L		----	----	----	----	0.989
potassium, total	7440-09-7	E420	0.050	mg/L		----	----	----	----	10.3
rubidium, total	7440-17-7	E420	0.00020	mg/L		----	----	----	----	0.0389
selenium, total	7782-49-2	E420	0.000050	mg/L		----	----	----	----	0.000257
silicon, total	7440-21-3	E420	0.10	mg/L		----	----	----	----	46.8
silver, total	7440-22-4	E420	0.000010	mg/L		----	----	----	----	0.000157
sodium, total	7440-23-5	E420	0.050	mg/L		----	----	----	----	34.2
strontium, total	7440-24-6	E420	0.00020	mg/L		----	----	----	----	0.116
sulfur, total	7704-34-9	E420	0.50	mg/L		----	----	----	----	9.38
tellurium, total	13494-80-9	E420	0.00020	mg/L		----	----	----	----	<0.00020
thallium, total	7440-28-0	E420	0.000010	mg/L		----	----	----	----	0.000260
thorium, total	7440-29-1	E420	0.00010	mg/L		----	----	----	----	0.00313
tin, total	7440-31-5	E420	0.00010	mg/L		----	----	----	----	0.00261
titanium, total	7440-32-6	E420	0.00030	mg/L		----	----	----	----	1.71
tungsten, total	7440-33-7	E420	0.00010	mg/L		----	----	----	----	0.00115
uranium, total	7440-61-1	E420	0.000010	mg/L		----	----	----	----	0.00354
vanadium, total	7440-62-2	E420	0.00050	mg/L		----	----	----	----	0.102
zinc, total	7440-66-6	E420	0.0030	mg/L		----	----	----	----	0.125
zirconium, total	7440-67-7	E420	0.00020	mg/L		----	----	----	----	0.00051
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L		----	----	----	----	0.0909
antimony, dissolved	7440-36-0	E421	0.00010	mg/L		----	----	----	----	0.00114
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L		----	----	----	----	0.227
barium, dissolved	7440-39-3	E421	0.00010	mg/L		----	----	----	----	0.0426
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L		----	----	----	----	<0.000100
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L		----	----	----	----	<0.000050
boron, dissolved	7440-42-8	E421	0.010	mg/L		----	----	----	----	0.027
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L		----	----	----	----	0.0000104
calcium, dissolved	7440-70-2	E421	0.050	mg/L		----	----	----	----	38.4

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	JF01-01	JF01-02	JF01-03	JF01-04	JF01-06
					Client sampling date / time	05-Aug-2022 14:30	05-Aug-2022 12:15	05-Aug-2022 11:40	05-Aug-2022 15:55	05-Aug-2022 15:20
						YL2201159-001	YL2201159-002	YL2201159-003	YL2201159-004	YL2201159-005
						Result	Result	Result	Result	Result
Dissolved Metals										
cesium, dissolved	7440-46-2	E421	0.000010	mg/L		----	----	----	----	0.000044
chromium, dissolved	7440-47-3	E421	0.00050	mg/L		----	----	----	----	<0.00050
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L		----	----	----	----	0.00069
copper, dissolved	7440-50-8	E421	0.00020	mg/L		----	----	----	----	0.00106
iron, dissolved	7439-89-6	E421	0.010	mg/L		----	----	----	----	0.078
lead, dissolved	7439-92-1	E421	0.000050	mg/L		----	----	----	----	0.000181
lithium, dissolved	7439-93-2	E421	0.0010	mg/L		----	----	----	----	0.0041
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L		----	----	----	----	12.7
manganese, dissolved	7439-96-5	E421	0.00010	mg/L		----	----	----	----	0.202
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L		----	----	----	----	<0.0000050
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L		----	----	----	----	0.000581 DTMF
nickel, dissolved	7440-02-0	E421	0.00050	mg/L		----	----	----	----	0.00315
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L		----	----	----	----	<0.050
potassium, dissolved	7440-09-7	E421	0.050	mg/L		----	----	----	----	5.34
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L		----	----	----	----	0.00459
selenium, dissolved	7782-49-2	E421	0.000050	mg/L		----	----	----	----	0.000096
silicon, dissolved	7440-21-3	E421	0.050	mg/L		----	----	----	----	6.37
silver, dissolved	7440-22-4	E421	0.000010	mg/L		----	----	----	----	<0.000010
sodium, dissolved	7440-23-5	E421	0.050	mg/L		----	----	----	----	31.8
strontium, dissolved	7440-24-6	E421	0.00020	mg/L		----	----	----	----	0.0970
sulfur, dissolved	7704-34-9	E421	0.50	mg/L		----	----	----	----	8.98
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L		----	----	----	----	<0.00020
thallium, dissolved	7440-28-0	E421	0.000010	mg/L		----	----	----	----	<0.000010
thorium, dissolved	7440-29-1	E421	0.00010	mg/L		----	----	----	----	0.00011
tin, dissolved	7440-31-5	E421	0.00010	mg/L		----	----	----	----	0.00010
titanium, dissolved	7440-32-6	E421	0.00030	mg/L		----	----	----	----	0.00306
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L		----	----	----	----	<0.00010
uranium, dissolved	7440-61-1	E421	0.000010	mg/L		----	----	----	----	0.000611
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L		----	----	----	----	0.00152
zinc, dissolved	7440-66-6	E421	0.0010	mg/L		----	----	----	----	0.0014
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L		----	----	----	----	0.00021

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	JF01-01	JF01-02	JF01-03	JF01-04	JF01-06
					Client sampling date / time	05-Aug-2022 14:30	05-Aug-2022 12:15	05-Aug-2022 11:40	05-Aug-2022 15:55	05-Aug-2022 15:20
						YL2201159-001	YL2201159-002	YL2201159-003	YL2201159-004	YL2201159-005
						Result	Result	Result	Result	Result
Dissolved Metals										
dissolved mercury filtration location	----	EP509	-	-		----	----	----	----	Field
dissolved metals filtration location	----	EP421	-	-		----	----	----	----	Field
Aggregate Organics										
oil & grease (gravimetric)	----	E567	5.0	mg/L		----	----	----	----	<5.0
Volatile Organic Compounds [Fuels]										
benzene	71-43-2	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
ethylbenzene	100-41-4	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
styrene	100-42-5	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
toluene	108-88-3	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
xylene, m+p-	179601-23-1	E611A	0.40	µg/L		<0.40	<0.40	<0.40	<0.40	<0.40
xylene, o-	95-47-6	E611A	0.30	µg/L		<0.30	<0.30	<0.30	<0.30	<0.30
xylenes, total	1330-20-7	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611A	1.0	%		88.3	88.4	85.5	82.2	83.1
difluorobenzene, 1,4-	540-36-3	E611A	1.0	%		104	101	103	101	102
Hydrocarbons										
F1 (C6-C10)	----	E581.VH+F1	100	µg/L		<100	<100	<100	<100	<100
F2 (C10-C16)	----	E601	300	µg/L		530	<300	<300	<300	<300
F3 (C16-C34)	----	E601	300	µg/L		<300	<300	<300	<300	<300
F4 (C34-C50)	----	E601	300	µg/L		<300	<300	<300	<300	<300
VHw (C6-C10)	----	E581.VH+F1	100	µg/L		<100	<100	<100	<100	<100
F1-BTEX	----	EC580	100	µg/L		<100	<100	<100	<100	<100
VPHw	----	EC580A	100	µg/L		<100	<100	<100	<100	<100
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601	1.0	%		95.8	87.4	83.0	90.7	91.2
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%		85.3	94.7	85.7	83.3	88.2

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

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	MW2	MW3	MW04	MW5	MW6
					Client sampling date / time	05-Aug-2022 11:15	05-Aug-2022 15:45	05-Aug-2022 15:35	05-Aug-2022 14:10	05-Aug-2022 15:00
						YL2201159-006	YL2201159-007	YL2201159-008	YL2201159-009	YL2201159-010
						Result	Result	Result	Result	Result
Physical Tests										
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		140	----	----	----	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L		139	----	----	----	----
pH	----	E108	0.10	pH units		7.94	----	----	----	----
Anions and Nutrients										
bromide	24959-67-9	E235.Br-L	0.050	mg/L		<0.050	----	----	----	----
chloride	16887-00-6	E235.Cl-L	0.10	mg/L		62.0	----	----	----	----
fluoride	16984-48-8	E235.F-L	0.010	mg/L		0.107	----	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		0.0153	----	----	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		0.0116	----	----	----	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		23.9	----	----	----	----
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L		0.427	----	----	----	----
antimony, total	7440-36-0	E420	0.00010	mg/L		0.00062	----	----	----	----
arsenic, total	7440-38-2	E420	0.00010	mg/L		0.231	----	----	----	----
barium, total	7440-39-3	E420	0.00010	mg/L		0.0466	----	----	----	----
beryllium, total	7440-41-7	E420	0.000100	mg/L		<0.000100	----	----	----	----
bismuth, total	7440-69-9	E420	0.000050	mg/L		<0.000050	----	----	----	----
boron, total	7440-42-8	E420	0.010	mg/L		0.025	----	----	----	----
cadmium, total	7440-43-9	E420	0.0000050	mg/L		0.0000205	----	----	----	----
calcium, total	7440-70-2	E420	0.050	mg/L		35.7	----	----	----	----
cesium, total	7440-46-2	E420	0.000010	mg/L		0.000054	----	----	----	----
chromium, total	7440-47-3	E420	0.00050	mg/L		0.00198	----	----	----	----
cobalt, total	7440-48-4	E420	0.00010	mg/L		0.00195	----	----	----	----
copper, total	7440-50-8	E420	0.00050	mg/L		0.00269	----	----	----	----
iron, total	7439-89-6	E420	0.010	mg/L		1.70	----	----	----	----
lead, total	7439-92-1	E420	0.000050	mg/L		0.000789	----	----	----	----
lithium, total	7439-93-2	E420	0.0010	mg/L		0.0062	----	----	----	----
magnesium, total	7439-95-4	E420	0.0050	mg/L		12.2	----	----	----	----
manganese, total	7439-96-5	E420	0.00010	mg/L		0.0778	----	----	----	----
mercury, total	7439-97-6	E508	0.0000050	mg/L		<0.0000050	----	----	----	----
molybdenum, total	7439-98-7	E420	0.000050	mg/L		0.000618	----	----	----	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	MW2	MW3	MW04	MW5	MW6
					Client sampling date / time	05-Aug-2022 11:15	05-Aug-2022 15:45	05-Aug-2022 15:35	05-Aug-2022 14:10	05-Aug-2022 15:00
						YL2201159-006	YL2201159-007	YL2201159-008	YL2201159-009	YL2201159-010
						Result	Result	Result	Result	Result
Total Metals										
nickel, total	7440-02-0	E420	0.00050	mg/L		0.00281	----	----	----	----
phosphorus, total	7723-14-0	E420	0.050	mg/L		0.078	----	----	----	----
potassium, total	7440-09-7	E420	0.050	mg/L		4.61	----	----	----	----
rubidium, total	7440-17-7	E420	0.00020	mg/L		0.00382	----	----	----	----
selenium, total	7782-49-2	E420	0.000050	mg/L		<0.000050	----	----	----	----
silicon, total	7440-21-3	E420	0.10	mg/L		7.41	----	----	----	----
silver, total	7440-22-4	E420	0.000010	mg/L		0.000010	----	----	----	----
sodium, total	7440-23-5	E420	0.050	mg/L		32.4	----	----	----	----
strontium, total	7440-24-6	E420	0.00020	mg/L		0.0926	----	----	----	----
sulfur, total	7704-34-9	E420	0.50	mg/L		8.26	----	----	----	----
tellurium, total	13494-80-9	E420	0.00020	mg/L		<0.00020	----	----	----	----
thallium, total	7440-28-0	E420	0.000010	mg/L		0.000014	----	----	----	----
thorium, total	7440-29-1	E420	0.00010	mg/L		0.00010	----	----	----	----
tin, total	7440-31-5	E420	0.00010	mg/L		0.00012	----	----	----	----
titanium, total	7440-32-6	E420	0.00030	mg/L		0.0220	----	----	----	----
tungsten, total	7440-33-7	E420	0.00010	mg/L		<0.00010	----	----	----	----
uranium, total	7440-61-1	E420	0.000010	mg/L		0.000351	----	----	----	----
vanadium, total	7440-62-2	E420	0.00050	mg/L		0.00385	----	----	----	----
zinc, total	7440-66-6	E420	0.0030	mg/L		0.0031	----	----	----	----
zirconium, total	7440-67-7	E420	0.00020	mg/L		0.00023	----	----	----	----
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L		0.0169	----	----	----	----
antimony, dissolved	7440-36-0	E421	0.00010	mg/L		0.00052	----	----	----	----
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L		0.178	----	----	----	----
barium, dissolved	7440-39-3	E421	0.00010	mg/L		0.0434	----	----	----	----
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L		<0.000100	----	----	----	----
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L		<0.000050	----	----	----	----
boron, dissolved	7440-42-8	E421	0.010	mg/L		0.025	----	----	----	----
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L		0.0000150	----	----	----	----
calcium, dissolved	7440-70-2	E421	0.050	mg/L		36.1	----	----	----	----
cesium, dissolved	7440-46-2	E421	0.000010	mg/L		0.000015	----	----	----	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	MW2	MW3	MW04	MW5	MW6
					Client sampling date / time	05-Aug-2022 11:15	05-Aug-2022 15:45	05-Aug-2022 15:35	05-Aug-2022 14:10	05-Aug-2022 15:00
						YL2201159-006	YL2201159-007	YL2201159-008	YL2201159-009	YL2201159-010
						Result	Result	Result	Result	Result
Dissolved Metals										
chromium, dissolved	7440-47-3	E421	0.00050	mg/L		<0.00050	----	----	----	----
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L		0.00108	----	----	----	----
copper, dissolved	7440-50-8	E421	0.00020	mg/L		0.00046	----	----	----	----
iron, dissolved	7439-89-6	E421	0.010	mg/L		0.520	----	----	----	----
lead, dissolved	7439-92-1	E421	0.000050	mg/L		0.000102	----	----	----	----
lithium, dissolved	7439-93-2	E421	0.0010	mg/L		0.0046	----	----	----	----
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L		12.2	----	----	----	----
manganese, dissolved	7439-96-5	E421	0.00010	mg/L		0.0631	----	----	----	----
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L		<0.0000050	----	----	----	----
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L		0.000432	----	----	----	----
nickel, dissolved	7440-02-0	E421	0.00050	mg/L		0.00166	----	----	----	----
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L		<0.050	----	----	----	----
potassium, dissolved	7440-09-7	E421	0.050	mg/L		4.40	----	----	----	----
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L		0.00335	----	----	----	----
selenium, dissolved	7782-49-2	E421	0.000050	mg/L		0.000065	----	----	----	----
silicon, dissolved	7440-21-3	E421	0.050	mg/L		6.22	----	----	----	----
silver, dissolved	7440-22-4	E421	0.000010	mg/L		<0.000010	----	----	----	----
sodium, dissolved	7440-23-5	E421	0.050	mg/L		30.7	----	----	----	----
strontium, dissolved	7440-24-6	E421	0.00020	mg/L		0.0926	----	----	----	----
sulfur, dissolved	7704-34-9	E421	0.50	mg/L		8.48	----	----	----	----
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L		<0.00020	----	----	----	----
thallium, dissolved	7440-28-0	E421	0.000010	mg/L		0.000011	----	----	----	----
thorium, dissolved	7440-29-1	E421	0.00010	mg/L		<0.00010	----	----	----	----
tin, dissolved	7440-31-5	E421	0.00010	mg/L		<0.00010	----	----	----	----
titanium, dissolved	7440-32-6	E421	0.00030	mg/L		0.00058	----	----	----	----
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L		<0.00010	----	----	----	----
uranium, dissolved	7440-61-1	E421	0.000010	mg/L		0.000229	----	----	----	----
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L		0.00161	----	----	----	----
zinc, dissolved	7440-66-6	E421	0.0010	mg/L		<0.0010	----	----	----	----
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L		<0.00020	----	----	----	----
dissolved mercury filtration location	----	EP509	-	-		Field	----	----	----	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	MW2	MW3	MW04	MW5	MW6
					Client sampling date / time	05-Aug-2022 11:15	05-Aug-2022 15:45	05-Aug-2022 15:35	05-Aug-2022 14:10	05-Aug-2022 15:00
						YL2201159-006	YL2201159-007	YL2201159-008	YL2201159-009	YL2201159-010
						Result	Result	Result	Result	Result
Dissolved Metals										
dissolved metals filtration location	----	EP421	-	-		Field	----	----	----	----
Aggregate Organics										
oil & grease (gravimetric)	----	E567	5.0	mg/L		<5.0	----	----	----	----
Volatile Organic Compounds [Fuels]										
benzene	71-43-2	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
ethylbenzene	100-41-4	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
styrene	100-42-5	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
toluene	108-88-3	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
xylene, m+p-	179601-23-1	E611A	0.40	µg/L		<0.40	<0.40	<0.40	<0.40	<0.40
xylene, o-	95-47-6	E611A	0.30	µg/L		<0.30	<0.30	<0.30	<0.30	<0.30
xylenes, total	1330-20-7	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611A	1.0	%		85.7	84.3	83.2	85.4	89.2
difluorobenzene, 1,4-	540-36-3	E611A	1.0	%		104	102	102	101	103
Hydrocarbons										
F1 (C6-C10)	----	E581.VH+F1	100	µg/L		<100	<100	<100	<100	<100
F2 (C10-C16)	----	E601	300	µg/L		<300	<300	<300	11300	2720
F3 (C16-C34)	----	E601	300	µg/L		<300	<300	<300	3180	850
F4 (C34-C50)	----	E601	300	µg/L		<300	<300	<300	<300	<300
VHw (C6-C10)	----	E581.VH+F1	100	µg/L		<100	<100	<100	<100	<100
F1-BTEX	----	EC580	100	µg/L		<100	<100	<100	<100	<100
VPHw	----	EC580A	100	µg/L		<100	<100	<100	<100	<100
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601	1.0	%		85.8	91.7	93.9	95.3	95.4
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%		91.1	76.7	78.0	80.2	84.4

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

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	MW7	MW9	MW10	Field Blank	Travel Blank
					Client sampling date / time	05-Aug-2022 13:50	05-Aug-2022 12:45	05-Aug-2022 13:10	05-Aug-2022 10:45	05-Aug-2022 10:10
						YL2201159-011	YL2201159-012	YL2201159-013	YL2201159-014	YL2201159-015
						Result	Result	Result	Result	Result
Physical Tests										
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		----	----	----	<0.60	<0.60
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L		----	----	----	<0.60	<0.60
pH	----	E108	0.10	pH units		----	----	----	5.58	5.51
Anions and Nutrients										
bromide	24959-67-9	E235.Br-L	0.050	mg/L		----	----	----	<0.050	<0.050
chloride	16887-00-6	E235.Cl-L	0.10	mg/L		----	----	----	<0.10	<0.10
fluoride	16984-48-8	E235.F-L	0.010	mg/L		----	----	----	<0.010	<0.010
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		----	----	----	<0.0050	<0.0050
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		----	----	----	<0.0010	<0.0010
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		----	----	----	<0.30	<0.30
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L		----	----	----	<0.0030	<0.0030
antimony, total	7440-36-0	E420	0.00010	mg/L		----	----	----	<0.00010	<0.00010
arsenic, total	7440-38-2	E420	0.00010	mg/L		----	----	----	<0.00010	<0.00010
barium, total	7440-39-3	E420	0.00010	mg/L		----	----	----	<0.00010	<0.00010
beryllium, total	7440-41-7	E420	0.000100	mg/L		----	----	----	<0.000100	<0.000100
bismuth, total	7440-69-9	E420	0.000050	mg/L		----	----	----	<0.000050	<0.000050
boron, total	7440-42-8	E420	0.010	mg/L		----	----	----	<0.010	<0.010
cadmium, total	7440-43-9	E420	0.0000050	mg/L		----	----	----	<0.0000050	<0.0000050
calcium, total	7440-70-2	E420	0.050	mg/L		----	----	----	<0.050	<0.050
cesium, total	7440-46-2	E420	0.000010	mg/L		----	----	----	<0.000010	<0.000010
chromium, total	7440-47-3	E420	0.00050	mg/L		----	----	----	<0.00050	<0.00050
cobalt, total	7440-48-4	E420	0.00010	mg/L		----	----	----	<0.00010	<0.00010
copper, total	7440-50-8	E420	0.00050	mg/L		----	----	----	<0.00050	<0.00050
iron, total	7439-89-6	E420	0.010	mg/L		----	----	----	<0.010	<0.010
lead, total	7439-92-1	E420	0.000050	mg/L		----	----	----	<0.000050	<0.000050
lithium, total	7439-93-2	E420	0.0010	mg/L		----	----	----	<0.0010	<0.0010
magnesium, total	7439-95-4	E420	0.0050	mg/L		----	----	----	<0.0050	<0.0050
manganese, total	7439-96-5	E420	0.00010	mg/L		----	----	----	<0.00010	<0.00010
mercury, total	7439-97-6	E508	0.0000050	mg/L		----	----	----	<0.0000050	<0.0000050
molybdenum, total	7439-98-7	E420	0.000050	mg/L		----	----	----	<0.000050	<0.000050

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	MW7	MW9	MW10	Field Blank	Travel Blank
					Client sampling date / time	05-Aug-2022 13:50	05-Aug-2022 12:45	05-Aug-2022 13:10	05-Aug-2022 10:45	05-Aug-2022 10:10
						YL2201159-011	YL2201159-012	YL2201159-013	YL2201159-014	YL2201159-015
						Result	Result	Result	Result	Result
Total Metals										
nickel, total	7440-02-0	E420	0.00050	mg/L		----	----	----	<0.00050	<0.00050
phosphorus, total	7723-14-0	E420	0.050	mg/L		----	----	----	<0.050	<0.050
potassium, total	7440-09-7	E420	0.050	mg/L		----	----	----	<0.050	<0.050
rubidium, total	7440-17-7	E420	0.00020	mg/L		----	----	----	<0.00020	<0.00020
selenium, total	7782-49-2	E420	0.000050	mg/L		----	----	----	<0.000050	<0.000050
silicon, total	7440-21-3	E420	0.10	mg/L		----	----	----	<0.10	<0.10
silver, total	7440-22-4	E420	0.000010	mg/L		----	----	----	<0.000010	<0.000010
sodium, total	7440-23-5	E420	0.050	mg/L		----	----	----	<0.050	<0.050
strontium, total	7440-24-6	E420	0.00020	mg/L		----	----	----	<0.00020	<0.00020
sulfur, total	7704-34-9	E420	0.50	mg/L		----	----	----	<0.50	<0.50
tellurium, total	13494-80-9	E420	0.00020	mg/L		----	----	----	<0.00020	<0.00020
thallium, total	7440-28-0	E420	0.000010	mg/L		----	----	----	<0.000010	<0.000010
thorium, total	7440-29-1	E420	0.00010	mg/L		----	----	----	<0.00010	<0.00010
tin, total	7440-31-5	E420	0.00010	mg/L		----	----	----	<0.00010	<0.00010
titanium, total	7440-32-6	E420	0.00030	mg/L		----	----	----	<0.00030	<0.00030
tungsten, total	7440-33-7	E420	0.00010	mg/L		----	----	----	<0.00010	<0.00010
uranium, total	7440-61-1	E420	0.000010	mg/L		----	----	----	<0.000010	<0.000010
vanadium, total	7440-62-2	E420	0.00050	mg/L		----	----	----	<0.00050	<0.00050
zinc, total	7440-66-6	E420	0.0030	mg/L		----	----	----	<0.0030	<0.0030
zirconium, total	7440-67-7	E420	0.00020	mg/L		----	----	----	<0.00020	<0.00020
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L		----	----	----	<0.0010	<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		----	----	----	<0.00010	<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	0.0000050	mg/L		----	----	----	<0.0000050	<0.0000050
calcium, dissolved	7440-70-2	E421	0.050	mg/L		----	----	----	<0.050	<0.050
cesium, dissolved	7440-46-2	E421	0.000010	mg/L		----	----	----	<0.000010	<0.000010

