NORTHWEST TERRITORIES POWER CORPORATION
Empowering Communities

Water Licence Annual Report

2023

Northwest Territories Power Corporation
Jackfish Power Generation Facility

Water Licence no. MV2019L1-0001

SUBMITTED TO:
MACKENZIE VALLEY LAND AND WATER BOARD

MARCH 2024

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

AEMP	Aquatic Effects Monitoring Program
BTEX	benzene, toluene, ethylbenzene, and xylenes
CRP	Closure and Reclamation Plan
GNWT	Government of Northwest Territories
MVLWB	Mackenzie Valley Land and Water Board
NTPC	Northwest Territories Power Corporation
ORS	Online Review System
SNP	Surveillance Network Program

TABLE OF CONCORDANCE

The following table of concordance has been provided by the Northwest Territories Power Corporation (NTPC) to track non-conformances for Water Licence MV2019L1-0001 and how they were addressed in 2023.

Source and Topic	Comment	2023 Addressed (Yes/No)
Missing Surveillance Network Program (SNP) Reports	The following Surveillance Network Program Monthly Monitoring Reports remain outstanding: • 2023: April	Outstanding April 2023 data is being provided with this Annual Report.
Missing Plans	Operations Maintenance and Surveillance Manual	No. NTPC submitted the Operations, Maintenance, and Surveillance Manual to the MVLWB on February 26, 2021. Initially this updated version was meant to incorporate the updated monitoring equipment but given that the equipment is not fully installed and/or commissioned this is the same version of the OMS Manual that was submitted and revised as part of the water licence renewal process. NTPC is required to resubmit an updated version with the updated equipment included. NTPC expects to provide an updated OMS Manual in 2025.
Missing Reports	AEMP Design Plan	No. NTPC requested deferral of the AEMP Design Plan submission until July 31, 2023. The MVLWB approved the deferral request on April 29, 2021. After public review in 2023, NTPC requested additional deferral of the Plan resubmission until February 26, 2024. The MVLWB approved the request on January 26, 2024.

AEMP – Aquatic Effect Monitoring Program; MVLWB – Mackenzie Valley Land and Water Board

CONFORMITY TABLE

The following table shows conformity with Schedule 1 of the Water Licence.

Water Licence MV2019L1-0001 Annual Report Requirements	Section in this Report
1. a) A brief summary of Project activities.	2
1. b) The monthly and annual quantities in cubic metres of fresh Water obtained from all sources and thermal data from intake and Discharge data loggers, as required in Part B, condition 14 and Part C, condition 1 of this Licence.	4
1. c) A summary of the calibration and status of the meters and devices referred to in Part B, condition 14 of this Licence.	5
1. d) A summary of engagement activities conducted in accordance with the approved Engagement Plan, referred to in Part B, condition 17 of this Licence.	6
1. e) A summary of modification activities conducted in accordance with Part D of this Licence.	7
1. f) A summary of major maintenance activities conducted in accordance with this Licence.	7
1. g) A summary of activities conducted in accordance with the approved Waste Management Plan, referred to in Part E, condition 2 of this Licence, including: i. A summary of approved updates or changes to the process or facilities required for the management of Waste; ii. A summary of approved updates or changes to the process or facilities required for the management of Waste	8.1
1. h) A summary of monitoring results and any Action Level exceedances as per the approved AEMP, required in Part F, condition 7 of this Licence	9
1. i) A summary of activities conducted in accordance with the approved Spill Contingency Plan, required in Part G, condition 2 of this Licence, including: i. A list and description for all Unauthorized Discharges, including the date, NWT spill number, volume, location, summary of the circumstances and follow-up actions taken, and status (i.e. open or closed), in accordance with the reporting requirements in Part G, condition 4 of this Licence; and ii. An outline of any spill training carried out.	10
1. j) A summary of any Closure and Reclamation work completed	8.2

Water Licence MV2019L1-0001 Annual Report Requirements	Section in this Report
1. k) Tabular summaries of all data and information generated under the monthly SNP annexed to this Licence, in Excel format	3, Appendix A and B
1. l) A list of any non-compliance(s) with the conditions of this Licence or any directive from the Board pursuant to the conditions of this Licence	Table of Concordance, 11.1
1. m) A summary of actions taken to address concerns, non-conformances, or deficiencies in any reports filed by an Inspector	11.2
1. n) Any other details requested by the Board by November 1 of the year being reported.	12

1 INTRODUCTION

This 2023 Water Licence Annual Report has been prepared for submission by Northwest Territories Power Corporation (NTPC) to the Mackenzie Valley Land and Water Board (MVLWB) as part of the requirements of Type A Water Licence MV2019L1-0001, Part B, Condition 15, and Schedule 1 (the Water Licence), reporting of operations between January 1 and December 31, 2023. The Water Licence regulates the use of water and the deposit of waste for industrial activities at the Jackfish Hydroelectric Power Generation Facility (Jackfish Facility), including withdrawal of water for the cooling of the power generators, depositing of waste, and progressive reclamation and associated closure and reclamation activities. The Water Licence became effective on October 18, 2019, and will expire on October 17, 2044.

NTPC operates the Jackfish Facility on Jackfish Lake, near Yellowknife, Northwest Territories. The facility is a diesel-operated electricity generation station, and through the Water Licence, NTPC uses water from Jackfish Lake to cool the facility generators.

Four water intakes exit on Jackfish Lake (two intakes for K Plant, and one each for the EMD Plant and the CAT Plant). After the water is used for cooling, it is returned to Jackfish Lake via three discharges. NTPC operated the Jackfish Facility for the purposes of standby and continuous power during the 2023 calendar year.

Figure 1-1 provides an overview of the Jackfish Facility location and Figure 1-2 shows an aerial view of the Jackfish Facility.

Figure 1-1 Jackfish Hydroelectric Power Generation Facility

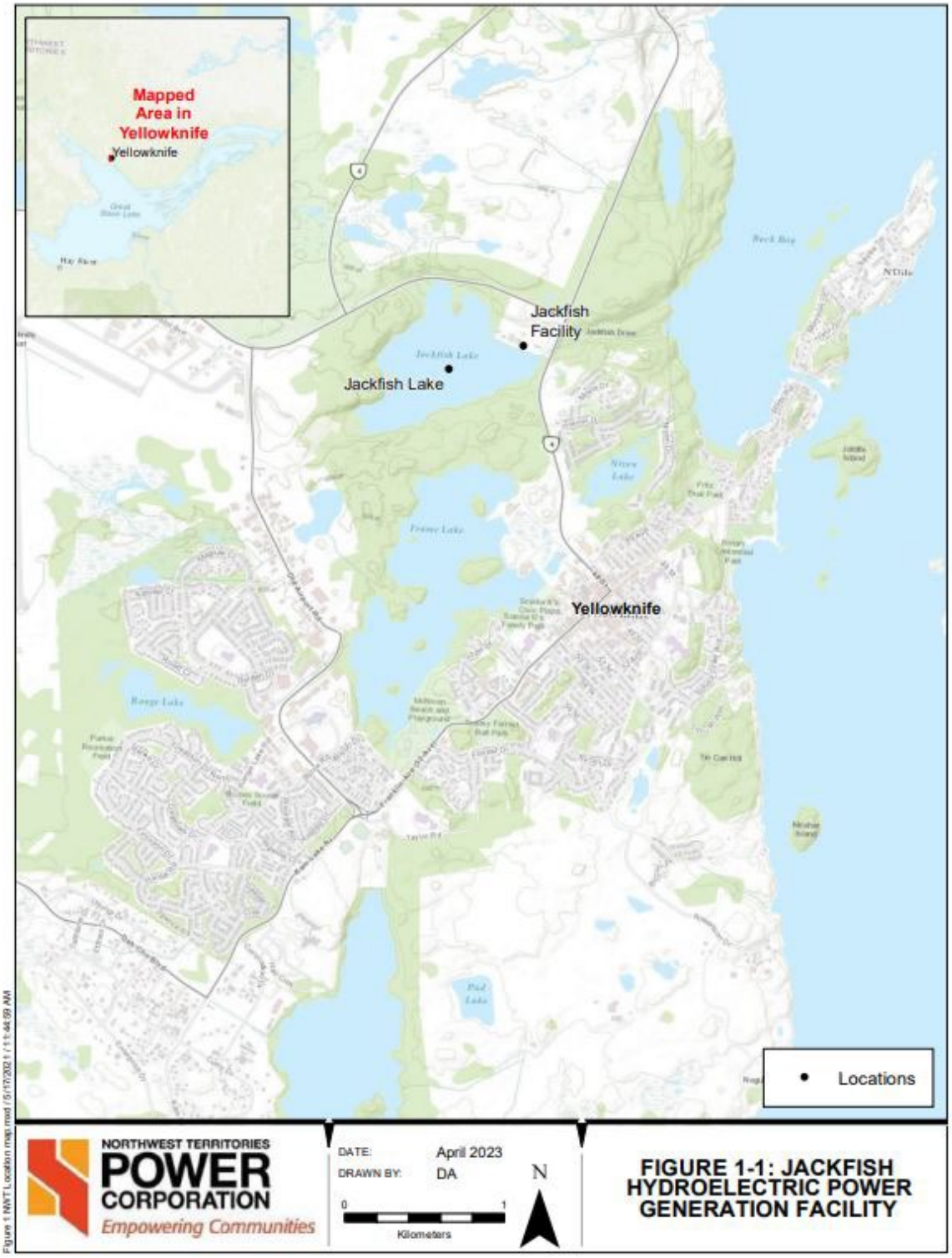


Figure 1-2 Jackfish Lake Generating Station

2 PROJECT ACTIVITIES

No significant projects were completed at the Jackfish Facility in 2023. Regular maintenance was completed on the diesel units to prepare for higher generation in winter 2023, as a result of the low-water situation in the Snare system. In 2023, NTPC initiated a project to add a 4 to 5-megawatt genset to the Jackfish Facility to further support reliability of the Snare system. Procurement and design work were completed in 2023. Installation and completion of the project is expected in late 2024.

3 SURVEILLANCE NETWORK PROGRAM

Tabulated SNP temperature data and laboratory results in Appendix A. The tabulated data are also included in digital format (.xlsx file) and are submitted with this report.

Groundwater samples were collected at SNP Stations JF01-06 and MW2 in July and October 2023. The samples were shipped to ALS Environmental in Edmonton, AB, for laboratory analysis. ALS is accredited by the Canadian Association for Laboratory Accreditation (member number 1352). Results are included in Appendix B.

4 WATER USAGE RECORDS

In situ water temperature (°C) data are continuously recorded by electronic data loggers at 15-minute intervals at the following locations at the Jackfish Facility:

- K Plant intake 1 – SNP Station 00-1a
- K Plant intake 2 – SNP Station 00-1b
- EMD Plant intake – SNP Station 00-1c
- CAT Plant intake – SNP Station 00-1d
- K Plant discharge – SNP Station 00-2a
- EMD Plant discharge – SNP Station 00-2b
- CAT Plant discharge – SNP Station 00-2c

The mean daily water temperature records for the intakes and discharge from the K Plant, EMD Plant, and CAT Plant are presented in Figure 4-1, Figure 4-2, and Figure 4-3, respectively. The in-plant data logger for the EMD Plant was offline from 07:45 January 28, 2023, to 10:45 February 2, 2023. Temperature data for this period is not available. Flow data has been estimated based on the average usage between January 1 and January 27.

Tabulated data of the mean daily water temperature are provided in Appendix A. The tabulated data are also included in digital format (.xlsx file) and are available on the MVLWB public registry. Table 4-1 summarizes the monthly and annual water use by the Jackfish Facility. Per Condition C.1 of the Water Licence, the daily water use did not exceed 50,000 m^3/day during 2023.

Beginning in fall 2022, there has been a significant increase in the amount of diesel generation at the Jackfish Facility due to low water in the Snare system. Low water continued throughout 2023 and is expected to continue into 2024. Discharge temperatures at the CAT, EMD Plant were variable throughout the year and later in the year for the K Plant

due to changes in system demand and which units were run from one day to the next. Engines were run at the three plants based on planned maintenance activities, unexpected downtime, and community loads.

Figure 4-1 Mean Daily Water Temperature Recorded at the SNP Stations Associated with the K Plant in 2023

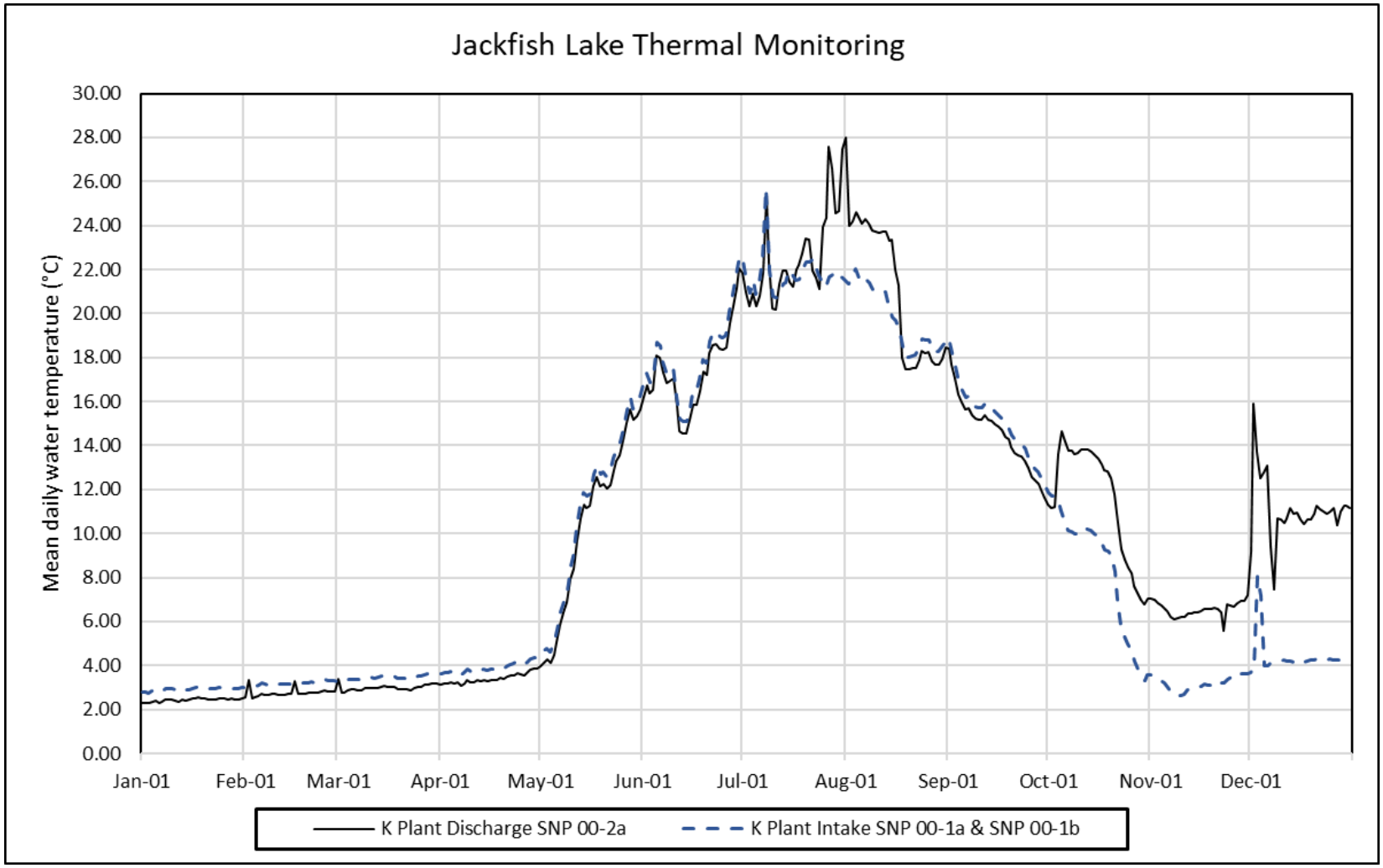


Figure 4-2 Mean Daily Water Temperatures Recorded at the SNP Stations Associated with the EMD Plant in 2023

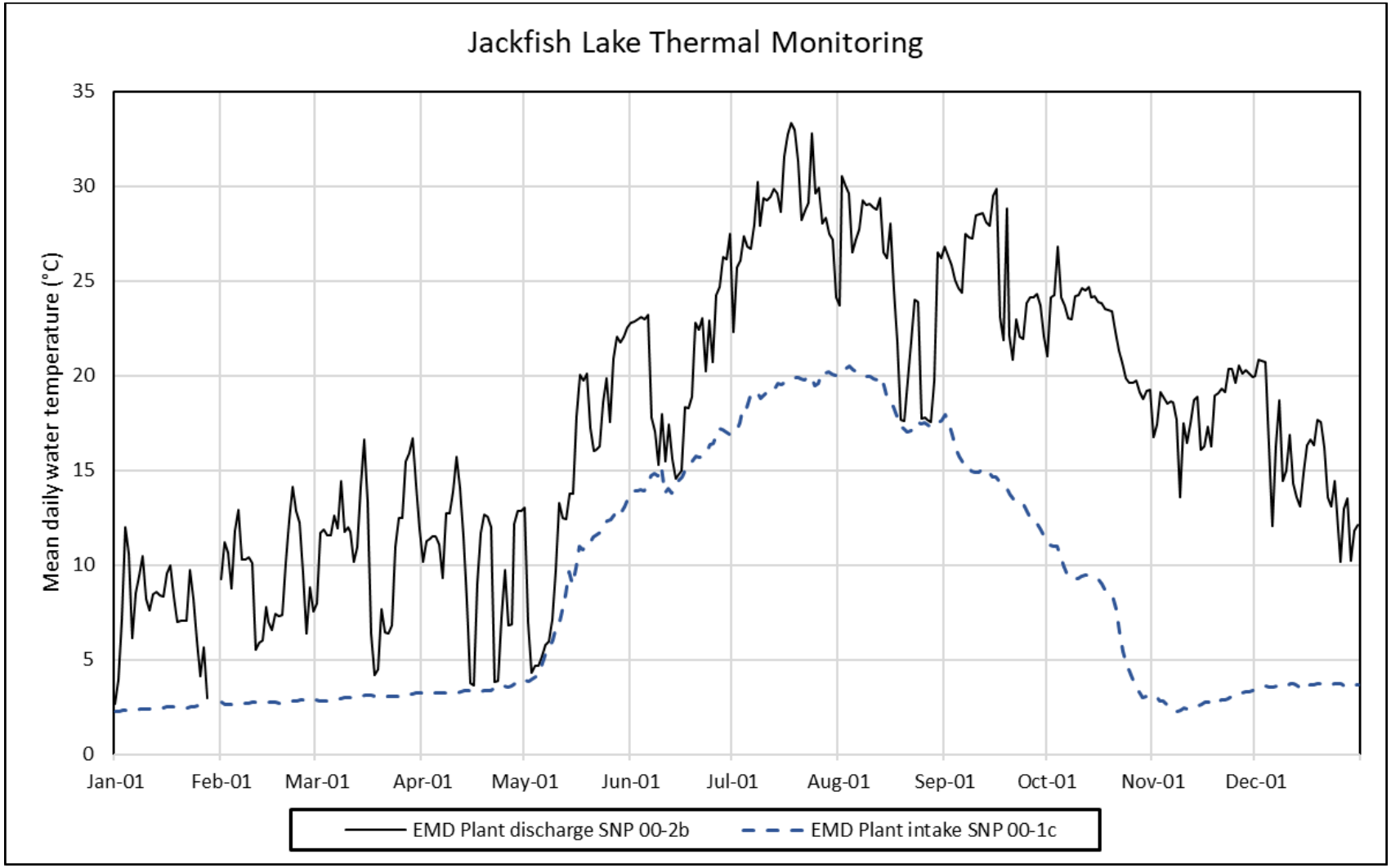


Figure 4-3 Mean Daily Water Temperatures Recorded at the SNP Stations Associated with the CAT Plant in 2023

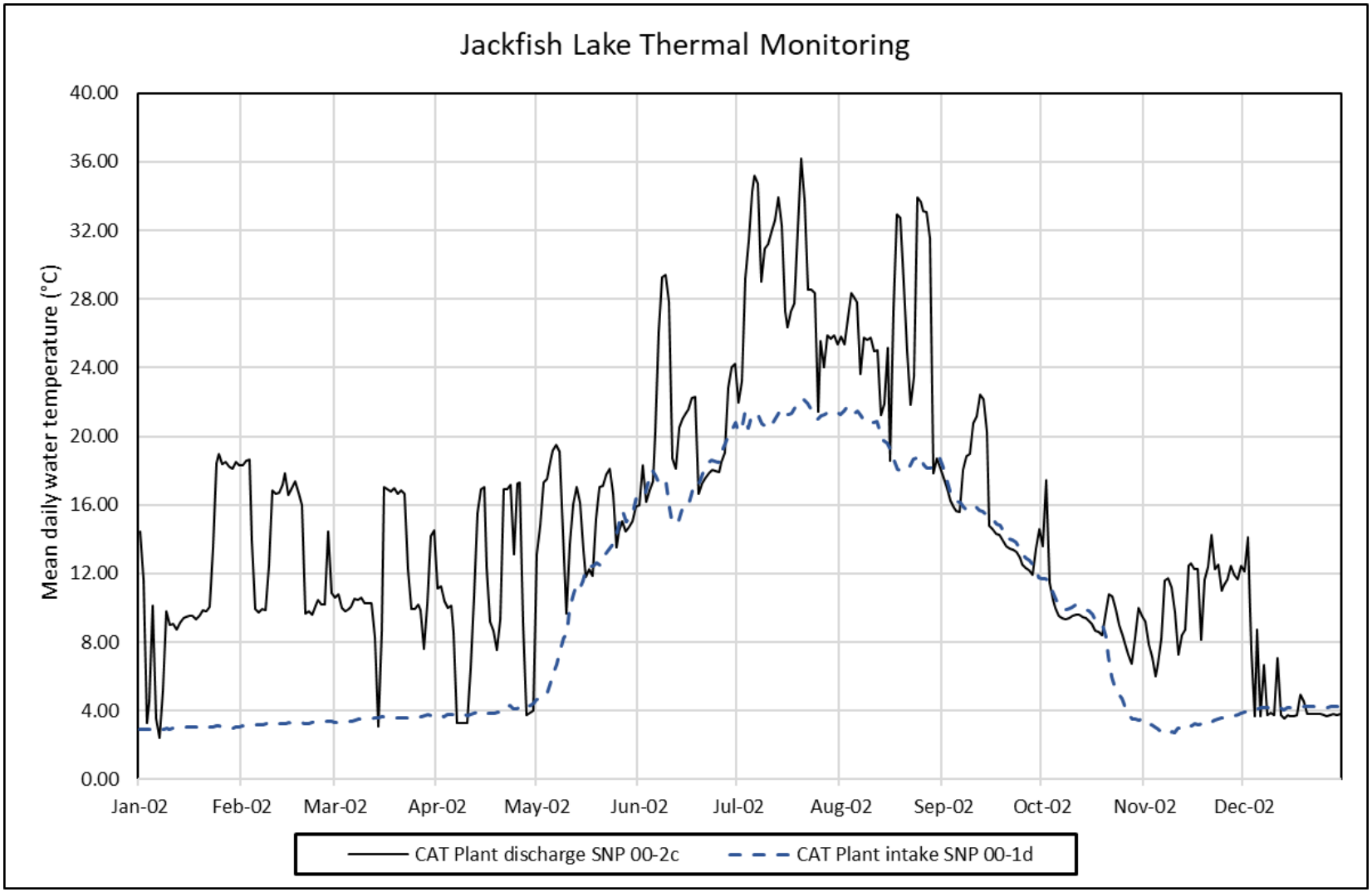


Table 4-1 2023 Monthly and Annual Water Use at the Jackfish Facility

Month	Daily Mean (m^3)	Monthly Total (m^3)
January	18,546	574,941
February	17,531	490,875
March	23,233	720,236
April	17,651	529,522
May	17,913	555,313
June	17,762	532,850
July	18,908	586,137
August	18,684	579,195
September	17,438	523,139
October	19,383	600,866
November	20,097	602,907
December	32,267	1,000,262
Annual Total		7,296,242

5 CALIBRATION AND STATUS OF METERS AND DEVICES

NTPC initiated automatic flow and temperature monitoring in 2022 for the raw water cooling systems at the Jackfish Facility. As a result of power supply interruptions to the data logger, there were several data gaps in 2022. To mitigate this issue, in 2023 NTPC started to transfer the data logger power supply to uninterruptable power supply–protected circuits, which will eliminate the need for the calibration of the meters. This project was still in progress at December 31, 2023 and will be completed in 2024.

6 ENGAGEMENT

As required by the approved Engagement Plan, (Part B, condition 17 of the Licence), NTPC openly engages with potentially affected water users and the public regarding the North Slave electrical system by providing information about, when required:

- Electricity generation, transmission, and distribution on the NTPC website (www.ntpc.com)
- Power outages, safety, employment opportunities, community investments, and other matters through:
  - Facebook (https://www.facebook.com/NTPC-Northwest-Territories-Power-Corporation-591764887576712/)
  - Twitter (https://twitter.com/ntpc_news)
- News releases about significant issues

- NTPC staff attendance at trade shows, conferences, and job fairs to engage directly with members of the public
- Placing paid advertising

No major project activities occurred in 2023 that required additional stakeholder engagement.

7 MODIFICATIONS AND MAJOR MAINTENANCE

No significant operational projects or modifications were undertaken in 2023.

8 MANAGEMENT PLAN REVISIONS

8.1 Waste Management

No updates or changes to the process or facilities occurred in 2023 that required management of waste as outlined in the approved Waste Management Plan (Part E, condition 2 of the Licence).

8.2 Closure and Reclamation

No updates or changes to the Interim Closure and Reclamation Plan V1.1 (CRP) were made in 2023.

9 AEMP MONITORING RESULTS

A summary of monitoring results and any action level exceedances as per the approved AEMP, required in Part F, condition 7 of this Licence will be provided after the first AEMP report is submitted to MVLWB in 2024. The approved timeline for the AEMP is as follows:

- May 31, 2021: Thermal Plume Delineation Study Design
- February 28, 2023: Thermal Plume Delineation Study Report
- February 26, 2024: AEMP Design Plan (incorporates results from the Thermal Plume Delineation Study)
- March 31, 2024: AEMP Annual Report

9.1 Thermal Plume Delineation Study

NTPC carried out the thermal plume delineation study in 2022.[1] The results of the study indicated that the Jackfish Facility has negligible impact on the temperature in Jackfish Lake, reflecting the highly intermittent nature and low heat of loads discharged to the lake by the facility. The thermal plume delineation study was submitted to the MVLWB on February 28, 2023. The report underwent online public review and NTPC responded to comments from

[1] WSP. 2023. Jackfish Lake – Thermal Plume Delineation Report. https://registry.mvlwb.ca/Documents/MV2019L1-0001/NTPC%20-%20Jackfish%20-%20Thermal%20Plume%20Delineation%20Study%20Report%20-%20Mar9_23.pdf

Environment and Climate Change Canada (ECCC), the MVLWB and GNWT-ECC. MVLWB approved the Thermal Plume Delineation Study Report on June 30, 2023[2].