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	MW7	MW9	MW10	Field Blank	Travel Blank
					Client sampling date / time	05-Aug-2022 13:50	05-Aug-2022 12:45	05-Aug-2022 13:10	05-Aug-2022 10:45	05-Aug-2022 10:10
						YL2201159-011	YL2201159-012	YL2201159-013	YL2201159-014	YL2201159-015
						Result	Result	Result	Result	Result
Dissolved Metals										
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		----	----	----	<0.0050	<0.0050
manganese, dissolved	7439-96-5	E421	0.00010	mg/L		----	----	----	<0.00010	<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		----	----	----	<0.000050	<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		----	----	----	<0.050	<0.050
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L		----	----	----	<0.00020	<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		----	----	----	<0.050	<0.050
silver, dissolved	7440-22-4	E421	0.000010	mg/L		----	----	----	<0.000010	<0.000010
sodium, dissolved	7440-23-5	E421	0.050	mg/L		----	----	----	<0.050	<0.050
strontium, dissolved	7440-24-6	E421	0.00020	mg/L		----	----	----	<0.00020	<0.00020
sulfur, dissolved	7704-34-9	E421	0.50	mg/L		----	----	----	<0.50	<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		----	----	----	<0.000010	<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
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L		----	----	----	<0.00020	<0.00020
dissolved mercury filtration location	----	EP509	-	-		----	----	----	Field	Field

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	MW7	MW9	MW10	Field Blank	Travel Blank
					Client sampling date / time	05-Aug-2022 13:50	05-Aug-2022 12:45	05-Aug-2022 13:10	05-Aug-2022 10:45	05-Aug-2022 10:10
						YL2201159-011	YL2201159-012	YL2201159-013	YL2201159-014	YL2201159-015
						Result	Result	Result	Result	Result
Dissolved Metals										
dissolved metals filtration location	----	EP421	-	-		----	----	----	Field	Field
Aggregate Organics										
oil & grease (gravimetric)	----	E567	5.0	mg/L		----	----	----	<5.0	<5.0
Volatile Organic Compounds [Fuels]										
benzene	71-43-2	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
ethylbenzene	100-41-4	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
styrene	100-42-5	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
toluene	108-88-3	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
xylene, m+p-	179601-23-1	E611A	0.40	µg/L		0.46	<0.40	<0.40	<0.40	<0.40
xylene, o-	95-47-6	E611A	0.30	µg/L		<0.30	<0.30	<0.30	<0.30	<0.30
xylenes, total	1330-20-7	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611A	1.0	%		97.8	90.7	91.4	78.6	83.9
difluorobenzene, 1,4-	540-36-3	E611A	1.0	%		102	102	102	104	100
Hydrocarbons										
F1 (C6-C10)	----	E581.VH+F1	100	µg/L		420	<100	<100	<100	<100
F2 (C10-C16)	----	E601	300	µg/L		8530	720	1270	<300	<300
F3 (C16-C34)	----	E601	300	µg/L		1960	<300	<300	<300	<300
F4 (C34-C50)	----	E601	300	µg/L		<300	<300	<300	<300	<300
VHw (C6-C10)	----	E581.VH+F1	100	µg/L		380	<100	<100	<100	<100
F1-BTEX	----	EC580	100	µg/L		420	<100	<100	<100	<100
VPHw	----	EC580A	100	µg/L		380	<100	<100	<100	<100
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601	1.0	%		94.5	89.5	94.1	87.0	83.8
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%		81.1	74.2	78.8	76.1	89.6

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **YL2201159**	Page	: 1 of 19
Amendment	: **2**		
Client	: **Golder Associates Ltd.**	Laboratory	: Yellowknife - Environmental
Contact	: Laurence Bonin	Account Manager	: Oliver Gregg
Address	: 9 - 4905 48th Street Yellowknife NT Canada X1A 3S3	Address	: 314 Old Airport Road, Unit 116 Yellowknife, Northwest Territories Canada X1A 3T3
Telephone	: ----	Telephone	: 1 867 446 5593
Project	: 22537423-Jackfish	Date Samples Received	: 08-Aug-2022 11:33
PO	: ----	Issue Date	: 08-Sep-2022 14:09
C-O-C number	: Jackfish-16072021		
Sampler	: ----		
Site	: Jackfish NTPC		
Quote number	: YL21-GOLD100-008		
No. of samples received	: 15		
No. of samples analysed	: 15		

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 Service number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Method Blank value outliers occur - please see following pages for full details.
- 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.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Method Blank (MB) Values								
Dissolved Metals	QC-MRG2-5968380 01	----	sodium, dissolved	7440-23-5	E421	0.061 B mg/L	0.05 mg/L	Blank result exceeds permitted value

Result Qualifiers

Qualifier	Description
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*

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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Oil & Grease by Gravimetry										
Amber glass (hydrochloric acid)										
Field Blank	E567	05-Aug-2022	15-Aug-2022	28 days	10 days	✓	15-Aug-2022	40 days	0 days	✓
Aggregate Organics : Oil & Grease by Gravimetry										
Amber glass (hydrochloric acid)										
JF01-06	E567	05-Aug-2022	15-Aug-2022	28 days	10 days	✓	15-Aug-2022	40 days	0 days	✓
Aggregate Organics : Oil & Grease by Gravimetry										
Amber glass (hydrochloric acid)										
MW2	E567	05-Aug-2022	15-Aug-2022	28 days	10 days	✓	15-Aug-2022	40 days	0 days	✓
Aggregate Organics : Oil & Grease by Gravimetry										
Amber glass (hydrochloric acid)										
Travel Blank	E567	05-Aug-2022	15-Aug-2022	28 days	10 days	✓	15-Aug-2022	40 days	0 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE										
Field Blank	E235.Br-L	05-Aug-2022	11-Aug-2022	----	----		11-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE										
JF01-06	E235.Br-L	05-Aug-2022	11-Aug-2022	----	----		11-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE										
MW2	E235.Br-L	05-Aug-2022	11-Aug-2022	----	----		11-Aug-2022	28 days	6 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	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE										
Travel Blank	E235.Br-L	05-Aug-2022	11-Aug-2022	----	----		11-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE										
Field Blank	E235.Cl-L	05-Aug-2022	11-Aug-2022	----	----		11-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE										
JF01-06	E235.Cl-L	05-Aug-2022	11-Aug-2022	----	----		11-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE										
MW2	E235.Cl-L	05-Aug-2022	11-Aug-2022	----	----		11-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE										
Travel Blank	E235.Cl-L	05-Aug-2022	11-Aug-2022	----	----		11-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC (Low Level)										
HDPE										
Field Blank	E235.F-L	05-Aug-2022	11-Aug-2022	----	----		11-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC (Low Level)										
HDPE										
JF01-06	E235.F-L	05-Aug-2022	11-Aug-2022	----	----		11-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC (Low Level)										
HDPE										
MW2	E235.F-L	05-Aug-2022	11-Aug-2022	----	----		11-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC (Low Level)										
HDPE										
Travel Blank	E235.F-L	05-Aug-2022	11-Aug-2022	----	----		11-Aug-2022	28 days	6 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	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Field Blank	E235.NO3-L	05-Aug-2022	11-Aug-2022	3 days	6 days	✖ EHTL	11-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE JF01-06	E235.NO3-L	05-Aug-2022	11-Aug-2022	3 days	6 days	✖ EHTL	11-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MW2	E235.NO3-L	05-Aug-2022	11-Aug-2022	3 days	6 days	✖ EHTL	11-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Travel Blank	E235.NO3-L	05-Aug-2022	11-Aug-2022	3 days	6 days	✖ EHTL	11-Aug-2022	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Field Blank	E235.NO2-L	05-Aug-2022	11-Aug-2022	----	----		11-Aug-2022	3 days	6 days	✖ EHTL
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE JF01-06	E235.NO2-L	05-Aug-2022	11-Aug-2022	----	----		11-Aug-2022	3 days	6 days	✖ EHTL
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE MW2	E235.NO2-L	05-Aug-2022	11-Aug-2022	----	----		11-Aug-2022	3 days	6 days	✖ EHTL
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Travel Blank	E235.NO2-L	05-Aug-2022	11-Aug-2022	----	----		11-Aug-2022	3 days	6 days	✖ EHTL
Anions and Nutrients : Sulfate in Water by IC										
HDPE Field Blank	E235.SO4	05-Aug-2022	11-Aug-2022	----	----		11-Aug-2022	28 days	6 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	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
JF01-06	E235.SO4	05-Aug-2022	11-Aug-2022	----	----		11-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
MW2	E235.SO4	05-Aug-2022	11-Aug-2022	----	----		11-Aug-2022	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Travel Blank	E235.SO4	05-Aug-2022	11-Aug-2022	----	----		11-Aug-2022	28 days	6 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
Field Blank	E509	05-Aug-2022	12-Aug-2022	----	----		13-Aug-2022	28 days	8 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
JF01-06	E509	05-Aug-2022	12-Aug-2022	----	----		13-Aug-2022	28 days	8 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
MW2	E509	05-Aug-2022	12-Aug-2022	----	----		13-Aug-2022	28 days	8 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial - dissolved (lab preserved)										
Travel Blank	E509	05-Aug-2022	12-Aug-2022	----	----		13-Aug-2022	28 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
Field Blank	E421	05-Aug-2022	11-Aug-2022	----	----		12-Aug-2022	180 days	6 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
JF01-06	E421	05-Aug-2022	11-Aug-2022	----	----		12-Aug-2022	180 days	6 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	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
MW2	E421	05-Aug-2022	11-Aug-2022	----	----		12-Aug-2022	180 days	6 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
Glass vial - dissolved (lab preserved)										
Travel Blank	E421	05-Aug-2022	11-Aug-2022	----	----		12-Aug-2022	180 days	6 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
Field Blank	E601	05-Aug-2022	12-Aug-2022	14 days	7 days	✓	13-Aug-2022	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
MW04	E601	05-Aug-2022	12-Aug-2022	14 days	7 days	✓	13-Aug-2022	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
MW10	E601	05-Aug-2022	12-Aug-2022	14 days	7 days	✓	13-Aug-2022	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
MW2	E601	05-Aug-2022	12-Aug-2022	14 days	7 days	✓	13-Aug-2022	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
MW3	E601	05-Aug-2022	12-Aug-2022	14 days	7 days	✓	13-Aug-2022	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
MW5	E601	05-Aug-2022	12-Aug-2022	14 days	7 days	✓	13-Aug-2022	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
MW6	E601	05-Aug-2022	12-Aug-2022	14 days	7 days	✓	13-Aug-2022	40 days	1 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	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) MW7	E601	05-Aug-2022	12-Aug-2022	14 days	7 days	✓	13-Aug-2022	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) MW9	E601	05-Aug-2022	12-Aug-2022	14 days	7 days	✓	13-Aug-2022	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) JF01-01	E601	05-Aug-2022	12-Aug-2022	14 days	7 days	✓	15-Aug-2022	40 days	3 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) JF01-02	E601	05-Aug-2022	12-Aug-2022	14 days	7 days	✓	15-Aug-2022	40 days	3 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) JF01-03	E601	05-Aug-2022	12-Aug-2022	14 days	7 days	✓	15-Aug-2022	40 days	3 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) JF01-04	E601	05-Aug-2022	12-Aug-2022	14 days	7 days	✓	15-Aug-2022	40 days	3 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) JF01-06	E601	05-Aug-2022	12-Aug-2022	14 days	7 days	✓	15-Aug-2022	40 days	3 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) Travel Blank	E601	05-Aug-2022	12-Aug-2022	14 days	8 days	✓	13-Aug-2022	40 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) Field Blank	E581.VH+F1	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	6 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	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) JF01-01	E581.VH+F1	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	6 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) JF01-02	E581.VH+F1	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	6 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) JF01-03	E581.VH+F1	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	6 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) JF01-04	E581.VH+F1	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	6 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) JF01-06	E581.VH+F1	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	6 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW04	E581.VH+F1	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	6 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW10	E581.VH+F1	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	6 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW2	E581.VH+F1	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	6 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW3	E581.VH+F1	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	6 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	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW5	E581.VH+F1	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	6 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW6	E581.VH+F1	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	6 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW7	E581.VH+F1	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	6 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW9	E581.VH+F1	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	6 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) Travel Blank	E581.VH+F1	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	7 days	✓
Physical Tests : pH by Meter										
HDPE Field Blank	E108	05-Aug-2022	11-Aug-2022	----	----		11-Aug-2022	0.25 hrs	3.25 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE JF01-06	E108	05-Aug-2022	11-Aug-2022	----	----		11-Aug-2022	0.25 hrs	3.25 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE MW2	E108	05-Aug-2022	11-Aug-2022	----	----		11-Aug-2022	0.25 hrs	3.25 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Travel Blank	E108	05-Aug-2022	11-Aug-2022	----	----		11-Aug-2022	0.25 hrs	3.25 hrs	× EHTR-FM

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	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid)										
Field Blank	E508	05-Aug-2022	13-Aug-2022	----	----		13-Aug-2022	28 days	8 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid)										
JF01-06	E508	05-Aug-2022	13-Aug-2022	----	----		13-Aug-2022	28 days	8 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid)										
MW2	E508	05-Aug-2022	13-Aug-2022	----	----		13-Aug-2022	28 days	8 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial - total (lab preserved)										
Travel Blank	E508	05-Aug-2022	13-Aug-2022	----	----		13-Aug-2022	28 days	8 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
JF01-06	E420	05-Aug-2022	12-Aug-2022	----	----		12-Aug-2022	180 days	6 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
Field Blank	E420	05-Aug-2022	12-Aug-2022	----	----		12-Aug-2022	180 days	7 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
MW2	E420	05-Aug-2022	12-Aug-2022	----	----		12-Aug-2022	180 days	7 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
Travel Blank	E420	05-Aug-2022	12-Aug-2022	----	----		12-Aug-2022	180 days	7 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
Field Blank	E611A	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	6 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	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) JF01-01	E611A	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	6 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) JF01-02	E611A	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	6 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) JF01-03	E611A	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	6 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) JF01-04	E611A	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	6 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) JF01-06	E611A	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	6 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW04	E611A	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	6 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW10	E611A	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	6 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW2	E611A	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	6 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW3	E611A	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	6 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	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW5	E611A	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	6 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW6	E611A	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	6 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW7	E611A	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	6 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW9	E611A	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	6 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Travel Blank	E611A	05-Aug-2022	10-Aug-2022	----	----		12-Aug-2022	14 days	7 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.

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			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Bromide in Water by IC (Low Level)	E235.Br-L	598010	1	5	20.0	5.0	✓
BTEX by Headspace GC-MS	E611A	597322	1	18	5.5	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	598011	1	8	12.5	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	600168	1	11	9.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	596838	1	16	6.2	5.0	✓
Fluoride in Water by IC (Low Level)	E235.F-L	598012	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	598007	1	5	20.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	598004	1	20	5.0	5.0	✓
pH by Meter	E108	598002	1	15	6.6	5.0	✓
Sulfate in Water by IC	E235.SO4	598006	1	5	20.0	5.0	✓
Total Mercury in Water by CVAAS	E508	601066	1	7	14.2	5.0	✓
Total Metals in Water by CRC ICPMS	E420	596846	1	20	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	597321	1	18	5.5	5.0	✓
Laboratory Control Samples (LCS)							
Bromide in Water by IC (Low Level)	E235.Br-L	598010	1	5	20.0	5.0	✓
BTEX by Headspace GC-MS	E611A	597322	1	18	5.5	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601	600272	2	30	6.6	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	598011	1	8	12.5	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	600168	1	11	9.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	596838	1	16	6.2	5.0	✓
Fluoride in Water by IC (Low Level)	E235.F-L	598012	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	598007	1	5	20.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	598004	1	20	5.0	5.0	✓
Oil & Grease by Gravimetry	E567	602699	1	8	12.5	5.0	✓
pH by Meter	E108	598002	1	15	6.6	5.0	✓
Sulfate in Water by IC	E235.SO4	598006	1	5	20.0	5.0	✓
Total Mercury in Water by CVAAS	E508	601066	1	7	14.2	5.0	✓
Total Metals in Water by CRC ICPMS	E420	596846	1	20	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	597321	1	18	5.5	5.0	✓
Method Blanks (MB)							
Bromide in Water by IC (Low Level)	E235.Br-L	598010	1	5	20.0	5.0	✓
BTEX by Headspace GC-MS	E611A	597322	1	18	5.5	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601	600272	2	30	6.6	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	598011	1	8	12.5	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	600168	1	11	9.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	596838	1	16	6.2	5.0	✓
Fluoride in Water by IC (Low Level)	E235.F-L	598012	1	8	12.5	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Nitrate in Water by IC (Low Level)	E235.NO3-L	598007	1	5	20.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	598004	1	20	5.0	5.0	✓
Oil & Grease by Gravimetry	E567	602699	1	8	12.5	5.0	✓
Sulfate in Water by IC	E235.SO4	598006	1	5	20.0	5.0	✓
Total Mercury in Water by CVAAS	E508	601066	1	7	14.2	5.0	✓
Total Metals in Water by CRC ICPMS	E420	596846	2	20	10.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	597321	1	18	5.5	5.0	✓
Matrix Spikes (MS)							
Bromide in Water by IC (Low Level)	E235.Br-L	598010	1	5	20.0	5.0	✓
BTEX by Headspace GC-MS	E611A	597322	1	18	5.5	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	598011	1	8	12.5	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	600168	1	11	9.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	596838	1	16	6.2	5.0	✓
Fluoride in Water by IC (Low Level)	E235.F-L	598012	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	598007	1	5	20.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	598004	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	598006	1	5	20.0	5.0	✓
Total Mercury in Water by CVAAS	E508	601066	1	7	14.2	5.0	✓
Total Metals in Water by CRC ICPMS	E420	596846	2	20	10.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	597321	1	18	5.5	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
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
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 (Low Level)	E235.Cl-L 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 (Low Level)	E235.F-L 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.
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.
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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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.
Oil & Grease by Gravimetry	E567 Vancouver - Environmental	Water	BC MOE Lab Manual (Oil & Grease) (mod)	The entire water sample is extracted with hexane and the extract is evaporated to dryness. The residue is then weighed to determine Oil and Grease.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
CCME PHCs - F2-F4 by GC-FID	E601 Vancouver - Environmental	Water	CCME PHC in Soil - Tier 1	Sample extracts are analyzed by GC-FID for CCME hydrocarbon fractions (F2-F4).
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 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 CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 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.
F1-BTEX	EC580 Vancouver - Environmental	Water	CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).
VPH: VH-BTEX-Styrene	EC580A Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
Oil & Grease Extraction for Gravimetry	EP567 Vancouver - Environmental	Water	BC MOE Lab Manual (Oil & Grease) (mod)	The entire water sample is extracted with hexane by liquid-liquid extraction.
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **YL2201159**	Page	: 1 of 18
Amendment	: **2**		
Client	: Golder Associates Ltd.	Laboratory	: Yellowknife - Environmental
Contact	: Laurence Bonin	Account Manager	: Oliver Gregg
Address	: 9 - 4905 48th Street Yellowknife NT Canada X1A 3S3	Address	: 314 Old Airport Road, Unit 116 Yellowknife, Northwest Territories Canada X1A 3T3
Telephone	: ----	Telephone	: 1 867 446 5593
Project	: 22537423-Jackfish	Date Samples Received	: 08-Aug-2022 11:33
PO	: ----	Date Analysis Commenced	: 10-Aug-2022
C-O-C number	: Jackfish-16072021	Issue Date	: 08-Sep-2022 14:11
Sampler	: ----		
Site	: Jackfish NTPC		
Quote number	: YL21-GOLD100-008		
No. of samples received	: 15		
No. of samples analysed	: 15		

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 Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

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.

Signatories	*Position*	*Laboratory Department*
Angela Ren	Team Leader - Metals	Vancouver Metals, Burnaby, British Columbia
Ann Joby	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Benjamin Oke	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Dan Gebert	Laboratory Analyst	Vancouver Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
Owen Cheng		Vancouver Metals, Burnaby, British Columbia
Qammar Almas	Lab Assistant	Vancouver 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 Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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: 598002)											
YL2201157-002	Anonymous	pH	----	E108	0.10	pH units	7.64	7.65	0.131%	4%	----
Anions and Nutrients (QC Lot: 598004)											
YL2201160-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 598006)											
YL2201157-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	12.0	12.0	0.0542%	20%	----
Anions and Nutrients (QC Lot: 598007)											
YL2201157-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 598010)											
YL2201157-002	Anonymous	bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 598011)											
YL2201160-001	Anonymous	chloride	16887-00-6	E235.Cl-L	0.50	mg/L	1.33	1.32	0.003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 598012)											
YL2201160-001	Anonymous	fluoride	16984-48-8	E235.F-L	0.020	mg/L	0.912	0.910	0.262%	20%	----
Total Metals (QC Lot: 596846)											
YL2201156-001	Anonymous	aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0364	0.0379	4.07%	20%	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	0.00017	0.00018	0.000002	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00072	0.00077	0.00005	Diff <2x LOR	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.0376	0.0383	1.68%	20%	----
		beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	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	0.016	0.016	0.0001	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	0.0000067	0.0000017	Diff <2x LOR	----
		calcium, total	7440-70-2	E420	0.050	mg/L	22.4	24.0	7.03%	20%	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	<0.000010	0	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	0.00124	0.00127	0.00003	Diff <2x LOR	----
		iron, total	7439-89-6	E420	0.010	mg/L	0.026	0.027	0.001	Diff <2x LOR	----
		lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	0.0038	0.0040	0.0002	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	6.36	6.34	0.267%	20%	----

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: 596846) - continued											
YL2201156-001	Anonymous	manganese, total	7439-96-5	E420	0.00010	mg/L	0.00090	0.00100	0.00009	Diff <2x LOR	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000676	0.000703	4.00%	20%	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.00089	0.00090	0.00001	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	1.19	1.19	0.319%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00097	0.00092	0.00005	Diff <2x LOR	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.000180	0.000148	0.000032	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	1.48	1.52	2.96%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, total	7440-23-5	E420	0.050	mg/L	7.15	7.19	0.570%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.126	0.126	0.0373%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	7.01	7.16	2.14%	20%	----
		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	0.00100	0.00101	0.00001	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	0.000362	0.000363	0.159%	20%	----
		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	----
Total Metals (QC Lot: 601066)											
VA22B8706-001	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 596838)											
YL2201156-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0071	0.0065	0.0006	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00013	0.00012	0.000004	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00052	0.00058	0.00005	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0390	0.0385	1.43%	20%	----
		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	----
		boron, dissolved	7440-42-8	E421	0.010	mg/L	0.013	0.014	0.0002	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	0.0000054	0.0000004	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	25.3	25.2	0.629%	20%	----
		cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	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: 596838) - continued											
YL2201156-001	Anonymous	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	0.00117	0.00113	0.00004	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	0.0036	0.0037	0.00010	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	6.31	6.24	1.19%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00020	0.00017	0.00002	Diff <2x LOR	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000684	0.000643	6.12%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00092	0.00088	0.00003	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	1.14	1.12	1.28%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00083	0.00088	0.00005	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000217	0.000160	0.000057	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.46	1.49	2.03%	20%	----
		silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, dissolved	7440-23-5	E421	0.050	mg/L	7.02	7.17	2.18%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.129	0.127	1.83%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	7.37	7.25	1.76%	20%	----
		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	0.000383	0.000392	2.26%	20%	----
		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	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 600168)											
YL2201155-007	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 597322)											
YL2201159-001	JF01-01	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	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*
Volatile Organic Compounds (QC Lot: 597322) - continued											
YL2201159-001	JF01-01	styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 597321)											
YL2201159-001	JF01-01	F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----
		VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----

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
Anions and Nutrients (QCLot: 598004)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 598006)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 598007)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 598010)						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 598011)						
chloride	16887-00-6	E235.Cl-L	0.1	mg/L	<0.10	----
Anions and Nutrients (QCLot: 598012)						
fluoride	16984-48-8	E235.F-L	0.01	mg/L	<0.010	----
Total Metals (QCLot: 596846)						
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	MBRR
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	----
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	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 596846) - continued						
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	7440-23-5	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	----
Total Metals (QCLot: 601066)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Dissolved Metals (QCLot: 596838)						
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	----
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	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 596838) - continued						
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	7440-23-5	E421	0.05	mg/L	# 0.061	B
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	----
Dissolved Metals (QCLot: 600168)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
Aggregate Organics (QCLot: 602699)						
oil & grease (gravimetric)	----	E567	5	mg/L	<5.0	----
Volatile Organic Compounds (QCLot: 597322)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Hydrocarbons (QCLot: 597321)						
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 600272)						
F2 (C10-C16)	----	E601	100	µg/L	<100	----
F3 (C16-C34)	----	E601	250	µg/L	<250	----
F4 (C34-C50)	----	E601	250	µg/L	<250	----
Hydrocarbons (QCLot: 600969)						
F2 (C10-C16)	----	E601	100	µg/L	<100	----
F3 (C16-C34)	----	E601	250	µg/L	<250	----
F4 (C34-C50)	----	E601	250	µg/L	<250	----

Qualifiers

Qualifier	Description
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*
MBRR	*Initial MB for this submission had positive results for flagged analyte (data not shown). Low level samples were repeated with new QC (2nd MB results shown). High level results (>5x initial MB level) and non-detect results were reported and are defensible*

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				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 598002)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Anions and Nutrients (QCLot: 598004)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	95.0	90.0	110	----
Anions and Nutrients (QCLot: 598006)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 598007)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 598010)									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	87.2	85.0	115	----
Anions and Nutrients (QCLot: 598011)									
chloride	16887-00-6	E235.Cl-L	0.1	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 598012)									
fluoride	16984-48-8	E235.F-L	0.01	mg/L	1 mg/L	95.8	90.0	110	----
Total Metals (QCLot: 596846)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	104	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	110	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	100	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	96.0	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	103	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	97.6	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	100	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	99.6	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	98.9	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	104	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	99.1	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	98.0	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	99.9	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	94.7	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	98.1	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	100	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	99.2	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: 596846) - continued									
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	106	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	97.4	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	107	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	102	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	105	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	102	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	106	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	96.4	80.0	120	----
sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	99.5	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	102	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	92.6	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	98.2	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	96.4	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	100	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	95.8	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	95.6	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	100	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	99.7	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	96.4	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
Total Metals (QCLot: 601066)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	95.1	80.0	120	----
Dissolved Metals (QCLot: 596838)									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	103	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	104	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	107	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	98.9	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	104	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	99.8	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	99.9	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	100	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	102	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	101	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
Dissolved Metals (QCLot: 596838) - continued									
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	103	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	114	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	102	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	93.1	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	104	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	100.0	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	103	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	109	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	110	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	98.5	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	90.4	80.0	120	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	101	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	101	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	107	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	103	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	107	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	99.0	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	101	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	102	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	105	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	104	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	102	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	95.1	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	98.0	80.0	120	----
Aggregate Organics (QCLot: 602699)									
oil & grease (gravimetric)	----	E567	5	mg/L	100 mg/L	98.7	70.0	130	----
Volatile Organic Compounds (QCLot: 597322)									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	87.8	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	100	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	92.9	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	96.8	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	93.7	70.0	130	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Volatile Organic Compounds (QCLot: 597322) - continued									
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	102	70.0	130	----
xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	99.7	70.0	130	----
Hydrocarbons (QCLot: 597321)									
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	104	70.0	130	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	93.8	70.0	130	----
Hydrocarbons (QCLot: 600272)									
F2 (C10-C16)	----	E601	100	µg/L	3538 µg/L	111	70.0	130	----
F3 (C16-C34)	----	E601	250	µg/L	7053 µg/L	99.3	70.0	130	----
F4 (C34-C50)	----	E601	250	µg/L	5051 µg/L	104	70.0	130	----
Hydrocarbons (QCLot: 600969)									
F2 (C10-C16)	----	E601	100	µg/L	3538 µg/L	110	70.0	130	----
F3 (C16-C34)	----	E601	250	µg/L	7053 µg/L	102	70.0	130	----
F4 (C34-C50)	----	E601	250	µg/L	5051 µg/L	89.8	70.0	130	----

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: 598004)										
YL2201160-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.485 mg/L	0.5 mg/L	97.0	75.0	125	----
Anions and Nutrients (QCLot: 598006)										
YL2201159-006	MW2	sulfate (as SO4)	14808-79-8	E235.SO4	106 mg/L	100 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 598007)										
YL2201159-006	MW2	nitrate (as N)	14797-55-8	E235.NO3-L	2.64 mg/L	2.5 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 598010)										
YL2201159-006	MW2	bromide	24959-67-9	E235.Br-L	0.478 mg/L	0.5 mg/L	95.6	75.0	125	----
Anions and Nutrients (QCLot: 598011)										
YL2201159-006	MW2	chloride	16887-00-6	E235.Cl-L	104 mg/L	100 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 598012)										
YL2201159-006	MW2	fluoride	16984-48-8	E235.F-L	0.995 mg/L	1 mg/L	99.5	75.0	125	----
Total Metals (QCLot: 596846)										
YL2201156-002	Anonymous	arsenic, total	7440-38-2	E420	0.0199 mg/L	0.02 mg/L	99.5	70.0	130	----
YL2201156-002	Anonymous	aluminum, total	7429-90-5	E420	0.198 mg/L	0.2 mg/L	98.9	70.0	130	----
		antimony, total	7440-36-0	E420	0.0199 mg/L	0.02 mg/L	99.4	70.0	130	----
		barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		beryllium, total	7440-41-7	E420	0.0392 mg/L	0.04 mg/L	98.0	70.0	130	----
		bismuth, total	7440-69-9	E420	0.00911 mg/L	0.01 mg/L	91.1	70.0	130	----
		boron, total	7440-42-8	E420	0.092 mg/L	0.1 mg/L	91.8	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00391 mg/L	0.004 mg/L	97.8	70.0	130	----
		calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, total	7440-46-2	E420	0.0100 mg/L	0.01 mg/L	100	70.0	130	----
		chromium, total	7440-47-3	E420	0.0385 mg/L	0.04 mg/L	96.3	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0193 mg/L	0.02 mg/L	96.4	70.0	130	----
		copper, total	7440-50-8	E420	0.0194 mg/L	0.02 mg/L	96.9	70.0	130	----
		iron, total	7439-89-6	E420	1.90 mg/L	2 mg/L	95.0	70.0	130	----
		lead, total	7439-92-1	E420	0.0180 mg/L	0.02 mg/L	90.0	70.0	130	----
		lithium, total	7439-93-2	E420	0.0920 mg/L	0.1 mg/L	92.0	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	0.0193 mg/L	0.02 mg/L	96.5	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0204 mg/L	0.02 mg/L	102	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: 596846) - continued										
YL2201156-002	Anonymous	nickel, total	7440-02-0	E420	0.0385 mg/L	0.04 mg/L	96.2	70.0	130	----
		phosphorus, total	7723-14-0	E420	10.2 mg/L	10 mg/L	102	70.0	130	----
		potassium, total	7440-09-7	E420	3.90 mg/L	4 mg/L	97.5	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0199 mg/L	0.02 mg/L	99.6	70.0	130	----
		selenium, total	7782-49-2	E420	0.0419 mg/L	0.04 mg/L	105	70.0	130	----
		silicon, total	7440-21-3	E420	9.98 mg/L	10 mg/L	99.8	70.0	130	----
		silver, total	7440-22-4	E420	0.00389 mg/L	0.004 mg/L	97.2	70.0	130	----
		sodium, total	7440-23-5	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, total	7704-34-9	E420	19.2 mg/L	20 mg/L	96.2	70.0	130	----
		tellurium, total	13494-80-9	E420	0.0402 mg/L	0.04 mg/L	100	70.0	130	----
		thallium, total	7440-28-0	E420	0.00370 mg/L	0.004 mg/L	92.5	70.0	130	----
		thorium, total	7440-29-1	E420	0.0203 mg/L	0.02 mg/L	102	70.0	130	----
		tin, total	7440-31-5	E420	0.0193 mg/L	0.02 mg/L	96.5	70.0	130	----
		titanium, total	7440-32-6	E420	0.0399 mg/L	0.04 mg/L	99.8	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0185 mg/L	0.02 mg/L	92.6	70.0	130	----
		uranium, total	7440-61-1	E420	0.00383 mg/L	0.004 mg/L	95.7	70.0	130	----
		vanadium, total	7440-62-2	E420	0.0977 mg/L	0.1 mg/L	97.7	70.0	130	----
		zinc, total	7440-66-6	E420	0.393 mg/L	0.4 mg/L	98.2	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0399 mg/L	0.04 mg/L	99.8	70.0	130	----
Total Metals (QCLot: 601066)										
VA22B8840-001	Anonymous	mercury, total	7439-97-6	E508	0.0000948 mg/L	0.0001 mg/L	94.8	70.0	130	----
Dissolved Metals (QCLot: 596838)										
YL2201156-002	Anonymous	aluminum, dissolved	7429-90-5	E421	0.189 mg/L	0.2 mg/L	94.7	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0196 mg/L	0.02 mg/L	98.3	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0205 mg/L	0.02 mg/L	102	70.0	130	----
		barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0397 mg/L	0.04 mg/L	99.2	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00902 mg/L	0.01 mg/L	90.2	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.098 mg/L	0.1 mg/L	97.8	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00386 mg/L	0.004 mg/L	96.5	70.0	130	----
		calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, dissolved	7440-46-2	E421	0.00959 mg/L	0.01 mg/L	95.9	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0378 mg/L	0.04 mg/L	94.5	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0194 mg/L	0.02 mg/L	96.9	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0190 mg/L	0.02 mg/L	94.9	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: 596838) - continued										
YL2201156-002	Anonymous	iron, dissolved	7439-89-6	E421	1.91 mg/L	2 mg/L	95.7	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0190 mg/L	0.02 mg/L	95.2	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.0859 mg/L	0.1 mg/L	85.9	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E421	0.0190 mg/L	0.02 mg/L	95.0	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0194 mg/L	0.02 mg/L	97.2	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0387 mg/L	0.04 mg/L	96.8	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	9.95 mg/L	10 mg/L	99.5	70.0	130	----
		potassium, dissolved	7440-09-7	E421	3.63 mg/L	4 mg/L	90.7	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0195 mg/L	0.02 mg/L	97.7	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0444 mg/L	0.04 mg/L	111	70.0	130	----
		silicon, dissolved	7440-21-3	E421	9.15 mg/L	10 mg/L	91.5	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00365 mg/L	0.004 mg/L	91.2	70.0	130	----
		sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	18.8 mg/L	20 mg/L	94.1	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0391 mg/L	0.04 mg/L	97.9	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00392 mg/L	0.004 mg/L	98.1	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0211 mg/L	0.02 mg/L	105	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0189 mg/L	0.02 mg/L	94.4	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0391 mg/L	0.04 mg/L	97.7	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00385 mg/L	0.004 mg/L	96.3	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.0970 mg/L	0.1 mg/L	97.0	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.387 mg/L	0.4 mg/L	96.6	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0372 mg/L	0.04 mg/L	92.9	70.0	130	----
Dissolved Metals (QCLot: 600168)										
YL2201155-008	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000980 mg/L	0.0001 mg/L	98.0	70.0	130	----
Volatile Organic Compounds (QCLot: 597322)										
YL2201159-001	JF01-01	benzene	71-43-2	E611A	85.5 µg/L	100 µg/L	85.5	60.0	140	----
		ethylbenzene	100-41-4	E611A	91.3 µg/L	100 µg/L	91.3	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	85.4 µg/L	100 µg/L	85.4	60.0	140	----
		styrene	100-42-5	E611A	91.7 µg/L	100 µg/L	91.7	60.0	140	----
		toluene	108-88-3	E611A	87.5 µg/L	100 µg/L	87.5	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	189 µg/L	200 µg/L	94.6	60.0	140	----
		xylene, o-	95-47-6	E611A	93.9 µg/L	100 µg/L	93.9	60.0	140	----

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
Hydrocarbons (QCLot: 597321)										
YL2201159-002	JF01-02	F1 (C6-C10)	----	E581.VH+F1	5510 µg/L	6310 µg/L	87.3	60.0	140	----
		VHw (C6-C10)	----	E581.VH+F1	4970 µg/L	6310 µg/L	78.8	60.0	140	----

Lab Copy

CoC#: NTPC-Jackfish-16072021
Created: July 16,

Northwest Territories Power Corp.(NTPC) Jackfish Power Plant GW Monitoring
Chain-of-Custody Record - Analytical Request Form

From:

Golder Associates - NTPC
Address: 9, 4905 - 48 Street Yellowknife, Northwest Territories X1A 3S3
Phone: (867) 873 6319
Contact: Laurence Bonin laurence_bonin@golder.com

Send Samples For Analysis To:

ALS Group, Yellowknife
Address: 314 Old Airport Rd, Unit 116 Yellowknife, NT X1A 3T3
Phone: (867) 873-5593 Fax: (867) 920-4238
Contact: Oliver Gregg Email: Oliver.Gregg@alsglobal.com

eMail Confirmation and Results To:

Please use full distribution list from quote
laurence.bonin@wsp.com
tamra.reynolds@wsp.com

Send Original Signed Lab Reports To:

Golder Associates Ltd.
Address: 9, 4905 - 48 Street Yellowknife, Northwest Territories X1A 3S3
Phone: (867) 873 6319
Contact: Laurence Bonin laurence.bonin@wsp.com

Send Invoice To:

Northwest Territories Power Corporation
Address: 4 Capital Drive Hay River, NT X0E 1G2 Canada
Phone: (867) 874-5200
Attn: Patrick Smith psmith@ntpc.com

FIELD SAMPLE INFORMATION

REQUESTED LAB SUITES (see reverse side for details)

Fields Notes:

Samples have been field filtered and preserved

Please ensure that there is only one COC per report. Use email confirmation and results list on this COC. Requires a 5-day TAT.

Facilty Code:

Project # 22537423-Jackfish
August 2022 NTPC Jackfish GW Sampling

Quote # YL21-GOLD100-008

√ = Preserved :			√	√	√	√	√	√														
√ = Field Filtered :				√		√																
√ = 1-Day Rush :																						

Sample ID #	Sample Location	Sample Date (dd-mmm-yy)	Sample Time (hh:mm)	Matrix	Laboratory Comments	Sampler Comments	G = Grab or C = Composite	Number of Containers	Routine (pH, major ions)	Oil and Grease (Hexane Extractable)	Total Metals	Dissolved Metals	Total Mercury	Dissolved Mercury	Benzene, Toluene, Ethylbenzene, Xylene (BTEX)	Total Petroleum Hydrocarbons (F1-F4 CCME Fracti								
JF01-01	JF01-01	05-Aug-22	14:30	Water			G	4							x	x								
JF01-02	JF01-02	05-Aug-22	12:15	Water			G	4							x	x								
JF01-03	JF01-03	05-Aug-22	11:40	Water			G	4							x	x								
JF01-04	JF01-04	05-Aug-22	15:55	Water			G	4							x	x								
JF01-06	JF01-06	05-Aug-22	15:20	Water			G	11	x	x	x	x	x	x	x	x								
MW2	MW2	05-Aug-22	11:15	Water			G	11	x	x	x	x	x	x	x	x								
MW3	MW2	05-Aug-22	15:45	Water			G	4							x	x								
MW04	MW04	05-Aug-22	15:35	Water			G	4							x	x								

Environmental Division
Yellowknife
Work Order Reference
YL2201159

Telephone : +1 867 873 5593

Relinquished by (Sampler Signature):	Date/Time: August 4, 2022	Company: Golder Associates Ltd	Received by (Signature): / Company:
Relinquished by (Signature):	Date/Time:	Company:	Received by (Signature): / Company:

Sampler (Printed Name): Meaghan MacIntyre-Newell

Sample Storage Temperature prior to Shipping (deg. C):

SAMPLE CONDITION (lab use only)

Sample Receipt Temperature (deg. C):

Samples Received in Good Condition? Yes / No (If no, provide details.)

Chain-of-Custody Record - Analytical Request Form

Created: July 16,

From:

Golder Associates - NTPC
Address: 9, 4905 - 48 Street Yellowknife, Northwest Territories X1A 3S3
Phone: (867) 873 6319
Contact: Laurence Bonin laurence_bonin@golder.com

Send Samples For Analysis To:

ALS Group, Yellowknife
Address: 314 Old Airport Rd, Unit 116 Yellowknife, NT X1A 3T3
Phone: (867) 873-5593 Fax: (867) 920-4238
Contact: Oliver Gregg Email: Oliver.Gregg@alsglobal.com

eMail Confirmation and Results To:

Please use full distribution list from quote
laurence.bonin@wsp.com
tamra.reynolds@wsp.com

Send Original Signed Lab Reports To:

Golder Associates Ltd.
Address: 9, 4905 - 48 Street Yellowknife, Northwest Territories X1A 3S3
Phone: (867) 873 6319
Contact: Laurence Bonin laurence.bonin@wsp.com

Send Invoice To:

Northwest Territories Power Corporation
Address: 4 Capital Drive Hay River, NT X0E 1G2 Canada
Phone: (867) 874-5200
Attn: Patrick Smith psmith@ntpc.com

FIELD SAMPLE INFORMATION

Fields Notes:

Samples have been field filtered and preserved

Please ensure that there is only one COC per report. Use email confirmation and results list on this COC. Requires a 5-day TAT.

Facilty Code:

Project # **22537423-Jackfish**
August 2022 NTPC Jackfish GW Sampling

Quote # **YL21-GOLD100-008**

REQUESTED LAB SUITES (see reverse side for details)

	Routine (pH, major ions)	Oil and Grease (Hexane Extractable)	Total Metals	Dissolved Metals	Total Mercury	Dissolved Mercury	Benzene, Toluene, Ethylbenzene, Xylene (BTEX)	Total Petroleum Hydrocarbons (F1-F4 CCME Fracti	
√ = Preserved :				√	√	√	√	√	√
√ = Field Filtered :					√		√		
√ = 1-Day Rush :									

Sample ID #	Sample Location	Sample Date (dd-mmm-yy)	Sample Time (hh:mm)	Matrix	Laboratory Comments	Sampler Comments	G = Grab or C = Composite	Number of Containers	Routine (pH, major ions)	Oil and Grease (Hexane Extractable)	Total Metals	Dissolved Metals	Total Mercury	Dissolved Mercury	Benzene, Toluene, Ethylbenzene, Xylene (BTEX)	Total Petroleum Hydrocarbons (F1-F4 CCME Fracti
MW5	MW5	05-Aug-22	14:10	Water			G	4							x	x
MW6	MW6	05-Aug-22	15:00	Water			G	4							x	x
MW7	MW7	05-Aug-22	13:50	Water			G	4							x	x
MW9	MW9	05-Aug-22	12:45	Water			G	4							x	x
MW10	MW10	05-Aug-22	13:10	Water			G	11							x	x
Field Blank	Field Blank	05-Aug-22	10:45	Water			G	11	x	x	x	x	x	x	x	x
Travel Blank	Travel Blank	05-Aug-22	10:10	Water			G	11	x	x	x	x	x	x	x	x

Relinquished by (Sampler Signature): [signature]	Date/Time: August 4, 2022	Company: Golder Associates Ltd	Received by (Signature):	Company:
Relinquished by (Signature):	Date/Time:	Company:	Received by (Signature):	Company:
Sampler (Printed Name): Meaghan MacIntyre-Newell	Sample Storage Temperature prior to Shipping (deg. C):	Sample Receipt Temperature (deg. C):	**SAMPLE CONDITION (lab use only)** Samples Received in Good Condition ? Yes / No (If no, provide details.)	

Lab Copy

Northwest Territories Power Corp.(NTPC) Jackfish Power Plant GW Monitoring
Chain-of-Custody Record - Analytical Request Form

CoC#: NTPC-Jackfish-16072021
Created: July 16,

From:

Golder Associates - NTPC
Address: 9, 4905 - 48 Street Yellowknife, Northwest Territories X1A 3S3
Phone: (867) 873 6319
Contact: Laurence Bonin laurence_bonin@golder.com

Send Samples For Analysis To:

ALS Group, Yellowknife
Address: 314 Old Airport Rd, Unit 116 Yellowknife, NT X1A 3T3
Phone: (867) 873-5593 Fax: (867) 920-4238
Contact: Oliver Gregg Email: Oliver.Gregg@alsglobal.com

eMail Confirmation and Results To:

Please use full distribution list from quote
laurence.bonin@wsp.com
tamra.reynolds@wsp.com

Send Original Signed Lab Reports To:

Golder Associates Ltd.
Address: 9, 4905 - 48 Street Yellowknife, Northwest Territories X1A 3S3
Phone: (867) 873 6319
Contact: Laurence Bonin laurence.bonin@wsp.com

Send Invoice To:

Northwest Territories Power Corporation
Address: 4 Capital Drive Hay River, NT X0E 1G2 Canada
Phone: (867) 874-5200
Attn: Patrick Smith psmith@ntpc.com

FIELD SAMPLE INFORMATION

Fields Notes:

Samples have been field filtered and preserved

Please ensure that there is only one COC per report. Use email confirmation and results list on this COC. Requires a 5-day TAT.

Facilty Code:

Project # **22537423-Jackfish**
August 2022 NTPC Jackfish GW Sampling

Quote # **YL21-GOLD100-008**

REQUESTED LAB SUITES (see reverse side for details)

√ = Preserved :			√	√	√	√	√												
√ = Field Filtered :				√		√													
√ = 1-Day Rush :																			

Sample ID #	Sample Location	Sample Date (dd-mmm-yy)	Sample Time (hh:mm)	Matrix	Laboratory Comments	Sampler Comments	G = Grab or C = Composite	Number of Containers	Routine (pH, major ions)	Oil and Grease (Hexane Extractable)	Total Metals	Dissolved Metals	Total Mercury	Dissolved Mercury	Benzene, Toluene, Ethylbenzene, Xylene (BTEX)	Total Petroleum Hydrocarbons (F1-F4 CCME Fracti								
JF01-01	JF01-01	05-Aug-22	14:30	Water			G	4							x	x								
JF01-02	JF01-02	05-Aug-22	12:15	Water			G	4							x	x								
JF01-03	JF01-03	05-Aug-22	11:40	Water			G	4							x	x								
JF01-04	JF01-04	05-Aug-22	15:55	Water			G	4							x	x								
JF01-06	JF01-06	05-Aug-22	15:20	Water			G	11	x	x	x	x	x	x	x	x								
MW2	MW2	05-Aug-22	11:15	Water			G	11	x	x	x	x	x	x	x	x								
MW3	MW2	05-Aug-22	15:45	Water			G	4							x	x								
MW04	MW04	05-Aug-22	15:35	Water			G	4							x	x								

Environmental Division
Yellowknife
Work Order Reference
YL2201159

Telephone : +1 867 873 5593

Relinquished by (Sampler Signature): Myll Mac	Date/Time: August 4, 2022	Company: Golder Associates Ltd	Received by (Signature): AB
Relinquished by (Signature):	Date/Time:	Company:	Received by (Signature):

Company: ALS

Company:

Sampler (Printed Name): Meaghan MacIntyre-Newell

Sample Storage Temperature prior to Shipping (deg. C):

SAMPLE CONDITION (lab use only)

Sample Receipt Temperature (deg. C): 6 Ice pack

Samples Received in Good Condition? Yes / No (If no, provide details.)

08/09/22

C2145

Lab Copy

Northwest Territories Power Corp.(NTPC) Jackfish Power Plant GW Monitoring
Chain-of-Custody Record - Analytical Request Form

CoC#: NTPC-Jackfish-16072021
Created: July 16,

From:

Golder Associates - NTPC
Address: 9, 4905 - 48 Street Yellowknife, Northwest Territories X1A 3S3
Phone: (867) 873 6319
Contact: Laurence Bonin laurence_bonin@golder.com

Send Samples For Analysis To:

ALS Group, Yellowknife
Address: 314 Old Airport Rd. Unit 116 Yellowknife, NT X1A 3T3
Phone: (867) 873-5593 Fax: (867) 920-4238
Contact: Oliver Gregg Email: Oliver.Gregg@alsglobal.com

eMail Confirmation and Results To:

Please use full distribution list from quote
laurence.bonin@wsp.com
tamra.reynolds@wsp.com

Send Original Signed Lab Reports To:

Golder Associates Ltd.
Address: 9, 4905 - 48 Street Yellowknife, Northwest Territories X1A 3S3
Phone: (867) 873 6319
Contact: Laurence Bonin laurence.bonin@wsp.com

Send Invoice To:

Northwest Territories Power Corporation
Address: 4 Capital Drive Hay River, NT X0E 1G2 Canada
Phone: (867) 874-5200
Attn: Patrick Smith psmith@ntpc.com

FIELD SAMPLE INFORMATION

REQUESTED LAB SUITES (see reverse side for details)

Fields Notes:

Samples have been field filtered and preserved

Please ensure that there is only one COC per report. Use email confirmation and results list on this COC. Requires a 5-day TAT.