9.2 AEMP Design Plan 2023

Based on the results of the thermal plume delineation study, NTPC developed AEMP Design Plan with an adaptive management approach based on temperature values for initiation and further monitoring of water quality and biological components. The AEMP Design Plan was submitted to MVLWV on July 31, 2023, and has completed the online public review. NTPC addressed the requirements from Environment and Climate Change Canada (ECCC) and the MVLWB. Due to the commissioning for the Taltson Overhaul Project and staff allocation needs, NTPC requested an extension for the resubmission of the revised AEMP Design Plan V1.1 from January 26, 2024, to February 26, 2024. MVLWB approved and granted the request to extend the submission date on January 26, 2024.

10 SPILLS

10.1 Spill Training Exercises

All new employees received training for the Spill Response Plan, spill response training, an introduction to the Hazardous Waste Management Plan, and the environmental management system. Training requirements are reviewed and renewed every 3 years. Spill procedures and contact numbers are posted in the plant control room, and spill kits are outside each facility. Spill response equipment was reviewed and updated in 2019, resulting in additional or replacement spill response kits being placed at key locations throughout the site as identified in the Spill Response Plan.

Spill training is mandatory and is completed by all employees. The spill training is approximately 1.5 hours and covers the following topics:

- Facility site specifics
- Health and safety
- Spill response
- General cleanup

On October 17, 2023, 11 NTPC staff members received spill training.

10.2 Unauthorized Discharges

No spills or Unauthorized Discharges occurred in 2023.

11 REGULATORY REQUIREMENTS

Table 11-1 present communication between NTPC and MVLWB in 2023.

[2] MVLWB. 2023. Thermal Plume Report – V1.1 -Board Staff Conformity. https://registry.mvlwb.ca/Documents/MV2019L1-0001/NTPC%20-%20Jackfish%20-%20Thermal%20Plume%20Report%20-%20V1.1%20-%20Board%20Staff%20Conformity%20-%20Jun30_23.pdf

Table 11-1 Regulatory Communications in 2023

Date	Communications
January 16	NTPC requested an extension for Thermal Plume Delineation Study Report and Thermal Plume Design to February 28, 2023, to allow more time to review and interpret data from the Thermal Plume Study.
February 28	NTPC submitted the Thermal Plume Delineation Study Report together with attached cover letter.
March 7	MVLWB requested changes to the Thermal Plume Delineation Study including combining Appendix D into all one appendix, combining appendix E into all one appendix and the ensuring the report is compressed and unsecured.
March 7	MVLWB send a letter to NTPC with granted Thermal Plume Delineation Study Report submission date extension to March 7, 2023.
March 7	MVLWB attached a letter of approval of the Compliance Date Change in an email to NTPC and stated to contact Tyree Mullaney for any questions.
March 16	NTPC requested an extension of the AEMP Design Plan to July 31, 2023, to ensure any comments from public review if the Thermal Plume Delineation Study Report are incorporated into the AEMP. NTPC also states they apologize for not including this request with the previous deferral request and in the future, NTPC will include deferral requests for studies that are connected in one submission for efficiency. NTPC attached a former letter requesting former extension for the submission of the AEMP Design Plan under Water MV2019L1-0001.
May 17	MVLWB sent a letter to NTPC with granted submission date extension for AEMP Design Plan to July 31, 2023.
May 31	MVLWB attached revisions required document for the Thermal Plume Delineation Study Report submitted by NTPC on March 7th, 2023. MVLWB stated to contact Kathy Racher for any questions.
May 31	MVLWB send a letter requestion revisions to the Thermal Plume Delineation Study Report.
June 28	NTPC sent an email re-submitting the Thermal Plume Delineation Study Report In accordance with the MVLWB decision letter dated May 31, 2023. NTPC attached a cover letter and informed MVLWB of all the documents that have been shared via the FTP site.
June 30	MVLWB approved the resubmitted version of Thermal Plume Delineation Study Report V1.1.
July 31	NTPC Submitted AEMP Design Plan V1.0 to MVLWB.
November 4	NTPC sent an email to MVLWB requesting an extension for the AEMP public review for the Jackfish Power Generation Facility to allow NTPC to properly engage with internal stakeholders and provide responses to questions received during the public review period. NTPC also attached a cover letter for the extension request.

Date	Communications
November 6	MVLWB responded to NTPC's email requesting an extension for the AEMP public review and approved the request.
November 23	Email with attached NTPC's ORS responses to be included for the public review of the Jackfish AEMP Design Plan as required under Part F, Condition 2 for Type A Water Licence MV2019L1-0001. NTPC stated they also have large data files that will be sent in a separate email.
December 2	MVLWB sent a follow up email to NTPC regarding the request from November 28, 2023.
December 21	MVLWB sent a letter requestion revisions to the AEMP Design Plan V1.0.

11.1 Outstanding Submissions and Non-compliances

- The Jackfish Lake Generating Facility Operations, Maintenance, and Surveillance Manual is still outstanding.
- The AEMP Design Plan remains outstanding.
- AEMP Annual Report was required to be submitted on March 31, 2023, and no later than March 31 of each year thereafter, to comply with Condition 5, Part F. Due to the deferral of the AEMP Design Plan submission, the AEMP Annual Report remains outstanding.
- No Annual Review documents were submitted to MVLWB to comply with Condition 7, Part B.

11.2 Annual Water Licence Inspection

The annual Water Licence inspection was completed for the Jackfish Facility on August 9, 2023, by GNWT – Environment and Climate Change Water Resource Officer Meaghan MacIntyre-Newell. The Inspector recommended that NTPC check all groundwater wells and ensure each well on the property has an appropriate cap. The Inspector also recommended NTPC add appropriate signage to flow measurement devices used as SNP stations. NTPC has labelled the flow measurement devices as per the Inspectors recommendation, and caps will be added once well maintenance has been completed in 2024. No other major deficiencies were recorded during the inspection[3].

12 OTHER BOARD REQUESTS

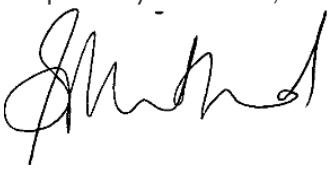
There were no other requests from the MVLWB relating to operating procedures before November 1, 2023.

[3]GNWT-ECC. 2023. Annual Inspection Report 2023. https://registry.mvlwb.ca/Documents/MV2019L1-0001/NTPC%20-%20Jackfish%20-%20Inspection%20Report%20-%20August%209,%202023%20-%20Sep25_23.pdf

CLOSURE

This 2023 Annual Report for the Jackfish Facility was prepared for Northwest Territories Power Corporation to meet the requirements of Water Licence MV2019L1-0001.

Respectfully submitted,



Belinda Whitford, CPA
Chief Operating Officer
Northwest Territories Power Corporation

APPENDIX A – SURVEILLANCE NETWORK PROGRAM DATA

This appendix summarizes the water temperature data for the Surveillance Network Program for the Jackfish Facility. Tabulated summaries of data generated in digital format (.xlsx files) are attached to this report submission.

The in-plant data logger for the EMD Plant was offline from 07:45 January 28, 2023. to 10:45 February 2, 2023. Temperature data for this period is not available. Flow data has been estimated based on the average usage between January 1 and January 27.

Table A-1 Surveillance Network Program Water Temperature Monitoring Data for the Jackfish Facility

Date	CAT Plant Discharge (°C)	CAT Plant Intake (°C)	EMP Plant Discharge (°C)	EDM Plant Intake (°C)	K Plant Discharge (°C)	K Plant Intake (°C)
2023-01-01	14.52	2.91	2.63	2.28	2.28	2.77
2023-01-02	14.45	2.91	3.96	2.27	2.27	2.76
2023-01-03	11.58	2.91	7.14	2.30	2.27	2.76
2023-01-04	3.31	2.91	11.97	2.34	2.36	2.85
2023-01-05	4.53	2.90	10.60	2.35	2.38	2.87
2023-01-06	10.15	2.91	6.13	2.35	2.30	2.79
2023-01-07	3.52	2.87	8.53	2.33	2.36	2.86
2023-01-08	2.43	2.90	9.43	2.36	2.43	2.93
2023-01-09	5.20	2.95	10.47	2.40	2.47	2.96
2023-01-10	9.81	2.96	8.20	2.40	2.44	2.93
2023-01-11	8.99	2.95	7.61	2.40	2.40	2.90
2023-01-12	9.06	2.98	8.45	2.43	2.36	2.85
2023-01-13	8.70	2.96	8.60	2.43	2.44	2.92
2023-01-14	9.15	2.99	8.42	2.44	2.39	2.87
2023-01-15	9.38	3.01	8.35	2.44	2.43	2.92
2023-01-16	9.45	3.02	9.55	2.48	2.48	2.97
2023-01-17	9.54	3.04	9.98	2.50	2.51	3.01
2023-01-18	9.50	3.06	8.31	2.51	2.54	3.03
2023-01-19	9.32	3.04	6.99	2.49	2.48	2.97
2023-01-20	9.54	3.00	7.08	2.47	2.50	2.98
2023-01-21	9.84	3.02	7.06	2.46	2.47	2.96
2023-01-22	9.80	3.02	7.04	2.47	2.46	2.95
2023-01-23	10.08	3.04	9.72	2.50	2.47	2.97
2023-01-24	13.52	3.08	8.19	2.52	2.52	3.01
2023-01-25	18.44	3.09	6.03	2.54	2.51	3.00
2023-01-26	19.00	3.09	4.14	2.54	2.49	2.98
2023-01-27	18.39	3.04	5.62	2.52	2.47	2.95

Date	CAT Plant Discharge (°C)	CAT Plant Intake (°C)	EMP Plant Discharge (°C)	EDM Plant Intake (°C)	K Plant Discharge (°C)	K Plant Intake (°C)
2023-01-28	18.52	3.05	2.96	2.50	2.48	2.96
2023-01-29	18.24	3.03	N/A	N/A	2.47	2.94
2023-01-30	18.12	3.01	N/A	N/A	2.47	2.95
2023-01-31	18.49	3.08	N/A	N/A	2.51	2.99
2023-02-01	18.29	3.08	9.26	2.74	2.53	3.00
2023-02-02	18.30	3.12	11.20	2.60	3.33	3.02
2023-02-03	18.60	3.09	10.62	2.61	2.50	2.97
2023-02-04	18.67	3.09	8.76	2.61	2.56	3.03
2023-02-05	13.95	3.15	11.84	2.62	2.62	3.10
2023-02-06	9.96	3.18	12.91	2.68	2.70	3.18
2023-02-07	9.72	3.16	10.30	2.67	2.66	3.14
2023-02-08	9.96	3.16	10.31	2.66	2.65	3.13
2023-02-09	9.83	3.23	10.41	2.69	2.69	3.17
2023-02-10	12.46	3.28	10.11	2.75	2.73	3.21
2023-02-11	16.84	3.29	5.51	2.75	2.68	3.16
2023-02-12	16.66	3.25	5.88	2.72	2.66	3.14
2023-02-13	16.70	3.26	6.04	2.72	2.66	3.14
2023-02-14	17.17	3.25	7.78	2.73	2.69	3.17
2023-02-15	17.83	3.26	6.97	2.73	2.70	3.17
2023-02-16	16.57	3.29	6.53	2.75	3.26	3.19
2023-02-17	16.98	3.26	7.42	2.75	2.69	3.16
2023-02-18	17.34	3.24	7.30	2.68	2.73	3.19
2023-02-19	16.71	3.29	7.37	2.74	2.72	3.18
2023-02-20	16.01	3.31	10.09	2.79	2.74	3.21
2023-02-21	9.64	3.28	12.34	2.78	2.79	3.26
2023-02-22	9.77	3.26	14.15	2.80	2.75	3.22
2023-02-23	9.57	3.29	12.85	2.82	2.74	3.21
2023-02-24	10.11	3.36	12.20	2.88	2.80	3.27
2023-02-25	10.47	3.40	9.53	2.86	2.85	3.34
2023-02-26	10.22	3.37	6.40	2.83	2.81	3.29
2023-02-27	10.16	3.36	8.80	2.83	2.81	3.29
2023-02-28	14.45	3.38	7.51	2.83	2.83	3.31
2023-03-01	10.88	3.39	7.94	2.87	3.40	3.26
2023-03-02	10.60	3.32	11.68	2.82	2.75	3.23

Date	CAT Plant Discharge (°C)	CAT Plant Intake (°C)	EMP Plant Discharge (°C)	EDM Plant Intake (°C)	K Plant Discharge (°C)	K Plant Intake (°C)
2023-03-03	10.76	3.32	11.85	2.83	2.77	3.26
2023-03-04	10.01	3.36	11.59	2.84	2.86	3.34
2023-03-05	9.77	3.39	11.56	2.89	2.90	3.37
2023-03-06	9.91	3.39	12.63	2.91	2.91	3.39
2023-03-07	10.05	3.41	11.95	2.90	2.87	3.36
2023-03-08	10.50	3.47	14.42	2.94	2.88	3.37
2023-03-09	10.44	3.52	11.76	3.00	2.96	3.45
2023-03-10	10.57	3.55	12.00	3.00	2.98	3.47
2023-03-11	10.25	3.53	11.75	3.01	2.96	3.45
2023-03-12	10.24	3.52	10.16	2.99	2.95	3.43
2023-03-13	10.25	3.54	10.98	3.01	2.96	3.44
2023-03-14	8.26	3.58	14.15	3.06	3.02	3.51
2023-03-15	3.10	3.60	16.64	3.10	3.06	3.55
2023-03-16	8.62	3.67	13.34	3.13	3.02	3.51
2023-03-17	17.04	3.66	6.35	3.12	3.04	3.53
2023-03-18	16.94	3.62	4.16	3.07	3.01	3.49
2023-03-19	16.77	3.59	4.46	3.04	2.93	3.42
2023-03-20	16.96	3.57	7.64	3.01	2.92	3.41
2023-03-21	16.65	3.61	6.41	3.06	2.92	3.41
2023-03-22	16.83	3.60	6.35	3.04	2.92	3.41
2023-03-23	16.67	3.61	6.80	3.07	2.88	3.37
2023-03-24	12.28	3.60	10.95	3.07	2.97	3.46
2023-03-25	9.93	3.61	12.47	3.08	3.02	3.51
2023-03-26	9.90	3.61	12.47	3.10	3.04	3.52
2023-03-27	10.22	3.63	15.46	3.15	3.10	3.59
2023-03-28	9.86	3.68	15.91	3.20	3.12	3.61
2023-03-29	7.57	3.70	16.70	3.20	3.19	3.68
2023-03-30	10.29	3.75	14.18	3.23	3.17	3.66
2023-03-31	14.22	3.73	11.88	3.24	3.18	3.67
2023-04-01	14.54	3.72	10.16	3.23	3.12	3.61
2023-04-02	11.11	3.69	11.26	3.20	3.19	3.68
2023-04-03	11.25	3.75	11.38	3.24	3.18	3.68
2023-04-04	10.38	3.68	11.52	3.21	3.24	3.73
2023-04-05	9.97	3.75	11.51	3.23	3.19	3.68

Date	CAT Plant Discharge (°C)	CAT Plant Intake (°C)	EMP Plant Discharge (°C)	EDM Plant Intake (°C)	K Plant Discharge (°C)	K Plant Intake (°C)
2023-04-06	10.12	3.76	11.06	3.25	3.22	3.71
2023-04-07	8.51	3.75	9.30	3.24	3.09	3.58
2023-04-08	3.26	3.72	12.69	3.21	3.19	3.69
2023-04-09	3.30	3.76	12.70	3.23	3.31	3.81
2023-04-10	3.31	3.78	13.86	3.24	3.26	3.75
2023-04-11	3.27	3.73	15.69	3.25	3.25	3.74
2023-04-12	6.50	3.81	14.05	3.28	3.33	3.83
2023-04-13	10.67	3.88	11.50	3.33	3.29	3.79
2023-04-14	15.49	3.92	8.06	3.38	3.32	3.82
2023-04-15	16.94	3.95	3.73	3.39	3.30	3.80
2023-04-16	17.04	3.84	3.64	3.29	3.32	3.81
2023-04-17	12.38	3.87	8.99	3.30	3.33	3.83
2023-04-18	9.18	3.84	11.66	3.28	3.35	3.85
2023-04-19	8.69	3.85	12.63	3.37	3.42	3.93
2023-04-20	7.51	3.91	12.57	3.37	3.40	3.90
2023-04-21	9.35	3.94	12.01	3.38	3.50	3.99
2023-04-22	16.93	4.09	3.84	3.47	3.56	4.06
2023-04-23	16.94	4.17	3.89	3.51	3.56	4.07
2023-04-24	17.15	4.29	7.26	3.65	3.66	4.17
2023-04-25	13.15	4.13	9.75	3.59	3.61	4.11
2023-04-26	17.24	4.12	6.81	3.54	3.54	4.03
2023-04-27	17.32	4.27	6.88	3.63	3.63	4.14
2023-04-28	9.14	4.37	12.18	3.75	3.81	4.32
2023-04-29	3.78	4.25	12.83	3.75	3.84	4.36
2023-04-30	3.86	4.33	12.87	3.74	3.84	4.37
2023-05-01	4.01	4.47	13.02	3.88	3.94	4.47
2023-05-02	13.14	4.67	6.97	3.83	4.12	4.64
2023-05-03	14.80	4.69	4.31	3.96	4.26	4.74
2023-05-04	17.30	4.77	4.67	4.10	4.14	4.60
2023-05-05	17.52	4.93	4.64	4.30	4.47	4.99
2023-05-06	18.59	5.52	5.16	4.81	5.05	5.59
2023-05-07	19.20	6.19	5.74	5.38	5.86	6.42
2023-05-08	19.50	6.69	5.98	5.62	6.39	6.92
2023-05-09	19.11	7.51	7.08	6.02	6.87	7.40

Date	CAT Plant Discharge (°C)	CAT Plant Intake (°C)	EMP Plant Discharge (°C)	EDM Plant Intake (°C)	K Plant Discharge (°C)	K Plant Intake (°C)
2023-05-10	14.35	8.24	9.72	6.51	7.95	8.51
2023-05-11	9.66	8.47	13.24	6.79	8.40	8.96
2023-05-12	13.71	9.83	12.49	7.59	9.70	10.26
2023-05-13	16.07	10.62	12.43	8.45	10.68	11.24
2023-05-14	17.03	11.32	13.75	9.61	11.29	11.85
2023-05-15	16.14	11.08	13.76	8.95	11.17	11.68
2023-05-16	13.35	11.54	17.84	9.82	11.25	11.81
2023-05-17	11.81	12.37	20.03	10.99	12.13	12.69
2023-05-18	12.29	12.44	19.77	10.83	12.54	13.09
2023-05-19	11.89	12.44	20.12	11.17	12.13	12.68
2023-05-20	15.17	12.64	17.21	11.16	12.26	12.79
2023-05-21	17.04	12.50	16.01	11.46	12.03	12.57
2023-05-22	17.14	12.61	16.09	11.56	12.22	12.78
2023-05-23	17.77	13.14	16.25	11.69	12.88	13.42
2023-05-24	18.08	13.42	18.58	12.06	13.32	13.87
2023-05-25	16.65	13.70	19.87	12.32	13.56	14.13
2023-05-26	13.55	14.11	17.56	12.41	14.24	14.78
2023-05-27	14.43	14.99	20.91	12.60	15.01	15.61
2023-05-28	15.02	15.59	22.03	12.94	15.64	16.18
2023-05-29	14.43	14.98	21.76	12.77	15.15	15.68
2023-05-30	14.70	15.26	22.05	13.09	15.32	15.87
2023-05-31	15.07	15.63	22.57	13.52	15.63	16.20
2023-06-01	15.88	16.46	22.82	13.79	16.20	16.77
2023-06-02	15.96	16.53	22.88	13.90	16.72	17.29
2023-06-03	18.31	16.50	22.95	13.91	16.34	16.87
2023-06-04	16.21	16.78	23.10	14.00	16.53	17.13
2023-06-05	16.87	17.45	22.97	13.92	18.10	18.68
2023-06-06	17.38	17.98	23.23	14.23	17.99	18.54
2023-06-07	20.26	17.71	17.81	14.68	17.28	17.81
2023-06-08	26.11	17.20	17.08	14.83	16.82	17.36
2023-06-09	29.25	17.08	15.30	14.68	16.96	17.52
2023-06-10	29.39	17.29	17.98	15.22	17.04	17.58
2023-06-11	27.80	15.82	15.48	13.78	15.77	16.25
2023-06-12	18.70	15.08	17.41	14.00	14.66	15.18

Date	CAT Plant Discharge (°C)	CAT Plant Intake (°C)	EMP Plant Discharge (°C)	EDM Plant Intake (°C)	K Plant Discharge (°C)	K Plant Intake (°C)
2023-06-13	18.08	14.91	15.58	13.82	14.53	15.08
2023-06-14	20.48	15.11	14.53	14.21	14.54	15.10
2023-06-15	21.01	15.74	14.76	14.43	15.17	15.73
2023-06-16	21.39	16.05	14.99	14.66	15.84	16.39
2023-06-17	21.53	16.09	18.33	15.04	15.85	16.42
2023-06-18	22.20	16.82	18.28	15.19	16.47	17.02
2023-06-19	22.31	17.32	18.88	15.48	17.33	17.91
2023-06-20	16.67	17.24	22.78	15.72	17.22	17.77
2023-06-21	17.25	17.83	22.44	15.67	18.18	18.73
2023-06-22	17.57	18.16	23.01	15.73	18.55	19.13
2023-06-23	17.86	18.45	20.25	15.87	18.60	19.15
2023-06-24	18.01	18.60	22.89	16.33	18.38	18.93
2023-06-25	17.96	18.55	20.74	16.42	18.36	18.90
2023-06-26	17.90	18.49	24.23	16.99	18.44	19.00
2023-06-27	18.54	19.12	24.71	17.21	19.53	20.11
2023-06-28	19.00	19.60	26.25	17.15	20.30	20.88
2023-06-29	22.81	20.05	26.12	16.99	21.18	21.79
2023-06-30	24.06	20.38	27.48	16.91	22.04	22.61
2023-07-01	24.24	20.80	22.31	16.95	21.84	22.37
2023-07-02	21.96	20.36	25.69	17.02	20.94	21.47
2023-07-03	23.23	20.34	26.11	17.50	20.34	20.91
2023-07-04	29.18	21.30	27.37	18.35	20.90	21.48
2023-07-05	31.39	20.46	26.79	18.29	20.34	20.88
2023-07-06	34.26	21.22	26.69	18.94	20.80	21.38
2023-07-07	35.19	21.33	27.97	18.96	21.82	22.50
2023-07-08	34.72	21.19	30.25	19.13	25.34	25.67
2023-07-09	29.01	20.75	27.93	18.80	22.31	21.98
2023-07-10	30.94	20.63	29.35	18.97	20.24	20.78
2023-07-11	31.21	20.43	29.25	19.15	20.18	20.74
2023-07-12	31.91	20.61	29.47	19.32	21.32	20.95
2023-07-13	32.58	20.92	29.85	19.30	21.96	21.34
2023-07-14	33.91	21.24	29.65	19.61	21.94	21.38
2023-07-15	32.25	21.60	28.66	19.54	21.40	21.97
2023-07-16	27.31	21.43	31.55	19.65	21.22	21.77

Date	CAT Plant Discharge (°C)	CAT Plant Intake (°C)	EMP Plant Discharge (°C)	EDM Plant Intake (°C)	K Plant Discharge (°C)	K Plant Intake (°C)
2023-07-17	26.34	21.29	32.75	19.76	21.99	21.51
2023-07-18	27.26	21.30	33.34	19.86	22.22	21.55
2023-07-19	27.73	21.69	33.00	19.90	22.71	22.05
2023-07-20	32.02	21.67	31.34	19.89	23.40	22.32
2023-07-21	36.19	21.89	28.21	19.84	23.36	22.35
2023-07-22	33.74	22.15	28.72	19.74	21.94	22.50
2023-07-23	28.54	21.91	29.15	19.93	21.61	22.17
2023-07-24	28.53	21.57	32.79	19.94	21.13	21.69
2023-07-25	28.34	21.26	29.61	19.47	23.95	21.45
2023-07-26	21.41	20.97	29.94	19.62	24.35	21.17
2023-07-27	25.55	21.19	28.05	20.17	27.58	21.67
2023-07-28	24.01	21.25	28.32	20.14	26.59	21.79
2023-07-29	25.90	21.37	27.47	20.20	24.54	21.53
2023-07-30	25.71	21.47	27.21	20.10	24.68	21.73
2023-07-31	25.90	21.41	24.14	20.02	27.50	21.62
2023-08-01	25.36	21.37	23.68	20.02	27.99	21.49
2023-08-02	25.81	21.26	30.51	20.11	23.97	21.35
2023-08-03	25.38	21.44	30.07	20.36	24.17	21.70
2023-08-04	26.87	21.76	29.62	20.50	24.58	22.02
2023-08-05	28.32	21.51	26.51	20.33	24.28	21.62
2023-08-06	28.16	21.33	27.21	20.19	24.08	21.39
2023-08-07	27.84	21.45	27.75	20.12	24.27	21.57
2023-08-08	23.64	21.18	29.26	20.00	24.10	21.40
2023-08-09	25.75	20.89	29.02	19.94	23.76	21.08
2023-08-10	25.60	20.87	29.10	19.97	23.70	21.01
2023-08-11	25.78	20.84	28.92	19.84	23.66	20.94
2023-08-12	24.97	20.77	28.76	19.75	23.72	20.99
2023-08-13	24.99	20.87	29.36	19.98	23.70	20.98
2023-08-14	21.24	20.22	26.51	19.48	23.29	20.28
2023-08-15	21.88	19.75	26.22	18.96	23.37	19.83
2023-08-16	25.16	19.58	28.01	18.65	22.00	19.65
2023-08-17	18.55	19.17	24.57	18.38	21.28	19.25
2023-08-18	27.32	18.59	21.72	17.86	18.01	18.54
2023-08-19	32.92	18.08	17.65	17.34	17.48	18.02

Date	CAT Plant Discharge (°C)	CAT Plant Intake (°C)	EMP Plant Discharge (°C)	EDM Plant Intake (°C)	K Plant Discharge (°C)	K Plant Intake (°C)
2023-08-20	32.71	18.04	17.60	17.18	17.45	18.01
2023-08-21	28.97	17.95	19.74	17.04	17.50	18.07
2023-08-22	24.94	18.07	21.79	17.09	17.54	18.09
2023-08-23	21.81	18.26	24.03	17.22	17.89	18.45
2023-08-24	23.52	18.67	23.88	17.57	18.28	18.84
2023-08-25	33.92	18.73	17.75	17.45	18.22	18.78
2023-08-26	33.65	18.85	17.81	17.52	18.25	18.80
2023-08-27	33.13	18.37	17.66	17.38	17.81	18.35
2023-08-28	33.03	18.13	17.56	17.28	17.69	18.26
2023-08-29	31.53	18.15	19.72	17.34	17.70	18.26
2023-08-30	17.83	18.43	26.53	17.53	17.92	18.48
2023-08-31	18.74	18.60	26.22	17.66	18.47	18.69
2023-09-01	18.15	18.76	26.84	17.92	18.42	18.92
2023-09-02	17.58	18.18	26.35	17.49	17.66	18.21
2023-09-03	16.96	17.55	25.82	16.91	17.07	17.61
2023-09-04	16.24	16.84	25.07	16.20	16.34	16.88
2023-09-05	15.82	16.41	24.59	15.73	15.95	16.50
2023-09-06	15.62	16.19	24.39	15.41	15.62	16.17
2023-09-07	15.55	16.13	27.50	15.45	15.67	16.22
2023-09-08	18.04	15.86	27.30	15.15	15.37	15.92
2023-09-09	18.84	15.69	27.24	14.95	15.23	15.78
2023-09-10	18.96	15.67	28.48	14.88	15.19	15.74
2023-09-11	20.73	15.69	28.52	14.91	15.15	15.71
2023-09-12	21.18	15.86	28.61	15.04	15.35	15.91
2023-09-13	22.41	15.68	28.12	14.87	15.19	15.74
2023-09-14	22.14	15.61	27.93	14.91	15.13	15.68
2023-09-15	20.24	15.44	29.48	14.68	14.95	15.50
2023-09-16	14.78	15.35	29.84	14.66	14.87	15.42
2023-09-17	14.57	15.15	23.11	14.42	14.69	15.23
2023-09-18	14.32	14.90	21.89	14.26	14.41	14.96
2023-09-19	14.24	14.82	28.84	14.12	14.29	14.84
2023-09-20	13.89	14.46	22.15	13.73	13.92	14.46
2023-09-21	13.58	14.15	20.85	13.52	13.68	14.24
2023-09-22	13.46	14.02	22.96	13.34	13.55	14.10

Date	CAT Plant Discharge (°C)	CAT Plant Intake (°C)	EMP Plant Discharge (°C)	EDM Plant Intake (°C)	K Plant Discharge (°C)	K Plant Intake (°C)
2023-09-23	13.41	13.98	22.05	13.34	13.51	14.06
2023-09-24	13.24	13.80	21.91	13.20	13.31	13.85
2023-09-25	12.94	13.51	23.85	12.83	12.98	13.52
2023-09-26	12.50	13.07	24.16	12.44	12.58	13.12
2023-09-27	12.32	12.88	24.16	12.23	12.43	12.96
2023-09-28	12.16	12.73	24.31	12.12	12.27	12.79
2023-09-29	11.91	12.47	23.68	11.84	11.99	12.51
2023-09-30	13.48	12.16	22.07	11.46	11.65	12.17
2023-10-01	14.58	11.79	21.04	11.19	11.32	11.85
2023-10-02	13.60	11.67	24.16	11.03	11.18	11.70
2023-10-03	17.45	11.72	24.23	11.00	11.20	11.73
2023-10-04	11.49	11.59	26.84	10.97	13.59	11.61
2023-10-05	10.46	10.99	24.11	10.41	14.67	11.05
2023-10-06	9.98	10.51	23.69	9.90	14.15	10.55
2023-10-07	9.55	10.08	23.01	9.46	13.75	10.12
2023-10-08	9.43	9.96	22.97	9.31	13.76	10.07
2023-10-09	9.34	9.87	24.22	9.25	13.62	9.98
2023-10-10	9.43	9.96	24.23	9.27	13.66	10.00
2023-10-11	9.52	10.05	24.62	9.39	13.81	10.18
2023-10-12	9.62	10.16	24.52	9.46	13.80	10.24
2023-10-13	9.58	10.11	24.68	9.46	13.80	10.20
2023-10-14	9.46	9.99	24.15	9.42	13.72	10.13
2023-10-15	9.38	9.91	24.16	9.29	13.56	9.98
2023-10-16	9.27	9.80	23.90	9.20	13.39	9.87
2023-10-17	9.08	9.60	23.81	8.96	13.14	9.63
2023-10-18	8.69	9.21	23.50	8.61	12.88	9.26
2023-10-19	8.63	9.14	23.48	8.50	12.83	9.21
2023-10-20	8.42	8.94	23.40	8.37	12.49	9.01
2023-10-21	9.57	8.29	22.33	7.67	11.77	8.27
2023-10-22	10.78	7.15	21.32	6.47	10.49	6.99
2023-10-23	10.67	5.96	20.67	5.40	9.27	5.80
2023-10-24	9.91	5.33	19.89	4.79	8.81	5.36
2023-10-25	9.00	4.97	19.61	4.36	8.45	4.99
2023-10-26	8.42	4.70	19.61	4.05	8.17	4.69

Date	CAT Plant Discharge (°C)	CAT Plant Intake (°C)	EMP Plant Discharge (°C)	EDM Plant Intake (°C)	K Plant Discharge (°C)	K Plant Intake (°C)
2023-10-27	7.94	4.17	19.73	3.64	7.63	4.21
2023-10-28	7.24	3.79	19.12	3.31	7.31	3.83
2023-10-29	6.77	3.53	18.75	2.97	6.98	3.55
2023-10-30	8.24	3.49	19.20	3.07	6.78	3.32
2023-10-31	9.98	3.48	19.24	3.09	7.04	3.58
2023-11-01	9.52	3.53	16.76	3.02	7.03	3.57
2023-11-02	9.20	3.46	17.41	3.03	6.96	3.55
2023-11-03	7.84	3.15	19.10	2.80	6.85	3.43
2023-11-04	7.11	3.16	18.80	2.78	6.71	3.29
2023-11-05	6.02	3.08	18.49	2.65	6.60	3.18
2023-11-06	6.76	2.91	18.65	2.54	6.46	3.01
2023-11-07	8.18	2.71	18.58	2.32	6.22	2.76
2023-11-08	11.56	2.66	17.67	2.26	6.07	2.66
2023-11-09	11.74	2.64	13.61	2.34	6.13	2.63
2023-11-10	11.20	2.77	17.47	2.43	6.19	2.61
2023-11-11	9.72	2.73	16.45	2.39	6.23	2.68
2023-11-12	7.26	2.95	17.50	2.47	6.36	2.89
2023-11-13	8.41	3.00	18.68	2.56	6.38	2.95
2023-11-14	8.76	2.98	18.87	2.54	6.41	2.95
2023-11-15	12.48	3.16	16.07	2.62	6.42	3.05
2023-11-16	12.62	3.13	16.28	2.73	6.47	3.04
2023-11-17	12.28	3.23	17.30	2.72	6.58	3.14
2023-11-18	12.27	3.20	16.26	2.80	6.55	3.11
2023-11-19	8.17	3.24	18.96	2.80	6.57	3.09
2023-11-20	11.65	3.39	19.09	2.70	6.63	3.26
2023-11-21	12.38	3.40	19.30	2.85	6.58	3.32
2023-11-22	14.28	3.32	19.13	2.89	6.41	3.22
2023-11-23	12.24	3.42	20.33	2.95	5.59	3.19
2023-11-24	12.53	3.48	20.32	3.06	6.79	3.37
2023-11-25	10.96	3.56	19.62	3.03	6.74	3.47
2023-11-26	11.31	3.58	20.51	3.13	6.65	3.40
2023-11-27	11.68	3.64	20.12	3.23	6.84	3.48
2023-11-28	12.43	3.66	20.28	3.27	6.92	3.60
2023-11-29	11.93	3.69	20.12	3.32	6.93	3.61

Date	CAT Plant Discharge (°C)	CAT Plant Intake (°C)	EMP Plant Discharge (°C)	EDM Plant Intake (°C)	K Plant Discharge (°C)	K Plant Intake (°C)
2023-11-30	11.64	3.80	19.90	3.34	7.19	3.62
2023-12-01	12.44	3.84	20.00	3.40	9.16	3.66
2023-12-02	12.11	3.90	20.84	3.46	15.87	3.90
2023-12-03	14.09	3.97	20.75	3.53	13.68	8.04
2023-12-04	7.52	3.99	20.73	3.59	12.50	7.19
2023-12-05	3.65	4.11	16.35	3.53	12.80	3.98
2023-12-06	8.74	4.09	12.08	3.55	13.08	4.00
2023-12-07	3.71	4.16	16.26	3.62	9.41	4.11
2023-12-08	6.64	4.16	18.68	3.65	7.44	4.10
2023-12-09	3.72	4.16	14.40	3.66	10.71	4.13
2023-12-10	3.87	4.19	14.99	3.62	10.65	4.20
2023-12-11	3.77	4.23	16.88	3.71	10.50	4.23
2023-12-12	7.04	4.22	14.29	3.70	10.71	4.18
2023-12-13	3.74	4.19	13.57	3.69	11.14	4.21
2023-12-14	3.58	4.04	13.06	3.56	10.89	4.16
2023-12-15	3.74	4.21	14.85	3.69	10.93	4.23
2023-12-16	3.71	4.18	16.30	3.62	10.64	4.20
2023-12-17	3.70	4.18	16.61	3.67	10.43	4.15
2023-12-18	3.76	4.23	16.31	3.67	10.64	4.21
2023-12-19	4.94	4.22	17.68	3.75	10.62	4.23
2023-12-20	4.55	4.24	17.57	3.75	10.91	4.23
2023-12-21	3.79	4.26	16.19	3.75	11.25	4.28
2023-12-22	3.82	4.28	13.57	3.73	11.12	4.29
2023-12-23	3.78	4.24	13.11	3.68	11.02	4.29
2023-12-24	3.78	4.25	14.45	3.73	10.90	4.25
2023-12-25	3.81	4.27	12.69	3.74	11.00	4.28
2023-12-26	3.78	4.23	10.17	3.69	11.18	4.26
2023-12-27	3.69	4.15	12.96	3.60	10.38	4.24
2023-12-28	3.76	4.22	13.52	3.68	11.00	4.26
2023-12-29	3.79	4.24	10.22	3.70	11.24	4.27
2023-12-30	3.77	4.23	11.84	3.69	11.26	4.28
2023-12-31	3.78	4.24	12.13	3.68	11.16	4.26

N/A – not available

APPENDIX B – GROUNDWATER MONITORING REPORT

2023 Groundwater Assessment

NTPC Jackfish Lake Power Generating Facility

As Part of Water Licence MV2019L1-001

KBL

2023 Assessment of Groundwater Water Quality

Northwest Territories Power Corporation Jackfish Lake Power Generating Facility, Yellowknife, NT
2023 Assessment of Groundwater Quality
23-099NT

March 27, 2024

EXECUTIVE SUMMARY

KBL Environmental Ltd. (KBL) is pleased to provide the following assessment report for the 2023 groundwater monitoring program performed at the Northwest Territories Power Corporation (NTPC) Jackfish Lake Generating Facility, Yellowknife, NT (hereafter referred to as "the Site"), as outlined in the water licence for the site (MV2019L1-0001).

On September 22, 2004, a diesel spill occurred at the Site. Remediation activities removed impacted material as much as possible, but as this is an active site, some areas of the Site could not be remediated due to access issues. In October of 2004, a recovery well was established to remove as much dissolved phase and free phase petroleum hydrocarbons (PHCs) as possible from the groundwater beneath the Site. During subsequent years, a complete network of monitoring wells was established across the Site and along the lakeshore to ensure there was no off-site migration of impacted groundwater. The recovery well was in operation until 2016, and monitoring of PHC contaminants in groundwater has continued to be conducted on a twice annual basis.

Historic reports provided to KBL indicate that detectable concentrations of PHC parameters have been reported in 11 out of 18 monitoring wells on the Site but these results were not compared to any regulatory guidelines. Wells that have historically reported detectable concentrations of PHCs in groundwater include pumping wells PW-01 and PW-02 and groundwater monitoring wells JF01-01, JF01-02, JF01-06, MW-02, MW-05, MW-06, MW-07, MW-09 and MW-10.

During the 2023 sampling events, detectable PHC concentrations were reported in pumping wells PW-01 and PW-02 and groundwater monitoring wells MW-05, MW-06, MW-07, MW-09, MW-10, and JF01 01. Concentrations of PHC parameters exceeding applicable regulatory guideline limits were reported in pumping wells PW-01 and PW-02 and groundwater monitoring wells MW-05, MW-06, and MW-07. All elevated concentrations of PHCs reported in groundwater are attributed to on-site operations at the Site.

Elevated dissolved metal parameters exceeding applicable regulatory guideline limits were reported in monitoring wells JF01-06 (Arsenic (As)) and MW-02 (As and Copper (Cu)). The reported dissolved metal parameter concentrations were similar to historical concentrations and were all within the same order of magnitude, leading to the assumption that they are naturally occurring.

During the 2023 groundwater monitoring events, a number of monitoring wells were identified as needing detailed inspection outside of the groundwater monitoring program. Pumping wells PW-01, PW-02 and PW-03 were observed not to have well caps. Pumping well PW-02 was identified as being screened all the way to surface. This creates a conduit for contaminants in surface water, spills and contaminated run-off to easily reach groundwater. As such, the well should be decommissioned and replaced with a properly constructed replacement well. Pumping well PW-03 is a large diameter well and was observed to have various debris inside it which may render groundwater samples collected from it invalid.

From the JF monitoring wells series, monitoring well JF01-01 was observed to be slanted or bent at ground surface and will require additional inspection and repair. Monitoring well JF01-02 appeared to be damaged to the point where groundwater samples could not be collected from it. Further inspection is required to determine if it should be repaired, replaced or decommissioned. Monitoring well JF01-03 was identified as having internal blockage and will need further inspection to see if it can be repaired. Monitoring well JF01-05 was dry during both sampling events

and detailed inspection is necessary to determine if groundwater samples can be collected from it in the future.

From the MW monitoring well series, monitoring well MW-01 appears to be damaged and groundwater samples could not be collected from it. Further inspection is required to determine if it should be repaired, replaced, or decommissioned. Monitoring well MW-09 was also identified as needing additional inspection for possible repair.

Detectable PHC parameter concentrations in groundwater appear to be the result of on-site activities and operations at the Site. A large quantity of visually impacted groundwater was collected and removed from the Site during the purging stage of the groundwater sampling; however, the groundwater PHC impacts appear to be persistent at the Site. KBL recommends that monitoring and sampling of the current monitoring well network continue, and proper well inspection be completed to determine if any of the existing wells require repair, replacement, or decommissioning.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

1.0 INTRODUCTION

Northwest Territories Power Corporation (NTPC) retained KBL Environmental Ltd. (KBL) to complete the 2023 groundwater water quality program at their Jackfish Power Plant site in Yellowknife, NT; hereinafter referred to as 'the Site', A site location diagram is shown on Figure 1 in Appendix A. An aerial photograph view of the Site is provided as Figure 2.

2.0 BACKGROUND

On September 22, 2004, a diesel spill occurred at the Site. Remediation activities removed impacted material as much as possible, but as this is an active site, some areas of the Site could not be remediated due to access issues. In October of 2004, a recovery well was established to remove as much dissolved phase and free phase petroleum hydrocarbons (PHCs) as possible from the groundwater beneath the Site (Figure 3, Appendix A). During subsequent years, a complete network of monitoring wells was established across the Site and along the lakeshore to ensure there was no off-site migration of impacted groundwater. The recovery well was in operation until 2016, and monitoring of PHC contaminants in groundwater has continued to be conducted on a twice annual basis.

Table 2-1 2023 Monitoring Well Network

Well	Location Description
PW-01	North Between L Plant and EMD Plant
PW-02	North of EMD Plant
PW-03	Southeast corner of EMD Plant
JF01-01	Northwest corner of Ruston Plant
JF01-02	Located at the Lease Boundary near the lakeshore, southwest of the Control Building
JF01-03	Located at the Lease Boundary near the lakeshore, south of the CAT Plant
JF01-04	Located at the Lease Boundary near the lakeshore, south of the EMD Plant
JF01-05	Located at the Lease Boundary near the lakeshore, south of the K Plant
JF01-06	Located at the Lease Boundary near the lakeshore, south of the Warehouse
MW-01	Located at the Lease Boundary near the lakeshore, southeast of CAT Plant
MW-02	Located at the Lease Boundary near the lakeshore, between EMD Plant and CAT Plant
MW-03	Located at the Lease Boundary near the lakeshore, southeast of K Plant and the Pump House
MW-04	Located at the Lease Boundary near the lakeshore, between K Plant and the Warehouse
MW-05	Northwest corner of Ruston Plant
MW-06	West of Ruston Plant
MW-07	Southwest corner of Ruston Plant
MW-09	Southeast of Ruston Plant
MW-10	Northwest corner of Cat Plant

3.0 OBJECTIVE AND SCOPE OF WORK

The scope of work for 2023 included the following:

1. Two (2) groundwater monitoring and sampling events (July and October) took place in 2023 where 18 monitoring well locations (PW1-PW3, JF01-01 – JF01-06, and MW1-MW10) were sampled for PHC constituents benzene, toluene, ethylbenzene, xylene (BTEX) and PHC fractions F1-F4 analysis;
2. Groundwater samples collected from monitoring wells JF01-06 and MW2 were also analyzed for routine water parameters, total suspended solids (TSS), dissolved metals, dissolved mercury, oil and grease, and dissolved oxygen;
3. In the event groundwater monitoring well JF01-06 was dry, a surface water sample was to be obtained from a location along the lakeshore with adequate water and the GPS location recorded;
4. Collection of two duplicate samples for QA/QC analysis;
5. Collection of field parameters including pH, temperature, electrical conductivity, and dissolved oxygen;
6. Complete monthly inspections of the Oil/Water Separator (OWS) in June and October and contract a vacuum truck to remove any hydrocarbon impacted water, if observed or suspected; and
7. Provide a summary and interpretation of results in a report.

4.0 REGULATORY FRAMEWORK

The property is a commercial/industrial power generating facility located within Yellowknife city limits. The nearest waterbody is Jackfish Lake, located directly south of the Site boundaries.

4.1. Surface Water

Surface water samples were not collected during the July and October sampling events due to safety limitations outside of the Site's fenced area and because JF01-06 and MW-02 wells were sampled during both July and October sampling events.

4.2. Groundwater

Government of Canada, 2016, Federal Interim Groundwater Quality Guidelines (FIGQG) - Commercial/Industrial and CCME, Dec 2014, CEQG Water Quality for the Protection of Aquatic Life (Freshwater, long term) were chosen for the Site. This is due to the Site's close proximity to Jackfish Lake. It is unknown if coarse- or fine-grained soil criteria are most applicable to the Site so, to be conservative, the most stringent guidelines were chosen. These were the guidelines for coarse grained soils.

5.0 REGIONAL GEOLOGY

The local terrain mainly consists of bare rocky outcrops with glacial and glaciolacustrine sediments in topographic lows between outcrops. Glacial till is the most common surficial sediment in the area. It consists of a loosely compact, stony, matrix-supported diamicton. The matrix ranges from coarse to fine sand with minor amounts of silt. Glacial till is most often composed of 20%-40% clast. The till is generally less than 2 m thick and forms a discontinuous veneer between areas where small to large bedrock outcrops are present. (Kerr, 2000)

In bedrock, Archean meta-volcanic and metasedimentary rocks are intruded by younger granitoid rocks. Fault lines divide the volcanic rocks from the younger granitoid rocks in the region, including the Kam Lake Fault and West Bay

Fault that run through Yellowknife. In the Yellowknife region, bedrock outcrops may cover up to 75% or more of the surface area. (Kerr, 2000)

6.0 TOPOGRAPHY AND DRAINAGE

The surface of the Site is an industrial gravel and asphalt padded lot, with the overall topography sloping south toward the Jackfish Lake. There was insufficient data to calculate the hydraulic gradient or determine the direction of groundwater flow during the July and October sampling events, however, it is anticipated that the direction of shallow groundwater flow will be south towards Jackfish Lake.

7.0 FIELD ACTIVITIES

7.1. Field Inspections

Inspections conducted during the July and October 2023 sampling events, resulted in the identification of several wells that were likely damaged from frost heaving and/or snow clearing, and/or traffic activity at the Site and/or have improper construction. Minor repairs to wells were made where possible. A full inventory of groundwater monitoring wells was conducted during the October sampling event. A more detailed summary of groundwater monitoring wells is provided in Section 7.3. Separate detailed inspection outside of the groundwater sampling program would be required to determine if wells will need to be repaired, replaced, or decommissioned.

7.2. Monitoring and Sample Collection Methodology

Groundwater monitoring included the measurement of depth to free product, depth to water and depth to the bottom of each well using a Solinst oil/water interface probe. A Waterra pump was used to purge the wells and then a dedicated bailer was used for collecting groundwater samples. Purge water produced by the Waterra pump was directed through a flow-through cell with a multi-parameter probe installed for the purpose of collecting field screening measurements using a YSI 556 multi-parameter analyzer.

Field measured parameters included pH, temperature, electrical conductivity (EC), dissolved oxygen percent (DO%) and oxidation - reduction potential (ORP). Measurements read off the handheld YSI 556 analyzer were periodically recorded, and purging continued until parameter stabilization occurred. At that point, groundwater samples were collected using dedicated bailers. Field screening information from the October sampling event was deemed as non-representative due to interference with the instrument sensors from extreme weather conditions.

All purged groundwater was collected in buckets for transfer to an on-site storage facility which consisted of a lidded steel drum placed inside a larger lidded plastic secondary containment drum. The drummed purge water and on-site oil-water separator are drained periodically by KBL via a vacuum truck for off-site consolidation at KBL's Yellowknife Waste Transfer facility.

All samples were collected using disposable nitrile gloves and placed into clean laboratory supplied containers. Disposable nitrile gloves were replaced between each sample location. All samples collected for laboratory analysis were stored for transport in ice packed coolers. Samples were uniquely labeled, and sample control was maintained using chain of custody forms.

7.3. Monitoring Well Conditions

The condition of the various groundwater monitoring wells on-site are summarized in the following table. Photographs of the monitoring wells are provided in Appendix B.

Table 7-3 2023 Monitoring well conditions

Well	Well Status and Visual Observations
PW-01	No well cap. Groundwater samples collected.
PW-02	No well cap. Hydrocarbon sheen observed during sampling and purging. Well screen extends above ground making the well a potential conduit for surface contaminants to reach groundwater. Needs inspection for possible decommission. Groundwater samples collected. (Photograph 2, Appendix B)
PW-03	No well cap. Large diameter well. Debris observed inside well. Insufficient groundwater to sample during the fall sampling event.
JF01-01	Slanted or bent at ground surface. Needs inspection for possible repair. Hydrocarbon sheen observed during purging and sampling. Groundwater samples collected.
JF01-02	Well Damaged. Needs inspection for repair or decommissioning. Well not sampled.
JF01-03	Well blocked on the inside. Needs inspection for repair or decommissioning. Well not sampled.
JF01-04	Appears to be in proper working condition. No notable observation. Groundwater samples collected.
JF01-05	Dry well. Insufficient water to sample. Needs inspection for possible repair or decommissioning.
JF01-06	Appears to be in proper working condition. Silt observed at bottom of the well. Groundwater samples collected.
MW-01	Dry well. Well Damaged. Needs inspection for repair or decommissioning. Well not sampled.
MW-02	Appears to be in proper working condition. No notable observation. Groundwater samples collected.
MW-03	Appears to be in proper working condition. No notable observation. Groundwater samples collected.
MW-04	Appears to be in proper working condition. No notable observation. Groundwater samples collected.
MW-05	Appears to be in proper working condition. Hydrocarbon sheen observed during purging and sampling. Groundwater samples collected.
MW-06	Appears to be in proper working condition. Groundwater samples collected.
MW-07	Appears to be in proper working condition. Hydrocarbon odour observed during purging and sampling. Groundwater samples collected.
MW-09	Requires inspection for possible repair. Groundwater samples collected.
MW-10	Appears to be in proper working condition. Hydrocarbon sheen observed during purging and sampling. Groundwater samples collected.

8.0 QUALITY ASSURANCE & QUALITY CONTROL (QA/QC)

ALS is accredited by Canadian Association for Laboratory Accreditation Inc. (CALA).

A Quality Assurance & Quality Control (QA/QC) review was conducted to assess the reliability of the data reported from the assessment. The review consisted of an evaluation of sample handling procedures and a detailed analysis of blind field duplicate sample results.

8.1. Blind Field Duplicates

A field duplicate (or blind duplicate) sample is a second sample collected from the same sample location as an original sample and stored in a separate sample container. The sample is given a different identifier to prevent the laboratory from knowing which primary sample it is a duplicate of and taking extraordinary or unusual measures to ensure duplicate sample results closely match primary sample results. The duplicates used for monitoring and sampling in this report include:

- July 2023: Dup1-230727 (*MW-10*), Dup2-230728 (*MW-3*)
- October 2023: DUP1 (*MW-07*), DUP2 (*MW-10*)

8.2. Zeiner Criteria for Duplicate Samples

In 1994, Stephen T. Zeiner, a senior quality assurance chemist, presented a paper at the Superfund XV conference in Washington, D.C. entitled "*Realistic Criteria for the Evaluation of Field Duplicate Sample Results*". In his presentation, he outlined the reasoning for the collection of duplicate field samples and how the results obtained should be evaluated. The evaluation and interpretation criteria have since been referred to as the Zeiner Criteria and are summarized in the following paragraphs.

Groundwater, like soils, must be collected in sufficient quantity to produce a duplicate sample for every ten (10) samples or as required by the client. Water for the field original and duplicate samples is collected at the same time. For samples that are not being analyzed for volatile compounds, the water from each bailer that is extracted from the well is split between the bottle(s) for the field original and the field duplicate. This process is repeated until both bottles have been filled.

For samples that are being analyzed for volatile compounds it is important to fill and cap the sample bottles quickly in order to minimize the escape of volatile compounds while the sample bottle(s) is/are being filled so the bottle(s) for the field original sample are always filled and sealed first before the bottle(s) for the field duplicates. In this case, the field duplicates should technically be referred to as "*field replicates*" instead but for the purposes of this report, all field duplicate and replicate samples shall be collectively referred to as "*duplicates*".