Facilty Code:

Project # **22537423-Jackfish**
August 2022 NTPC Jackfish GW Sampling
Quote # **YL21-GOLD100-008**

						√ = Preserved :			√	√	√	√	√	√								
						√ = Field Filtered :				√		√										
						√ = 1-Day Rush :																
Sample ID #	Sample Location	Sample Date (dd-mmm-yy)	Sample Time (hh:mm)	Matrix	Laboratory Comments	Sampler Comments	G = Grab or C = Composite	Number of Containers	Routine (pH, major ions)	Oil and Grease (Hexane Extractable)	Total Metals	Dissolved Metals	Total Mercury	Dissolved Mercury	Benzene, Toluene, Ethylbenzene, Xylene (BTEX)	Total Petroleum Hydrocarbons (F1-F4 CCME Fracti						
MW5	MW5	05-Aug-22	14:10	Water			G	4							x	x						
MW6	MW6	05-Aug-22	15:00	Water			G	4							x	x						
MW7	*MW7*	05-Aug-22	13:50	Water			G	4							x	x						
MW9	*MW9*	05-Aug-22	12:45	Water			G	4							x	x						
MW10	*MW10*	05-Aug-22	13:10	Water			G	11							x	x						
Field Blank	*Field Blank*	05-Aug-22	10:45	Water			G	11	x	x	x	x	x	x	x	x						
Travel Blank	*Travel Blank*	05-Aug-22	10:10	Water			G	11	x	x	x	x	x	x	x	x						

Relinquished by (Sampler Signature): Meaghan Newell	Date/Time: August 4, 2022	Company: Golder Associates Ltd	Received by (Signature):	Company: ALS
Relinquished by (Signature):	Date/Time:	Company:	Received by (Signature):	Company:
Sampler (Printed Name): Meaghan MacIntyre-Newell	Sample Storage Temperature prior to Shipping (deg. C):	Sample Receipt Temperature (deg. C): 6	**SAMPLE CONDITION (lab use only)** Samples Received in Good Condition? Yes / No (If no, provide details.)	

Ice Pack 08/09/22 12:45

Lab Copy

CoC#: NTPC-Jackfish-16072021
Created: July 16,

Northwest Territories Power Corp.(NTPC) Jackfish Power Plant GW Monitoring
Chain-of-Custody Record - Analytical Request Form

From:

Golder Associates - NTPC
Address: 9, 4905 - 48 Street Yellowknife, Northwest Territories X1A 3S3
Phone: (867) 873 6319
Contact: Laurence Bonin laurence_bonin@golder.com

Send Samples For Analysis To:

ALS Group, Yellowknife
Address: 314 Old Airport Rd, Unit 116 Yellowknife, NT X1A 3T3
Phone: (867) 873-5593 Fax: (867) 920-4238
Contact: Oliver Gregg Email: Oliver.Gregg@alsglobal.com

eMail Confirmation and Results To:

Please use full distribution list from quote
laurence.bonin@wsp.com
tamra.reynolds@wsp.com

Send Original Signed Lab Reports To:

Golder Associates Ltd.
Address: 9, 4905 - 48 Street Yellowknife, Northwest Territories X1A 3S3
Phone: (867) 873 6319
Contact: Laurence Bonin laurence.bonin@wsp.com

Send Invoice To:

Northwest Territories Power Corporation
Address: 4 Capital Drive Hay River, NT X0E 1G2 Canada
Phone: (867) 874-5200
Attn: Patrick Smith psmith@ntpc.com

FIELD SAMPLE INFORMATION

REQUESTED LAB SUITES (see reverse side for details)

Fields Notes:

Samples have been field filtered and preserved

Please ensure that there is only one COC per report. Use email confirmation and results list on this COC. Requires a 5-day TAT.

Facilty Code:

Project # 22537423-Jackfish
August 2022 NTPC Jackfish GW Sampling

Quote # YL21-GOLD100-008

√ = Preserved :			√	√	√	√	√	√														
√ = Field Filtered :				√		√																
√ = 1-Day Rush :																						

Sample ID #	Sample Location	Sample Date (dd-mmm-yy)	Sample Time (hh:mm)	Matrix	Laboratory Comments	Sampler Comments	G = Grab or C = Composite	Number of Containers	Routine (pH, major ions)	Oil and Grease (Hexane Extractable)	Total Metals	Dissolved Metals	Total Mercury	Dissolved Mercury	Benzene, Toluene, Ethylbenzene, Xylene (BTEX)	Total Petroleum Hydrocarbons (F1-F4 CCME Fracti								
JF01-01	JF01-01	05-Aug-22	14:30	Water			G	4							x	x								
JF01-02	JF01-02	05-Aug-22	12:15	Water			G	4							x	x								
JF01-03	JF01-03	05-Aug-22	11:40	Water			G	4							x	x								
JF01-04	JF01-04	05-Aug-22	15:55	Water			G	4							x	x								
JF01-06	JF01-06	05-Aug-22	15:20	Water			G	11	x	x	x	x	x	x	x	x								
MW2	MW2	05-Aug-22	11:15	Water			G	11	x	x	x	x	x	x	x	x								
MW3	MW2	05-Aug-22	15:45	Water			G	4							x	x								
MW04	MW04	05-Aug-22	15:35	Water			G	4							x	x								

Environmental Division
Yellowknife
Work Order Reference
YL2201159

Telephone : +1 867 873 5593

Relinquished by (Sampler Signature):	Date/Time: August 4, 2022	Company: Golder Associates Ltd	Received by (Signature): / Company:
Relinquished by (Signature):	Date/Time:	Company:	Received by (Signature): / Company:

Sampler (Printed Name): Meaghan MacIntyre-Newell

Sample Storage Temperature prior to Shipping (deg. C):

SAMPLE CONDITION (lab use only)

Sample Receipt Temperature (deg. C):

Samples Received in Good Condition? Yes / No (If no, provide details.)

Chain-of-Custody Record - Analytical Request Form

Created: July 16,

From:

From:
Golder Associates - NTPC
Address: 9, 4905 - 48 Street Yellowknife, Northwest Territories X1A 3S3
Phone: (867) 873 6319
Contact: Laurence Bonin laurence_bonin@golder.com

Send Samples For Analysis To:
ALS Group, Yellowknife
Address: 314 Old Airport Rd, Unit 116 Yellowknife, NT X1A 3T3
Phone: (867) 873-5593 Fax: (867) 920-4238
Contact: Oliver Gregg Email: Oliver.Gregg@alsglobal.com

eMail Confirmation and Results To:
Please use full distribution list from quote
laurence.bonin@wsp.com
tamra.reynolds@wsp.com

Send Original Signed Lab Reports To:
Golder Associates Ltd.
Address: 9, 4905 - 48 Street Yellowknife, Northwest Territories X1A 3S3
Phone: (867) 873 6319
Contact: Laurence Bonin laurence.bonin@wsp.com

Send Invoice To:
Northwest Territories Power Corporation
Address: 4 Capital Drive Hay River, NT X0E 1G2 Canada
Phone: (867) 874-5200
Attn: Patrick Smith psmith@ntpc.com

FIELD SAMPLE INFORMATION

Fields Notes:

Samples have been field filtered and preserved

Please ensure that there is only one COC per report. Use email confirmation and results list on this COC. Requires a 5-day TAT.

Facilty Code:

Project # 22537423-Jackfish
August 2022 NTPC Jackfish GW Sampling

Quote # YL21-GOLD100-008

REQUESTED LAB SUITES (see reverse side for details)

	Routine (pH, major ions)	Oil and Grease (Hexane Extractable)	Total Metals	Dissolved Metals	Total Mercury	Dissolved Mercury	Benzene, Toluene, Ethylbenzene, Xylene (BTEX)	Total Petroleum Hydrocarbons (F1-F4 CCME Fracti	
√ = Preserved :				√	√	√	√	√	√
√ = Field Filtered :					√		√		
√ = 1-Day Rush :									

Sample ID #	Sample Location	Sample Date (dd-mmm-yy)	Sample Time (hh:mm)	Matrix	Laboratory Comments	Sampler Comments	G = Grab or C = Composite	Number of Containers	Routine (pH, major ions)	Oil and Grease (Hexane Extractable)	Total Metals	Dissolved Metals	Total Mercury	Dissolved Mercury	Benzene, Toluene, Ethylbenzene, Xylene (BTEX)	Total Petroleum Hydrocarbons (F1-F4 CCME Fracti
MW5	MW5	05-Aug-22	14:10	Water			G	4							x	x
MW6	MW6	05-Aug-22	15:00	Water			G	4							x	x
MW7	MW7	05-Aug-22	13:50	Water			G	4							x	x
MW9	MW9	05-Aug-22	12:45	Water			G	4							x	x
MW10	MW10	05-Aug-22	13:10	Water			G	11							x	x
Field Blank	Field Blank	05-Aug-22	10:45	Water			G	11	x	x	x	x	x	x	x	x
Travel Blank	Travel Blank	05-Aug-22	10:10	Water			G	11	X	X	X	X	X	X	x	x

Relinquished by (Sampler Signature): [signature]	Date/Time: August 4, 2022	Company: Golder Associates Ltd	Received by (Signature):	Company:
Relinquished by (Signature):	Date/Time:	Company:	Received by (Signature):	Company:
Sampler (Printed Name): Meaghan MacIntyre-Newell	Sample Storage Temperature prior to Shipping (deg. C):	Sample Receipt Temperature (deg. C):	**SAMPLE CONDITION (lab use only)** Samples Received in Good Condition ? Yes / No (If no, provide details.)	

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **YL2201195**	Page	: 1 of 3
Client	: **Golder Associates Ltd.**	Laboratory	: Yellowknife - Environmental
Contact	: Sarah Beattie	Account Manager	: Oliver Gregg
Address	: 9 - 4905 48th Street Yellowknife NT Canada X1A 3S3	Address	: 314 Old Airport Road, Unit 116 Yellowknife NT Canada X1A 3T3
Telephone	: 867 873 6319	Telephone	: 1 867 446 5593
Project	: 22537423-Jackfish	Date Samples Received	: 12-Aug-2022 09:20
PO	: ----	Date Analysis Commenced	: 16-Aug-2022
C-O-C number	: NTPC-Jackfish-16072021	Issue Date	: 19-Aug-2022 15:39
Sampler	: ----		
Site	: Jackfish NTPC		
Quote number	: YL21-GOLD100-008		
No. of samples received	: 4		
No. of samples analysed	: 4		

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
- Surrogate Control Limits

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.

Signatories	*Position*	*Laboratory Department*
Ophelia Chiu	Department Manager - Organics	Organics, 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).

Unit	*Description*
µg/L	micrograms 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**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	PW1	PW2	PW3	PW3-01	----
					Client sampling date / time	11-Aug-2022 11:35	11-Aug-2022 13:10	11-Aug-2022 15:30	11-Aug-2022 15:35	----
						YL2201195-001	YL2201195-002	YL2201195-003	YL2201195-004	--------
						Result	Result	Result	Result	----
Volatile Organic Compounds [Fuels]										
benzene	71-43-2	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	----
ethylbenzene	100-41-4	E611A	0.50	µg/L		0.86	<0.50	<0.50	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	----
styrene	100-42-5	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	----
toluene	108-88-3	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.40	µg/L		4.48	<0.40	<0.40	<0.40	----
xylene, o-	95-47-6	E611A	0.30	µg/L		2.75	<0.30	<0.30	<0.30	----
xylenes, total	1330-20-7	E611A	0.50	µg/L		7.23	<0.50	<0.50	<0.50	----
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611A	1.0	%		114	95.8	87.4	83.6	----
difluorobenzene, 1,4-	540-36-3	E611A	1.0	%		98.4	99.1	99.0	99.5	----
Hydrocarbons										
F1 (C6-C10)	----	E581.VH+F1	100	µg/L		860	<100	<100	<100	----
F2 (C10-C16)	----	E601	300	µg/L		15600	6430	<300	<300	----
F3 (C16-C34)	----	E601	300	µg/L		6610	4380	<300	<300	----
F4 (C34-C50)	----	E601	300	µg/L		<300	<300	<300	<300	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L		760	<100	<100	<100	----
F1-BTEX	----	EC580	100	µg/L		852	<100	<100	<100	----
VPHw	----	EC580A	100	µg/L		750	<100	<100	<100	----
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601	1.0	%		106	89.4	89.3	87.9	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%		104	103	120	106	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **YL2201195**	Page	: 1 of 6
Client	: **Golder Associates Ltd.**	Laboratory	: Yellowknife - Environmental
Contact	: Sarah Beattie	Account Manager	: Oliver Gregg
Address	: 9 - 4905 48th Street Yellowknife NT Canada X1A 3S3	Address	: 314 Old Airport Road, Unit 116 Yellowknife, Northwest Territories Canada X1A 3T3
Telephone	: 867 873 6319	Telephone	: 1 867 446 5593
Project	: 22537423-Jackfish	Date Samples Received	: 12-Aug-2022 09:20
PO	: ----	Issue Date	: 19-Aug-2022 15:36
C-O-C number	: NTPC-Jackfish-16072021		
Sampler	: ----		
Site	: Jackfish NTPC		
Quote number	: YL21-GOLD100-008		
No. of samples received	: 4		
No. of samples analysed	: 4		

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 Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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)

- No Analysis Holding Time Outliers exist.

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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
PW1	E601	11-Aug-2022	17-Aug-2022	14 days	6 days	✓	18-Aug-2022	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
PW2	E601	11-Aug-2022	17-Aug-2022	14 days	6 days	✓	18-Aug-2022	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
PW3	E601	11-Aug-2022	17-Aug-2022	14 days	6 days	✓	19-Aug-2022	40 days	2 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
PW3-01	E601	11-Aug-2022	17-Aug-2022	14 days	6 days	✓	19-Aug-2022	40 days	2 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
PW1	E581.VH+F1	11-Aug-2022	16-Aug-2022	----	----		17-Aug-2022	14 days	5 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
PW2	E581.VH+F1	11-Aug-2022	16-Aug-2022	----	----		17-Aug-2022	14 days	5 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
PW3	E581.VH+F1	11-Aug-2022	16-Aug-2022	----	----		17-Aug-2022	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	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) PW3-01	E581.VH+F1	11-Aug-2022	16-Aug-2022	----	----		17-Aug-2022	14 days	5 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) PW1	E611A	11-Aug-2022	16-Aug-2022	----	----		17-Aug-2022	14 days	5 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) PW2	E611A	11-Aug-2022	16-Aug-2022	----	----		17-Aug-2022	14 days	5 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) PW3	E611A	11-Aug-2022	16-Aug-2022	----	----		17-Aug-2022	14 days	5 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) PW3-01	E611A	11-Aug-2022	16-Aug-2022	----	----		17-Aug-2022	14 days	5 days	✓

Legend & Qualifier Definitions

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			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
BTEX by Headspace GC-MS	E611A	605308	1	18	5.5	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	605309	1	18	5.5	5.0	✓
Laboratory Control Samples (LCS)							
BTEX by Headspace GC-MS	E611A	605308	1	18	5.5	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601	606094	1	5	20.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	605309	1	18	5.5	5.0	✓
Method Blanks (MB)							
BTEX by Headspace GC-MS	E611A	605308	1	18	5.5	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601	606094	1	5	20.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	605309	1	18	5.5	5.0	✓
Matrix Spikes (MS)							
BTEX by Headspace GC-MS	E611A	605308	1	18	5.5	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	605309	1	18	5.5	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
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
CCME PHCs - F2-F4 by GC-FID	E601 Vancouver - Environmental	Water	CCME PHC in Soil - Tier 1	Sample extracts are analyzed by GC-FID for CCME hydrocarbon fractions (F2-F4).
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
F1-BTEX	EC580 Vancouver - Environmental	Water	CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).
VPH: VH-BTEX-Styrene	EC580A Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

QUALITY CONTROL REPORT

Work Order	: **YL2201195**	Page	: 1 of 5
Client	: Golder Associates Ltd.	Laboratory	: Yellowknife - Environmental
Contact	: Sarah Beattie	Account Manager	: Oliver Gregg
Address	: 9 - 4905 48th Street Yellowknife NT Canada X1A 3S3	Address	: 314 Old Airport Road, Unit 116 Yellowknife, Northwest Territories Canada X1A 3T3
Telephone	: 867 873 6319	Telephone	: 1 867 446 5593
Project	: 22537423-Jackfish	Date Samples Received	: 12-Aug-2022 09:20
PO	: ----	Date Analysis Commenced	: 16-Aug-2022
C-O-C number	: NTPC-Jackfish-16072021	Issue Date	: 19-Aug-2022 15:38
Sampler	: ----		
Site	: Jackfish NTPC		
Quote number	: YL21-GOLD100-008		
No. of samples received	: 4		
No. of samples analysed	: 4		

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 Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

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.

Signatories	*Position*	*Laboratory Department*
Ophelia Chiu	Department Manager - Organics	Vancouver Organics, 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 Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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*
Volatile Organic Compounds (QC Lot: 605308)											
VA22B8718-001	Anonymous	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 605309)											
VA22B8718-001	Anonymous	F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----
		VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----

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
Volatile Organic Compounds (QCLot: 605308)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 605309)						
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 606094)						
F2 (C10-C16)	----	E601	100	µg/L	<100	----
F3 (C16-C34)	----	E601	250	µg/L	<250	----
F4 (C34-C50)	----	E601	250	µg/L	<250	----

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				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 605308)									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	95.4	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	96.7	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	106	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	96.7	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	94.2	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	107	70.0	130	----
xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	98.7	70.0	130	----
Hydrocarbons (QCLot: 605309)									
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	101	70.0	130	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	91.2	70.0	130	----
Hydrocarbons (QCLot: 606094)									
F2 (C10-C16)	----	E601	100	µg/L	3538 µg/L	108	70.0	130	----
F3 (C16-C34)	----	E601	250	µg/L	7053 µg/L	94.6	70.0	130	----
F4 (C34-C50)	----	E601	250	µg/L	5051 µg/L	104	70.0	130	----

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
Volatile Organic Compounds (QCLot: 605308)										
VA22B8718-001	Anonymous	benzene	71-43-2	E611A	95.9 µg/L	100 µg/L	95.9	60.0	140	----
		ethylbenzene	100-41-4	E611A	94.0 µg/L	100 µg/L	94.0	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	98.0 µg/L	100 µg/L	98.0	60.0	140	----
		styrene	100-42-5	E611A	93.0 µg/L	100 µg/L	93.0	60.0	140	----
		toluene	108-88-3	E611A	93.6 µg/L	100 µg/L	93.6	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	206 µg/L	200 µg/L	103	60.0	140	----
		xylene, o-	95-47-6	E611A	96.9 µg/L	100 µg/L	96.9	60.0	140	----
Hydrocarbons (QCLot: 605309)										
WR2200826-001	Anonymous	F1 (C6-C10)	----	E581.VH+F1	5530 µg/L	6310 µg/L	87.6	60.0	140	----
		VHw (C6-C10)	----	E581.VH+F1	4990 µg/L	6310 µg/L	79.1	60.0	140	----

Lab Copy

Northwest Territories Power Corp.(NTPC) Jackfish Power Plant GW Monitoring
Chain-of-Custody Record - Analytical Request Form

CoC#: NTPC-Jackfish-16072021
Created: July 16,

From:

Golder Associates - NTPC
Address: 9, 4905 - 48 Street Yellowknife, Northwest Territories X1A 3S3
Phone: (867) 873 6319
Contact: Laurence Bonin laurence.bonin@wsp.com

Send Samples For Analysis To:

ALS Group, Yellowknife
Address: 314 Old Airport Rd, Unit 116 Yellowknife, NT X1A 3T3
Phone: (867) 873-5593 Fax: (867) 920-4238
Contact: Oliver Gregg Email: Oliver.Gregg@alsglobal.com

eMail Confirmation and Results To:

Please use full distribution list from quote
laurence.bonin@wsp.com
tamra.reynolds@wsp.com

Send Original Signed Lab Reports To:

Golder Associates Ltd.
Address: 9, 4905 - 48 Street Yellowknife, Northwest Territories X1A 3S3
Phone: (867) 873 6319
Contact: Laurence Bonin
laurence.bonin@wsp.com

Send Invoice To:

Northwest Territories Power Corporation
Address: 4 Capital Drive Hay River, NT X0E 1G2 Canada
Phone: (867) 874-5200
Attn: Patrick Smith
psmith@ntpc.com

FIELD SAMPLE INFORMATION

REQUESTED LAB SUITES (see reverse side for details)

Fields Notes:
Samples have been field filtered and preserved
Please ensure that there is only one COC per report. Use email confirmation and results list on this COC. Requires a 5-day TAT.

Facilty Code:

Project # 22537423-Jackfish
August 2022 NTPC Jackfish GW Sampling
Quote # YL21-GOLD100-008

√ = Preserved :			√	√	√	√	√	√																							
√ = Field Filtered :					√		√																								
√ = 1-Day Rush :																															
Sample ID #	Sample Location	Sample Date (dd-mmm-yy)	Sample Time (hh:mm)	Matrix	ler Comments	G = Grab or C = Composite	Number of Containers	Routine (pH, major ions)	Oil and Grease (Hexane Extractable)	Total Metals	Dissolved Metals	Total Mercury	Dissolved Mercury	Benzene, Toluene, Ethylbenzene, Xylene (BTEX)	Total Petroleum Hydrocarbons (F1-F4 CCME Fracti																
PW1	PW1	11-Aug-22	11:35	Water		G	4							x	x																
PW2	PW2	11-Aug-22	13:10	Water		G	4							x	x																
PW3	PW3	11-Aug-22	15:30	Water		G	4							x	x																
PW3-01	PW3	11-Aug-22	15:35	Water		G	4							x	x																

Environmental Division
Yellowknife
Work Order Reference
YL2201195

Telephone : +1 867 873 5593

Relinquished by (Sampler Signature):	Date/Time: August 12, 2022 8:00	Company: Golder Associates Ltd	Received by (Signature): / Company:
Relinquished by (Signature):	Date/Time: Aug 12 9:20 am	Company: ALS	Received by (Signature): / Company: ALS
Sampler (Printed Name): ~~Maaghan MacIntyre-Newell~~ Bernadette Weaves	Sample Storage Temperature prior to Shipping (deg. C): 7.2	Sample Receipt Temperature (deg. C):	**SAMPLE CONDITION (lab use only)** Samples Received in Good Condition? Yes / No (If no, provide details.)

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **YL2201730**	Page	: 1 of 18
Amendment	: **1**		
Client	: **Golder Associates Ltd.**	Laboratory	: Yellowknife - Environmental
Contact	: Laurence Bonin	Account Manager	: Oliver Gregg
Address	: 9 - 4905 48th Street Yellowknife NT Canada X1A 3S3	Address	: 314 Old Airport Road, Unit 116 Yellowknife NT Canada X1A 3T3
Telephone	: ----	Telephone	: 1 867 446 5593
Project	: 183527250	Date Samples Received	: 03-Oct-2022 10:50
PO	: ----	Date Analysis Commenced	: 06-Oct-2022
C-O-C number	: ----	Issue Date	: 17-Oct-2022 16:15
Sampler	: ----		
Site	: Jackfish NTPC		
Quote number	: YL21-GOLD100-008		
No. of samples received	: 19		
No. of samples analysed	: 19		

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
- Surrogate Control Limits

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.

Signatories	*Position*	*Laboratory Department*
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Dan Gebert	Laboratory Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kyle Chang	Lab Assistant	Metals, Burnaby, British Columbia
Qammar Almas	Lab Assistant	Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Inorganics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	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).

Unit	*Description*
-	No Unit
µg/L	micrograms per litre
µS/cm	Microsiemens per centimetre
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: 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.

Sample Comments

Sample	Client Id	*Comment*
YL2201730-001	MW10	Unable to report Total Nitrogen for samples 005 and 006. Initial result did not meet ALS DQO, there was insufficient sample to complete reanalysis.