KBL's practice is to ensure all duplicate samples that are submitted are what are commonly referred to as "blind duplicates" by giving them a generic name that does not give the analytical laboratory a clue as to which sample the duplicate is a duplicate of. This is to prevent the laboratory from taking any unusual measures to ensure the results reported by the duplicate sample are acceptably similar to those of the original sample.

Precision in analytical results may be evaluated by calculating the relative percent difference (RPD) or absolute difference (AD) of replicate samples using the following formulae:

$$\textbf{RPD} = \frac{|(S - D)|}{(S + D) / 2} \times 100 \qquad \textbf{AD} = |(S - D)|$$

where: RPD and AD are absolute values;

S is the original sample result (mg/kg) or (mg/L); and,

D is the replicate sample result (mg/kg) or (mg/L).

For groundwater (or water in general), if both the original and duplicate aqueous sample concentrations are greater than five times the MDL for a given parameter, the RPD must be less than or equal to 20% to be considered precise. If the results lie outside of that range, they should be considered estimates only.

If at least one of the sample concentrations reported is less than or equal to five times the MDL for a given parameter, the AD should be less than or equal to the MDL. If the AD is greater than the MDL, the results should be considered estimates only.

If one of the sample concentrations is positive and its duplicate sample concentration is less than the MDL, the AD between the reported concentration and one-half the MDL should be less than or equal to the MDL. If the difference is greater than the MDL, the results should be considered estimates only.

Table 2 and Table 3 in Appendix C present a detailed analysis of all duplicate sample results. It applies the Zeiner criteria and indicates where any results are outside the acceptable range and are to be considered as estimates only (Zeiner, 1994).

8.3. Groundwater Samples

The 1994 Zeiner QA/QC protocol for duplicate water samples were rigorously applied to all tested parameters in all duplicate groundwater samples collected in 2023.

Overall, KBL is satisfied with the accuracy of the QA/QC duplicate sample results reported in 2023.

For the 2023 groundwater sampling events, all concentrations met the testing parameters, except for the following:

- MW-07 (*DUP1*) in October: F2 (RPD 33.33%), F3 (RPD 36.35%), and VPH (AD 330)

The elevated RPD and AD values area believed to be attributed to non-homogenous sampling media upon collection.

Overall, KBL is satisfied with the accuracy of the QA/QC duplicate sample results reported in 2023.

9.0 ANALYTICAL RESULTS

9.1. Groundwater

Groundwater Analytics from 2023 July and October sampling events from Table 1 (Appendix C), are summarized in Table 9-1 below.

Table 9-1 Summary of Groundwater Results

Well	July 2023	October 2023
	Parameter Exceedances	
PW-01	PHC Fraction F2	PHC Fraction F2
PW-02	PHC Fraction F2	PHC Fraction F2
PW-03	None	-
JF01-01	None	None
JF01-02	-	-
JF01-03	-	-
JF01-04	None	None
JF01-05	-	-
JF01-06	Dissolved Arsenic	Dissolved Arsenic
MW-01	None	None
MW-02	Dissolved Arsenic and Copper	Dissolved Arsenic and Copper
MW-03	None	None
MW-04	None	None
MW-05	PHC Fraction F2	-
MW-06	None	PHC Fraction F2
MW-07	PHC Fraction F2	PHC Fraction F2
MW-09	None	None
MW-10	None	None

Notes:

Parameter exceedance

All parameters reported concentrations below applicable guideline limits and/or reported non-detect

"- " No sample collected

During the 2023 sampling events, detectable PHC concentrations were reported in pumping wells PW-01 and PW-02 and groundwater monitoring wells MW-05, MW-06, MW-07, MW-09, MW-10, and JF01-01.

As summarized in Table 9-1 above, concentrations of PHC Fraction F2 above the applicable regulatory guideline limit were reported in pumping wells PW-01, PW-02 and groundwater monitoring wells MW-05, MW-06, and MW-07. Elevated concentrations of dissolved metals As and Cu above the applicable regulatory guideline limits were reported in groundwater monitoring wells JF01-06 and MW-02.

All tested routine water parameters reported concentrations below applicable regulatory guideline limits in 2023. Groundwater analytical results are summarized in tables provided in Appendix C. Laboratory Certificates of Analysis are provided in Appendix D.

10.0 CONCLUSION & RECOMMENDATIONS

10.1. Groundwater

From the historical 2022 report (Golder, 2022), detectable PHC parameter concentrations of were reported in 11 out of 18 monitoring wells on the Site but were not compared to any regulatory guidelines. Those pumping and monitoring wells included PW-01, PW-02, JF01-01, JF01-02, JF01-06, MW-02, MW-05, MW-06, MW-07, MW-09 and MW-10.

During the 2023 sampling events, detectable PHC concentrations were reported in pumping wells PW 01 and PW-02 and groundwater monitoring wells MW-05, MW-06, MW-07, MW-09, MW-10, and JF01-01. Concentrations of PHC Fraction F2 above the applicable guideline limit were reported in pumping wells PW 01 and PW-02 and groundwater monitoring wells MW-05, MW-06, and MW-07. All elevated PHC concentrations reported in groundwater at the Site are attributed to on-site operations.

Elevated dissolved metal parameters exceeding the applicable regulatory guideline limits were reported in monitoring wells JF01-06 (As) and MW-02 (As, Cu). The reported dissolved metal parameter concentrations were similar to historical concentrations and were all within the same order of magnitude, leading to the assumption that they are naturally occurring.

10.2. Recommendations

During the 2023 groundwater monitoring events, a number of monitoring wells were identified as needing detailed inspection outside of the groundwater monitoring program. Pumping wells PW-01, PW-02 and PW-03 were observed not to have well caps. Pumping well PW-02 was identified as being screened all the way to surface. This creates a conduit for contaminants in surface water, spills and contaminated run-off to easily reach groundwater (Photograph 2, Appendix B). As such, the well should be decommissioned and replaced with a properly constructed replacement well. Pumping well PW-03 is a large diameter well and was observed to have various debris inside it which may render groundwater samples collected from it invalid.

From the JF monitoring wells series, monitoring well JF01-01 was observed to be slanted or bent at ground surface and will require additional inspection and repair. Monitoring well JF01-02 appeared to be damaged to the point where groundwater samples could not be collected from it. Further inspection is required to determine if it should be repaired, replaced or decommissioned. Monitoring well JF01-03 was identified as having internal blockage and will need further inspection to see if it can be repaired. Monitoring well JF01-05 was dry during both sampling events and detailed inspection is necessary to determine if groundwater samples can be collected from it in the future.

From the MW monitoring well series, monitoring well MW-01 appears to be damaged and groundwater samples could not be collected from it. Further inspection is required to determine if it should be repaired, replaced or decommissioned. Monitoring well MW-09 was also identified as needing additional inspection for possible repair.

Detectable PHC parameter concentrations in groundwater appear to be the result of on-site activities and operations at the Site. A large quantity of visually impacted groundwater was collected and removed from the Site during the purging stage of the groundwater sampling; however, the groundwater PHC impacts appear to be persistent at the Site. KBL recommends that monitoring and sampling of the current monitoring well network continue, and proper well inspection be completed to determine if any of the existing wells require repair,

replacement, or decommissioning.

11.0 NOTICE TO READERS/CLOSURE

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The findings, conclusions and recommendations in this report have been developed in a manner consistent with the level of skill normally exercised by professionals currently practicing under similar conditions in the area and reflect KBL's best judgement based on information available at the time of preparation of this report. No other warranties, either expressed or implied are made as to the professional services included in this report.

The findings and conclusions contained in this report are valid only as of the date of this report and may be based, in part, upon information provided by others. If any of the information is inaccurate, new information is discovered, the conditions of the Site or intended use of the Site change, or applicable standards are amended, modifications to this report may be necessary. KBL cannot be responsible for the use of this report or portions thereof unless KBL is requested to review and, if necessary, update the report. The results of the work herein should in no way be construed as a warranty that the subject Site is free from any and all contamination.

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Should you have any questions or concerns please contact the undersigned at your earliest convenience.

Respectfully,

KBL Environmental Ltd. – NAPEG Permit to Practice P1107.

Prepared By:

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NAPEG L5474

Project Manager

Reviewed and Edited By:

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NAPEG L5486

Senior Reviewer

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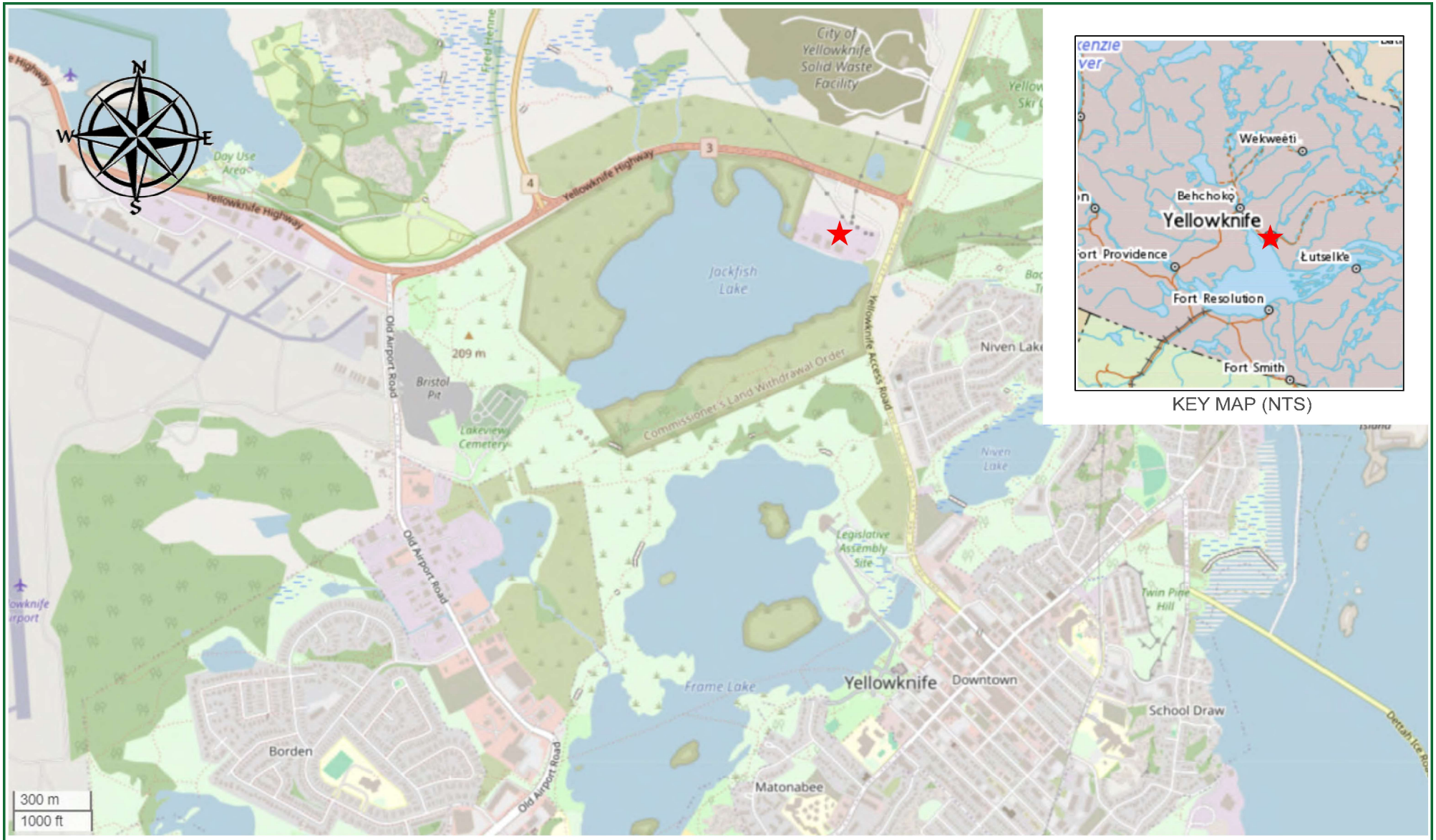
APPENDIX A

Site Figures



KEY MAP (NTS)

MAP SOURCE:

Main Map: OpenStreetMap.org
Inset Map: atlas.gc.ca/Toporama

LEGEND

★ SITE LOCATION

NOTES

SITE LOCATION MAP

KBL

Date: 27-FEB-2024	Drawn: RD	NORTHWEST TERRITORIES POWER CORPORATION Jackfish Power Plant Site Jackfish Lake, Yellowknife, NT	Figure: 1
File Name: 23-099NT_Fig 1.srf	Approved: ZK		

LEGEND

NOTES

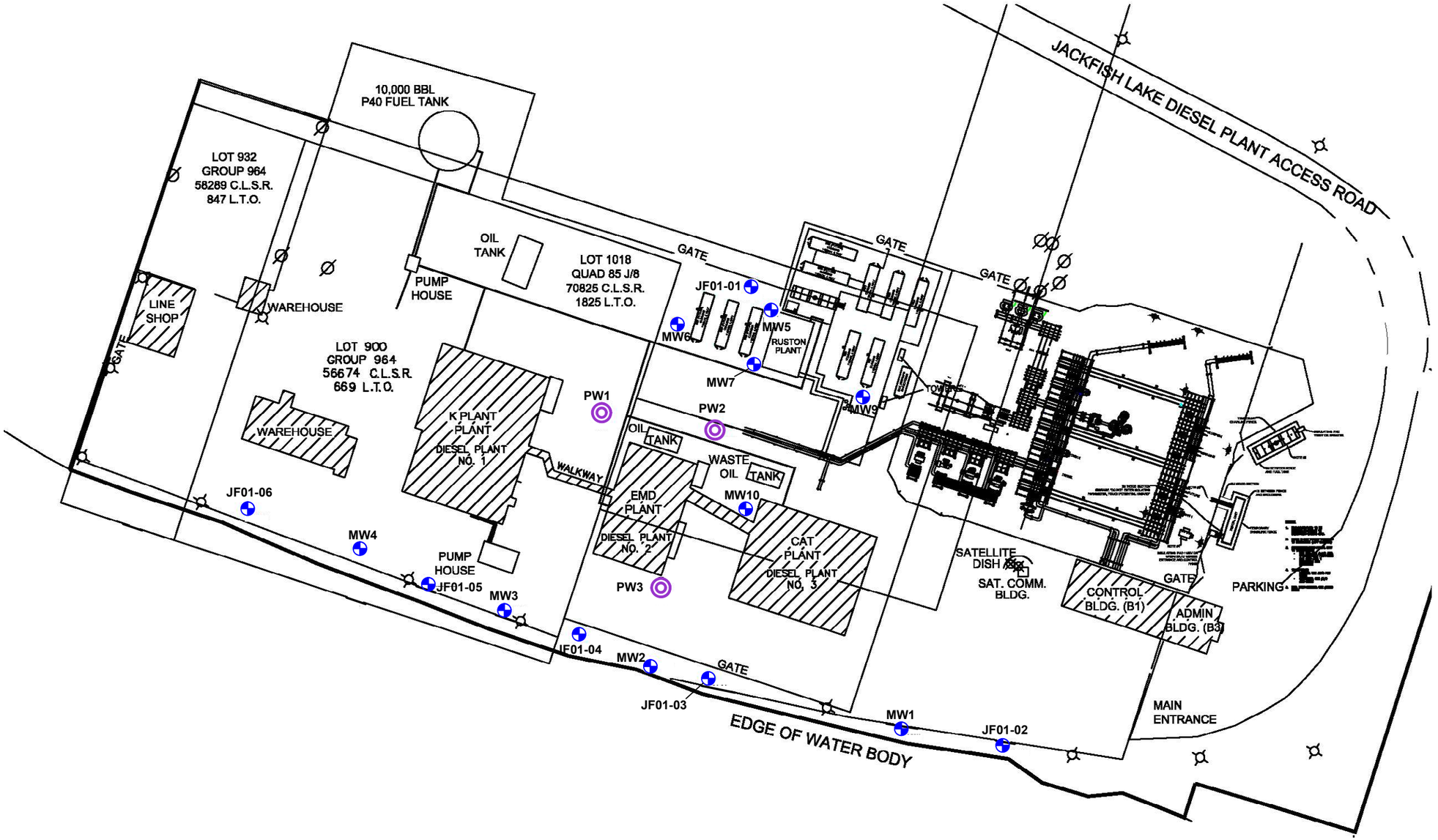
MAP SOURCE:

Main Map: ESRI World Imagery Wayback

2022 AERIAL PHOTOGRAPH

KBL

Date: 27-FEB-2024	Drawn: RD	NORTHWEST TERRITORIES POWER CORPORATION Jackfish Power Plant Site Jackfish Lake, Yellowknife, NT	Figure: 2
File Name: 23-099NT_Fig 1.srf	Approved: ZK		



KBL

FIGURE 3:

SITE LAYOUT DIAGRAM SHOWING GROUNDWATER MONITORING WELL AND PUMPING WELL LOCATIONS

Date: 27-FEB-2024

PROJECT INFORMATION

LOCATION:
Jackfish Power Plant Site

PROJECT NO.:
23-099NT

CLIENT NAME:
Northwest Territories Power Corporation

DRAWN BY:	CHECKED BY:
R. Dunkley	Z. Kosanic

LEGEND

Groundwater Monitoring Well

Pumping Well Location

Note: Diagram based on Northwest Territories Power Corporation Jackfish Lake Diesel Plant 2017 Groundwater Monitoring Wells Diagram Drawing No. P101-1000

APPENDIX B

Site Photographs

SITE PHOTOGRAPHS

Photograph 1: **PW-01.** No well cap. Well sample collected. Photograph was taken on October 25, 2023.

Photograph 2: **PW-02.** No well cap. Hydrocarbon sheen observed during sampling and purging. Screen of the well extends above ground. Possible conduit to groundwater contamination. Needs inspection for possible decommission. Well sample collected. Photograph was taken on October 25, 2023.

SITE PHOTOGRAPHS

Photograph 3: **PW-03.** No well cap. Debris observed in the well. Insufficient water for sample. Photograph was taken October 25, 2023.

Photograph 4: **JF01-01.** Well not horizontal. Appears to be in proper working condition. Hydrocarbon sheen observed during purging and sampling. Well sample collected. Photograph was taken October 25, 2023

SITE PHOTOGRAPHS

Photograph 5: **JF01-02.** Well damaged. Needs inspection for repair or decommission. Well not sampled. Photograph was taken October 25, 2023

Photograph 6: **JF01-03.** Well blocked on the inside. Needs inspection for repair or decommission. Well not sampled. Photograph was taken October 25, 2023.

SITE PHOTOGRAPHS

Photograph 7: **JF01-04.** Appears to be in proper working condition. Silt observed at bottom of the well. Well sample collected. Photograph was taken October 25, 2023.

Photograph 8: **JF01-05.** Dry well. Insufficient water to sample. Needs inspection for possible repair or decommission. Photograph was taken October 25, 2023.

SITE PHOTOGRAPHS

Photograph 9: **JF01-06.** Appears to be in proper working condition. Silt observed at the bottom of the well. Well sample collected. Photograph was taken October 25, 2023.

Photograph 10: **MW-01.** Dry well. Well damaged. Needs inspection for repair or decommission. Well not sampled. Photograph was taken October 25, 2023.

SITE PHOTOGRAPHS

Photograph 11: **MW-02.** Appears to be in proper working condition. No notable observation. Well sample collected. Photograph taken on October 25, 2023

Photograph 12: **MW-03.** Appears to be in proper working condition. No notable observation. Well sample collected. Photograph taken on October 25, 2023

SITE PHOTOGRAPHS

Photograph 13: **MW-04.** Appears to be in proper working condition. No notable observation. Well sample collected. Photograph taken on October 25, 2023

Photograph 14: **MW-05.** Appears to be in proper working condition. Hydrocarbon sheen observed during purging and sampling. Well sample collected. Photograph taken on October 25, 2023.

SITE PHOTOGRAPHS

Photograph 15: **MW-06.** Appears to be in proper working condition. Well sampled collected. Photograph taken on October 25, 2023.

Photograph 16: **MW-07.** Appears to be in proper working condition. Hydrocarbon odour observed during purging and sampling. Well sample collected. Photographed taken on October 25, 2023

SITE PHOTOGRAPHS

Photograph 17: **MW-09.** Requires inspection for possible repair. Well sample collected. Photograph taken on October 25, 2023

Photograph 18: **MW-10.** Appears to be in proper working condition. Hydrocarbon sheen observed during purging and sampling. Well sample collected. Photograph taken on October 25, 2023.

APPENDIX C

Data Summary Tables

<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	130	740	450	<100	<100	<100
<300	<300	<300	<300	<300	<300	<300	<300	2,900	810	1,400	4,280	44,100	31,500	720	1,140	820
<300	<300	<300	<300	<300	<300	<300	<300	930	<300	440	810	11,800	8,170	<300	360	<300
<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	<300	710	450	<300	<300	<300
<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	140	830	500	<100	<100	<100
	<5.0	<5.0														
<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	<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	0.73	<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	<0.50	<0.50	<0.50
<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.68	0.50	<0.40	<0.40	<0.40
<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.68	0.50	<0.50	<0.50	<0.50
	7.41	7.88														
	510	487														
	162	153														
	31.0	28.9														
	70.5	55.0														
	66.0	66.2														
	0.087	0.094														
	0.124	0.136														
	<0.0010	0.0023														
	<1,000	<1,000														
	36.1	30.6														
	276	286														
	0.0095	0.0101														
	0.00152	0.00074														
	0.0501	0.0632														
	0.0732	0.0522														
	<0.000020	<0.000100														
	<0.000050	<0.000050														
	0.039	0.018														
	41.6	38.3														
	0.0000207	0.0000136														
	0.000015	<0.000010														
	<0.00050	<0.00050														
	0.00053	0.00031														
	0.00202	0.00233														
	0.096	0.067														
	<0.000050	<0.000050														
	0.0050	0.0029														
	14.1	13.9														
	0.0456	0.0265														
	<0.0000050	<0.0000050														
	0.00141	0.00102														
	0.00218	0.00117														
	<0.050	<0.050														
	6.07	4.25														
	0.000127	<0.000050														
	7,640	5,170														
	<0.000010	<0.000010														
	0.116	0.101														
	<0.20	<0.20														
	0.000023	0.000015														
	<0.00010	<0.00010														
	<0.00010	0.00041														
	0.00030	0.00031														
	<0.00010	<0.00010														
	0.282	0.591														
	0.00133	0.00106														
	<0.0030	0.0017														
	<0.20	<0.20														

Table 2. Quality Assurance / Quality Control Results - Field Duplicates - July 2023
Client Name: NTPC
Location: Jackfish Lake Generating Facility
KBL File #: 23-099NT

Analyzed Parameter	Unit	RDL	27-Jul-23		Relative Percent Difference (RPD)	Absolute Difference (AD)[1]	28-Jul-23		Relative Percent Difference (RPD)	Absolute Difference (AD)[1]
			MW-10	DUP1-230727			MW03	DUP2-230728		
			YL2300918-002	YL2300918-003			YL2300932-002	YL2300932-003		
F1-BTEX	µg/L	100	<100	<100	NA	NA	<100	<100	NA	NA
F2	µg/L	300	820	980	NA	160	<300	<300	NA	NA
F3	µg/L	300	<300	350	NA	NA	<300	<300	NA	NA
F4	µg/L	300	<300	<300	NA	NA	<300	<300	NA	NA
VPH (C6-C10)	µg/L	100	<100	<100	NA	NA	<100	<100	NA	NA
Benzene	µg/L	0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	NA	NA
Toluene	µg/L	0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	NA	NA
Ethylbenzene	µg/L	0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	NA	NA
Xylene (m & p)	µg/L	0.50	<0.40	<0.40	NA	NA	<0.50	<0.50	NA	NA
Xylene (o)	µg/L	0.50	<0.30	<0.30	NA	NA	<0.50	<0.50	NA	NA
Xylene Total	µg/L	0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	NA	NA

Notes:

NA- Not Applicable or cannot be calculated

ND- No Data

RDL- Reporting Detection Limit

1. When one duplicate sample reports non-detect and the other reports a detectable concentration, the AD is considered to be the detectable concentration minus have the detection limit for that parameter

Value - Value is outside the Zeiner QA/QC criteria limits for duplicate groundwater samples as per the following criteria:

- When concentrations of both samples are greater than 5 times the detection limit, and RPD of less or equal to 20% is considered precise. Otherwise, the results should be considered estimates.

Otherwise, the results should be considered estimates.

reported concentration should be less than or equal to the detection limit for the result to be considered precise. Otherwise, the result should be considered estimates.

Table 3. Quality Assurance / Quality Control Results - Field Duplicates - October 2023
Client Name: NTPC
Location: Jackfish Lake Generating Facility
KBL File #: 23-099NT

Analyzed Parameter	Unit	RDL	25-Oct-23		Relative Percent Difference (RPD)	Absolute Difference (AD)[1]	25-Oct-23		Relative Percent Difference (RPD)	Absolute Difference (AD)[1]
			MW-07	DUP1			MW-10	DUP2		
			YL2301518-010	YL2301518-013			YL2301518-012	YL2301518-014		
F1-BTEX	µg/L	100	740	450	NA	NA	<100	<100	NA	NA
F2	µg/L	300	44,100	31,500	33.33%	12600	340	390	13.70%	50
F3	µg/L	300	11,800	8,170	36.35%	3630	<300	<300	NA	NA
F4	µg/L	300	710	450	44.83%	260	<300	<300	NA	NA
VPH (C6-C10)	µg/L	100	830	500	49.62%	330	<100	<100	NA	NA
Benzene	µg/L	0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	NA	NA
Toluene	µg/L	0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	NA	NA
Ethylbenzene	µg/L	0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	NA	NA
Xylene (m & p)	µg/L	0.50	<0.40	<0.40	NA	NA	<0.40	<0.40	NA	NA
Xylene (o)	µg/L	0.50	<0.30	<0.30	NA	NA	<0.30	<0.30	NA	NA
Xylene Total	µg/L	0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	NA	NA

Notes:

NA- Not Applicable or cannot be calculated

ND- No Data

RDL- Reporting Detection Limit

1. When one duplicate sample reports non-detect and the other reports a detectable concentration, the AD is considered to be the detectable concentration minus have the detection limit for that parameter

Value - Value is outside the Zeiner QA/QC criteria limits for duplicate groundwater samples as per the following criteria:

- When concentrations of both samples are greater than 5 times the detection limit, and RPD of less or equal to 20% is considered precise. Otherwise, the results should be considered estimates.

Otherwise, the results should be considered estimates.

reported concentration should be less than or equal to the detection limit for the result to be considered precise. Otherwise, the result should be considered estimates.

Table 4: Field Data Measurements
KBL Project No: 23-099NT
Client: NTPC Jackfish Lake Generating Facility

Monitoring Well	Date	Stick-up (m)	Depth to Water (mbtor)	Depth to Bottom (mbtor)	Water Column Height (m)	pH	Temp (°C)	DO	EC
PW-01	05-Aug-22	0.87	2.35	3.27	0.92	-	-	-	-
	11-Aug-22	0.87	2.41	3.15	0.74	-	-	-	-
	29-Sep-22	0.83	2.61	3.10	0.49	-	-	-	-
	27-Jul-23	0.92	2.52	3.16	0.64	6.8	13.80	15.50	305.60
	25-Oct-23	0.92	2.93	3.16	0.23	-	-	-	-
PW-02	05-Aug-22	0.60	2.01	4.89	2.88	-	-	-	-
	11-Aug-22	0.60	2.07	4.72	2.65	-	-	-	-
	29-Sep-22	0.74	2.28	4.66	2.38	-	-	-	-
	27-Jul-23	0.74	2.55	4.73	2.19	6.6	13.80	33.00	720.00
	25-Oct-23	0.74	2.60	4.73	2.13	-	-	-	-
PW-03	05-Aug-22	1.07	2.58	3.18	0.60	-	-	-	-
	11-Aug-22	1.07	2.64	3.22	0.58	-	-	-	-
	29-Sep-22	1.07	2.85	3.17	0.32	-	-	-	-
	27-Jul-23	1.09	2.76	3.19	0.43	7.7	13.50	49.50	519.00
	25-Oct-23	1.09	2.17	3.19	1.02	-	-	-	-
JF01-01	05-Aug-22	0.95	1.99	2.72	0.73	-	-	-	-
	29-Sep-22	0.91	2.26	2.89	0.63	-	-	-	-
	27-Jul-23	1.03	2.17	2.78	0.61	7.1	12.30	30.10	429.40
	25-Oct-23	1.03	2.58	2.78	0.20	-	-	-	-
JF01-02	05-Aug-22	1.24	1.76	2.04	0.28	-	-	-	-
	29-Sep-22	1.13	1.87	2.05	0.18	-	-	-	-
	27-Jul-23	1.16	1.90	2.05	0.15	-	-	-	-
	25-Oct-23	1.16	1.90	2.05	0.15	-	-	-	-
JF01-03	04-Aug-22	1.17	2.22	3.09	0.87	-	-	-	-
	29-Sep-22	1.15	2.46	3.10	0.64	-	-	-	-
	27-Jul-23	1.20	-	-	-	-	-	-	-
	25-Oct-23	1.20	2.79	3.14	0.35	-	-	-	-
JF01-04	04-Aug-22	0.89	2.12	2.95	0.83	-	-	-	-
	29-Sep-22	0.90	2.40	3.12	0.72	-	-	-	-
	27-Jul-23	1.12	2.31	3.15	0.84	7.4	19.90	29.20	513.00
	25-Oct-23	1.12	2.72	3.15	0.43	-	-	-	-
JF01-05	04-Aug-22	0.68	2.05	2.10	0.05	-	-	-	-
	29-Sep-22	0.70	-	2.11	-	-	-	-	-
	27-Jul-23	0.94	-	2.14	-	-	-	-	-
	25-Oct-23	0.94	-	2.14	-	-	-	-	-
JF01-06	04-Aug-22	0.89	2.03	2.44	0.41				
	29-Sep-22	0.87	2.30	2.84	0.54				
	27-Jul-23	0.98	2.21	3.06	0.85	7.8	20.10	25.70	500.00
	25-Oct-23	0.98	2.63	3.06	0.43	-	-	-	-
MW-01	05-Aug-22	-	-	-	-	-	-	-	-
	29-Sep-22	0.94	-	1.69	-	-	-	-	-
	27-Jul-23	1.03	-	1.73	-	-	-	-	-
	25-Oct-23	1.03	-	1.73	-	-	-	-	-
MW-02	05-Aug-22	0.77	2.14	3.68	1.54	-	-	-	-
	29-Sep-22	0.77	2.46	3.80	1.34	-	-	-	-
	27-Jul-23	0.85	2.31	3.12	0.81	7.2	20.30	32.10	521.00
	25-Oct-23	0.85	2.77	3.12	0.35	-	-	-	-
MW-03	04-Aug-22	0.92	2.19	2.69	0.50	-	-	-	-
	29-Sep-22	0.93	2.52	3.46	0.94	-	-	-	-
	27-Jul-23	0.93	2.39	3.48	1.09	7.5	20.00	34.30	516.00
	25-Oct-23	0.93	2.81	3.48	0.67	-	-	-	-
MW-04	04-Aug-22	0.87	2.02	3.11	1.09				
	29-Sep-22	0.82	2.26	3.52	1.26				
	27-Jul-23	0.89	2.18	3.69	1.51	7.4	20.90	21.10	464.40
	25-Oct-23	0.89	2.18	3.69	1.51	-	-	-	-
MW-05	05-Aug-22	1.14	2.22	2.89	0.67	-	-	-	-
	29-Sep-22	1.12	2.50	2.85	0.35	-	-	-	-
	27-Jul-23	1.20	2.42	2.91	0.49	6.9	15.60	52.60	452.00
	25-Oct-23	1.20	2.82	2.91	0.09	-	-	-	-
MW-06	05-Aug-22	0.55	2.14	5.90	3.76	-	-	-	-
	29-Sep-22	0.52	2.40	6.21	3.81	-	-	-	-
	27-Jul-23	0.70	2.30	5.84	3.54	6.9	9.00	25.30	415.90
	25-Oct-23	0.70	2.70	5.84	3.14	-	-	-	-
MW-07	05-Aug-22	0.86	1.99	5.15	3.16	-	-	-	-
	29-Sep-22	0.83	2.33	5.13	2.80	-	-	-	-
	27-Jul-23	1.06	2.17	5.12	2.95	7	8.80	33.60	440.30
	25-Oct-23	1.06	2.57	5.12	2.55	-	-	-	-
MW-09	05-Aug-22	0.55	1.71	6.05	4.34	-	-	-	-
	29-Sep-22	0.49	1.97	6.16	4.19	-	-	-	-
	27-Jul-23	0.72	1.89	6.05	4.16	7	11.00	40.00	
	25-Oct-23	0.72	2.28	6.05	3.77	-	-	-	-
MW-10	05-Aug-22	0.92	2.39	4.74	2.35	-	-	-	-
	29-Sep-22	0.89	2.64	4.82	2.18	-	-	-	-
	27-Jul-23	1.02	2.31	4.86	2.55	7.2	14.60	28.90	496.00
	25-Oct-23	1.02	2.96	4.86	1.905	-	-	-	-

m- meters
mbtor- meters below top of riser
°C- Celsius
DO - Dissolved Oxygen
EC - Electric Conductivity

APPENDIX D

Laboratory Certificates of Analysis

ALS Canada Ltd.

CERTIFICATE OF ANALYSIS

Work Order	: **YL2300918**	Page	: 1 of 4
Client	: **KBL Environmental Ltd.**	Laboratory	: ALS Environmental - Yellowknife
Contact	: Katie Oliver	Account Manager	: Oliver Gregg
Address	: 17 Cameron Road PO Box 1895 Yellowknife NT Canada X1A 2P4	Address	: 314 Old Airport Road, Unit 116 Yellowknife NT Canada X1A 3T3
Telephone	: 780 893 3305	Telephone	: 1 867 445 7143
Project	: 23-099NT	Date Samples Received	: 27-Jul-2023 14:45
PO	: ----	Date Analysis Commenced	: 31-Jul-2023
C-O-C number	: ----	Issue Date	: 08-Aug-2023 09:03
Sampler	: ----		
Site	: ----		
Quote number	: YL22-KBLE100-001		
No. of samples received	: 10		
No. of samples analysed	: 10		

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/Lab	LOR	Unit	Client sample ID	MW-9-230727	MW-10-230727	Dup1-230727	PW-02-230727	PW-01-230727
					Client sampling date / time	27-Jul-2023 00:00	27-Jul-2023 00:00	27-Jul-2023 00:00	27-Jul-2023 00:00	27-Jul-2023 00:00
						YL2300918-001	YL2300918-002	YL2300918-003	YL2300918-004	YL2300918-005
						Result	Result	Result	Result	Result
Volatile Organic Compounds [Fuels]										
Benzene	71-43-2	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Ethylbenzene	100-41-4	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	1.69
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	100-42-5	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Toluene	108-88-3	E611A/VA	0.50	µg/L		0.73	<0.50	<0.50	<0.50	<0.50
Xylene, m+p-	179601-23-1	E611A/VA	0.40	µg/L		<0.40	<0.40	<0.40	<0.40	6.54
Xylene, o-	95-47-6	E611A/VA	0.30	µg/L		<0.30	<0.30	<0.30	<0.30	3.76
Xylenes, total	1330-20-7	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	10.3
Hydrocarbons										
F1 (C6-C10)	----	E581.VH+F1/VA	100	µg/L		<100	<100	<100	<100	170
F2 (C10-C16)	----	E601/VA	300	µg/L		720	820	980	1600	5270
F3 (C16-C34)	----	E601/VA	300	µg/L		<300	<300	350	1160	1770
F4 (C34-C50)	----	E601/VA	300	µg/L		<300	<300	<300	<300	<300
VHw (C6-C10)	----	E581.VH+F1/VA	100	µg/L		<100	<100	<100	<100	200
F1-BTEX	----	EC580/VA	100	µg/L		<100	<100	<100	<100	158
VPHw	----	EC580A/VA	100	µg/L		<100	<100	<100	<100	190
Hydrocarbons Surrogates										
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	E601/VA	1.0	%		83.9	90.9	87.3	89.3	96.7
Dichlorotoluene, 3,4-	95-75-0	E581.VH+F1/VA	1.0	%		----	----	----	----	83.7
Volatile Organic Compounds Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611A/VA	1.0	%		----	----	----	----	94.1
Difluorobenzene, 1,4-	540-36-3	E611A/VA	1.0	%		----	----	----	----	102

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MW-06-230727	MW-07-230727	MW-05-230727	JF01-01-230727	MW-04-230727
					Client sampling date / time	27-Jul-2023 00:00	27-Jul-2023 00:00	27-Jul-2023 00:00	27-Jul-2023 00:00	27-Jul-2023 00:00
						YL2300918-006	YL2300918-007	YL2300918-008	YL2300918-009	YL2300918-010
						Result	Result	Result	Result	Result
Volatile Organic Compounds [Fuels]										
Benzene	71-43-2	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Ethylbenzene	100-41-4	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	100-42-5	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Toluene	108-88-3	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Xylene, m+p-	179601-23-1	E611A/VA	0.40	µg/L		<0.40	<0.40	<0.40	<0.40	<0.40
Xylene, o-	95-47-6	E611A/VA	0.30	µg/L		<0.30	<0.30	<0.30	<0.30	<0.30
Xylenes, total	1330-20-7	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Hydrocarbons										
F1 (C6-C10)	----	E581.VH+F1/VA	100	µg/L		<100	130	<100	<100	<100
F2 (C10-C16)	----	E601/VA	300	µg/L		810	4280	2900	960	<300
F3 (C16-C34)	----	E601/VA	300	µg/L		<300	810	930	<300	<300
F4 (C34-C50)	----	E601/VA	300	µg/L		<300	<300	<300	<300	<300
VHw (C6-C10)	----	E581.VH+F1/VA	100	µg/L		<100	140	<100	<100	<100
F1-BTEX	----	EC580/VA	100	µg/L		<100	130	<100	<100	<100
VPHw	----	EC580A/VA	100	µg/L		<100	140	<100	<100	<100
Hydrocarbons Surrogates										
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	E601/VA	1.0	%		84.5	97.2	94.0	106	89.5
Dichlorotoluene, 3,4-	95-75-0	E581.VH+F1/VA	1.0	%		91.8	76.5	96.6	93.2	90.2
Volatile Organic Compounds Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611A/VA	1.0	%		92.4	94.0	93.8	92.7	91.9
Difluorobenzene, 1,4-	540-36-3	E611A/VA	1.0	%		104	101	102	103	103

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **YL2300918**	Page	: 1 of 8
Client	: **KBL Environmental Ltd.**	Laboratory	: ALS Environmental - Yellowknife
Contact	: Katie Oliver	Account Manager	: Oliver Gregg
Address	: 17 Cameron Road PO Box 1895 Yellowknife NT Canada X1A 2P4	Address	: 314 Old Airport Road, Unit 116 Yellowknife, Northwest Territories Canada X1A 3T3
Telephone	: 780 893 3305	Telephone	: 1 867 445 7143
Project	: 23-099NT	Date Samples Received	: 27-Jul-2023 14:45
PO	: ----	Issue Date	: 08-Aug-2023 09:03
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: YL22-KBLE100-001		
No. of samples received	: 10		
No. of samples analysed	: 10		

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)										
Dup1-230727	E601	27-Jul-2023	03-Aug-2023	14 days	7 days	✓	04-Aug-2023	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
MW-06-230727	E601	27-Jul-2023	03-Aug-2023	14 days	7 days	✓	04-Aug-2023	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
MW-10-230727	E601	27-Jul-2023	03-Aug-2023	14 days	7 days	✓	04-Aug-2023	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
MW-9-230727	E601	27-Jul-2023	03-Aug-2023	14 days	7 days	✓	04-Aug-2023	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
PW-01-230727	E601	27-Jul-2023	03-Aug-2023	14 days	7 days	✓	04-Aug-2023	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
PW-02-230727	E601	27-Jul-2023	03-Aug-2023	14 days	7 days	✓	04-Aug-2023	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
JF01-01-230727	E601	27-Jul-2023	03-Aug-2023	14 days	8 days	✓	04-Aug-2023	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) MW-04-230727	E601	27-Jul-2023	03-Aug-2023	14 days	8 days	✓	04-Aug-2023	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) MW-05-230727	E601	27-Jul-2023	03-Aug-2023	14 days	8 days	✓	04-Aug-2023	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) MW-07-230727	E601	27-Jul-2023	03-Aug-2023	14 days	8 days	✓	04-Aug-2023	40 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) Dup1-230727	E581.VH+F1	27-Jul-2023	31-Jul-2023	14 days	4 days	✓	31-Jul-2023	10 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW-10-230727	E581.VH+F1	27-Jul-2023	31-Jul-2023	14 days	4 days	✓	31-Jul-2023	10 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW-9-230727	E581.VH+F1	27-Jul-2023	31-Jul-2023	14 days	4 days	✓	31-Jul-2023	10 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) PW-02-230727	E581.VH+F1	27-Jul-2023	31-Jul-2023	14 days	4 days	✓	31-Jul-2023	10 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) JF01-01-230727	E581.VH+F1	27-Jul-2023	03-Aug-2023	14 days	7 days	✓	03-Aug-2023	7 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW-04-230727	E581.VH+F1	27-Jul-2023	03-Aug-2023	14 days	7 days	✓	03-Aug-2023	7 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
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW-05-230727	E581.VH+F1	27-Jul-2023	03-Aug-2023	14 days	7 days	✓	03-Aug-2023	7 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW-06-230727	E581.VH+F1	27-Jul-2023	03-Aug-2023	14 days	7 days	✓	03-Aug-2023	7 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW-07-230727	E581.VH+F1	27-Jul-2023	03-Aug-2023	14 days	7 days	✓	03-Aug-2023	7 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) PW-01-230727	E581.VH+F1	27-Jul-2023	03-Aug-2023	14 days	7 days	✓	03-Aug-2023	7 days	0 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Dup1-230727	E611A	27-Jul-2023	31-Jul-2023	14 days	4 days	✓	31-Jul-2023	10 days	0 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-10-230727	E611A	27-Jul-2023	31-Jul-2023	14 days	4 days	✓	31-Jul-2023	10 days	0 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-9-230727	E611A	27-Jul-2023	31-Jul-2023	14 days	4 days	✓	31-Jul-2023	10 days	0 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) PW-02-230727	E611A	27-Jul-2023	31-Jul-2023	14 days	4 days	✓	31-Jul-2023	10 days	0 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) JF01-01-230727	E611A	27-Jul-2023	03-Aug-2023	14 days	7 days	✓	03-Aug-2023	7 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
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-04-230727	E611A	27-Jul-2023	03-Aug-2023	14 days	7 days	✓	03-Aug-2023	7 days	0 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-05-230727	E611A	27-Jul-2023	03-Aug-2023	14 days	7 days	✓	03-Aug-2023	7 days	0 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-06-230727	E611A	27-Jul-2023	03-Aug-2023	14 days	7 days	✓	03-Aug-2023	7 days	0 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-07-230727	E611A	27-Jul-2023	03-Aug-2023	14 days	7 days	✓	03-Aug-2023	7 days	0 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) PW-01-230727	E611A	27-Jul-2023	03-Aug-2023	14 days	7 days	✓	03-Aug-2023	7 days	0 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	1063276	2	37	5.4	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	1063275	2	34	5.8	5.0	✓
Laboratory Control Samples (LCS)							
BTEX by Headspace GC-MS	E611A	1063276	2	37	5.4	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601	1069039	2	25	8.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	1063275	2	34	5.8	5.0	✓
Method Blanks (MB)							
BTEX by Headspace GC-MS	E611A	1063276	2	37	5.4	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601	1069039	2	25	8.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	1063275	2	34	5.8	5.0	✓
Matrix Spikes (MS)							
BTEX by Headspace GC-MS	E611A	1063276	2	37	5.4	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	1063275	2	34	5.8	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 ALS Environmental - Vancouver	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. Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
CCME PHCs - F2-F4 by GC-FID	E601 ALS Environmental - Vancouver	Water	CCME PHC in Soil - Tier 1	Sample extracts are analyzed by GC-FID for CCME hydrocarbon fractions (F2-F4). Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
BTEX by Headspace GC-MS	E611A ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

ALS Canada Ltd.

QUALITY CONTROL REPORT

Work Order	: **YL2300918**	Page	: 1 of 6
Client	: KBL Environmental Ltd.	Laboratory	: ALS Environmental - Yellowknife
Contact	: Katie Oliver	Account Manager	: Oliver Gregg
Address	: 17 Cameron Road PO Box 1895 Yellowknife NT Canada X1A 2P4	Address	: 314 Old Airport Road, Unit 116 Yellowknife, Northwest Territories Canada X1A 3T3
Telephone	:	Telephone	: 1 867 445 7143
Project	: 23-099NT	Date Samples Received	: 27-Jul-2023 14:45
PO	: ----	Date Analysis Commenced	: 31-Jul-2023
C-O-C number	: ----	Issue Date	: 08-Aug-2023 09:03
Sampler	: ---- 780 893 3305		
Site	: ----		
Quote number	: YL22-KBLE100-001		
No. of samples received	: 10		
No. of samples analysed	: 10		

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: 1063276)											
KS2302731-003	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	----
Volatile Organic Compounds (QC Lot: 1068955)											
VA23B7487-001	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: 1063275)											
KS2302731-003	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%	----
Hydrocarbons (QC Lot: 1068954)											
VA23B7487-001	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: 1063276)						
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: 1068955)						
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: 1063275)						
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 1068954)						
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 1069039)						
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: 1069261)						
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: 1063276)									
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	101	70.0	130	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	111	70.0	130	----
Styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	103	70.0	130	----
Toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	101	70.0	130	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	106	70.0	130	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	101	70.0	130	----
Volatile Organic Compounds (QCLot: 1068955)									
Benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	99.2	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	105	70.0	130	----
Styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	99.1	70.0	130	----
Toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	100	70.0	130	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	106	70.0	130	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	102	70.0	130	----
Hydrocarbons (QCLot: 1063275)									
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	99.2	70.0	130	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	99.3	70.0	130	----
Hydrocarbons (QCLot: 1068954)									
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	86.2	70.0	130	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	88.7	70.0	130	----
Hydrocarbons (QCLot: 1069039)									
F2 (C10-C16)	----	E601	100	µg/L	4493.26 µg/L	108	70.0	130	----
F3 (C16-C34)	----	E601	250	µg/L	7476.18 µg/L	109	70.0	130	----
F4 (C34-C50)	----	E601	250	µg/L	6616.81 µg/L	101	70.0	130	----
Hydrocarbons (QCLot: 1069261)									
F2 (C10-C16)	----	E601	100	µg/L	4493.26 µg/L	107	70.0	130	----
F3 (C16-C34)	----	E601	250	µg/L	7476.18 µg/L	111	70.0	130	----
F4 (C34-C50)	----	E601	250	µg/L	6616.81 µg/L	95.4	70.0	130	----

Matrix Spike (MS) Report

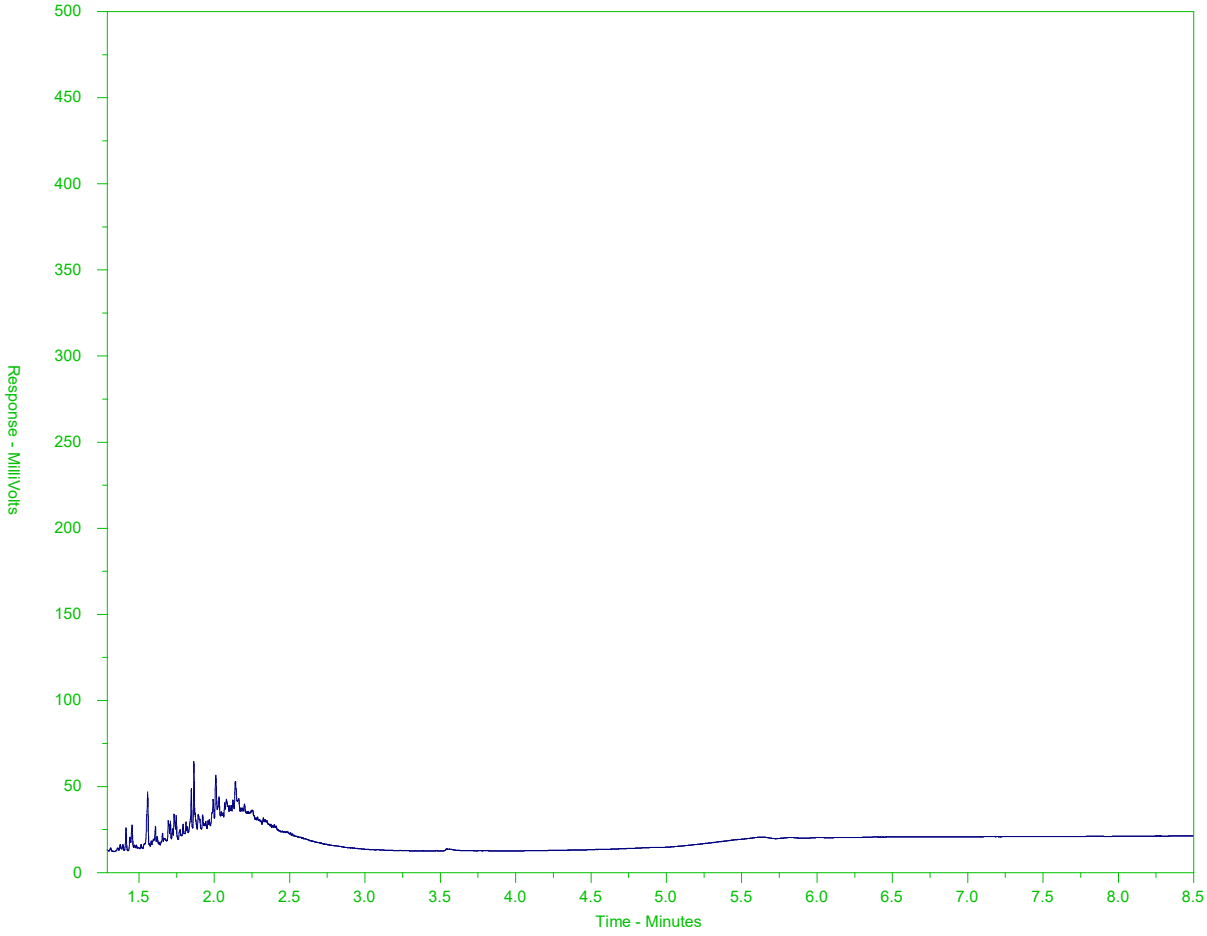
A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS 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.