Qualifiers

Qualifier	*Description*
SFT	*Sample was filtered due to turbidity interference. Result reflects soluble analyte concentration.*

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	MW10	MW09	JF01-02	JF01-03	MW02
					Client sampling date / time	29-Sep-2022 11:30	29-Sep-2022 11:10	29-Sep-2022 10:55	29-Sep-2022 10:40	29-Sep-2022 10:10
						YL2201730-001	YL2201730-002	YL2201730-003	YL2201730-004	YL2201730-005
						Result	Result	Result	Result	Result
Physical Tests										
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L		----	----	----	----	111
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L		----	----	----	----	<1.0
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L		----	----	----	----	<1.0
alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L		----	----	----	----	<1.0
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		----	----	----	----	111
conductivity	----	E100	2.0	µS/cm		----	----	----	----	470
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		----	----	----	----	151
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L		----	----	----	----	165
pH	----	E108	0.10	pH units		----	----	----	----	8.21
solids, total dissolved [TDS]	----	E162	10	mg/L		----	----	----	----	295
solids, total dissolved [TDS], calculated (APHA)	----	EC103.APHA	1.0	mg/L		----	----	----	----	249
solids, total suspended [TSS]	----	E160	3.0	mg/L		----	----	----	----	46.3
turbidity	----	E121	0.10	NTU		----	----	----	----	21.2
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L		----	----	----	----	0.219
chloride	16887-00-6	E235.Cl-L	0.10	mg/L		----	----	----	----	62.3
fluoride	16984-48-8	E235.F-L	0.010	mg/L		----	----	----	----	0.109
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		----	----	----	----	0.0370
nitrate + nitrite (as N)	----	EC235.N+N	0.0050	mg/L		----	----	----	----	0.0520
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		----	----	----	----	0.0150
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L		----	----	----	----	0.0744
phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L		----	----	----	----	0.0156
silicate (as SiO2)	7631-86-9	E392	0.50	mg/L		----	----	----	----	11.2 SFT
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		----	----	----	----	28.6
Organic / Inorganic Carbon										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L		----	----	----	----	9.27
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L		----	----	----	----	2.16
antimony, total	7440-36-0	E420	0.00010	mg/L		----	----	----	----	0.00151
arsenic, total	7440-38-2	E420	0.00010	mg/L		----	----	----	----	0.208

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	MW10	MW09	JF01-02	JF01-03	MW02
					Client sampling date / time	29-Sep-2022 11:30	29-Sep-2022 11:10	29-Sep-2022 10:55	29-Sep-2022 10:40	29-Sep-2022 10:10
						YL2201730-001	YL2201730-002	YL2201730-003	YL2201730-004	YL2201730-005
						Result	Result	Result	Result	Result
Total Metals										
barium, total	7440-39-3	E420	0.00010	mg/L		----	----	----	----	0.0514
beryllium, total	7440-41-7	E420	0.000100	mg/L		----	----	----	----	<0.000100
bismuth, total	7440-69-9	E420	0.000050	mg/L		----	----	----	----	0.000091
boron, total	7440-42-8	E420	0.010	mg/L		----	----	----	----	0.019
cadmium, total	7440-43-9	E420	0.0000050	mg/L		----	----	----	----	0.0000366
calcium, total	7440-70-2	E420	0.050	mg/L		----	----	----	----	43.9
cesium, total	7440-46-2	E420	0.000010	mg/L		----	----	----	----	0.000256
chromium, total	7440-47-3	E420	0.00050	mg/L		----	----	----	----	0.00882
cobalt, total	7440-48-4	E420	0.00010	mg/L		----	----	----	----	0.00348
copper, total	7440-50-8	E420	0.00050	mg/L		----	----	----	----	0.00572
iron, total	7439-89-6	E420	0.010	mg/L		----	----	----	----	4.42
lead, total	7439-92-1	E420	0.000050	mg/L		----	----	----	----	0.00152
lithium, total	7439-93-2	E420	0.0010	mg/L		----	----	----	----	0.0171
magnesium, total	7439-95-4	E420	0.0050	mg/L		----	----	----	----	13.5
manganese, total	7439-96-5	E420	0.00010	mg/L		----	----	----	----	0.0949
mercury, total	7439-97-6	E508	0.0000050	mg/L		----	----	----	----	<0.0000050
molybdenum, total	7439-98-7	E420	0.000050	mg/L		----	----	----	----	0.000366
nickel, total	7440-02-0	E420	0.00050	mg/L		----	----	----	----	0.00628
phosphorus, total	7723-14-0	E420	0.050	mg/L		----	----	----	----	0.137
potassium, total	7440-09-7	E420	0.050	mg/L		----	----	----	----	4.19
rubidium, total	7440-17-7	E420	0.00020	mg/L		----	----	----	----	0.00487
selenium, total	7782-49-2	E420	0.000050	mg/L		----	----	----	----	<0.000050
silicon, total	7440-21-3	E420	0.10	mg/L		----	----	----	----	7.71
silver, total	7440-22-4	E420	0.000010	mg/L		----	----	----	----	0.000039
sodium, total	7440-23-5	E420	0.050	mg/L		----	----	----	----	29.8
strontium, total	7440-24-6	E420	0.00020	mg/L		----	----	----	----	0.103
sulfur, total	7704-34-9	E420	0.50	mg/L		----	----	----	----	11.1
tellurium, total	13494-80-9	E420	0.00020	mg/L		----	----	----	----	<0.00020
thallium, total	7440-28-0	E420	0.000010	mg/L		----	----	----	----	0.000020
thorium, total	7440-29-1	E420	0.00010	mg/L		----	----	----	----	0.00022
tin, total	7440-31-5	E420	0.00010	mg/L		----	----	----	----	0.00077

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	MW10	MW09	JF01-02	JF01-03	MW02
					Client sampling date / time	29-Sep-2022 11:30	29-Sep-2022 11:10	29-Sep-2022 10:55	29-Sep-2022 10:40	29-Sep-2022 10:10
						YL2201730-001	YL2201730-002	YL2201730-003	YL2201730-004	YL2201730-005
						Result	Result	Result	Result	Result
Total Metals										
titanium, total	7440-32-6	E420	0.00030	mg/L		----	----	----	----	0.109
tungsten, total	7440-33-7	E420	0.00010	mg/L		----	----	----	----	0.00010
uranium, total	7440-61-1	E420	0.000010	mg/L		----	----	----	----	0.000636
vanadium, total	7440-62-2	E420	0.00050	mg/L		----	----	----	----	0.00861
zinc, total	7440-66-6	E420	0.0030	mg/L		----	----	----	----	0.0103
zirconium, total	7440-67-7	E420	0.00020	mg/L		----	----	----	----	<0.00020
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L		----	----	----	----	0.0114
antimony, dissolved	7440-36-0	E421	0.00010	mg/L		----	----	----	----	0.00052
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L		----	----	----	----	0.123
barium, dissolved	7440-39-3	E421	0.00010	mg/L		----	----	----	----	0.0372
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L		----	----	----	----	<0.000100
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L		----	----	----	----	<0.000050
boron, dissolved	7440-42-8	E421	0.010	mg/L		----	----	----	----	0.016
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L		----	----	----	----	0.0000152
calcium, dissolved	7440-70-2	E421	0.050	mg/L		----	----	----	----	39.5
cesium, dissolved	7440-46-2	E421	0.000010	mg/L		----	----	----	----	0.000011
chromium, dissolved	7440-47-3	E421	0.00050	mg/L		----	----	----	----	<0.00050
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L		----	----	----	----	0.00088
copper, dissolved	7440-50-8	E421	0.00020	mg/L		----	----	----	----	<0.00020
iron, dissolved	7439-89-6	E421	0.010	mg/L		----	----	----	----	0.719
lead, dissolved	7439-92-1	E421	0.000050	mg/L		----	----	----	----	0.000098
lithium, dissolved	7439-93-2	E421	0.0010	mg/L		----	----	----	----	0.0033
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L		----	----	----	----	12.8
manganese, dissolved	7439-96-5	E421	0.00010	mg/L		----	----	----	----	0.0632
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L		----	----	----	----	<0.0000050
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L		----	----	----	----	0.000294
nickel, dissolved	7440-02-0	E421	0.00050	mg/L		----	----	----	----	0.00118
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L		----	----	----	----	<0.050
potassium, dissolved	7440-09-7	E421	0.050	mg/L		----	----	----	----	3.69
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L		----	----	----	----	0.00249

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	MW10	MW09	JF01-02	JF01-03	MW02
					Client sampling date / time	29-Sep-2022 11:30	29-Sep-2022 11:10	29-Sep-2022 10:55	29-Sep-2022 10:40	29-Sep-2022 10:10
						YL2201730-001	YL2201730-002	YL2201730-003	YL2201730-004	YL2201730-005
						Result	Result	Result	Result	Result
Dissolved Metals										
selenium, dissolved	7782-49-2	E421	0.000050	mg/L		----	----	----	----	<0.000050
silicon, dissolved	7440-21-3	E421	0.050	mg/L		----	----	----	----	5.23
silver, dissolved	7440-22-4	E421	0.000010	mg/L		----	----	----	----	<0.000010
sodium, dissolved	7440-23-5	E421	0.050	mg/L		----	----	----	----	28.8
strontium, dissolved	7440-24-6	E421	0.00020	mg/L		----	----	----	----	0.0993
sulfur, dissolved	7704-34-9	E421	0.50	mg/L		----	----	----	----	10.9
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L		----	----	----	----	<0.00020
thallium, dissolved	7440-28-0	E421	0.000010	mg/L		----	----	----	----	<0.000010
thorium, dissolved	7440-29-1	E421	0.00010	mg/L		----	----	----	----	<0.00010
tin, dissolved	7440-31-5	E421	0.00010	mg/L		----	----	----	----	0.00011
titanium, dissolved	7440-32-6	E421	0.00030	mg/L		----	----	----	----	0.00048
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L		----	----	----	----	<0.00010
uranium, dissolved	7440-61-1	E421	0.000010	mg/L		----	----	----	----	0.000384
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L		----	----	----	----	0.00114
zinc, dissolved	7440-66-6	E421	0.0010	mg/L		----	----	----	----	0.0014
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L		----	----	----	----	<0.00020
dissolved mercury filtration location	----	EP509	-	-		----	----	----	----	Field
dissolved metals filtration location	----	EP421	-	-		----	----	----	----	Field
Aggregate Organics										
oil & grease (gravimetric)	----	E567	5.0	mg/L		----	----	----	----	<5.0
Volatile Organic Compounds [Fuels]										
benzene	71-43-2	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
ethylbenzene	100-41-4	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
styrene	100-42-5	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
toluene	108-88-3	E611A	0.50	µg/L		<0.50	<0.50	1.72	<0.50	0.78
xylene, m+p-	179601-23-1	E611A	0.40	µg/L		<0.40	<0.40	<0.40	<0.40	<0.40
xylene, o-	95-47-6	E611A	0.30	µg/L		<0.30	<0.30	<0.30	<0.30	<0.30
xylenes, total	1330-20-7	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Hydrocarbons										
F1 (C6-C10)	----	E581.VH+F1	100	µg/L		<100	<100	<100	<100	<100

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	MW10	MW09	JF01-02	JF01-03	MW02
					Client sampling date / time	29-Sep-2022 11:30	29-Sep-2022 11:10	29-Sep-2022 10:55	29-Sep-2022 10:40	29-Sep-2022 10:10
						YL2201730-001	YL2201730-002	YL2201730-003	YL2201730-004	YL2201730-005
						Result	Result	Result	Result	Result
Hydrocarbons										
F2 (C10-C16)	----	E601	300	µg/L		750	1320	<300	<300	<300
F3 (C16-C34)	----	E601	300	µg/L		360	520	<300	<300	<300
F4 (C34-C50)	----	E601	300	µg/L		<300	<300	<300	<300	<300
VHw (C6-C10)	----	E581.VH+F1	100	µg/L		<100	<100	<100	<100	<100
F1-BTEX	----	EC580	100	µg/L		<100	<100	<100	<100	<100
VPHw	----	EC580A	100	µg/L		<100	<100	<100	<100	<100
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601	1.0	%		96.8	94.5	91.7	95.8	96.6
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%		79.4	93.0	71.9	76.2	82.9
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611A	1.0	%		94.2	94.1	92.0	91.4	90.8
difluorobenzene, 1,4-	540-36-3	E611A	1.0	%		100	100	101	100	100

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

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	FIELD BLANK	JF01-04	MW03	PW03	PW01
					Client sampling date / time	29-Sep-2022 10:15	29-Sep-2022 09:50	29-Sep-2022 09:35	29-Sep-2022 14:10	29-Sep-2022 13:20
						YL2201730-006	YL2201730-007	YL2201730-008	YL2201730-009	YL2201730-010
						Result	Result	Result	Result	Result
Physical Tests										
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L		<1.0	----	----	----	----
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L		<1.0	----	----	----	----
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L		<1.0	----	----	----	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L		<1.0	----	----	----	----
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		<1.0	----	----	----	----
conductivity	----	E100	2.0	µS/cm		<2.0	----	----	----	----
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		<0.60	----	----	----	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L		<0.60	----	----	----	----
pH	----	E108	0.10	pH units		5.44	----	----	----	----
solids, total dissolved [TDS]	----	E162	10	mg/L		<10	----	----	----	----
solids, total dissolved [TDS], calculated (APHA)	----	EC103.APHA	1.0	mg/L		<1.0	----	----	----	----
solids, total suspended [TSS]	----	E160	3.0	mg/L		<3.0	----	----	----	----
turbidity	----	E121	0.10	NTU		<0.10	----	----	----	----
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L		<0.0050	----	----	----	----
chloride	16887-00-6	E235.Cl-L	0.10	mg/L		<0.10	----	----	----	----
fluoride	16984-48-8	E235.F-L	0.010	mg/L		<0.010	----	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		<0.0050	----	----	----	----
nitrate + nitrite (as N)	----	EC235.N+N	0.0050	mg/L		<0.0051	----	----	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		<0.0010	----	----	----	----
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L		<0.0020	----	----	----	----
phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L		<0.0020	----	----	----	----
silicate (as SiO2)	7631-86-9	E392	0.50	mg/L		<0.50	----	----	----	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		<0.30	----	----	----	----
Organic / Inorganic Carbon										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L		<0.50	----	----	----	----
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L		<0.0030	----	----	----	----
antimony, total	7440-36-0	E420	0.00010	mg/L		<0.00010	----	----	----	----
arsenic, total	7440-38-2	E420	0.00010	mg/L		<0.00010	----	----	----	----
barium, total	7440-39-3	E420	0.00010	mg/L		<0.00010	----	----	----	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	FIELD BLANK	JF01-04	MW03	PW03	PW01
					Client sampling date / time	29-Sep-2022 10:15	29-Sep-2022 09:50	29-Sep-2022 09:35	29-Sep-2022 14:10	29-Sep-2022 13:20
						YL2201730-006	YL2201730-007	YL2201730-008	YL2201730-009	YL2201730-010
						Result	Result	Result	Result	Result
Total Metals										
beryllium, total	7440-41-7	E420	0.000100	mg/L		<0.000100	----	----	----	----
bismuth, total	7440-69-9	E420	0.000050	mg/L		<0.000050	----	----	----	----
boron, total	7440-42-8	E420	0.010	mg/L		<0.010	----	----	----	----
cadmium, total	7440-43-9	E420	0.0000050	mg/L		<0.0000050	----	----	----	----
calcium, total	7440-70-2	E420	0.050	mg/L		<0.050	----	----	----	----
cesium, total	7440-46-2	E420	0.000010	mg/L		<0.000010	----	----	----	----
chromium, total	7440-47-3	E420	0.00050	mg/L		<0.00050	----	----	----	----
cobalt, total	7440-48-4	E420	0.00010	mg/L		<0.00010	----	----	----	----
copper, total	7440-50-8	E420	0.00050	mg/L		<0.00050	----	----	----	----
iron, total	7439-89-6	E420	0.010	mg/L		<0.010	----	----	----	----
lead, total	7439-92-1	E420	0.000050	mg/L		<0.000050	----	----	----	----
lithium, total	7439-93-2	E420	0.0010	mg/L		<0.0010	----	----	----	----
magnesium, total	7439-95-4	E420	0.0050	mg/L		<0.0050	----	----	----	----
manganese, total	7439-96-5	E420	0.00010	mg/L		<0.00010	----	----	----	----
mercury, total	7439-97-6	E508	0.0000050	mg/L		<0.0000050	----	----	----	----
molybdenum, total	7439-98-7	E420	0.000050	mg/L		<0.000050	----	----	----	----
nickel, total	7440-02-0	E420	0.00050	mg/L		<0.00050	----	----	----	----
phosphorus, total	7723-14-0	E420	0.050	mg/L		<0.050	----	----	----	----
potassium, total	7440-09-7	E420	0.050	mg/L		<0.050	----	----	----	----
rubidium, total	7440-17-7	E420	0.00020	mg/L		<0.00020	----	----	----	----
selenium, total	7782-49-2	E420	0.000050	mg/L		<0.000050	----	----	----	----
silicon, total	7440-21-3	E420	0.10	mg/L		<0.10	----	----	----	----
silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	----	----	----	----
sodium, total	7440-23-5	E420	0.050	mg/L		<0.050	----	----	----	----
strontium, total	7440-24-6	E420	0.00020	mg/L		<0.00020	----	----	----	----
sulfur, total	7704-34-9	E420	0.50	mg/L		<0.50	----	----	----	----
tellurium, total	13494-80-9	E420	0.00020	mg/L		<0.00020	----	----	----	----
thallium, total	7440-28-0	E420	0.000010	mg/L		<0.000010	----	----	----	----
thorium, total	7440-29-1	E420	0.00010	mg/L		<0.00010	----	----	----	----
tin, total	7440-31-5	E420	0.00010	mg/L		<0.00010	----	----	----	----
titanium, total	7440-32-6	E420	0.00030	mg/L		<0.00030	----	----	----	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	FIELD BLANK	JF01-04	MW03	PW03	PW01
					Client sampling date / time	29-Sep-2022 10:15	29-Sep-2022 09:50	29-Sep-2022 09:35	29-Sep-2022 14:10	29-Sep-2022 13:20
						YL2201730-006	YL2201730-007	YL2201730-008	YL2201730-009	YL2201730-010
						Result	Result	Result	Result	Result
Total Metals										
tungsten, total	7440-33-7	E420	0.00010	mg/L		<0.00010	----	----	----	----
uranium, total	7440-61-1	E420	0.000010	mg/L		<0.000010	----	----	----	----
vanadium, total	7440-62-2	E420	0.00050	mg/L		<0.00050	----	----	----	----
zinc, total	7440-66-6	E420	0.0030	mg/L		<0.0030	----	----	----	----
zirconium, total	7440-67-7	E420	0.00020	mg/L		<0.00020	----	----	----	----
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L		<0.0010	----	----	----	----
antimony, dissolved	7440-36-0	E421	0.00010	mg/L		<0.00010	----	----	----	----
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L		<0.00010	----	----	----	----
barium, dissolved	7440-39-3	E421	0.00010	mg/L		<0.00010	----	----	----	----
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L		<0.000100	----	----	----	----
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L		<0.000050	----	----	----	----
boron, dissolved	7440-42-8	E421	0.010	mg/L		<0.010	----	----	----	----
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L		<0.0000050	----	----	----	----
calcium, dissolved	7440-70-2	E421	0.050	mg/L		<0.050	----	----	----	----
cesium, dissolved	7440-46-2	E421	0.000010	mg/L		<0.000010	----	----	----	----
chromium, dissolved	7440-47-3	E421	0.00050	mg/L		<0.00050	----	----	----	----
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L		<0.00010	----	----	----	----
copper, dissolved	7440-50-8	E421	0.00020	mg/L		<0.00020	----	----	----	----
iron, dissolved	7439-89-6	E421	0.010	mg/L		<0.010	----	----	----	----
lead, dissolved	7439-92-1	E421	0.000050	mg/L		<0.000050	----	----	----	----
lithium, dissolved	7439-93-2	E421	0.0010	mg/L		<0.0010	----	----	----	----
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L		<0.0050	----	----	----	----
manganese, dissolved	7439-96-5	E421	0.00010	mg/L		<0.00010	----	----	----	----
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L		<0.0000050	----	----	----	----
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L		<0.000050	----	----	----	----
nickel, dissolved	7440-02-0	E421	0.00050	mg/L		<0.00050	----	----	----	----
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L		<0.050	----	----	----	----
potassium, dissolved	7440-09-7	E421	0.050	mg/L		<0.050	----	----	----	----
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L		<0.00020	----	----	----	----
selenium, dissolved	7782-49-2	E421	0.000050	mg/L		<0.000050	----	----	----	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	FIELD BLANK	JF01-04	MW03	PW03	PW01
					Client sampling date / time	29-Sep-2022 10:15	29-Sep-2022 09:50	29-Sep-2022 09:35	29-Sep-2022 14:10	29-Sep-2022 13:20
						YL2201730-006	YL2201730-007	YL2201730-008	YL2201730-009	YL2201730-010
						Result	Result	Result	Result	Result
Dissolved Metals										
silicon, dissolved	7440-21-3	E421	0.050	mg/L		<0.050	----	----	----	----
silver, dissolved	7440-22-4	E421	0.000010	mg/L		<0.000010	----	----	----	----
sodium, dissolved	7440-23-5	E421	0.050	mg/L		<0.050	----	----	----	----
strontium, dissolved	7440-24-6	E421	0.00020	mg/L		<0.00020	----	----	----	----
sulfur, dissolved	7704-34-9	E421	0.50	mg/L		<0.50	----	----	----	----
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L		<0.00020	----	----	----	----
thallium, dissolved	7440-28-0	E421	0.000010	mg/L		<0.000010	----	----	----	----
thorium, dissolved	7440-29-1	E421	0.00010	mg/L		<0.00010	----	----	----	----
tin, dissolved	7440-31-5	E421	0.00010	mg/L		<0.00010	----	----	----	----
titanium, dissolved	7440-32-6	E421	0.00030	mg/L		<0.00030	----	----	----	----
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L		<0.00010	----	----	----	----
uranium, dissolved	7440-61-1	E421	0.000010	mg/L		<0.000010	----	----	----	----
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L		<0.00050	----	----	----	----
zinc, dissolved	7440-66-6	E421	0.0010	mg/L		<0.0010	----	----	----	----
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L		<0.00020	----	----	----	----
dissolved mercury filtration location	----	EP509	-	-		Field	----	----	----	----
dissolved metals filtration location	----	EP421	-	-		Field	----	----	----	----
Aggregate Organics										
oil & grease (gravimetric)	----	E567	5.0	mg/L		<5.0	----	----	----	----
Volatile Organic Compounds [Fuels]										
benzene	71-43-2	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
ethylbenzene	100-41-4	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	0.78
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
styrene	100-42-5	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
toluene	108-88-3	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
xylene, m+p-	179601-23-1	E611A	0.40	µg/L		<0.40	<0.40	<0.40	<0.40	4.74
xylene, o-	95-47-6	E611A	0.30	µg/L		<0.30	<0.30	<0.30	<0.30	2.78
xylenes, total	1330-20-7	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	7.52
Hydrocarbons										
F1 (C6-C10)	----	E581.VH+F1	100	µg/L		<100	<100	<100	<100	150
F2 (C10-C16)	----	E601	300	µg/L		<300	<300	<300	<300	3120

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	FIELD BLANK	JF01-04	MW03	PW03	PW01
					Client sampling date / time	29-Sep-2022 10:15	29-Sep-2022 09:50	29-Sep-2022 09:35	29-Sep-2022 14:10	29-Sep-2022 13:20
						YL2201730-006	YL2201730-007	YL2201730-008	YL2201730-009	YL2201730-010
						Result	Result	Result	Result	Result
Hydrocarbons										
F3 (C16-C34)	----	E601	300	µg/L		<300	<300	<300	<300	880
F4 (C34-C50)	----	E601	300	µg/L		<300	<300	<300	<300	<300
VHw (C6-C10)	----	E581.VH+F1	100	µg/L		<100	<100	<100	<100	170
F1-BTEX	----	EC580	100	µg/L		<100	<100	<100	<100	142
VPHw	----	EC580A	100	µg/L		<100	<100	<100	<100	160
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601	1.0	%		93.9	88.0	75.4	88.1	93.8
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%		78.2	82.2	80.1	79.8	91.6
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611A	1.0	%		89.9	90.3	89.8	90.4	98.2
difluorobenzene, 1,4-	540-36-3	E611A	1.0	%		99.7	101	101	99.5	101

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

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	JF01-01	PW02	MW05	MW06	MW06-DUP
					Client sampling date / time	29-Sep-2022 12:50	29-Sep-2022 13:40	29-Sep-2022 12:40	29-Sep-2022 12:05	29-Sep-2022 12:10
						YL2201730-011	YL2201730-012	YL2201730-013	YL2201730-014	YL2201730-015
						Result	Result	Result	Result	Result
Volatile Organic Compounds [Fuels]										
benzene	71-43-2	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
ethylbenzene	100-41-4	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
styrene	100-42-5	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
toluene	108-88-3	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
xylene, m+p-	179601-23-1	E611A	0.40	µg/L		<0.40	<0.40	<0.40	<0.40	<0.40
xylene, o-	95-47-6	E611A	0.30	µg/L		<0.30	<0.30	<0.30	<0.30	<0.30
xylenes, total	1330-20-7	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Hydrocarbons										
F1 (C6-C10)	----	E581.VH+F1	100	µg/L		<100	<100	<100	<100	<100
F2 (C10-C16)	----	E601	300	µg/L		500	1830	4610	5140	2530
F3 (C16-C34)	----	E601	300	µg/L		<300	1410	1150	1530	690
F4 (C34-C50)	----	E601	300	µg/L		<300	<300	<300	<300	<300
VHw (C6-C10)	----	E581.VH+F1	100	µg/L		<100	<100	<100	<100	<100
F1-BTEX	----	EC580	100	µg/L		<100	<100	<100	<100	<100
VPHw	----	EC580A	100	µg/L		<100	<100	<100	<100	<100
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601	1.0	%		89.9	90.7	93.9	92.8	90.1
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%		81.4	78.3	91.7	88.8	99.3
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611A	1.0	%		92.5	89.7	91.9	92.4	101
difluorobenzene, 1,4-	540-36-3	E611A	1.0	%		99.0	99.4	99.4	98.8	115

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

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	MW07	MW04	JF-01-06	JF01-06-DUP	----
					Client sampling date / time	29-Sep-2022 11:50	29-Sep-2022 09:15	29-Sep-2022 08:45	29-Sep-2022 08:50	----
						YL2201730-016	YL2201730-017	YL2201730-018	YL2201730-019	--------
						Result	Result	Result	Result	----
Physical Tests										
alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L		----	----	113	113	----
alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L		----	----	<1.0	<1.0	----
alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L		----	----	<1.0	<1.0	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L		----	----	<1.0	<1.0	----
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		----	----	113	113	----
conductivity	----	E100	2.0	µS/cm		----	----	479	478	----
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		----	----	163	152	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L		----	----	170	169	----
pH	----	E108	0.10	pH units		----	----	8.25	8.25	----
solids, total dissolved [TDS]	----	E162	10	mg/L		----	----	289	309	----
solids, total dissolved [TDS], calculated (APHA)	----	EC103.APHA	1.0	mg/L		----	----	258	252	----
solids, total suspended [TSS]	----	E160	3.0	mg/L		----	----	87.1	78.7	----
turbidity	----	E121	0.10	NTU		----	----	14.3	16.9	----
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L		----	----	0.0476	0.0685	----
chloride	16887-00-6	E235.Cl-L	0.10	mg/L		----	----	62.4	62.2	----
fluoride	16984-48-8	E235.F-L	0.010	mg/L		----	----	0.098	0.096	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		----	----	0.338	0.348	----
nitrate + nitrite (as N)	----	EC235.N+N	0.0050	mg/L		----	----	0.340	0.350	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		----	----	0.0015	0.0025	----
nitrogen, total	7727-37-9	E366	0.030	mg/L		----	----	0.823	0.839	----
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L		----	----	0.0808	0.0850	----
phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L		----	----	0.0445	0.0785	----
silicate (as SiO2)	7631-86-9	E392	0.50	mg/L		----	----	11.1 SFT	11.4 SFT	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		----	----	27.6	27.6	----
Organic / Inorganic Carbon										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L		----	----	8.88	9.26	----
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L		----	----	1.90	1.57	----
antimony, total	7440-36-0	E420	0.00010	mg/L		----	----	0.00107	0.00120	----
arsenic, total	7440-38-2	E420	0.00010	mg/L		----	----	0.233	0.231	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	MW07	MW04	JF-01-06	JF01-06-DUP	----
					Client sampling date / time	29-Sep-2022 11:50	29-Sep-2022 09:15	29-Sep-2022 08:45	29-Sep-2022 08:50	----
						YL2201730-016	YL2201730-017	YL2201730-018	YL2201730-019	--------
						Result	Result	Result	Result	----
Total Metals										
barium, total	7440-39-3	E420	0.00010	mg/L		----	----	0.0496	0.0511	----
beryllium, total	7440-41-7	E420	0.000100	mg/L		----	----	<0.000100	<0.000100	----
bismuth, total	7440-69-9	E420	0.000050	mg/L		----	----	0.000075	0.000075	----
boron, total	7440-42-8	E420	0.010	mg/L		----	----	0.026	0.027	----
cadmium, total	7440-43-9	E420	0.0000050	mg/L		----	----	0.0000226	0.0000255	----
calcium, total	7440-70-2	E420	0.050	mg/L		----	----	44.3	45.2	----
cesium, total	7440-46-2	E420	0.000010	mg/L		----	----	0.000215	0.000200	----
chromium, total	7440-47-3	E420	0.00050	mg/L		----	----	0.00813	0.00631	----
cobalt, total	7440-48-4	E420	0.00010	mg/L		----	----	0.00600	0.00575	----
copper, total	7440-50-8	E420	0.00050	mg/L		----	----	0.00457	0.00372	----
iron, total	7439-89-6	E420	0.010	mg/L		----	----	2.43	2.06	----
lead, total	7439-92-1	E420	0.000050	mg/L		----	----	0.00105	0.00102	----
lithium, total	7439-93-2	E420	0.0010	mg/L		----	----	0.0152	0.0131	----
magnesium, total	7439-95-4	E420	0.0050	mg/L		----	----	14.3	13.6	----
manganese, total	7439-96-5	E420	0.00010	mg/L		----	----	0.877	0.874	----
mercury, total	7439-97-6	E508	0.0000050	mg/L		----	----	<0.0000050	<0.0000050	----
molybdenum, total	7439-98-7	E420	0.000050	mg/L		----	----	0.000335	0.000355	----
nickel, total	7440-02-0	E420	0.00050	mg/L		----	----	0.00751	0.00672	----
phosphorus, total	7723-14-0	E420	0.050	mg/L		----	----	0.077	0.075	----
potassium, total	7440-09-7	E420	0.050	mg/L		----	----	3.87	4.03	----
rubidium, total	7440-17-7	E420	0.00020	mg/L		----	----	0.00411	0.00384	----
selenium, total	7782-49-2	E420	0.000050	mg/L		----	----	0.000074	0.000051	----
silicon, total	7440-21-3	E420	0.10	mg/L		----	----	7.82	7.28	----
silver, total	7440-22-4	E420	0.000010	mg/L		----	----	<0.000010	<0.000010	----
sodium, total	7440-23-5	E420	0.050	mg/L		----	----	32.5	32.7	----
strontium, total	7440-24-6	E420	0.00020	mg/L		----	----	0.0943	0.103	----
sulfur, total	7704-34-9	E420	0.50	mg/L		----	----	10.4	10.6	----
tellurium, total	13494-80-9	E420	0.00020	mg/L		----	----	<0.00020	<0.00020	----
thallium, total	7440-28-0	E420	0.000010	mg/L		----	----	0.000017	0.000015	----
thorium, total	7440-29-1	E420	0.00010	mg/L		----	----	0.00019	0.00016	----
tin, total	7440-31-5	E420	0.00010	mg/L		----	----	0.00037	0.00041	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MW07	MW04	JF-01-06	JF01-06-DUP	----
					Client sampling date / time	29-Sep-2022 11:50	29-Sep-2022 09:15	29-Sep-2022 08:45	29-Sep-2022 08:50	----
Analyte	CAS Number	Method	LOR	Unit		YL2201730-016	YL2201730-017	YL2201730-018	YL2201730-019	--------
						Result	Result	Result	Result	----
Total Metals										
titanium, total	7440-32-6	E420	0.00030	mg/L		----	----	0.102	0.0829	----
tungsten, total	7440-33-7	E420	0.00010	mg/L		----	----	0.00028	0.00030	----
uranium, total	7440-61-1	E420	0.000010	mg/L		----	----	0.00137	0.00144	----
vanadium, total	7440-62-2	E420	0.00050	mg/L		----	----	0.00644	0.00558	----
zinc, total	7440-66-6	E420	0.0030	mg/L		----	----	0.0086	0.0071	----
zirconium, total	7440-67-7	E420	0.00020	mg/L		----	----	<0.00020	<0.00020	----
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L		----	----	0.0068	0.0064	----
antimony, dissolved	7440-36-0	E421	0.00010	mg/L		----	----	0.00049	0.00051	----
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L		----	----	0.224	0.203	----
barium, dissolved	7440-39-3	E421	0.00010	mg/L		----	----	0.0328	0.0325	----
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		----	----	0.027	0.022	----
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L		----	----	0.0000078	0.0000063	----
calcium, dissolved	7440-70-2	E421	0.050	mg/L		----	----	42.5	40.3	----
cesium, dissolved	7440-46-2	E421	0.000010	mg/L		----	----	0.000014	0.000016	----
chromium, dissolved	7440-47-3	E421	0.00050	mg/L		----	----	<0.00050	<0.00050	----
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L		----	----	0.00046	0.00045	----
copper, dissolved	7440-50-8	E421	0.00020	mg/L		----	----	0.00053	0.00050	----
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		----	----	0.0027	0.0026	----
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L		----	----	13.8	12.6	----
manganese, dissolved	7439-96-5	E421	0.00010	mg/L		----	----	0.102	0.102	----
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L		----	----	<0.0000050	<0.0000050	----
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L		----	----	0.000221	0.000212	----
nickel, dissolved	7440-02-0	E421	0.00050	mg/L		----	----	0.00172	0.00156	----
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L		----	----	<0.050	<0.050	----
potassium, dissolved	7440-09-7	E421	0.050	mg/L		----	----	3.61	3.41	----
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L		----	----	0.00202	0.00192	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	MW07	MW04	JF-01-06	JF01-06-DUP	----
					Client sampling date / time	29-Sep-2022 11:50	29-Sep-2022 09:15	29-Sep-2022 08:45	29-Sep-2022 08:50	----
						YL2201730-016	YL2201730-017	YL2201730-018	YL2201730-019	--------
						Result	Result	Result	Result	----
Dissolved Metals										
selenium, dissolved	7782-49-2	E421	0.000050	mg/L		----	----	<0.000050	<0.000050	----
silicon, dissolved	7440-21-3	E421	0.050	mg/L		----	----	5.58	5.13	----
silver, dissolved	7440-22-4	E421	0.000010	mg/L		----	----	<0.000010	<0.000010	----
sodium, dissolved	7440-23-5	E421	0.050	mg/L		----	----	32.0	30.5	----
strontium, dissolved	7440-24-6	E421	0.00020	mg/L		----	----	0.0931	0.0972	----
sulfur, dissolved	7704-34-9	E421	0.50	mg/L		----	----	10.3	9.68	----
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		----	----	0.00114	0.00118	----
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L		----	----	0.00052	<0.00050	----
zinc, dissolved	7440-66-6	E421	0.0010	mg/L		----	----	0.0011	<0.0010	----
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	----
Aggregate Organics										
oil & grease (gravimetric)	----	E567	5.0	mg/L		----	----	<5.0	<5.0	----
Volatile Organic Compounds [Fuels]										
benzene	71-43-2	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	----
ethylbenzene	100-41-4	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	----
styrene	100-42-5	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	----
toluene	108-88-3	E611A	0.50	µg/L		0.53	<0.50	0.76	0.73	----
xylene, m+p-	179601-23-1	E611A	0.40	µg/L		0.92	<0.40	<0.40	<0.40	----
xylene, o-	95-47-6	E611A	0.30	µg/L		<0.30	<0.30	<0.30	<0.30	----
xylenes, total	1330-20-7	E611A	0.50	µg/L		0.92	<0.50	<0.50	<0.50	----
Hydrocarbons										
F1 (C6-C10)	----	E581.VH+F1	100	µg/L		180	<100	<100	<100	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	MW07	MW04	JF-01-06	JF01-06-DUP	----
					Client sampling date / time	29-Sep-2022 11:50	29-Sep-2022 09:15	29-Sep-2022 08:45	29-Sep-2022 08:50	----
						YL2201730-016	YL2201730-017	YL2201730-018	YL2201730-019	--------
						Result	Result	Result	Result	----
Hydrocarbons										
F2 (C10-C16)	----	E601	300	µg/L		16400	<300	<300	<300	----
F3 (C16-C34)	----	E601	300	µg/L		4220	<300	<300	<300	----
F4 (C34-C50)	----	E601	300	µg/L		<300	<300	<300	<300	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L		190	<100	<100	<100	----
F1-BTEX	----	EC580	100	µg/L		179	<100	<100	<100	----
VPHw	----	EC580A	100	µg/L		190	<100	<100	<100	----
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601	1.0	%		101	84.7	70.4	83.0	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%		94.2	80.9	79.2	80.9	----
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611A	1.0	%		100	98.0	95.4	88.4	----
difluorobenzene, 1,4-	540-36-3	E611A	1.0	%		114	115	114	101	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **YL2201730**	Page	: 1 of 27
Amendment	: 1		
Client	: **Golder Associates Ltd.**	Laboratory	: Yellowknife - Environmental
Contact	: Laurence Bonin	Account Manager	: Oliver Gregg
Address	: 9 - 4905 48th Street Yellowknife NT Canada X1A 3S3	Address	: 314 Old Airport Road, Unit 116 Yellowknife, Northwest Territories Canada X1A 3T3
Telephone	: ----	Telephone	: 1 867 446 5593
Project	: 183527250	Date Samples Received	: 03-Oct-2022 10:50
PO	: ----	Issue Date	: 17-Oct-2022 16:16
C-O-C number	: ----		
Sampler	: ----		
Site	: Jackfish NTPC		
Quote number	: YL21-GOLD100-008		
No. of samples received	: 19		
No. of samples analysed	: 19		

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 Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.

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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Oil & Grease by Gravimetry										
Amber glass (hydrochloric acid)										
FIELD BLANK	E567	29-Sep-2022	09-Oct-2022	28 days	10 days	✓	09-Oct-2022	40 days	0 days	✓
Aggregate Organics : Oil & Grease by Gravimetry										
Amber glass (hydrochloric acid)										
JF-01-06	E567	29-Sep-2022	09-Oct-2022	28 days	10 days	✓	09-Oct-2022	40 days	0 days	✓
Aggregate Organics : Oil & Grease by Gravimetry										
Amber glass (hydrochloric acid)										
JF01-06-DUP	E567	29-Sep-2022	09-Oct-2022	28 days	10 days	✓	09-Oct-2022	40 days	0 days	✓
Aggregate Organics : Oil & Grease by Gravimetry										
Amber glass (hydrochloric acid)										
MW02	E567	29-Sep-2022	09-Oct-2022	28 days	10 days	✓	09-Oct-2022	40 days	0 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (lab preserved)										
FIELD BLANK	E298	29-Sep-2022	06-Oct-2022	3 days	7 days	× EHTR	06-Oct-2022	28 days	0 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (lab preserved)										
JF-01-06	E298	29-Sep-2022	06-Oct-2022	3 days	7 days	× EHTR	06-Oct-2022	28 days	0 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (lab preserved)										
JF01-06-DUP	E298	29-Sep-2022	06-Oct-2022	3 days	7 days	× EHTR	06-Oct-2022	28 days	0 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	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (lab preserved)										
MW02	E298	29-Sep-2022	06-Oct-2022	3 days	7 days	× EHTR	06-Oct-2022	28 days	0 days	✓
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE										
FIELD BLANK	E235.Cl-L	29-Sep-2022	08-Oct-2022	----	----		08-Oct-2022	28 days	9 days	✓
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE										
JF-01-06	E235.Cl-L	29-Sep-2022	08-Oct-2022	----	----		08-Oct-2022	28 days	9 days	✓
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE										
JF01-06-DUP	E235.Cl-L	29-Sep-2022	08-Oct-2022	----	----		08-Oct-2022	28 days	9 days	✓
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE										
MW02	E235.Cl-L	29-Sep-2022	08-Oct-2022	----	----		08-Oct-2022	28 days	9 days	✓
Anions and Nutrients : Fluoride in Water by IC (Low Level)										
HDPE										
FIELD BLANK	E235.F-L	29-Sep-2022	08-Oct-2022	----	----		08-Oct-2022	28 days	9 days	✓
Anions and Nutrients : Fluoride in Water by IC (Low Level)										
HDPE										
JF-01-06	E235.F-L	29-Sep-2022	08-Oct-2022	----	----		08-Oct-2022	28 days	9 days	✓
Anions and Nutrients : Fluoride in Water by IC (Low Level)										
HDPE										
JF01-06-DUP	E235.F-L	29-Sep-2022	08-Oct-2022	----	----		08-Oct-2022	28 days	9 days	✓
Anions and Nutrients : Fluoride in Water by IC (Low Level)										
HDPE										
MW02	E235.F-L	29-Sep-2022	08-Oct-2022	----	----		08-Oct-2022	28 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE FIELD BLANK	E235.NO3-L	29-Sep-2022	08-Oct-2022	3 days	9 days	× EHTR	08-Oct-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE JF-01-06	E235.NO3-L	29-Sep-2022	08-Oct-2022	3 days	9 days	× EHTR	08-Oct-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE JF01-06-DUP	E235.NO3-L	29-Sep-2022	08-Oct-2022	3 days	9 days	× EHTR	08-Oct-2022	3 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MW02	E235.NO3-L	29-Sep-2022	08-Oct-2022	3 days	9 days	× EHTR	08-Oct-2022	3 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE FIELD BLANK	E235.NO2-L	29-Sep-2022	08-Oct-2022	----	----		08-Oct-2022	3 days	9 days	× EHTR-FM
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE JF-01-06	E235.NO2-L	29-Sep-2022	08-Oct-2022	----	----		08-Oct-2022	3 days	9 days	× EHTR-FM
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE JF01-06-DUP	E235.NO2-L	29-Sep-2022	08-Oct-2022	----	----		08-Oct-2022	3 days	9 days	× EHTR-FM
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE MW02	E235.NO2-L	29-Sep-2022	08-Oct-2022	----	----		08-Oct-2022	3 days	9 days	× EHTR-FM
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE FIELD BLANK	E392	29-Sep-2022	----	----	----		06-Oct-2022	28 days	7 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	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE JF-01-06	E392	29-Sep-2022	----	----	----		06-Oct-2022	28 days	7 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE JF01-06-DUP	E392	29-Sep-2022	----	----	----		06-Oct-2022	28 days	7 days	✓
Anions and Nutrients : Reactive Silica by Colourimetry										
HDPE MW02	E392	29-Sep-2022	----	----	----		06-Oct-2022	28 days	7 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE FIELD BLANK	E235.SO4	29-Sep-2022	08-Oct-2022	----	----		08-Oct-2022	28 days	9 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE JF-01-06	E235.SO4	29-Sep-2022	08-Oct-2022	----	----		08-Oct-2022	28 days	9 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE JF01-06-DUP	E235.SO4	29-Sep-2022	08-Oct-2022	----	----		08-Oct-2022	28 days	9 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE MW02	E235.SO4	29-Sep-2022	08-Oct-2022	----	----		08-Oct-2022	28 days	9 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (lab preserved) FIELD BLANK	E375-T	29-Sep-2022	06-Oct-2022	3 days	7 days	× EHTR	06-Oct-2022	28 days	0 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (lab preserved) JF-01-06	E375-T	29-Sep-2022	06-Oct-2022	3 days	7 days	× EHTR	06-Oct-2022	28 days	0 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	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (lab preserved)										
JF01-06-DUP	E375-T	29-Sep-2022	06-Oct-2022	3 days	7 days	× EHTR	06-Oct-2022	28 days	0 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (lab preserved)										
MW02	E375-T	29-Sep-2022	06-Oct-2022	3 days	7 days	× EHTR	06-Oct-2022	28 days	0 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (lab preserved)										
JF-01-06	E366	29-Sep-2022	06-Oct-2022	3 days	7 days	× EHTR	07-Oct-2022	28 days	1 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (lab preserved)										
JF01-06-DUP	E366	29-Sep-2022	06-Oct-2022	3 days	7 days	× EHTR	07-Oct-2022	28 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (lab preserved)										
FIELD BLANK	E372-U	29-Sep-2022	06-Oct-2022	3 days	7 days	× EHTR	07-Oct-2022	28 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (lab preserved)										
JF-01-06	E372-U	29-Sep-2022	06-Oct-2022	3 days	7 days	× EHTR	07-Oct-2022	28 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (lab preserved)										
JF01-06-DUP	E372-U	29-Sep-2022	06-Oct-2022	3 days	7 days	× EHTR	07-Oct-2022	28 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (lab preserved)										
MW02	E372-U	29-Sep-2022	06-Oct-2022	3 days	7 days	× EHTR	07-Oct-2022	28 days	1 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
FIELD BLANK	E509	29-Sep-2022	09-Oct-2022	----	----		09-Oct-2022	28 days	10 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	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) JF-01-06	E509	29-Sep-2022	09-Oct-2022	----	----		09-Oct-2022	28 days	10 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) JF01-06-DUP	E509	29-Sep-2022	09-Oct-2022	----	----		09-Oct-2022	28 days	10 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) MW02	E509	29-Sep-2022	09-Oct-2022	----	----		09-Oct-2022	28 days	10 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) FIELD BLANK	E421	29-Sep-2022	06-Oct-2022	----	----		06-Oct-2022	180 days	7 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) JF-01-06	E421	29-Sep-2022	06-Oct-2022	----	----		06-Oct-2022	180 days	7 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) JF01-06-DUP	E421	29-Sep-2022	06-Oct-2022	----	----		06-Oct-2022	180 days	7 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) MW02	E421	29-Sep-2022	06-Oct-2022	----	----		06-Oct-2022	180 days	7 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) JF-01-06	E601	29-Sep-2022	10-Oct-2022	14 days	11 days	✓	11-Oct-2022	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) JF01-06-DUP	E601	29-Sep-2022	10-Oct-2022	14 days	11 days	✓	11-Oct-2022	40 days	1 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	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) MW03	E601	29-Sep-2022	10-Oct-2022	14 days	11 days	✓	11-Oct-2022	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) MW04	E601	29-Sep-2022	10-Oct-2022	14 days	11 days	✓	11-Oct-2022	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) MW06	E601	29-Sep-2022	10-Oct-2022	14 days	11 days	✓	11-Oct-2022	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) MW06-DUP	E601	29-Sep-2022	10-Oct-2022	14 days	11 days	✓	11-Oct-2022	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) MW07	E601	29-Sep-2022	10-Oct-2022	14 days	11 days	✓	11-Oct-2022	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) JF01-01	E601	29-Sep-2022	11-Oct-2022	14 days	12 days	✓	12-Oct-2022	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) MW05	E601	29-Sep-2022	11-Oct-2022	14 days	12 days	✓	12-Oct-2022	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) PW01	E601	29-Sep-2022	11-Oct-2022	14 days	12 days	✓	12-Oct-2022	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) PW02	E601	29-Sep-2022	11-Oct-2022	14 days	12 days	✓	12-Oct-2022	40 days	1 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	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) PW03	E601	29-Sep-2022	11-Oct-2022	14 days	12 days	✓	12-Oct-2022	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) FIELD BLANK	E601	29-Sep-2022	08-Oct-2022	14 days	9 days	✓	08-Oct-2022	40 days	0 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) JF01-02	E601	29-Sep-2022	08-Oct-2022	14 days	9 days	✓	08-Oct-2022	40 days	0 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) JF01-03	E601	29-Sep-2022	08-Oct-2022	14 days	9 days	✓	08-Oct-2022	40 days	0 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) JF01-04	E601	29-Sep-2022	08-Oct-2022	14 days	9 days	✓	08-Oct-2022	40 days	0 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) MW02	E601	29-Sep-2022	08-Oct-2022	14 days	9 days	✓	08-Oct-2022	40 days	0 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) MW09	E601	29-Sep-2022	08-Oct-2022	14 days	9 days	✓	08-Oct-2022	40 days	0 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) MW10	E601	29-Sep-2022	08-Oct-2022	14 days	9 days	✓	08-Oct-2022	40 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) FIELD BLANK	E581.VH+F1	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 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	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) JF01-01	E581.VH+F1	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) JF01-02	E581.VH+F1	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) JF01-03	E581.VH+F1	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) JF01-04	E581.VH+F1	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) JF-01-06	E581.VH+F1	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) JF01-06-DUP	E581.VH+F1	29-Sep-2022	10-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW02	E581.VH+F1	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW03	E581.VH+F1	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW04	E581.VH+F1	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 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	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW05	E581.VH+F1	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW06	E581.VH+F1	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW06-DUP	E581.VH+F1	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW07	E581.VH+F1	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW09	E581.VH+F1	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW10	E581.VH+F1	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) PW01	E581.VH+F1	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) PW02	E581.VH+F1	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) PW03	E581.VH+F1	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 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	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (lab preserved) FIELD BLANK	E358-L	29-Sep-2022	06-Oct-2022	3 days	7 days	× EHTR	06-Oct-2022	28 days	0 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (lab preserved) JF-01-06	E358-L	29-Sep-2022	06-Oct-2022	3 days	7 days	× EHTR	06-Oct-2022	28 days	0 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (lab preserved) JF01-06-DUP	E358-L	29-Sep-2022	06-Oct-2022	3 days	7 days	× EHTR	06-Oct-2022	28 days	0 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (lab preserved) MW02	E358-L	29-Sep-2022	06-Oct-2022	3 days	7 days	× EHTR	06-Oct-2022	28 days	0 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE FIELD BLANK	E290	29-Sep-2022	08-Oct-2022	----	----		09-Oct-2022	14 days	11 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE JF-01-06	E290	29-Sep-2022	08-Oct-2022	----	----		09-Oct-2022	14 days	11 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE JF01-06-DUP	E290	29-Sep-2022	08-Oct-2022	----	----		09-Oct-2022	14 days	11 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MW02	E290	29-Sep-2022	08-Oct-2022	----	----		09-Oct-2022	14 days	11 days	✓
Physical Tests : Conductivity in Water										
HDPE FIELD BLANK	E100	29-Sep-2022	08-Oct-2022	----	----		09-Oct-2022	28 days	11 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	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Conductivity in Water										
HDPE JF-01-06	E100	29-Sep-2022	08-Oct-2022	----	----		09-Oct-2022	28 days	11 days	✓
Physical Tests : Conductivity in Water										
HDPE JF01-06-DUP	E100	29-Sep-2022	08-Oct-2022	----	----		09-Oct-2022	28 days	11 days	✓
Physical Tests : Conductivity in Water										
HDPE MW02	E100	29-Sep-2022	08-Oct-2022	----	----		09-Oct-2022	28 days	11 days	✓
Physical Tests : pH by Meter										
HDPE FIELD BLANK	E108	29-Sep-2022	08-Oct-2022	----	----		09-Oct-2022	0.25 hrs	36.25 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE JF-01-06	E108	29-Sep-2022	08-Oct-2022	----	----		09-Oct-2022	0.25 hrs	36.25 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE JF01-06-DUP	E108	29-Sep-2022	08-Oct-2022	----	----		09-Oct-2022	0.25 hrs	36.25 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE MW02	E108	29-Sep-2022	08-Oct-2022	----	----		09-Oct-2022	0.25 hrs	36.25 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE FIELD BLANK	E162	29-Sep-2022	----	----	----		06-Oct-2022	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE JF-01-06	E162	29-Sep-2022	----	----	----		06-Oct-2022	7 days	7 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	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TDS by Gravimetry										
HDPE JF01-06-DUP	E162	29-Sep-2022	----	----	----		06-Oct-2022	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE MW02	E162	29-Sep-2022	----	----	----		06-Oct-2022	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE FIELD BLANK	E160	29-Sep-2022	----	----	----		06-Oct-2022	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE JF-01-06	E160	29-Sep-2022	----	----	----		06-Oct-2022	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE JF01-06-DUP	E160	29-Sep-2022	----	----	----		06-Oct-2022	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE MW02	E160	29-Sep-2022	----	----	----		06-Oct-2022	7 days	7 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE FIELD BLANK	E121	29-Sep-2022	----	----	----		06-Oct-2022	3 days	7 days	× EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE JF-01-06	E121	29-Sep-2022	----	----	----		06-Oct-2022	3 days	7 days	× EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE JF01-06-DUP	E121	29-Sep-2022	----	----	----		06-Oct-2022	3 days	7 days	× EHTR