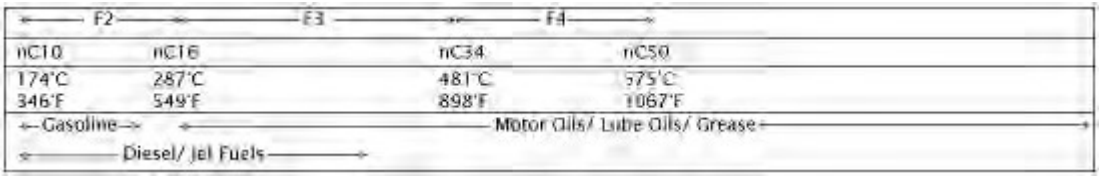
Sub-Matrix: **Water**

					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: 1063276)										
KS2302731-004	Anonymous	Benzene	71-43-2	E611A	102 µg/L	100 µg/L	102	60.0	140	----
		Ethylbenzene	100-41-4	E611A	97.4 µg/L	100 µg/L	97.4	60.0	140	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	113 µg/L	100 µg/L	113	60.0	140	----
		Styrene	100-42-5	E611A	101 µg/L	100 µg/L	101	60.0	140	----
		Toluene	108-88-3	E611A	97.6 µg/L	100 µg/L	97.6	60.0	140	----
		Xylene, m+p-	179601-23-1	E611A	204 µg/L	200 µg/L	102	60.0	140	----
		Xylene, o-	95-47-6	E611A	98.6 µg/L	100 µg/L	98.6	60.0	140	----
Volatile Organic Compounds (QCLot: 1068955)										
VA23B7487-002	Anonymous	Benzene	71-43-2	E611A	104 µg/L	100 µg/L	104	60.0	140	----
		Ethylbenzene	100-41-4	E611A	104 µg/L	100 µg/L	104	60.0	140	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	112 µg/L	100 µg/L	112	60.0	140	----
		Styrene	100-42-5	E611A	104 µg/L	100 µg/L	104	60.0	140	----
		Toluene	108-88-3	E611A	103 µg/L	100 µg/L	103	60.0	140	----
		Xylene, m+p-	179601-23-1	E611A	216 µg/L	200 µg/L	108	60.0	140	----
		Xylene, o-	95-47-6	E611A	104 µg/L	100 µg/L	104	60.0	140	----
Hydrocarbons (QCLot: 1063275)										
KS2302731-005	Anonymous	F1 (C6-C10)	----	E581.VH+F1	5460 µg/L	6310 µg/L	86.6	60.0	140	----
		VHw (C6-C10)	----	E581.VH+F1	5470 µg/L	6310 µg/L	86.7	60.0	140	----
Hydrocarbons (QCLot: 1068954)										
VA23B7487-003	Anonymous	F1 (C6-C10)	----	E581.VH+F1	6260 µg/L	6310 µg/L	99.2	60.0	140	----
		VHw (C6-C10)	----	E581.VH+F1	6450 µg/L	6310 µg/L	102	60.0	140	----

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: YL2300918-001-E601
Client Sample ID: MW-9-230727





The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

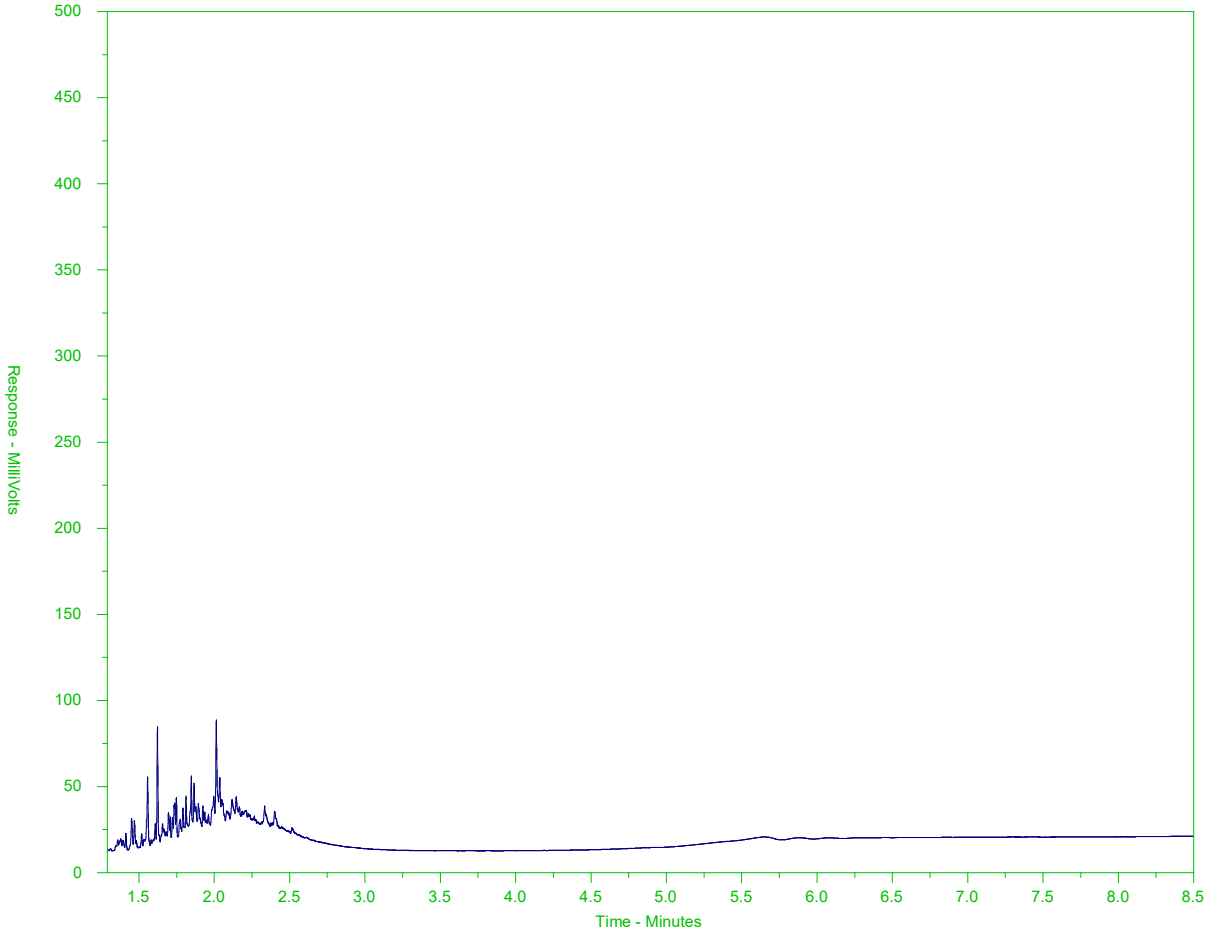
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

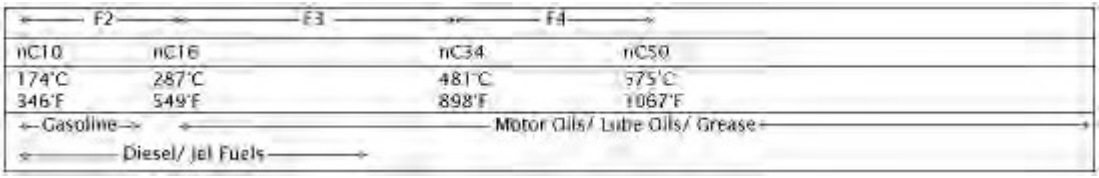
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: YL2300918-002-E601
Client Sample ID: MW-10-230727





The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

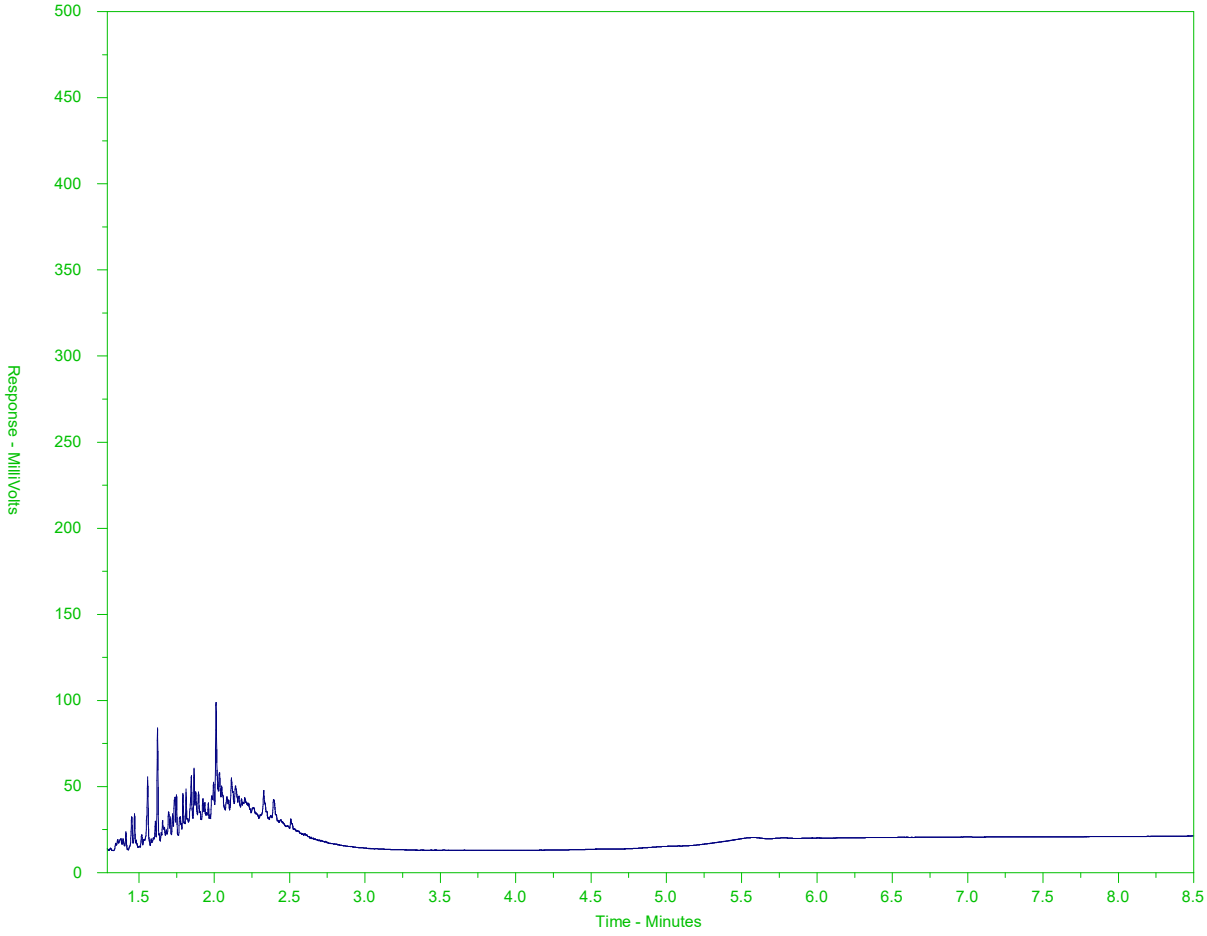
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

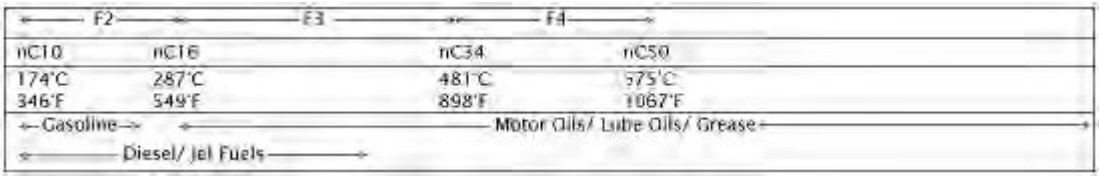
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: YL2300918-003-E601
Client Sample ID: Dup1-230727





The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

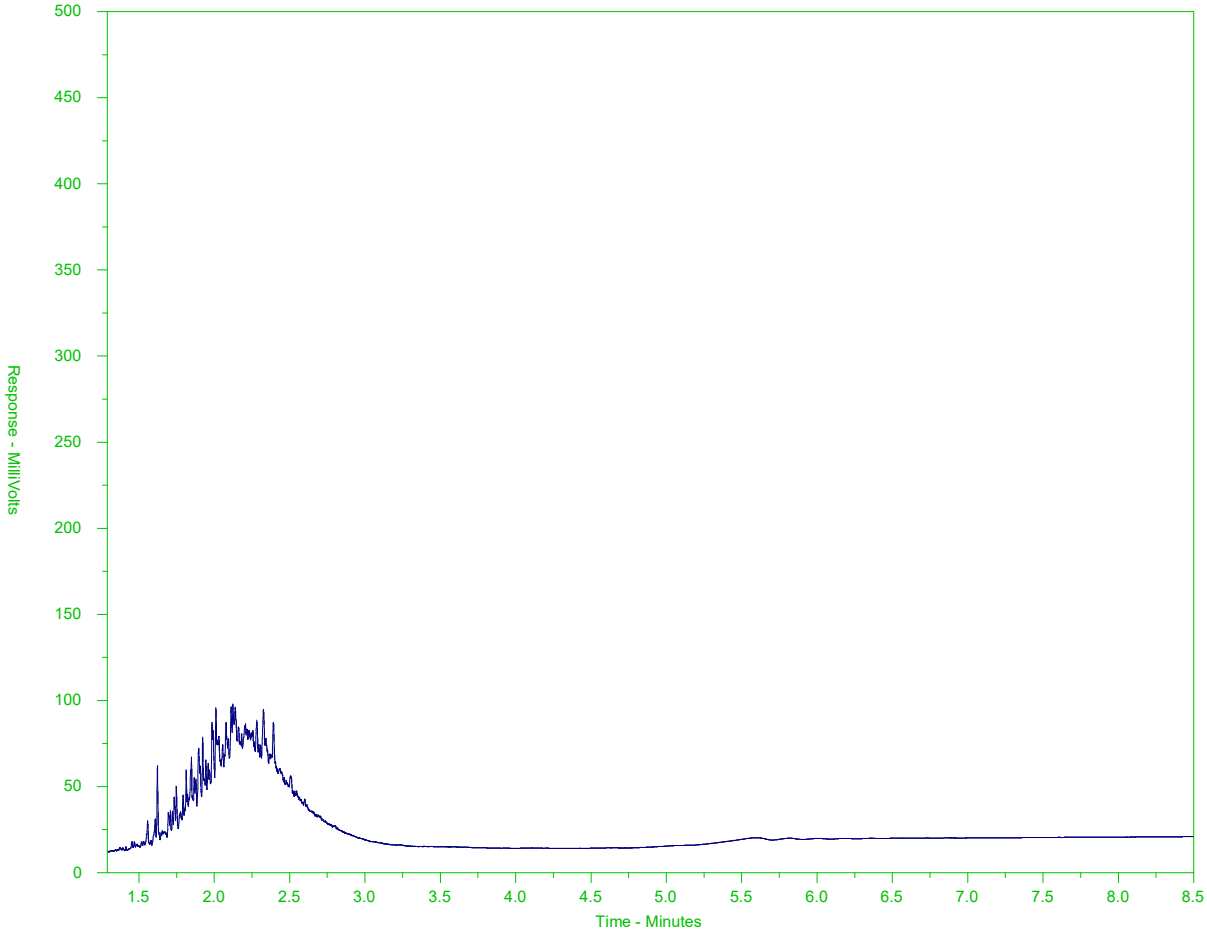
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

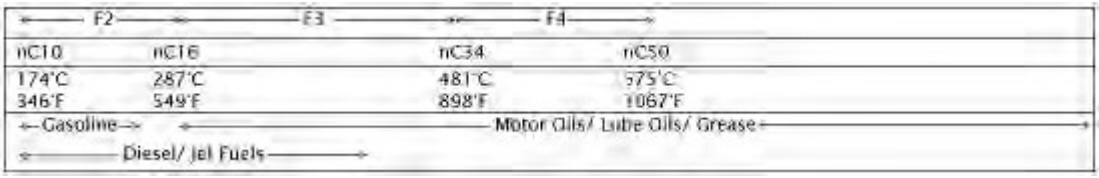
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: YL2300918-004-E601
Client Sample ID: PW-02-230727





The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

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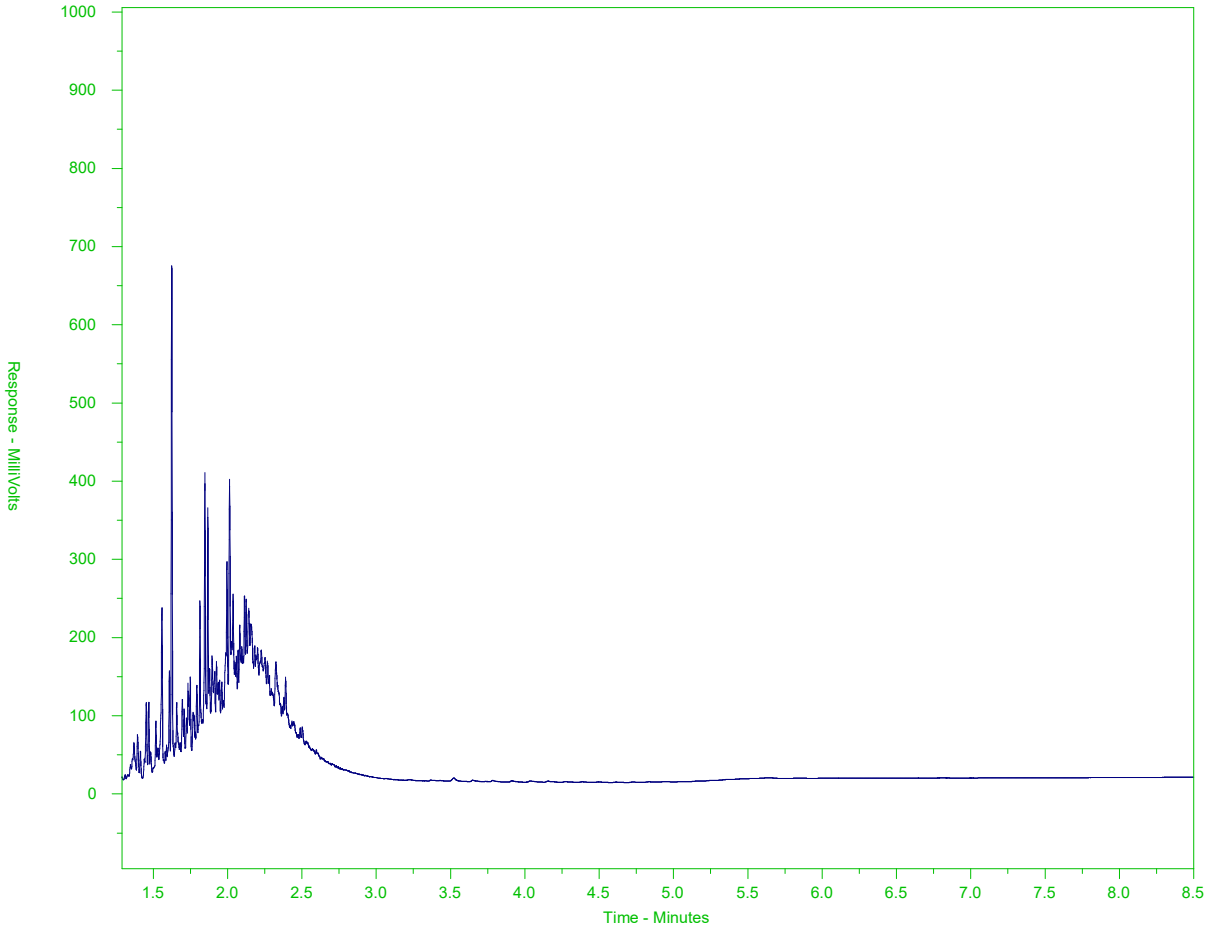
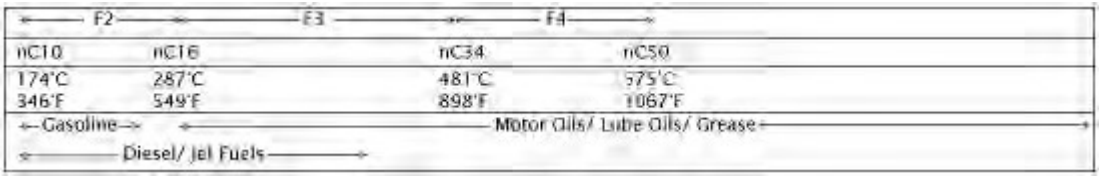
Client Sample ID: PW-01-230727





The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

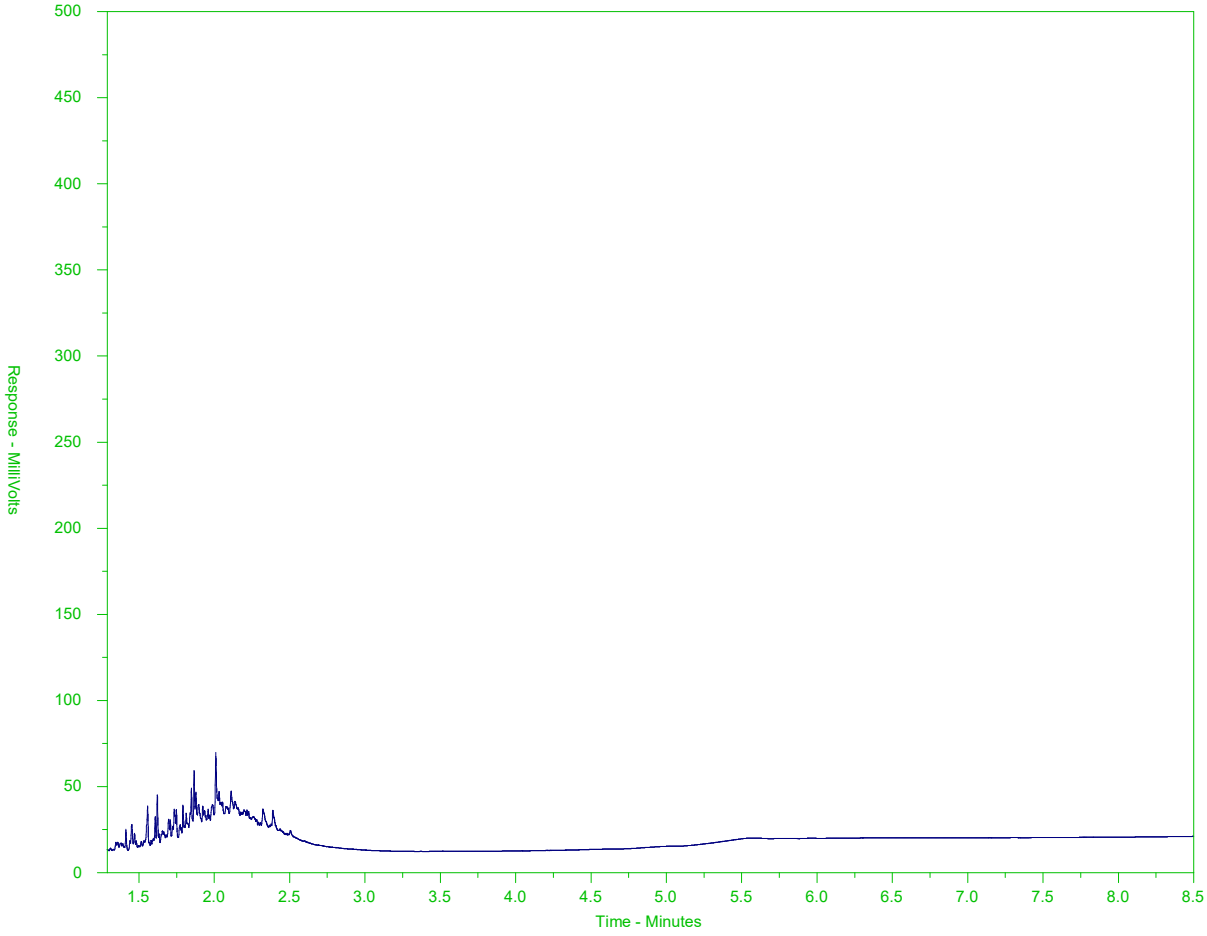
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

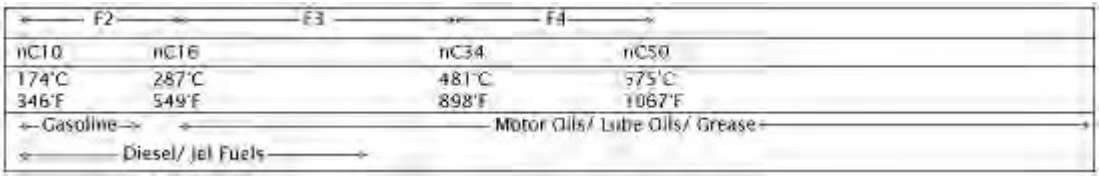
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: YL2300918-006-E601
Client Sample ID: MW-06-230727





The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

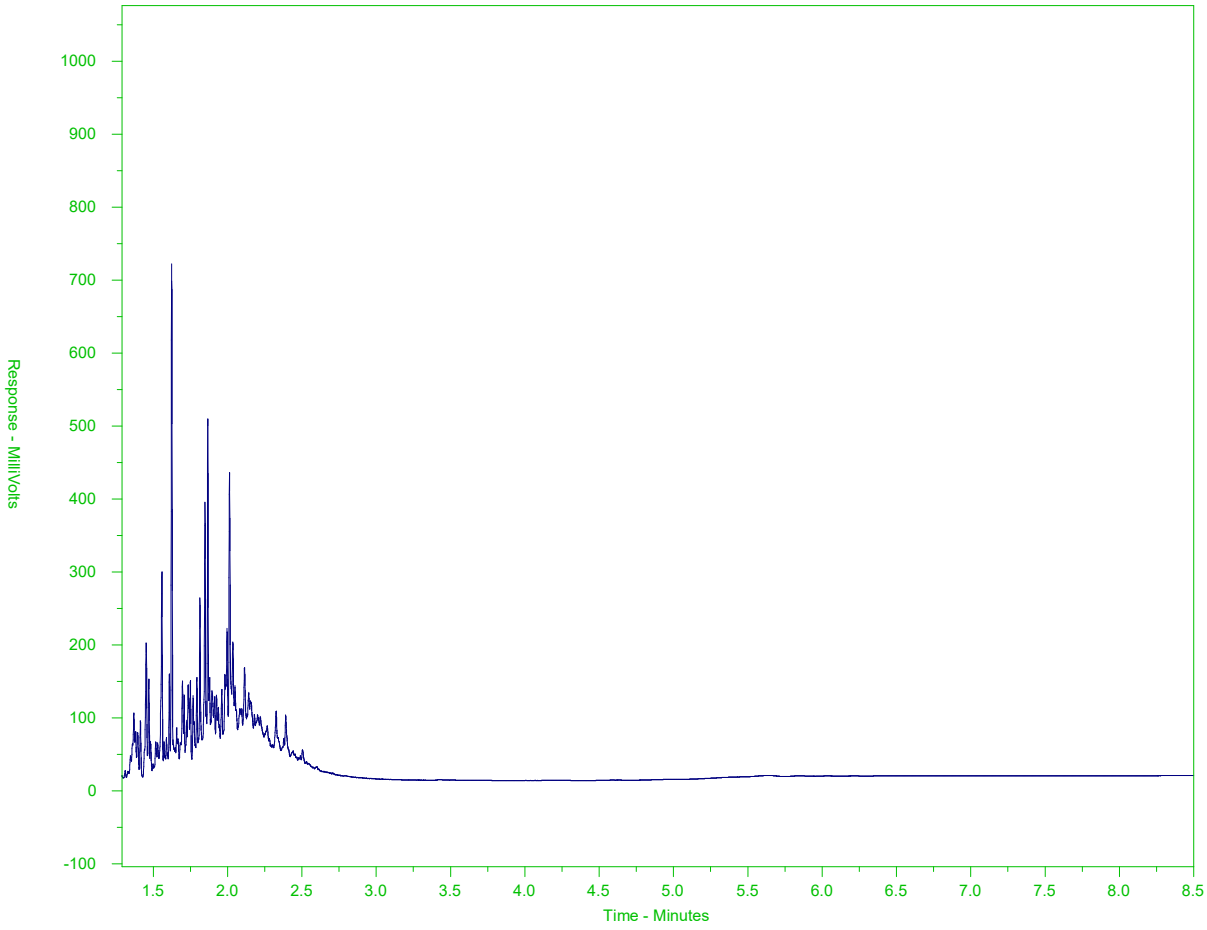
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

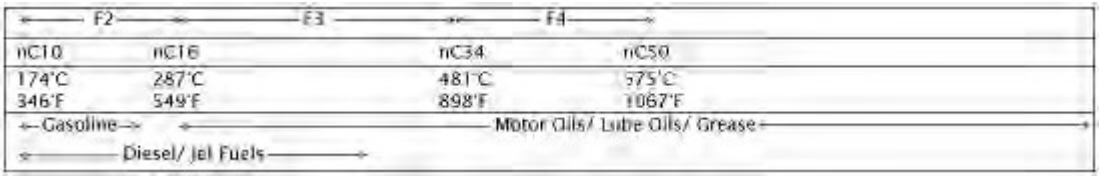
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: YL2300918-007-E601
Client Sample ID: MW-07-230727





The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

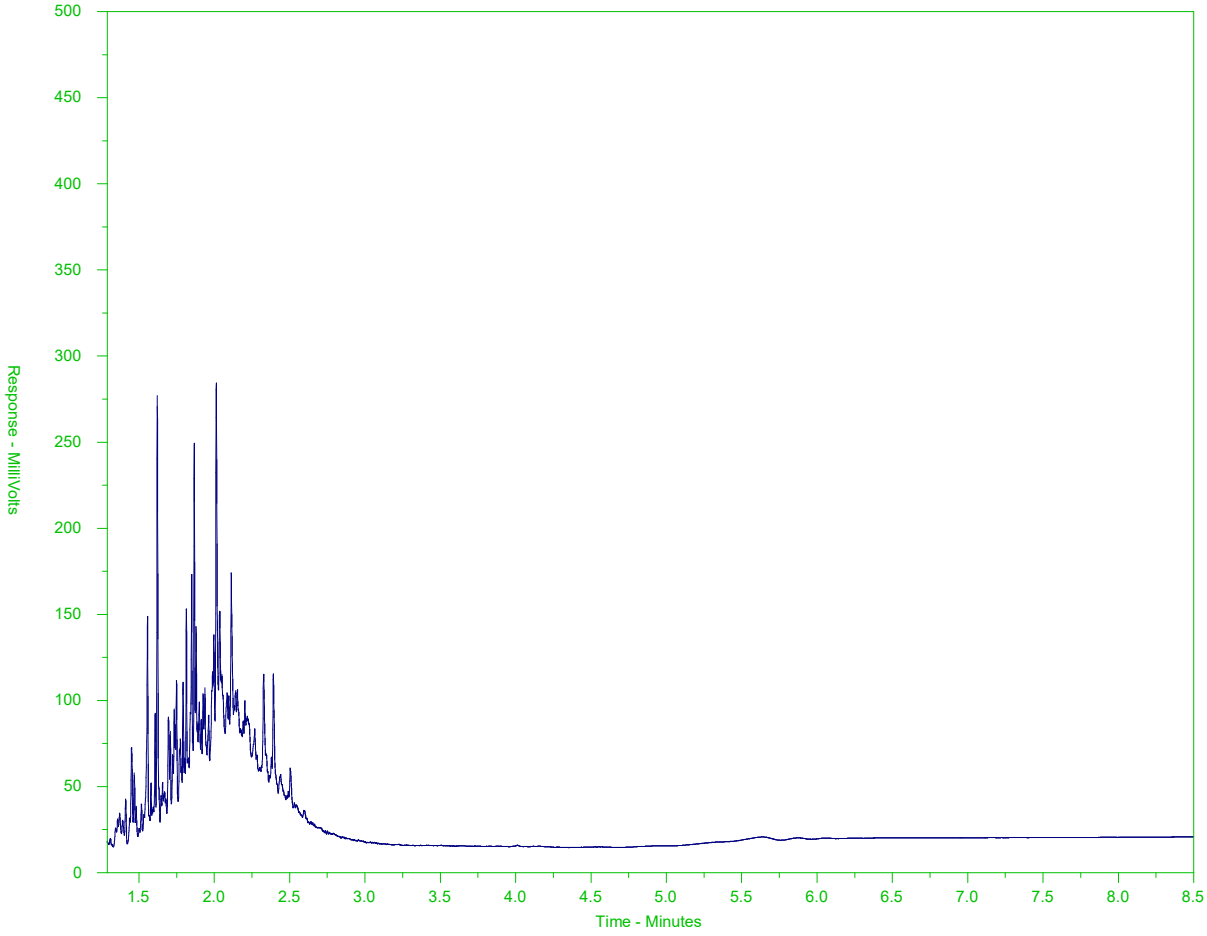
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: YL2300918-008-E601
Client Sample ID: MW-05-230727



F2		F3	F4
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline		Motor Oils/ Lube Oils/ Grease	
Diesel/ Jet Fuels			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

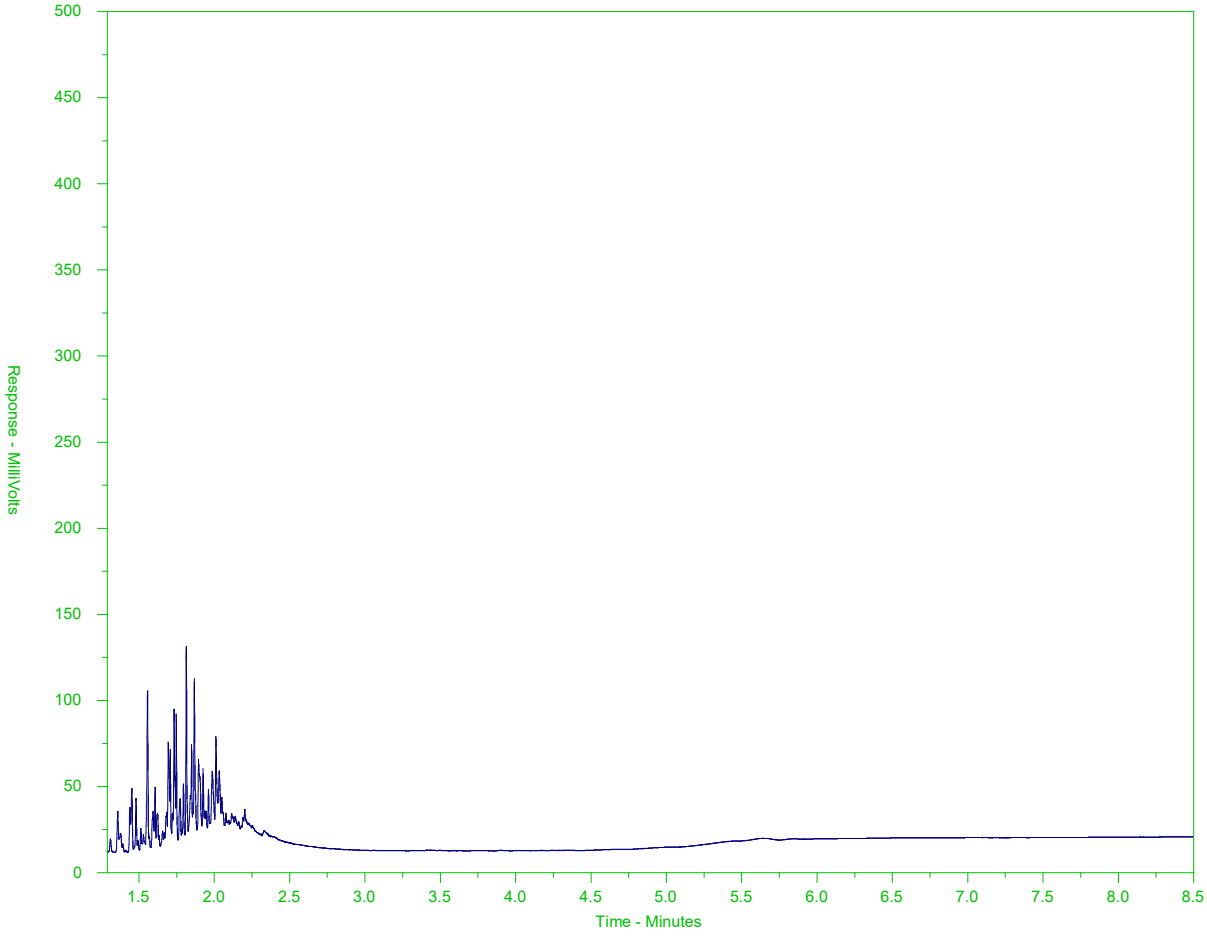
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

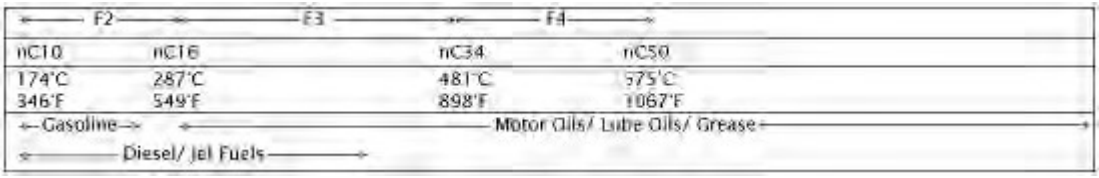
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: YL2300918-009-E601
Client Sample ID: JF01-01-230727





The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

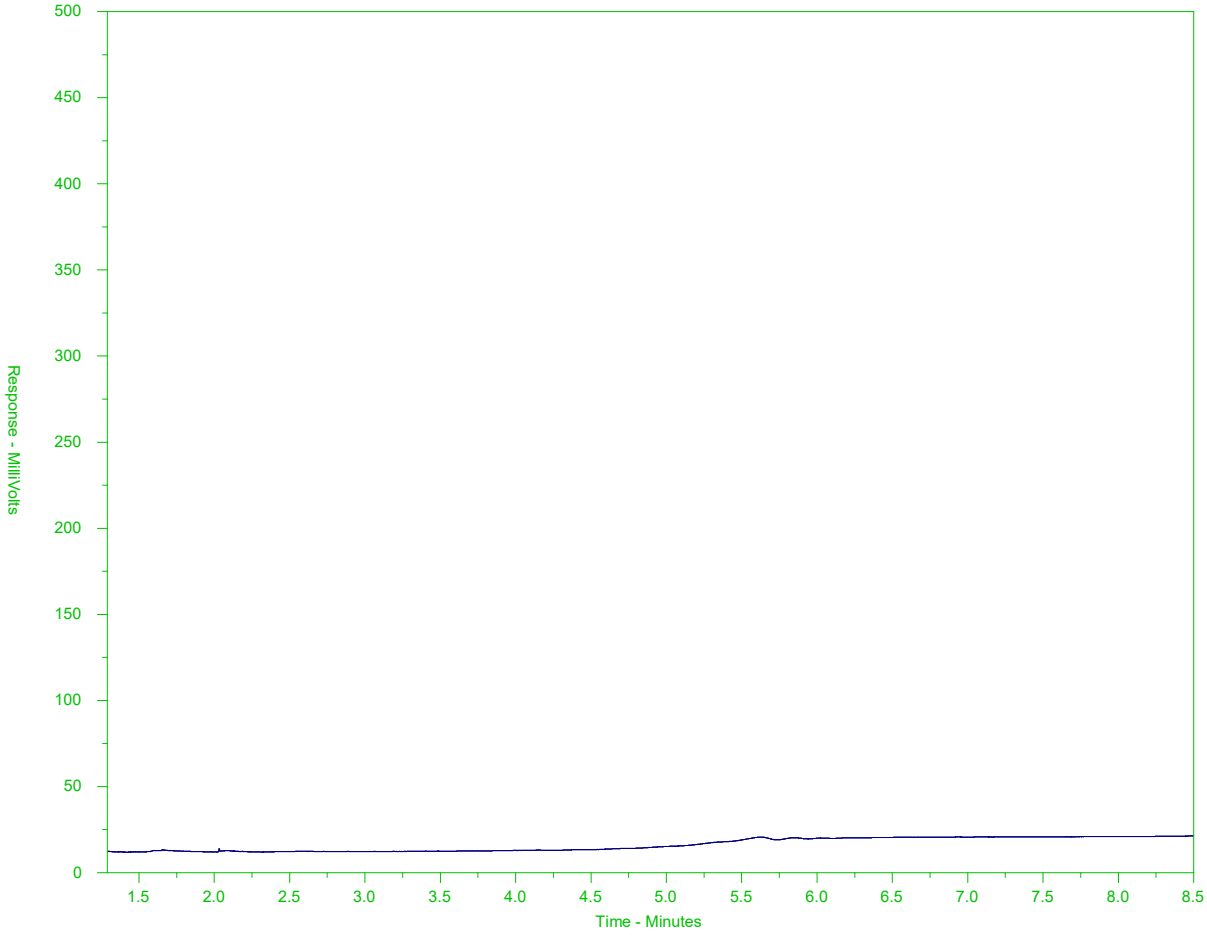
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

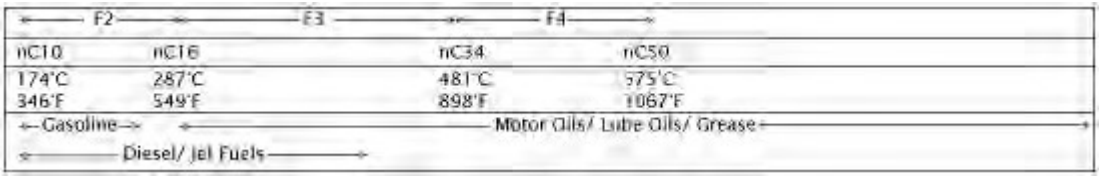
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: YL2300918-010-E601
Client Sample ID: MW-04-230727





The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

COC Number: 21 -

Page of

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Report To	Contact and company name below will appear on the final report
Company:	KBL Environmental
Contact:	Katie Oliver
Phone:	780.452.7779
	Company address below will appear on the final report
Street:	3909, 68 Avenue
City/Province:	Leduc, AB
Postal Code:	T9E 0Z4
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	
Contact:	

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☐ YES ☐ NO ☐ N/A

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: Kklevgaard@kblenv.com

Email 2: GMRPMonitoring@kblenv.com

Email 3: kbl@esdat.net

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: accounting@kblenv.com

Email 2: Khaywoodfarmer@kblenv

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply

☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum

☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum

☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum

☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum

☐ Same day [E2] if received by 10am M-S - 200% rush surcharge.

Additional fees may apply to rush requests on weekends, statutory holidays and for non-routine tests.

Date and Time Required for all E&P TATs:

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Project Information	
ALS Account # / Quote #:	
Job #:	23-099NT
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (ALS use only):

ALS Contact: Oliver Greg Sampler: MM

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	BTEX / F1-F4	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	MW-9-230727			Ground Water	4	R			
	MW-10-230727			Ground Water	4	R			
	Dup1-230727			Ground Water	4	R			
	PW-02-230727			Ground Water	4	R			
	PW-01-230727			Ground Water	4	R			
	MW-06-230727			Ground Water	4	R			
	MW-07-230727			Ground Water	4	R			
	MW-05-230727			Ground Water	4	R			
	JF01-01-230727			Ground Water	4	R			
	MW-04-230727			Ground Water	4	4			

Environmental Division
Yellowknife
Work Order Reference
YL2300918

Telephone : +1 867 873 6593

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?

☐ YES ☑ NO

Are samples for human consumption/ use?

☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
4.7							

SHIPMENT RELEASE (client use)		
Released by:	Date:	Time:

INITIAL SHIPMENT RECEPTION (ALS use only)		
Received by:	Date: JULY 27/26	Time: 1345

FINAL SHIPMENT RECEPTION (ALS use only)		
Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2022 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

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

ALS Canada Ltd.

right solutions. right partner.

CERTIFICATE OF ANALYSIS

Work Order	: **YL2300932**	Page	: 1 of 10
Client	: **KBL Environmental Ltd.**	Laboratory	: ALS Environmental - Yellowknife
Contact	: Katie Oliver	Account Manager	: Oliver Gregg
Address	: 17 Cameron Road PO Box 1895 Yellowknife NT Canada X1A 2P4	Address	: 314 Old Airport Road, Unit 116 Yellowknife NT Canada X1A 3T3
Telephone	: 780 893 3305	Telephone	: 1 867 445 7143
Project	: 23-099NT	Date Samples Received	: 28-Jul-2023 10:20
PO	: ----	Date Analysis Commenced	: 01-Aug-2023
C-O-C number	: ----	Issue Date	: 08-Aug-2023 09:04
Sampler	: MM		
Site	: ----		
Quote number	: YL22-KBLE100-001		
No. of samples received	: 6		
No. of samples analysed	: 6		

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*
Anshim Anshim	Lab Assistant	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Inorganics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Owen Cheng		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 units
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
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.

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	JF01-06-230728	MW-03-230728	Dup2-230728	JF01-04-230728	PW3-230728
					Client sampling date / time	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00
						YL2300932-001	YL2300932-002	YL2300932-003	YL2300932-004	YL2300932-005
						Result	Result	Result	Result	Result
Physical Tests										
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	1.0	mg/L		109	----	----	----	----
Alkalinity, carbonate (as CaCO3)	----	E290/VA	1.0	mg/L		<1.0	----	----	----	----
Alkalinity, hydroxide (as CaCO3)	----	E290/VA	1.0	mg/L		<1.0	----	----	----	----
Alkalinity, phenolphthalein (as CaCO3)	----	E290/VA	1.0	mg/L		<1.0	----	----	----	----
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L		109	----	----	----	----
Conductivity	----	E100/VA	2.0	µS/cm		487	----	----	----	----
Hardness (as CaCO3), dissolved	----	EC100/VA	0.50	mg/L		148	----	----	----	----
pH	----	E108/VA	0.10	pH units		7.56	----	----	----	----
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L		280	----	----	----	----
Solids, total suspended [TSS]	----	E160/VA	3.0	mg/L		25.3	----	----	----	----
Anions and Nutrients										
Bromide	24959-67-9	E235.Br-U/VA	0.0050	mg/L		0.0730	----	----	----	----
Chloride	16887-00-6	E235.Cl-L/VA	0.10	mg/L		66.0	----	----	----	----
Fluoride	16984-48-8	E235.F-L/VA	0.010	mg/L		0.080	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-T/VA	0.0030	mg/L		0.267	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	0.0010	mg/L		0.0112	----	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4-L/VA	0.050	mg/L		23.6	----	----	----	----
Total Metals										
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L		0.0080	----	----	----	----
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L		0.00132	----	----	----	----
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L		0.140	----	----	----	----
Barium, total	7440-39-3	E420/VA	0.00010	mg/L		0.0457	----	----	----	----
Beryllium, total	7440-41-7	E420/VA	0.000020	mg/L		<0.000020	----	----	----	----
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L		<0.000050	----	----	----	----
Boron, total	7440-42-8	E420/VA	0.010	mg/L		0.035	----	----	----	----
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L		0.0000073	----	----	----	----
Calcium, total	7440-70-2	E420/VA	0.050	mg/L		38.0	----	----	----	----
Cesium, total	7440-46-2	E420/VA	0.000010	mg/L		0.000015	----	----	----	----

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	JF01-06-230728	MW-03-230728	Dup2-230728	JF01-04-230728	PW3-230728
					Client sampling date / time	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00
						YL2300932-001	YL2300932-002	YL2300932-003	YL2300932-004	YL2300932-005
						Result	Result	Result	Result	Result
Total Metals										
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L		<0.00050	----	----	----	----
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L		0.00048	----	----	----	----
Copper, total	7440-50-8	E420/VA	0.00050	mg/L		0.00141	----	----	----	----
Iron, total	7439-89-6	E420/VA	0.010	mg/L		<0.010	----	----	----	----
Lead, total	7439-92-1	E420/VA	0.000050	mg/L		<0.000050	----	----	----	----
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L		0.0056	----	----	----	----
Magnesium, total	7439-95-4	E420/VA	0.0050	mg/L		11.2	----	----	----	----
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L		0.110	----	----	----	----
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L		0.000674	----	----	----	----
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L		0.00240	----	----	----	----
Phosphorus, total	7723-14-0	E420/VA	0.050	mg/L		0.052	----	----	----	----
Potassium, total	7440-09-7	E420/VA	0.050	mg/L		5.79	----	----	----	----
Rubidium, total	7440-17-7	E420/VA	0.00020	mg/L		0.00143	----	----	----	----
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L		0.000083	----	----	----	----
Silicon, total	7440-21-3	E420/VA	0.10	mg/L		7.66	----	----	----	----
Silver, total	7440-22-4	E420/VA	0.000010	mg/L		<0.000010	----	----	----	----
Sodium, total	7440-23-5	E420/VA	0.050	mg/L		33.6	----	----	----	----
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L		0.100	----	----	----	----
Sulfur, total	7704-34-9	E420/VA	0.50	mg/L		9.21	----	----	----	----
Tellurium, total	13494-80-9	E420/VA	0.00020	mg/L		<0.00020	----	----	----	----
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L		<0.000010	----	----	----	----
Thorium, total	7440-29-1	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Tin, total	7440-31-5	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Titanium, total	7440-32-6	E420/VA	0.00030	mg/L		<0.00030	----	----	----	----
Tungsten, total	7440-33-7	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L		0.000270	----	----	----	----
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L		0.00094	----	----	----	----
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L		0.0034	----	----	----	----
Zirconium, total	7440-67-7	E420/VA	0.00020	mg/L		<0.00020	----	----	----	----
Dissolved Metals										
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L		38.3	----	----	----	----

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	JF01-06-230728	MW-03-230728	Dup2-230728	JF01-04-230728	PW3-230728
					Client sampling date / time	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00
						YL2300932-001	YL2300932-002	YL2300932-003	YL2300932-004	YL2300932-005
						Result	Result	Result	Result	Result
Dissolved Metals										
Magnesium, dissolved	7439-95-4	E421/VA	0.0050	mg/L		12.6	----	----	----	----
Mercury, dissolved	7439-97-6	E509/VA	0.0000050	mg/L		<0.0000050	----	----	----	----
Potassium, dissolved	7440-09-7	E421/VA	0.050	mg/L		6.64	----	----	----	----
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L		35.4	----	----	----	----
Dissolved mercury filtration location	----	EP509/VA	-	-		Field	----	----	----	----
Dissolved metals filtration location	----	EP421/VA	-	-		Laboratory	----	----	----	----
Aggregate Organics										
Oil & grease (gravimetric)	----	E567/VA	5.0	mg/L		<5.0	----	----	----	----
Volatile Organic Compounds [Fuels]										
Benzene	71-43-2	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Ethylbenzene	100-41-4	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	100-42-5	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Toluene	108-88-3	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Xylene, m+p-	179601-23-1	E611A/VA	0.40	µg/L		<0.40	<0.40	<0.40	<0.40	<0.40
Xylene, o-	95-47-6	E611A/VA	0.30	µg/L		<0.30	<0.30	<0.30	<0.30	<0.30
Xylenes, total	1330-20-7	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Hydrocarbons										
F1 (C6-C10)	----	E581.VH+F1/VA	100	µg/L		<100	<100	<100	<100	<100
F2 (C10-C16)	----	E601/VA	300	µg/L		<300	<300	<300	<300	<300
F3 (C16-C34)	----	E601/VA	300	µg/L		<300	<300	<300	<300	<300
F4 (C34-C50)	----	E601/VA	300	µg/L		<300	<300	<300	<300	<300
VHw (C6-C10)	----	E581.VH+F1/VA	100	µg/L		<100	<100	<100	<100	<100
F1-BTEX	----	EC580/VA	100	µg/L		<100	<100	<100	<100	<100
VPHw	----	EC580A/VA	100	µg/L		<100	<100	<100	<100	<100
Hydrocarbons Surrogates										
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	E601/VA	1.0	%		90.4	87.4	88.7	84.3	88.5
Dichlorotoluene, 3,4-	95-75-0	E581.VH+F1/VA	1.0	%		109	95.1	101	100	104

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	JF01-06-230728	MW-03-230728	Dup2-230728	JF01-04-230728	PW3-230728
					Client sampling date / time	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00	28-Jul-2023 00:00
						YL2300932-001	YL2300932-002	YL2300932-003	YL2300932-004	YL2300932-005
						Result	Result	Result	Result	Result
Volatile Organic Compounds Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611A/VA	1.0	%		92.1	93.6	91.6	90.8	91.3
Difluorobenzene, 1,4-	540-36-3	E611A/VA	1.0	%		104	103	104	105	104