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	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Turbidity by Nephelometry										
HDPE MW02	E121	29-Sep-2022	----	----	----		06-Oct-2022	3 days	7 days	× EHTR
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) FIELD BLANK	E508	29-Sep-2022	07-Oct-2022	----	----		07-Oct-2022	28 days	8 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) JF-01-06	E508	29-Sep-2022	07-Oct-2022	----	----		07-Oct-2022	28 days	8 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) JF01-06-DUP	E508	29-Sep-2022	07-Oct-2022	----	----		07-Oct-2022	28 days	8 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) MW02	E508	29-Sep-2022	07-Oct-2022	----	----		07-Oct-2022	28 days	8 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE total (nitric acid) FIELD BLANK	E420	29-Sep-2022	07-Oct-2022	----	----		08-Oct-2022	180 days	9 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE total (nitric acid) JF-01-06	E420	29-Sep-2022	07-Oct-2022	----	----		08-Oct-2022	180 days	9 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE total (nitric acid) JF01-06-DUP	E420	29-Sep-2022	07-Oct-2022	----	----		08-Oct-2022	180 days	9 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE total (nitric acid) MW02	E420	29-Sep-2022	07-Oct-2022	----	----		08-Oct-2022	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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) FIELD BLANK	E611A	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) JF01-01	E611A	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) JF01-02	E611A	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) JF01-03	E611A	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) JF01-04	E611A	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) JF-01-06	E611A	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) JF01-06-DUP	E611A	29-Sep-2022	10-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW02	E611A	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW03	E611A	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 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	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW04	E611A	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW05	E611A	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW06	E611A	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW06-DUP	E611A	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW07	E611A	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW09	E611A	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW10	E611A	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) PW01	E611A	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) PW02	E611A	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 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	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
PW03	E611A	29-Sep-2022	08-Oct-2022	----	----		10-Oct-2022	14 days	11 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHTR: Exceeded ALS recommended hold time prior to sample receipt.

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			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	687130	1	7	14.2	5.0	✓
Ammonia by Fluorescence	E298	682753	1	12	8.3	5.0	✓
BTEX by Headspace GC-MS	E611A	687932	2	38	5.2	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	687138	1	4	25.0	5.0	✓
Conductivity in Water	E100	687129	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	688272	1	15	6.6	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	683874	1	17	5.8	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	682752	1	10	10.0	5.0	✓
Fluoride in Water by IC (Low Level)	E235.F-L	687137	1	4	25.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	687134	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	687135	1	20	5.0	5.0	✓
pH by Meter	E108	687128	1	20	5.0	5.0	✓
Reactive Silica by Colourimetry	E392	684477	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	687136	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	682670	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	682758	2	9	22.2	5.0	✓
Total Mercury in Water by CVAAS	E508	686522	1	20	5.0	5.0	✓
Total metals in Water by CRC ICPMS	E420	683319	2	20	10.0	5.0	✓
Total Nitrogen by Colourimetry	E366	682756	1	2	50.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	682757	1	4	25.0	5.0	✓
TSS by Gravimetry	E160	682673	1	12	8.3	5.0	✓
Turbidity by Nephelometry	E121	683829	2	32	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	687931	2	38	5.2	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	687130	1	7	14.2	5.0	✓
Ammonia by Fluorescence	E298	682753	1	12	8.3	5.0	✓
BTEX by Headspace GC-MS	E611A	687932	2	38	5.2	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601	686945	4	40	10.0	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	687138	1	4	25.0	5.0	✓
Conductivity in Water	E100	687129	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	688272	1	15	6.6	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	683874	1	17	5.8	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	682752	1	10	10.0	5.0	✓
Fluoride in Water by IC (Low Level)	E235.F-L	687137	1	4	25.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	687134	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	687135	1	20	5.0	5.0	✓
Oil & Grease by Gravimetry	E567	688409	1	8	12.5	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
pH by Meter	E108	687128	1	20	5.0	5.0	✓
Reactive Silica by Colourimetry	E392	684477	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	687136	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	682670	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	682758	2	9	22.2	5.0	✓
Total Mercury in Water by CVAAS	E508	686522	1	20	5.0	5.0	✓
Total metals in Water by CRC ICPMS	E420	683319	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	682756	1	2	50.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	682757	1	4	25.0	5.0	✓
TSS by Gravimetry	E160	682673	1	12	8.3	5.0	✓
Turbidity by Nephelometry	E121	683829	2	32	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	687931	2	38	5.2	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	687130	1	7	14.2	5.0	✓
Ammonia by Fluorescence	E298	682753	1	12	8.3	5.0	✓
BTEX by Headspace GC-MS	E611A	687932	2	38	5.2	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601	686945	4	40	10.0	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	687138	1	4	25.0	5.0	✓
Conductivity in Water	E100	687129	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	688272	1	15	6.6	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	683874	1	17	5.8	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	682752	1	10	10.0	5.0	✓
Fluoride in Water by IC (Low Level)	E235.F-L	687137	1	4	25.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	687134	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	687135	1	20	5.0	5.0	✓
Oil & Grease by Gravimetry	E567	688409	1	8	12.5	5.0	✓
Reactive Silica by Colourimetry	E392	684477	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	687136	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	682670	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	682758	2	9	22.2	5.0	✓
Total Mercury in Water by CVAAS	E508	686522	1	20	5.0	5.0	✓
Total metals in Water by CRC ICPMS	E420	683319	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	682756	1	2	50.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	682757	1	4	25.0	5.0	✓
TSS by Gravimetry	E160	682673	1	12	8.3	5.0	✓
Turbidity by Nephelometry	E121	683829	2	32	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	687931	2	38	5.2	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	682753	1	12	8.3	5.0	✓
BTEX by Headspace GC-MS	E611A	687932	2	38	5.2	5.0	✓

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Matrix Spikes (MS) - Continued							
Chloride in Water by IC (Low Level)	E235.Cl-L	687138	1	4	25.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	688272	1	15	6.6	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	683874	1	17	5.8	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	682752	1	10	10.0	5.0	✓
Fluoride in Water by IC (Low Level)	E235.F-L	687137	1	4	25.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	687134	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	687135	1	20	5.0	5.0	✓
Reactive Silica by Colourimetry	E392	684477	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	687136	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	682758	1	9	11.1	5.0	✓
Total Mercury in Water by CVAAS	E508	686522	1	20	5.0	5.0	✓
Total metals in Water by CRC ICPMS	E420	683319	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	682756	0	2	0.0	5.0	✗
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	682757	1	4	25.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	687931	2	38	5.2	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
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 Vancouver - Environmental	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TSS by Gravimetry	E160 Vancouver - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC (Low Level)	E235.Cl-L 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 (Low Level)	E235.F-L 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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Nitrogen by Colourimetry	E366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U Vancouver - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T Vancouver - Environmental	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Reactive Silica by Colourimetry	E392 Vancouver - Environmental	Water	APHA 4500-SiO2 E (mod)	Silicate (molybdate-reactive silica) is determined by the molybdosilicate-heteropoly blue colourimetric method using a discrete analyzer. Method Limitation: Arsenic (5+) above 100 mg/L is a negative interference on this test
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.
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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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.
Oil & Grease by Gravimetry	E567 Vancouver - Environmental	Water	BC MOE Lab Manual (Oil & Grease) (mod)	The entire water sample is extracted with hexane and the extract is evaporated to dryness. The residue is then weighed to determine Oil and Grease.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
CCME PHCs - F2-F4 by GC-FID	E601 Vancouver - Environmental	Water	CCME PHC in Soil - Tier 1	Sample extracts are analyzed by GC-FID for CCME hydrocarbon fractions (F2-F4).
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 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 CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 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.
TDS in Water (Calculation) Using APHA Analyte List	EC103.APHA Vancouver - Environmental	Water	APHA 1030E	Total DIssolved Solids is calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis).
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N Vancouver - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
F1-BTEX	EC580 Vancouver - Environmental	Water	CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
VPH: VH-BTEX-Styrene	EC580A Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 Vancouver - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Preparation for Dissolved Organic Carbon for Combustion	EP358 Vancouver - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Nitrogen in water	EP366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
Digestion for Total Phosphorus in water	EP372 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
Oil & Grease Extraction for Gravimetry	EP567 Vancouver - Environmental	Water	BC MOE Lab Manual (Oil & Grease) (mod)	The entire water sample is extracted with hexane by liquid-liquid extraction.
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **YL2201730**	Page	: 1 of 21
Amendment	: **1**		
Client	: Golder Associates Ltd.	Laboratory	: Yellowknife - Environmental
Contact	: Laurence Bonin	Account Manager	: Oliver Gregg
Address	: 9 - 4905 48th Street Yellowknife NT Canada X1A 3S3	Address	: 314 Old Airport Road, Unit 116 Yellowknife, Northwest Territories Canada X1A 3T3
Telephone	: ----	Telephone	: 1 867 446 5593
Project	: 183527250	Date Samples Received	: 03-Oct-2022 10:50
PO	: ----	Date Analysis Commenced	: 06-Oct-2022
C-O-C number	: ----	Issue Date	: 17-Oct-2022 16:15
Sampler	: ----		
Site	: Jackfish NTPC		
Quote number	: YL21-GOLD100-008		
No. of samples received	: 19		
No. of samples analysed	: 19		

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 Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

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.

Signatories	*Position*	*Laboratory Department*
Angelo Salandanan	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
Dan Gebert	Laboratory Analyst	Vancouver Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Kyle Chang	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Qammar Almas	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Vancouver Inorganics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Vancouver 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 Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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: 682670)											
VA22C3483-001	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	179	176	4	Diff <2x LOR	----
Physical Tests (QC Lot: 682673)											
VA22C3875-001	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 683829)											
VA22C3786-001	Anonymous	turbidity	----	E121	0.10	NTU	0.28	0.28	0.002	Diff <2x LOR	----
Physical Tests (QC Lot: 683830)											
YL2201730-018	JF-01-06	turbidity	----	E121	0.10	NTU	14.3	13.7	4.30%	15%	----
Physical Tests (QC Lot: 687128)											
WR2201221-003	Anonymous	pH	----	E108	0.10	pH units	7.84	7.85	0.127%	4%	----
Physical Tests (QC Lot: 687129)											
WR2201221-003	Anonymous	conductivity	----	E100	2.0	µS/cm	2030	2060	1.47%	10%	----
Physical Tests (QC Lot: 687130)											
WR2201221-003	Anonymous	alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	47.4	47.5	0.211%	20%	----
		alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, phenolphthalein (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	47.4	47.5	0.211%	20%	----
Anions and Nutrients (QC Lot: 682753)											
KS2203731-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 682756)											
YL2201730-018	JF-01-06	nitrogen, total	7727-37-9	E366	0.030	mg/L	0.823	0.816	0.832%	20%	----
Anions and Nutrients (QC Lot: 682757)											
YL2201730-005	MW02	phosphorus, total	7723-14-0	E372-U	0.0200	mg/L	0.0744	0.0950	0.0205	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 682758)											
YL2201730-005	MW02	phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	0.0156	0.0154	0.0002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 684477)											
YL2201654-001	Anonymous	silicate (as SiO2)	7631-86-9	E392	2.50	mg/L	27.7	27.9	0.659%	20%	----
Anions and Nutrients (QC Lot: 684961)											
VA22C3783-001	Anonymous	phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	0.0757	0.0765	0.999%	20%	----
Anions and Nutrients (QC Lot: 687134)											
VA22C3741-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	<0.0250	<0.0250	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*
Anions and Nutrients (QC Lot: 687135)											
VA22C3741-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 687136)											
VA22C3741-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	28.5	28.2	0.867%	20%	----
Anions and Nutrients (QC Lot: 687137)											
YL2201730-005	MW02	fluoride	16984-48-8	E235.F-L	0.010	mg/L	0.109	0.108	1.19%	20%	----
Anions and Nutrients (QC Lot: 687138)											
YL2201730-005	MW02	chloride	16887-00-6	E235.Cl-L	0.10	mg/L	62.3	62.2	0.200%	20%	----
Organic / Inorganic Carbon (QC Lot: 682752)											
YL2201660-001	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	1.50	mg/L	108	111	2.82%	20%	----
Total Metals (QC Lot: 683319)											
YL2201785-001	Anonymous	titanium, total	7440-32-6	E420	0.00030	mg/L	0.00069	0.00052	0.00017	Diff <2x LOR	----
YL2201785-001	Anonymous	aluminum, total	7429-90-5	E420	0.0030	mg/L	0.429	0.436	1.76%	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	0.00045	0.00044	0.000009	Diff <2x LOR	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.338	0.346	2.14%	20%	----
		beryllium, total	7440-41-7	E420	0.000020	mg/L	0.000197	0.000210	6.24%	20%	----
		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	1.65	1.70	2.90%	20%	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.000544	0.000527	3.12%	20%	----
		calcium, total	7440-70-2	E420	0.050	mg/L	221	220	0.471%	20%	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	0.000071	0.000066	0.000005	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	0.0175	0.0175	0.0550%	20%	----
		copper, total	7440-50-8	E420	0.00050	mg/L	0.0119	0.0118	1.00%	20%	----
		iron, total	7439-89-6	E420	0.010	mg/L	0.192	0.192	0.152%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	0.000391	0.000388	0.000003	Diff <2x LOR	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	0.0144	0.0143	0.506%	20%	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	52.0	53.0	2.01%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.922	0.946	2.57%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00626	0.00624	0.288%	20%	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.0649	0.0650	0.106%	20%	----
		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	43.5	44.9	3.20%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.0370	0.0380	2.55%	20%	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.000208	0.000199	0.000009	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: 683319) - continued											
YL2201785-001	Anonymous	silicon, total	7440-21-3	E420	0.10	mg/L	5.98	5.96	0.321%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, total	7440-23-5	E420	0.050	mg/L	135	137	1.20%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	2.67	2.68	0.202%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	38.1	36.8	3.43%	20%	----
		tellurium, total	13494-80-9	E420	0.00020	mg/L	0.00053	0.00051	0.00002	Diff <2x LOR	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	0.000109	0.000103	5.56%	20%	----
		thorium, total	7440-29-1	E420	0.00010	mg/L	0.00024	0.00024	0.000005	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	0.00018	0.00018	0.000003	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.00272	0.00271	0.337%	20%	----
		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	0.0519	0.0524	1.11%	20%	----
		zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Total Metals (QC Lot: 686522)											
VA22C4042-002	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 683874)											
VA22C3795-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0022	0.0020	0.0001	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00170	0.00173	1.58%	20%	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00232	0.00231	0.522%	20%	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0354	0.0356	0.723%	20%	----
		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	----
		boron, dissolved	7440-42-8	E421	0.010	mg/L	0.023	0.024	0.001	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000277	0.0000268	0.0000009	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	87.6	91.4	4.16%	20%	----
		cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000024	0.000025	0.000002	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	0.00026	0.00026	0.000003	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00075	0.00075	0.000001	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	0.0036	0.0037	0.0001	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.100	mg/L	26.6	26.1	1.97%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.284	0.284	0.0901%	20%	----

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: 683874) - continued											
VA22C3795-001	Anonymous	molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00908	0.00921	1.52%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00132	0.00124	0.00008	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	0.100	mg/L	3.86	3.83	0.700%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00214	0.00212	0.939%	20%	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000250	0.000281	0.000032	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	3.45	3.43	0.359%	20%	----
		silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, dissolved	7440-23-5	E421	0.050	mg/L	98.9	97.9	1.05%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.547	0.558	1.98%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	119	122	2.70%	20%	----
		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	0.000024	0.000024	0.0000003	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	0.000519	0.000525	1.13%	20%	----
		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	0.0116	0.0116	0.757%	20%	----
		zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 688272)											
VA22C4062-004	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0050 µg/L	<0.0000050	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 687932)											
YL2201730-001	MW10	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 688818)											
KS2203783-001	Anonymous	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	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*
Volatile Organic Compounds (QC Lot: 688818) - continued											
KS2203783-001	Anonymous	styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 687931)											
YL2201730-001	MW10	F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----
		VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----
Hydrocarbons (QC Lot: 688817)											
KS2203783-001	Anonymous	F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----
		VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----

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: 682670)						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Physical Tests (QCLot: 682673)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Physical Tests (QCLot: 683829)						
turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 683830)						
turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 687129)						
conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 687130)						
alkalinity, bicarbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, carbonate (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, hydroxide (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	<1.0	----
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Anions and Nutrients (QCLot: 682753)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 682756)						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 682757)						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 682758)						
phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 684477)						
silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 684961)						
phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 687134)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 687135)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 687136)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 687137)						
fluoride	16984-48-8	E235.F-L	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 687138)						
chloride	16887-00-6	E235.Cl-L	0.1	mg/L	<0.10	----
Organic / Inorganic Carbon (QCLot: 682752)						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 683319)						
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	----
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	7440-23-5	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	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 683319) - continued						
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	----
Total Metals (QCLot: 686522)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Dissolved Metals (QCLot: 683874)						
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	----
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	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 683874) - continued						
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	7440-23-5	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	----
Dissolved Metals (QCLot: 688272)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
Aggregate Organics (QCLot: 688409)						
oil & grease (gravimetric)	----	E567	5	mg/L	<5.0	----
Volatile Organic Compounds (QCLot: 687932)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Volatile Organic Compounds (QCLot: 688818)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 686945)						

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Hydrocarbons (QCLot: 686945) - continued						
F2 (C10-C16)	----	E601	100	µg/L	<100	----
F3 (C16-C34)	----	E601	250	µg/L	<250	----
F4 (C34-C50)	----	E601	250	µg/L	<250	----
Hydrocarbons (QCLot: 687931)						
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 688817)						
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 688982)						
F2 (C10-C16)	----	E601	100	µg/L	<100	----
F3 (C16-C34)	----	E601	250	µg/L	<250	----
F4 (C34-C50)	----	E601	250	µg/L	<250	----
Hydrocarbons (QCLot: 689614)						
F2 (C10-C16)	----	E601	100	µg/L	<100	----
F3 (C16-C34)	----	E601	250	µg/L	<250	----
F4 (C34-C50)	----	E601	250	µg/L	<250	----
Hydrocarbons (QCLot: 690783)						
F2 (C10-C16)	----	E601	100	µg/L	<100	----
F3 (C16-C34)	----	E601	250	µg/L	<250	----
F4 (C34-C50)	----	E601	250	µg/L	<250	----

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				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 682670)									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	97.5	85.0	115	----
Physical Tests (QCLot: 682673)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	90.5	85.0	115	----
Physical Tests (QCLot: 683829)									
turbidity	----	E121	0.1	NTU	200 NTU	98.0	85.0	115	----
Physical Tests (QCLot: 683830)									
turbidity	----	E121	0.1	NTU	200 NTU	98.0	85.0	115	----
Physical Tests (QCLot: 687128)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 687129)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	99.6	90.0	110	----
Physical Tests (QCLot: 687130)									
alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	229 mg/L	109	75.0	125	----
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	108	85.0	115	----
Anions and Nutrients (QCLot: 682753)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	96.2	85.0	115	----
Anions and Nutrients (QCLot: 682756)									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	99.8	75.0	125	----
Anions and Nutrients (QCLot: 682757)									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	90.1	80.0	120	----
Anions and Nutrients (QCLot: 682758)									
phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	0.05 mg/L	93.9	80.0	120	----
Anions and Nutrients (QCLot: 684477)									
silicate (as SiO2)	7631-86-9	E392	0.5	mg/L	10 mg/L	104	85.0	115	----
Anions and Nutrients (QCLot: 684961)									
phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	0.05 mg/L	91.1	80.0	120	----
Anions and Nutrients (QCLot: 687134)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	105	90.0	110	----
Anions and Nutrients (QCLot: 687135)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	98.8	90.0	110	----
Anions and Nutrients (QCLot: 687136)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	106	90.0	110	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 687137)									
fluoride	16984-48-8	E235.F-L	0.01	mg/L	1 mg/L	99.8	90.0	110	----
Anions and Nutrients (QCLot: 687138)									
chloride	16887-00-6	E235.Cl-L	0.1	mg/L	100 mg/L	104	90.0	110	----
Organic / Inorganic Carbon (QCLot: 682752)									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	101	80.0	120	----
Total Metals (QCLot: 683319)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	101	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	111	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	105	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	104	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	107	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	92.8	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	101	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	106	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	107	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	101	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	99.8	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	104	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	106	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	105	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	101	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	99.6	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	110	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	100	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	107	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	108	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	108	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	100	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	100	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	97.9	80.0	120	----
sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	102	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	109	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	106	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	102	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: 683319) - continued									
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	105	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	98.4	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	102	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	98.2	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	103	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	107	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	103	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	96.8	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	104	80.0	120	----
Total Metals (QCLot: 686522)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	95.7	80.0	120	----
Dissolved Metals (QCLot: 683874)									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	96.2	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	103	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	99.2	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	96.5	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	101	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	102	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	89.5	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	98.5	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	100	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	101	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	94.2	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	94.6	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	95.3	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	117	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	102	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	98.2	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	97.2	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	97.0	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	101	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	94.5	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	108	80.0	120	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	98.0	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	98.1	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	99.4	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
Dissolved Metals (QCLot: 683874) - continued									
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	103	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	93.4	80.0	120	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	99.6	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	109	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	90.7	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	107	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	97.7	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	97.8	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	93.6	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	99.4	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	104	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	98.8	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	96.7	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	97.5	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	104	80.0	120	----
Aggregate Organics (QCLot: 688409)									
oil & grease (gravimetric)	----	E567	5	mg/L	100 mg/L	93.4	70.0	130	----
Volatile Organic Compounds (QCLot: 687932)									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	103	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	108	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	103	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	98.8	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	108	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	116	70.0	130	----
xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	108	70.0	130	----
Volatile Organic Compounds (QCLot: 688818)									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	98.7	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	96.8	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	99.3	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	92.9	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	96.7	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	105	70.0	130	----
xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	99.2	70.0	130	----
Hydrocarbons (QCLot: 686945)									

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Hydrocarbons (QCLot: 686945) - continued									
F2 (C10-C16)	----	E601	100	µg/L	3538 µg/L	121	70.0	130	----
F3 (C16-C34)	----	E601	250	µg/L	7053 µg/L	106	70.0	130	----
F4 (C34-C50)	----	E601	250	µg/L	5051 µg/L	110	70.0	130	----
Hydrocarbons (QCLot: 687931)									
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	91.4	70.0	130	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	95.3	70.0	130	----
Hydrocarbons (QCLot: 688817)									
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	112	70.0	130	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	112	70.0	130	----
Hydrocarbons (QCLot: 688982)									
F2 (C10-C16)	----	E601	100	µg/L	3538 µg/L	113	70.0	130	----
F3 (C16-C34)	----	E601	250	µg/L	7053 µg/L	99.2	70.0	130	----
F4 (C34-C50)	----	E601	250	µg/L	5051 µg/L	109	70.0	130	----
Hydrocarbons (QCLot: 689614)									
F2 (C10-C16)	----	E601	100	µg/L	3538 µg/L	118	70.0	130	----
F3 (C16-C34)	----	E601	250	µg/L	7053 µg/L	107	70.0	130	----
F4 (C34-C50)	----	E601	250	µg/L	5051 µg/L	107	70.0	130	----
Hydrocarbons (QCLot: 690783)									
F2 (C10-C16)	----	E601	100	µg/L	3538 µg/L	121	70.0	130	----
F3 (C16-C34)	----	E601	250	µg/L	7053 µg/L	106	70.0	130	----
F4 (C34-C50)	----	E601	250	µg/L	5051 µg/L	111	70.0	130	----

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: 682753)										
KS2203731-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0925 mg/L	0.1 mg/L	92.5	75.0	125	----
Anions and Nutrients (QCLot: 682757)										
YL2201730-006	FIELD BLANK	phosphorus, total	7723-14-0	E372-U	0.0476 mg/L	0.05 mg/L	95.2	70.0	130	----
Anions and Nutrients (QCLot: 684477)										
YL2201654-002	Anonymous	silicate (as SiO2)	7631-86-9	E392	ND mg/L	10 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 684961)										
VA22C4085-001	Anonymous	phosphorus, total dissolved	7723-14-0	E375-T	0.0474 mg/L	0.05 mg/L	94.9	70.0	130	----
Anions and Nutrients (QCLot: 687134)										
VA22C3741-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	12.8 mg/L	12.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 687135)										
VA22C3741-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	2.39 mg/L	2.5 mg/L	95.7	75.0	125	----
Anions and Nutrients (QCLot: 687136)										
VA22C3741-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	492 mg/L	500 mg/L	98.4	75.0	125	----
Anions and Nutrients (QCLot: 687137)										
YL2201730-006	FIELD BLANK	fluoride	16984-48-8	E235.F-L	1.03 mg/L	1 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 687138)										
YL2201730-006	FIELD BLANK	chloride	16887-00-6	E235.Cl-L	108 mg/L	100 mg/L	108	75.0	125	----
Organic / Inorganic Carbon (QCLot: 682752)										
YL2201660-002	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
Total Metals (QCLot: 683319)										
YL2201786-001	Anonymous	aluminum, total	7429-90-5	E420	ND mg/L	0.2 mg/L	ND	70.0	130	----
		antimony, total	7440-36-0	E420	0.0207 mg/L	0.02 mg/L	103	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0193 mg/L	0.02 mg/L	96.4	70.0	130	----
		barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		beryllium, total	7440-41-7	E420	0.0412 mg/L	0.04 mg/L	103	70.0	130	----
		bismuth, total	7440-69-9	E420	0.00911 mg/L	0.01 mg/L	91.1	70.0	130	----
		boron, total	7440-42-8	E420	ND mg/L	0.1 mg/L	ND	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00368 mg/L	0.004 mg/L	91.9	70.0	130	----
		calcium, total	7440-70-2	E420	ND mg/L	4 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
Total Metals (QCLot: 683319) - continued										
YL2201786-001	Anonymous	cesium, total	7440-46-2	E420	0.0102 mg/L	0.01 mg/L	102	70.0	130	----
		chromium, total	7440-47-3	E420	0.0380 mg/L	0.04 mg/L	95.1	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0180 mg/L	0.02 mg/L	90.0	70.0	130	----
		copper, total	7440-50-8	E420	0.0172 mg/L	0.02 mg/L	85.8	70.0	130	----
		iron, total	7439-89-6	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		lead, total	7439-92-1	E420	0.0182 mg/L	0.02 mg/L	90.8	70.0	130	----
		lithium, total	7439-93-2	E420	0.0986 mg/L	0.1 mg/L	98.6	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	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	0.0221 mg/L	0.02 mg/L	110	70.0	130	----
		nickel, total	7440-02-0	E420	0.0333 mg/L	0.04 mg/L	83.2	70.0	130	----
		phosphorus, total	7723-14-0	E420	10.8 mg/L	10 mg/L	108	70.0	130	----
		potassium, total	7440-09-7	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0195 mg/L	0.02 mg/L	97.7	70.0	130	----
		selenium, total	7782-49-2	E420	0.0358 mg/L	0.04 mg/L	89.4	70.0	130	----
		silicon, total	7440-21-3	E420	9.11 mg/L	10 mg/L	91.1	70.0	130	----
		silver, total	7440-22-4	E420	0.00404 mg/L	0.004 mg/L	101	70.0	130	----
		sodium, total	7440-23-5	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, total	7704-34-9	E420	ND mg/L	20 mg/L	ND	70.0	130	----
		tellurium, total	13494-80-9	E420	0.0376 mg/L	0.04 mg/L	94.0	70.0	130	----
		thallium, total	7440-28-0	E420	0.00355 mg/L	0.004 mg/L	88.8	70.0	130	----
		thorium, total	7440-29-1	E420	0.0206 mg/L	0.02 mg/L	103	70.0	130	----
		tin, total	7440-31-5	E420	0.0193 mg/L	0.02 mg/L	96.6	70.0	130	----
		titanium, total	7440-32-6	E420	ND mg/L	0.04 mg/L	ND	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0191 mg/L	0.02 mg/L	95.7	70.0	130	----
		uranium, total	7440-61-1	E420	0.00395 mg/L	0.004 mg/L	98.8	70.0	130	----
		vanadium, total	7440-62-2	E420	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		zinc, total	7440-66-6	E420	0.344 mg/L	0.4 mg/L	86.1	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0441 mg/L	0.04 mg/L	110	70.0	130	----
Total Metals (QCLot: 686522)										
VA22C4042-003	Anonymous	mercury, total	7439-97-6	E508	0.0000936 mg/L	0.0001 mg/L	93.6	70.0	130	----
Dissolved Metals (QCLot: 683874)										
VA22C3795-002	Anonymous	aluminum, dissolved	7429-90-5	E421	0.188 mg/L	0.2 mg/L	94.2	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0196 mg/L	0.02 mg/L	98.2	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0189 mg/L	0.02 mg/L	94.3	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: 683874) - continued										
VA22C3795-002	Anonymous	barium, dissolved	7440-39-3	E421	0.0190 mg/L	0.02 mg/L	95.0	70.0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0400 mg/L	0.04 mg/L	99.9	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00875 mg/L	0.01 mg/L	87.5	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.084 mg/L	0.1 mg/L	84.6	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00394 mg/L	0.004 mg/L	98.4	70.0	130	----
		calcium, dissolved	7440-70-2	E421	3.88 mg/L	4 mg/L	97.0	70.0	130	----
		cesium, dissolved	7440-46-2	E421	0.0102 mg/L	0.01 mg/L	102	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0374 mg/L	0.04 mg/L	93.5	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0189 mg/L	0.02 mg/L	94.7	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0192 mg/L	0.02 mg/L	95.8	70.0	130	----
		iron, dissolved	7439-89-6	E421	1.92 mg/L	2 mg/L	96.1	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.0983 mg/L	0.1 mg/L	98.3	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	0.957 mg/L	1 mg/L	95.7	70.0	130	----
		manganese, dissolved	7439-96-5	E421	0.0192 mg/L	0.02 mg/L	96.0	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0196 mg/L	0.02 mg/L	98.2	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0383 mg/L	0.04 mg/L	95.7	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	10.3 mg/L	10 mg/L	103	70.0	130	----
		potassium, dissolved	7440-09-7	E421	3.88 mg/L	4 mg/L	97.1	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0191 mg/L	0.02 mg/L	95.3	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0398 mg/L	0.04 mg/L	99.4	70.0	130	----
		silicon, dissolved	7440-21-3	E421	9.43 mg/L	10 mg/L	94.3	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00420 mg/L	0.004 mg/L	105	70.0	130	----
		sodium, dissolved	7440-23-5	E421	1.99 mg/L	2 mg/L	99.5	70.0	130	----
		strontium, dissolved	7440-24-6	E421	0.0210 mg/L	0.02 mg/L	105	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	19.7 mg/L	20 mg/L	98.4	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0417 mg/L	0.04 mg/L	104	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00387 mg/L	0.004 mg/L	96.8	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0219 mg/L	0.02 mg/L	109	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0191 mg/L	0.02 mg/L	95.4	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0377 mg/L	0.04 mg/L	94.2	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0191 mg/L	0.02 mg/L	95.3	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00392 mg/L	0.004 mg/L	97.9	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.0973 mg/L	0.1 mg/L	97.3	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.393 mg/L	0.4 mg/L	98.2	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0405 mg/L	0.04 mg/L	101	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: 688272)										
VA22C4062-005	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000998 mg/L	0.0001 mg/L	99.8	70.0	130	----
Volatile Organic Compounds (QCLot: 687932)										
YL2201730-001	MW10	benzene	71-43-2	E611A	98.1 µg/L	100 µg/L	98.1	60.0	140	----
		ethylbenzene	100-41-4	E611A	91.3 µg/L	100 µg/L	91.3	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	99.2 µg/L	100 µg/L	99.2	60.0	140	----
		styrene	100-42-5	E611A	89.9 µg/L	100 µg/L	89.9	60.0	140	----
		toluene	108-88-3	E611A	92.3 µg/L	100 µg/L	92.3	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	199 µg/L	200 µg/L	99.5	60.0	140	----
		xylene, o-	95-47-6	E611A	96.6 µg/L	100 µg/L	96.6	60.0	140	----
Volatile Organic Compounds (QCLot: 688818)										
KS2203783-001	Anonymous	benzene	71-43-2	E611A	98.5 µg/L	100 µg/L	98.5	60.0	140	----
		ethylbenzene	100-41-4	E611A	93.7 µg/L	100 µg/L	93.7	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	98.4 µg/L	100 µg/L	98.4	60.0	140	----
		styrene	100-42-5	E611A	91.2 µg/L	100 µg/L	91.2	60.0	140	----
		toluene	108-88-3	E611A	93.6 µg/L	100 µg/L	93.6	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	203 µg/L	200 µg/L	102	60.0	140	----
		xylene, o-	95-47-6	E611A	96.9 µg/L	100 µg/L	96.9	60.0	140	----
Hydrocarbons (QCLot: 687931)										
YL2201730-002	MW09	F1 (C6-C10)	----	E581.VH+F1	3970 µg/L	6310 µg/L	62.9	60.0	140	----
		VHw (C6-C10)	----	E581.VH+F1	3910 µg/L	6310 µg/L	61.9	60.0	140	----
Hydrocarbons (QCLot: 688817)										
KS2203783-002	Anonymous	F1 (C6-C10)	----	E581.VH+F1	5280 µg/L	6310 µg/L	83.7	60.0	140	----
		VHw (C6-C10)	----	E581.VH+F1	4740 µg/L	6310 µg/L	75.1	60.0	140	----

Lab Copy

Northwest Territories Power Corp.(NTPC) Jackfish Power Plant GW Monitoring
Chain-of-Custody Record - Analytical Request Form

CoC#: NTPC-Jackfish-16072021
Created: 29

From:

Golder Associates - NTPC
Address: 9, 4905 - 48 Street Yellowknife, Northwest Territories X1A 3S3
Phone: (867) 873 6319
Contact: Laurence Bonin laurence.bonin@wsp.com

Send Samples For Analysis To:

ALS Group, Yellowknife
Address: 314 Old Airport Rd, Unit 116 Yellowknife, NT X1A 3T3
Phone: (867) 873-5593 Fax: (867) 920-4238
Contact: Oliver Gregg Email: Oliver.Gregg@alsglobal.com

eMail Confirmation and Results To:

Please use full distribution list from quote
laurence.bonin@wsp.com
tamra.reynolds@wsp.com

Send Original Signed Lab Reports To:

Golder Associates Ltd.
Address: 9, 4905 - 48 Street Yellowknife, Northwest Territories X1A 3S3
Phone: (867) 873 6319
Contact: Laurence Bonin laurence.bonin@wsp.com

Send Invoice To:

Northwest Territories Power Corporation
Address: 4 Capital Drive Hay River, NT X0E 1G2 Canada
Phone: (867) 874-5200
Attn: Patrick Smith psmith@ntpc.com

FIELD SAMPLE INFORMATION

REQUESTED LAB SUITES (see reverse side for details)

Fields Notes:

Samples have been field filtered and preserved

Please ensure that there is only one COC per report. Use email confirmation and results list on this COC. Requires a 5-day TAT.

Facilty Code:

Project # 22537423-Jackfish
August 2022 NTPC Jackfish GW Sampling
Quote # YL21-GOLD100-008

							√ = Preserved :			√	√	√	√	√	√																
							√ = Field Filtered :				√			√																		
							√ = 1-Day Rush :																								
Sample ID #	Sample Location	Sample Date (dd-mmm-yy)	Sample Time (hh:mm)	Matrix	Laboratory Comments	Sampler Comments	G = Grab or C = Composite	Number of Containers	Routine (pH, major ions)	Oil and Grease (Hexane Extractable)	Total Metals	Dissolved Metals	Total Mercury	Dissolved Mercury	Benzene, Toluene, Ethylbenzene, Xylene (BTEX)	Total Petroleum Hydrocarbons (F1-F4 CCME Fracti														
√MW10	MW10	29-Sep-22	11:30	Water			G	4							x	x														
√MW09	MW09	29-Sep-22	11:10	Water			G	4							x	x														
√JF01-02	JF01-02	29-Sep-22	10:55	Water			G	4							x	x														
√JF01-03	JF01-03	29-Sep-22	10:40	Water			G	4							x	x														
√MW02	MW02	29-Sep-22	10:10	Water			G	11	x	x	x	x	x	x	x	x														
Field Blank	MW02	29-Sep-22	10:15	Water			G	11	x	x	x	x	x	x	x	x														
√JF01-04	JF01-04	29-Sep-22	9:50	Water			G	4							x	x														
√MW03	MW03	29-Sep-22	9:35	Water			G	4							x	x														

Environmental Division
Yellowknife
Work Order Reference
YL2201730

Telephone : +1 867 873 5593

Relinquished by (Sampler Signature):	Date/Time: August 12, 2022 345	Company: Golder Associates Ltd	Received by (Signature):	Company:
Relinquished by (Signature):	Date/Time: 29/09/22	Company:	Received by (Signature):	Company:
Sampler (Printed Name): Meaghan MacIntyre-Newell Dylan Cooke	Sample Storage Temperature prior to Shipping (deg. C):	Sample Receipt Temperature (deg. C): 5.7	SAMPLE CONDITION (lab use only) Samples Received in Good Condition? (Yes) / No (If no, provide details.)	

JC OCT - 4 2022 1310 6°C (avg 4) rcpt

Lab Copy

Northwest Territories Power Corp.(NTPC) Jackfish Power Plant GW Monitoring
Chain-of-Custody Record - Analytical Request Form

CoC#: NTPC-Jackfish-16072021
Created: 29

From:

Golder Associates - NTPC
Address: 9, 4905 - 48 Street Yellowknife, Northwest Territories X1A 3S3
Phone: (867) 873 6319
Contact: Laurence Bonin laurence.bonin@wsp.com

Send Samples For Analysis To:

ALS Group, Yellowknife
Address: 314 Old Airport Rd, Unit 116 Yellowknife, NT X1A 3T3
Phone: (867) 873-5593 Fax: (867) 920-4238
Contact: Oliver Gregg Email: Oliver.Gregg@alsglobal.com

eMail Confirmation and Results To:

Please use full distribution list from quote
laurence.bonin@wsp.com
tamra.reynolds@wsp.com

Send Original Signed Lab Reports To:

Golder Associates Ltd.
Address: 9, 4905 - 48 Street Yellowknife, Northwest Territories X1A 3S3
Phone: (867) 873 6319
Contact: Laurence Bonin laurence.bonin@wsp.com

Send Invoice To:

Northwest Territories Power Corporation
Address: 4 Capital Drive Hay River, NT X0E 1G2 Canada
Phone: (867) 874-5200
Attn: Patrick Smith psmith@ntpc.com

FIELD SAMPLE INFORMATION

REQUESTED LAB SUITES (see reverse side for details)

Fields Notes:
Samples have been field filtered and preserved
Please ensure that there is only one COC per report. Use email confirmation and results list on this COC. Requires a 5-day TAT.
Facilty Code:

Project # **22537423-Jackfish**
August 2022 NTPC Jackfish GW Sampling
Quote # **YL21-GOLD100-008**

√ = Preserved :										√	√	√	√	√	√															
√ = Field Filtered :												√		√																
√ = 1-Day Rush :																														
Sample ID #	Sample Location	Sample Date (dd-mmm-yy)	Sample Time (hh:mm)	Matrix	Laboratory Comments	Sampler Comments	G = Grab or C = Composite	Number of Containers	Routine (pH, major ions)	Oil and Grease (Hexane Extractable)	Total Metals	Dissolved Metals	Total Mercury	Dissolved Mercury	Benzene, Toluene, Ethylbenzene, Xylene (BTEX)	Total Petroleum Hydrocarbons (F1-F4 CCME Fracti														
√ PW03	PW03	29-Sep-22	14:10	Water			G	4							x	x														
√ PW01	PW01	29-Sep-22	13:20	Water			G	4							x	x														
√ JF01-01	JF01-01	29-Sep-22	12:50	Water			G	4							x	x														
√ PW02	PW02	29-Sep-22	13:40	Water			G	4							x	x														
√ MW05	MW05	29-Sep-22	12:40	Water			G	4							x	x														
√ MW06	MW06	29-Sep-22	12:05	Water			G	4							x	x														
√ MW08-DUP	MW08-DUP	29-Sep-22	12:10	Water			G	4							x	x														
√ MW07	MW07	29-Sep-22	11:50	Water			G	4							x	x														

Relinquished by (Sampler Signature):	Date/Time: August 12, 2022 345	Company: Golder Associates Ltd	Received by (Signature): / Company:
Relinquished by (Signature):	Date/Time: 29/09/22	Company:	Received by (Signature): / Company:
Sampler (Printed Name): Meaghan MacIntyre-Newell Dylan Cook	Sample Storage Temperature prior to Shipping (deg. C):	Sample Receipt Temperature (deg. C): 5.7	**SAMPLE CONDITION (lab use only)** Samples Received in Good Condition? (Yes) No (If no, provide details.)

JC OCT - 4 2022 1310 6°C (avg 4) ice pk

Lab Copy

Northwest Territories Power Corp.(NTPC) Jackfish Power Plant GW Monitoring
Chain-of-Custody Record - Analytical Request Form

CoC#: NTPC-Jackfish-16072021
Created: 29

From:

Golder Associates - NTPC
Address: 9, 4905 - 48 Street Yellowknife, Northwest Territories X1A 3S3
Phone: (867) 873 6319
Contact: Laurence Bonin laurence.bonin@wsp.com

Send Samples For Analysis To:

ALS Group, Yellowknife
Address: 314 Old Airport Rd, Unit 116 Yellowknife, NT X1A 3T3
Phone: (867) 873-5593 Fax: (867) 920-4238
Contact: Oliver Gregg Email: Oliver.Gregg@alsglobal.com

eMail Confirmation and Results To:

Please use full distribution list from quote
laurence.bonin@wsp.com
tamra.reynolds@wsp.com

Send Original Signed Lab Reports To:

Golder Associates Ltd.
Address: 9, 4905 - 48 Street Yellowknife, Northwest Territories X1A 3S3
Phone: (867) 873 6319
Contact: Laurence Bonin laurence.bonin@wsp.com

Send Invoice To:

Northwest Territories Power Corporation
Address: 4 Capital Drive Hay River, NT X0E 1G2 Canada
Phone: (867) 874-5200
Attn: Patrick Smith psmith@ntpc.com

FIELD SAMPLE INFORMATION

REQUESTED LAB SUITES (see reverse side for details)

Fields Notes:
Samples have been field filtered and preserved
Please ensure that there is only one COC per report. Use email confirmation and results list on this COC. Requires a 5-day TAT.

Facilty Code:

Project # 22537423-Jackfish
August 2022 NTPC Jackfish GW Sampling
Quote # YL21-GOLD100-008

							√ = Preserved :		√	√	√	√	√																		
							√ = Field Filtered :			√		√																				
							√ = 1-Day Rush :																								
Sample ID #	Sample Location	Sample Date (dd-mmm-yy)	Sample Time (hh:mm)	Matrix	Laboratory Comments	Sampler Comments	G = Grab or C = Composite	Number of Containers	Routine (pH, major ions)	Oil and Grease (Hexane Extractable)	Total Metals	Dissolved Metals	Total Mercury	Dissolved Mercury	Benzene, Toluene, Ethylbenzene, Xylene (BTEX)	Total Petroleum Hydrocarbons (F1-F4 CCME Fracti															
MW04	MW04	29-Sep-22	9:15	Water			G	4							x	x															
JF01-06	JF01-06	29-Sep-22	8:45	Water			G	11	x	x	x	x	x	x	x	x															
JF01-06-DUP	JF01-06	29-Sep-22	8:50	Water			G	11	x	x	x	x	x	x	x	x															

Relinquished by (Sampler Signature):	Date/Time: August 12, 2022 345	Company: Golder Associates Ltd	Received by (Signature):	Company:
Relinquished by (Signature):	Date/Time: 29/09/22	Company:	Received by (Signature):	Company:

Sampler (Printed Name): Meaghan MacIntyre-Newell
Dylan Cooke

Sample Storage Temperature prior to Shipping (deg. C):

Sample Receipt Temperature (deg. C): 5.7

SAMPLE CONDITION (lab use only)
Samples Received in Good Condition? Yes / No (If no, provide details.)

JC OCT - 4 2022 1310 6°C (avg 4) 100 pk

golder.com