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MW-02-230728	----	----	----	----
					Client sampling date / time	28-Jul-2023 00:00	----	----	----	----
						YL2300932-006	--------	--------	--------	--------
						Result	----	----	----	----
Physical Tests										
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	1.0	mg/L		114	----	----	----	----
Alkalinity, carbonate (as CaCO3)	----	E290/VA	1.0	mg/L		<1.0	----	----	----	----
Alkalinity, hydroxide (as CaCO3)	----	E290/VA	1.0	mg/L		<1.0	----	----	----	----
Alkalinity, phenolphthalein (as CaCO3)	----	E290/VA	1.0	mg/L		<1.0	----	----	----	----
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L		114	----	----	----	----
Conductivity	----	E100/VA	2.0	µS/cm		510	----	----	----	----
Hardness (as CaCO3), dissolved	----	EC100/VA	0.50	mg/L		162	----	----	----	----
pH	----	E108/VA	0.10	pH units		7.41	----	----	----	----
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L		276	----	----	----	----
Solids, total suspended [TSS]	----	E160/VA	3.0	mg/L		21.9	----	----	----	----
Anions and Nutrients										
Bromide	24959-67-9	E235.Br-U/VA	0.0050	mg/L		0.0705	----	----	----	----
Chloride	16887-00-6	E235.Cl-L/VA	0.10	mg/L		66.0	----	----	----	----
Fluoride	16984-48-8	E235.F-L/VA	0.010	mg/L		0.087	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-T/VA	0.0030	mg/L		0.124	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	0.0010	mg/L		<0.0010	----	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4-L/VA	0.050	mg/L		31.0	----	----	----	----
Total Metals										
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L		0.0095	----	----	----	----
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L		0.00152	----	----	----	----
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L		0.0501	----	----	----	----
Barium, total	7440-39-3	E420/VA	0.00010	mg/L		0.0732	----	----	----	----
Beryllium, total	7440-41-7	E420/VA	0.000020	mg/L		<0.000020	----	----	----	----
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L		<0.000050	----	----	----	----
Boron, total	7440-42-8	E420/VA	0.010	mg/L		0.039	----	----	----	----
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L		0.0000207	----	----	----	----
Calcium, total	7440-70-2	E420/VA	0.050	mg/L		39.5	----	----	----	----
Cesium, total	7440-46-2	E420/VA	0.000010	mg/L		0.000015	----	----	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MW-02-230728	----	----	----	----
					Client sampling date / time	28-Jul-2023 00:00	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		YL2300932-006	--------	--------	--------	--------
						Result	----	----	----	----
Total Metals										
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L		<0.00050	----	----	----	----
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L		0.00053	----	----	----	----
Copper, total	7440-50-8	E420/VA	0.00050	mg/L		0.00202	----	----	----	----
Iron, total	7439-89-6	E420/VA	0.010	mg/L		0.096	----	----	----	----
Lead, total	7439-92-1	E420/VA	0.000050	mg/L		<0.000050	----	----	----	----
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L		0.0050	----	----	----	----
Magnesium, total	7439-95-4	E420/VA	0.0050	mg/L		12.4	----	----	----	----
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L		0.0456	----	----	----	----
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L		0.00141	----	----	----	----
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L		0.00218	----	----	----	----
Phosphorus, total	7723-14-0	E420/VA	0.050	mg/L		<0.050	----	----	----	----
Potassium, total	7440-09-7	E420/VA	0.050	mg/L		5.59	----	----	----	----
Rubidium, total	7440-17-7	E420/VA	0.00020	mg/L		0.00237	----	----	----	----
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L		0.000127	----	----	----	----
Silicon, total	7440-21-3	E420/VA	0.10	mg/L		7.64	----	----	----	----
Silver, total	7440-22-4	E420/VA	0.000010	mg/L		<0.000010	----	----	----	----
Sodium, total	7440-23-5	E420/VA	0.050	mg/L		34.0	----	----	----	----
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L		0.116	----	----	----	----
Sulfur, total	7704-34-9	E420/VA	0.50	mg/L		12.1	----	----	----	----
Tellurium, total	13494-80-9	E420/VA	0.00020	mg/L		<0.00020	----	----	----	----
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L		0.000023	----	----	----	----
Thorium, total	7440-29-1	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Tin, total	7440-31-5	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Titanium, total	7440-32-6	E420/VA	0.00030	mg/L		0.00030	----	----	----	----
Tungsten, total	7440-33-7	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L		0.000282	----	----	----	----
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L		0.00133	----	----	----	----
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L		<0.0030	----	----	----	----
Zirconium, total	7440-67-7	E420/VA	0.00020	mg/L		<0.00020	----	----	----	----
Dissolved Metals										
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L		41.6	----	----	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MW-02-230728	----	----	----	----
					Client sampling date / time	28-Jul-2023 00:00	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		YL2300932-006	--------	--------	--------	--------
						Result	----	----	----	----
Dissolved Metals										
Magnesium, dissolved	7439-95-4	E421/VA	0.0050	mg/L		14.1	----	----	----	----
Mercury, dissolved	7439-97-6	E509/VA	0.0000050	mg/L		<0.0000050	----	----	----	----
Potassium, dissolved	7440-09-7	E421/VA	0.050	mg/L		6.07	----	----	----	----
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L		36.1	----	----	----	----
Dissolved mercury filtration location	----	EP509/VA	-	-		Field	----	----	----	----
Dissolved metals filtration location	----	EP421/VA	-	-		Laboratory	----	----	----	----
Aggregate Organics										
Oil & grease (gravimetric)	----	E567/VA	5.0	mg/L		<5.0	----	----	----	----
Volatile Organic Compounds [Fuels]										
Benzene	71-43-2	E611A/VA	0.50	µg/L		<0.50	----	----	----	----
Ethylbenzene	100-41-4	E611A/VA	0.50	µg/L		<0.50	----	----	----	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A/VA	0.50	µg/L		<0.50	----	----	----	----
Styrene	100-42-5	E611A/VA	0.50	µg/L		<0.50	----	----	----	----
Toluene	108-88-3	E611A/VA	0.50	µg/L		<0.50	----	----	----	----
Xylene, m+p-	179601-23-1	E611A/VA	0.40	µg/L		<0.40	----	----	----	----
Xylene, o-	95-47-6	E611A/VA	0.30	µg/L		<0.30	----	----	----	----
Xylenes, total	1330-20-7	E611A/VA	0.50	µg/L		<0.50	----	----	----	----
Hydrocarbons										
F1 (C6-C10)	----	E581.VH+F1/VA	100	µg/L		<100	----	----	----	----
F2 (C10-C16)	----	E601/VA	300	µg/L		<300	----	----	----	----
F3 (C16-C34)	----	E601/VA	300	µg/L		<300	----	----	----	----
F4 (C34-C50)	----	E601/VA	300	µg/L		<300	----	----	----	----
VHw (C6-C10)	----	E581.VH+F1/VA	100	µg/L		<100	----	----	----	----
F1-BTEX	----	EC580/VA	100	µg/L		<100	----	----	----	----
VPHw	----	EC580A/VA	100	µg/L		<100	----	----	----	----
Hydrocarbons Surrogates										
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	E601/VA	1.0	%		86.6	----	----	----	----
Dichlorotoluene, 3,4-	95-75-0	E581.VH+F1/VA	1.0	%		96.2	----	----	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MW-02-230728	----	----	----	----
					Client sampling date / time	28-Jul-2023 00:00	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		YL2300932-006	--------	--------	--------	--------
						Result	----	----	----	----
Volatile Organic Compounds Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611A/VA	1.0	%		91.5	----	----	----	----
Difluorobenzene, 1,4-	540-36-3	E611A/VA	1.0	%		102	----	----	----	----

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **YL2300932**	Page	: 1 of 13
Client	: **KBL Environmental Ltd.**	Laboratory	: ALS Environmental - Yellowknife
Contact	: Katie Oliver	Account Manager	: Oliver Gregg
Address	: 17 Cameron Road PO Box 1895 Yellowknife NT Canada X1A 2P4	Address	: 314 Old Airport Road, Unit 116 Yellowknife, Northwest Territories Canada X1A 3T3
Telephone	: 780 893 3305	Telephone	: 1 867 445 7143
Project	: 23-099NT	Date Samples Received	: 28-Jul-2023 10:20
PO	: ----	Issue Date	: 08-Aug-2023 09:04
C-O-C number	: ----		
Sampler	: MM		
Site	: ----		
Quote number	: YL22-KBLE100-001		
No. of samples received	: 6		
No. of samples analysed	: 6		

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

- 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
Aggregate Organics : Oil & Grease by Gravimetry										
Amber glass (hydrochloric acid)										
JF01-06-230728	E567	28-Jul-2023	03-Aug-2023	28 days	6 days	✓	03-Aug-2023	40 days	0 days	✓
Aggregate Organics : Oil & Grease by Gravimetry										
Amber glass (hydrochloric acid)										
MW-02-230728	E567	28-Jul-2023	03-Aug-2023	28 days	6 days	✓	03-Aug-2023	40 days	0 days	✓
Anions and Nutrients : Bromide by IC (Ultra Trace Level)										
HDPE										
JF01-06-230728	E235.Br-U	28-Jul-2023	02-Aug-2023	28 days	5 days	✓	02-Aug-2023	23 days	0 days	✓
Anions and Nutrients : Bromide by IC (Ultra Trace Level)										
HDPE										
MW-02-230728	E235.Br-U	28-Jul-2023	02-Aug-2023	28 days	5 days	✓	02-Aug-2023	23 days	0 days	✓
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE										
JF01-06-230728	E235.Cl-L	28-Jul-2023	02-Aug-2023	28 days	5 days	✓	02-Aug-2023	23 days	0 days	✓
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE										
MW-02-230728	E235.Cl-L	28-Jul-2023	02-Aug-2023	28 days	5 days	✓	02-Aug-2023	23 days	0 days	✓
Anions and Nutrients : Fluoride in Water by IC (Low Level)										
HDPE										
JF01-06-230728	E235.F-L	28-Jul-2023	02-Aug-2023	28 days	5 days	✓	02-Aug-2023	23 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 : Fluoride in Water by IC (Low Level)										
HDPE										
MW-02-230728	E235.F-L	28-Jul-2023	02-Aug-2023	28 days	5 days	✓	02-Aug-2023	23 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC (Trace Level)										
HDPE										
JF01-06-230728	E235.NO3-T	28-Jul-2023	02-Aug-2023	3 days	5 days	× EHT	02-Aug-2023	-2 days	0 days	× UCP
Anions and Nutrients : Nitrate in Water by IC (Trace Level)										
HDPE										
MW-02-230728	E235.NO3-T	28-Jul-2023	02-Aug-2023	3 days	5 days	× EHT	02-Aug-2023	-2 days	0 days	× UCP
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
JF01-06-230728	E235.NO2-L	28-Jul-2023	02-Aug-2023	3 days	5 days	× EHT	02-Aug-2023	-2 days	0 days	× UCP
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
MW-02-230728	E235.NO2-L	28-Jul-2023	02-Aug-2023	3 days	5 days	× EHT	02-Aug-2023	-2 days	0 days	× UCP
Anions and Nutrients : Sulfate in Water by IC (Low Level)										
HDPE										
JF01-06-230728	E235.SO4-L	28-Jul-2023	02-Aug-2023	28 days	5 days	✓	02-Aug-2023	23 days	0 days	✓
Anions and Nutrients : Sulfate in Water by IC (Low Level)										
HDPE										
MW-02-230728	E235.SO4-L	28-Jul-2023	02-Aug-2023	28 days	5 days	✓	02-Aug-2023	23 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
JF01-06-230728	E509	28-Jul-2023	03-Aug-2023	28 days	6 days	✓	03-Aug-2023	22 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
MW-02-230728	E509	28-Jul-2023	03-Aug-2023	28 days	6 days	✓	03-Aug-2023	22 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
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) JF01-06-230728	E421	28-Jul-2023	03-Aug-2023	180 days	7 days	✓	04-Aug-2023	173 days	1 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) MW-02-230728	E421	28-Jul-2023	03-Aug-2023	180 days	7 days	✓	04-Aug-2023	173 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) Dup2-230728	E601	28-Jul-2023	03-Aug-2023	14 days	6 days	✓	03-Aug-2023	40 days	0 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) JF01-04-230728	E601	28-Jul-2023	03-Aug-2023	14 days	6 days	✓	03-Aug-2023	40 days	0 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) JF01-06-230728	E601	28-Jul-2023	03-Aug-2023	14 days	6 days	✓	03-Aug-2023	40 days	0 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) MW-02-230728	E601	28-Jul-2023	03-Aug-2023	14 days	6 days	✓	03-Aug-2023	40 days	0 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) MW-03-230728	E601	28-Jul-2023	03-Aug-2023	14 days	6 days	✓	03-Aug-2023	40 days	0 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) PW3-230728	E601	28-Jul-2023	03-Aug-2023	14 days	6 days	✓	03-Aug-2023	40 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) Dup2-230728	E581.VH+F1	28-Jul-2023	01-Aug-2023	14 days	5 days	✓	02-Aug-2023	9 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
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) JF01-04-230728	E581.VH+F1	28-Jul-2023	01-Aug-2023	14 days	5 days	✓	02-Aug-2023	9 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) JF01-06-230728	E581.VH+F1	28-Jul-2023	01-Aug-2023	14 days	5 days	✓	02-Aug-2023	9 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW-02-230728	E581.VH+F1	28-Jul-2023	01-Aug-2023	14 days	5 days	✓	02-Aug-2023	9 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW-03-230728	E581.VH+F1	28-Jul-2023	01-Aug-2023	14 days	5 days	✓	02-Aug-2023	9 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) PW3-230728	E581.VH+F1	28-Jul-2023	01-Aug-2023	14 days	5 days	✓	02-Aug-2023	9 days	0 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE JF01-06-230728	E290	28-Jul-2023	02-Aug-2023	14 days	5 days	✓	02-Aug-2023	9 days	0 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MW-02-230728	E290	28-Jul-2023	02-Aug-2023	14 days	5 days	✓	02-Aug-2023	9 days	0 days	✓
Physical Tests : Conductivity in Water										
HDPE JF01-06-230728	E100	28-Jul-2023	02-Aug-2023	28 days	5 days	✓	02-Aug-2023	23 days	0 days	✓
Physical Tests : Conductivity in Water										
HDPE MW-02-230728	E100	28-Jul-2023	02-Aug-2023	28 days	5 days	✓	02-Aug-2023	23 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
Physical Tests : pH by Meter										
HDPE JF01-06-230728	E108	28-Jul-2023	02-Aug-2023	0.11 hrs	0.25 hrs	✗ EHTR-FM	02-Aug-2023	-131.32 hrs	0.11 hrs	✗ UCP
Physical Tests : pH by Meter										
HDPE MW-02-230728	E108	28-Jul-2023	02-Aug-2023	0.11 hrs	0.25 hrs	✗ EHTR-FM	02-Aug-2023	-131.32 hrs	0.11 hrs	✗ UCP
Physical Tests : TDS by Gravimetry										
HDPE JF01-06-230728	E162	28-Jul-2023	----	----	----		03-Aug-2023	7 days	6 days	✓
Physical Tests : TDS by Gravimetry										
HDPE MW-02-230728	E162	28-Jul-2023	----	----	----		03-Aug-2023	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE JF01-06-230728	E160	28-Jul-2023	----	----	----		02-Aug-2023	7 days	5 days	✓
Physical Tests : TSS by Gravimetry										
HDPE MW-02-230728	E160	28-Jul-2023	----	----	----		02-Aug-2023	7 days	5 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE total (nitric acid) JF01-06-230728	E420	28-Jul-2023	03-Aug-2023	180 days	6 days	✓	03-Aug-2023	174 days	0 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE total (nitric acid) MW-02-230728	E420	28-Jul-2023	03-Aug-2023	180 days	6 days	✓	03-Aug-2023	174 days	0 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Dup2-230728	E611A	28-Jul-2023	01-Aug-2023	14 days	5 days	✓	02-Aug-2023	9 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
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) JF01-04-230728	E611A	28-Jul-2023	01-Aug-2023	14 days	5 days	✓	02-Aug-2023	9 days	0 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) JF01-06-230728	E611A	28-Jul-2023	01-Aug-2023	14 days	5 days	✓	02-Aug-2023	9 days	0 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-02-230728	E611A	28-Jul-2023	01-Aug-2023	14 days	5 days	✓	02-Aug-2023	9 days	0 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-03-230728	E611A	28-Jul-2023	01-Aug-2023	14 days	5 days	✓	02-Aug-2023	9 days	0 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) PW3-230728	E611A	28-Jul-2023	01-Aug-2023	14 days	5 days	✓	02-Aug-2023	9 days	0 days	✓

Legend & Qualifier Definitions

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

EHT: Exceeded ALS recommended hold time prior to analysis.

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

UCP: Unsuitable Container and/or Preservative used (invalidates standard hold time). Maximum hold time of zero applied. Test results may be biased low / unreliable, and may not meet regulatory requirements.

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	1067361	1	11	9.0	5.0	✓
Bromide by IC (Ultra Trace Level)	E235.Br-U	1067357	1	2	50.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1066792	1	6	16.6	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	1067355	1	2	50.0	5.0	✓
Conductivity in Water	E100	1067360	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	1069128	1	13	7.6	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1070929	1	17	5.8	5.0	✓
Fluoride in Water by IC (Low Level)	E235.F-L	1067356	1	2	50.0	5.0	✓
Nitrate in Water by IC (Trace Level)	E235.NO3-T	1067353	1	5	20.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1067350	1	20	5.0	5.0	✓
pH by Meter	E108	1067359	1	16	6.2	5.0	✓
Sulfate in Water by IC (Low Level)	E235.SO4-L	1067358	1	2	50.0	5.0	✓
TDS by Gravimetry	E162	1068969	1	6	16.6	5.0	✓
Total metals in Water by CRC ICPMS	E420	1067021	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1068976	1	6	16.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	1066791	1	6	16.6	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1067361	1	11	9.0	5.0	✓
Bromide by IC (Ultra Trace Level)	E235.Br-U	1067357	1	2	50.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1066792	1	6	16.6	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601	1068963	1	7	14.2	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	1067355	1	2	50.0	5.0	✓
Conductivity in Water	E100	1067360	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	1069128	1	13	7.6	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1070929	1	17	5.8	5.0	✓
Fluoride in Water by IC (Low Level)	E235.F-L	1067356	1	2	50.0	5.0	✓
Nitrate in Water by IC (Trace Level)	E235.NO3-T	1067353	1	5	20.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1067350	1	20	5.0	5.0	✓
Oil & Grease by Gravimetry	E567	1068831	1	10	10.0	5.0	✓
pH by Meter	E108	1067359	1	16	6.2	5.0	✓
Sulfate in Water by IC (Low Level)	E235.SO4-L	1067358	1	2	50.0	5.0	✓
TDS by Gravimetry	E162	1068969	1	6	16.6	5.0	✓
Total metals in Water by CRC ICPMS	E420	1067021	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1068976	1	6	16.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	1066791	1	6	16.6	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)							
Alkalinity Species by Titration	E290	1067361	1	11	9.0	5.0	✓
Bromide by IC (Ultra Trace Level)	E235.Br-U	1067357	1	2	50.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1066792	1	6	16.6	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601	1068963	1	7	14.2	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	1067355	1	2	50.0	5.0	✓
Conductivity in Water	E100	1067360	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	1069128	1	13	7.6	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1070929	1	17	5.8	5.0	✓
Fluoride in Water by IC (Low Level)	E235.F-L	1067356	1	2	50.0	5.0	✓
Nitrate in Water by IC (Trace Level)	E235.NO3-T	1067353	1	5	20.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1067350	1	20	5.0	5.0	✓
Oil & Grease by Gravimetry	E567	1068831	1	10	10.0	5.0	✓
Sulfate in Water by IC (Low Level)	E235.SO4-L	1067358	1	2	50.0	5.0	✓
TDS by Gravimetry	E162	1068969	1	6	16.6	5.0	✓
Total metals in Water by CRC ICPMS	E420	1067021	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	1068976	1	6	16.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	1066791	1	6	16.6	5.0	✓
Matrix Spikes (MS)							
Bromide by IC (Ultra Trace Level)	E235.Br-U	1067357	1	2	50.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1066792	1	6	16.6	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	1067355	1	2	50.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	1069128	1	13	7.6	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1070929	1	17	5.8	5.0	✓
Fluoride in Water by IC (Low Level)	E235.F-L	1067356	1	2	50.0	5.0	✓
Nitrate in Water by IC (Trace Level)	E235.NO3-T	1067353	1	5	20.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1067350	1	20	5.0	5.0	✓
Sulfate in Water by IC (Low Level)	E235.SO4-L	1067358	1	2	50.0	5.0	✓
Total metals in Water by CRC ICPMS	E420	1067021	1	20	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	1066791	1	6	16.6	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 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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.
TSS by Gravimetry	E160 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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.
Bromide by IC (Ultra Trace Level)	E235.Br-U ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Trace Level)	E235.NO3-T ALS Environmental - Vancouver	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
Sulfate in Water by IC (Low Level)	E235.SO4-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Total metals in Water by CRC ICPMS	E420 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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.
Dissolved Mercury in Water by CVAAS	E509 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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. Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
CCME PHCs - F2-F4 by GC-FID	E601 ALS Environmental - Vancouver	Water	CCME PHC in Soil - Tier 1	Sample extracts are analyzed by GC-FID for CCME hydrocarbon fractions (F2-F4). Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
BTEX by Headspace GC-MS	E611A ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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.
F1-BTEX	EC580 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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
Dissolved Metals Water Filtration	EP421 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration	EP509 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
Oil & Grease Extraction for Gravimetry	EP567 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

ALS Canada Ltd.

QUALITY CONTROL REPORT

Work Order	: **YL2300932**	Page	: 1 of 14
Client	: KBL Environmental Ltd.	Laboratory	: ALS Environmental - Yellowknife
Contact	: Katie Oliver	Account Manager	: Oliver Gregg
Address	: 17 Cameron Road PO Box 1895 Yellowknife NT Canada X1A 2P4	Address	: 314 Old Airport Road, Unit 116 Yellowknife, Northwest Territories Canada X1A 3T3
Telephone	:	Telephone	: 1 867 445 7143
Project	: 23-099NT	Date Samples Received	: 28-Jul-2023 10:20
PO	: ----	Date Analysis Commenced	: 01-Aug-2023
C-O-C number	: ----	Issue Date	: 08-Aug-2023 09:04
Sampler	: MM 780 893 3305		
Site	: ----		
Quote number	: YL22-KBLE100-001		
No. of samples received	: 6		
No. of samples analysed	: 6		

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*
Anshim Anshim	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Inorganics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Owen Cheng		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: 1067359)											
VA23B7639-001	Anonymous	pH	----	E108	0.10	pH units	7.54	7.54	0.00%	4%	----
Physical Tests (QC Lot: 1067360)											
VA23B7639-001	Anonymous	Conductivity	----	E100	2.0	µS/cm	110	110	0.0907%	10%	----
Physical Tests (QC Lot: 1067361)											
VA23B7639-001	Anonymous	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	28.4	28.1	1.07%	200%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0.00%	200%	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0.00%	200%	----
		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	28.4	28.1	1.07%	20%	----
Physical Tests (QC Lot: 1068969)											
VA23B7561-003	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	228	228	0.438%	20%	----
Physical Tests (QC Lot: 1068976)											
VA23B7561-003	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	5.1	5.9	0.8	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1067350)											
VA23B7699-001	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: 1067353)											
VA23B7638-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-T	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1067355)											
YL2300932-001	JF01-06-230728	Chloride	16887-00-6	E235.Cl-L	0.10	mg/L	66.0	66.0	0.0383%	20%	----
Anions and Nutrients (QC Lot: 1067356)											
YL2300932-001	JF01-06-230728	Fluoride	16984-48-8	E235.F-L	0.010	mg/L	0.080	0.078	0.001	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1067357)											
YL2300932-001	JF01-06-230728	Bromide	24959-67-9	E235.Br-U	0.0050	mg/L	0.0730	0.0717	1.73%	20%	----
Anions and Nutrients (QC Lot: 1067358)											
YL2300932-001	JF01-06-230728	Sulfate (as SO4)	14808-79-8	E235.SO4-L	0.050	mg/L	23.6	23.6	0.00939%	20%	----
Total Metals (QC Lot: 1067021)											
FJ2301884-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0197	0.0178	0.0019	Diff <2x LOR	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	0.00012	0.00013	0.000002	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00016	0.00018	0.00001	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: 1067021) - continued											
FJ2301884-001	Anonymous	Barium, total	7440-39-3	E420	0.00010	mg/L	0.117	0.119	1.65%	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	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000321	0.0000271	0.0000050	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.050	mg/L	54.7	57.6	5.02%	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	0.00240	0.00247	0.00007	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.010	mg/L	0.062	0.056	0.006	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	0.0101	0.0104	2.35%	20%	----
		Magnesium, total	7439-95-4	E420	0.0050	mg/L	19.7	20.3	2.68%	20%	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	0.00582	0.00582	0.00657%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00266	0.00263	0.968%	20%	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	0.00082	0.00083	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	0.702	0.704	0.276%	20%	----
		Rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00038	0.00034	0.00004	Diff <2x LOR	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.00130	0.00137	5.26%	20%	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	1.88	1.83	2.48%	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	8.35	8.13	2.63%	20%	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	0.289	0.277	4.27%	20%	----
		Sulfur, total	7704-34-9	E420	0.50	mg/L	29.6	29.8	0.355%	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	<0.00030	<0.00030	0	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	0.000760	0.000742	2.39%	20%	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00062	0.00061	0.00002	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: 1067021) - continued											
FJ2301884-001	Anonymous	Zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1069128)											
FJ2301856-001	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1070929)											
YL2300952-001	Anonymous	Calcium, dissolved	7440-70-2	E421	0.050	mg/L	209	210	0.713%	20%	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	41.9	41.2	1.62%	20%	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	12.7	12.5	1.34%	20%	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	205	202	1.32%	20%	----
Volatile Organic Compounds (QC Lot: 1066792)											
YL2300932-001	JF01-06-230728	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: 1066791)											
YL2300932-001	JF01-06-230728	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: 1067360)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 1067361)						
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	----
Physical Tests (QCLot: 1068969)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Physical Tests (QCLot: 1068976)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1067350)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1067353)						
Nitrate (as N)	14797-55-8	E235.NO3-T	0.003	mg/L	<0.0030	----
Anions and Nutrients (QCLot: 1067355)						
Chloride	16887-00-6	E235.Cl-L	0.1	mg/L	<0.10	----
Anions and Nutrients (QCLot: 1067356)						
Fluoride	16984-48-8	E235.F-L	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 1067357)						
Bromide	24959-67-9	E235.Br-U	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1067358)						
Sulfate (as SO4)	14808-79-8	E235.SO4-L	0.05	mg/L	<0.050	----
Total Metals (QCLot: 1067021)						
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	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1067021) - continued						
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	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Dissolved Metals (QCLot: 1069128)						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
Dissolved Metals (QCLot: 1070929)						
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1070929) - continued						
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Aggregate Organics (QCLot: 1068831)						
Oil & grease (gravimetric)	----	E567	5	mg/L	<5.0	----
Volatile Organic Compounds (QCLot: 1066792)						
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: 1066791)						
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 1068963)						
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: 1067359)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1067360)									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	101	90.0	110	----
Physical Tests (QCLot: 1067361)									
Alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	229 mg/L	114	75.0	125	----
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	110	85.0	115	----
Physical Tests (QCLot: 1068969)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	111	85.0	115	----
Physical Tests (QCLot: 1068976)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	103	85.0	115	----
Anions and Nutrients (QCLot: 1067350)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.6	90.0	110	----
Anions and Nutrients (QCLot: 1067353)									
Nitrate (as N)	14797-55-8	E235.NO3-T	0.003	mg/L	2.5 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 1067355)									
Chloride	16887-00-6	E235.Cl-L	0.1	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1067356)									
Fluoride	16984-48-8	E235.F-L	0.01	mg/L	1 mg/L	99.3	90.0	110	----
Anions and Nutrients (QCLot: 1067357)									
Bromide	24959-67-9	E235.Br-U	0.005	mg/L	0.5 mg/L	111	85.0	115	----
Anions and Nutrients (QCLot: 1067358)									
Sulfate (as SO4)	14808-79-8	E235.SO4-L	0.05	mg/L	100 mg/L	101	90.0	110	----
Total Metals (QCLot: 1067021)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	110	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	107	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	112	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	110	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	107	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	106	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	95.8	80.0	120	----

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
Total Metals (QCLot: 1067021) - continued									
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	109	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	107	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	110	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	105	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	107	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	104	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	111	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	104	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	109	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	107	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	105	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	113	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	107	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	104	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	108	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	117	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	103	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	108	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	114	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	102	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	95.8	80.0	120	----
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	111	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	104	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	102	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	100	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	112	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	107	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	106	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	106	80.0	120	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	96.0	80.0	120	----
Dissolved Metals (QCLot: 1070929)									
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	105	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 1070929) - continued									
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	108	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	111	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	112	80.0	120	----
Aggregate Organics (QCLot: 1068831)									
Oil & grease (gravimetric)	----	E567	5	mg/L	100 mg/L	97.5	70.0	130	----
Volatile Organic Compounds (QCLot: 1066792)									
Benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	102	70.0	130	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	110	70.0	130	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	108	70.0	130	----
Styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	110	70.0	130	----
Toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	105	70.0	130	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	109	70.0	130	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	109	70.0	130	----
Hydrocarbons (QCLot: 1066791)									
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	109	70.0	130	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	112	70.0	130	----
Hydrocarbons (QCLot: 1068963)									
F2 (C10-C16)	----	E601	100	µg/L	3538 µg/L	130	70.0	130	----
F3 (C16-C34)	----	E601	250	µg/L	7053 µg/L	115	70.0	130	----
F4 (C34-C50)	----	E601	250	µg/L	5051 µg/L	123	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: 1067350)										
VA23B7699-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.504 mg/L	0.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1067353)										
VA23B7639-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-T	2.65 mg/L	2.5 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 1067355)										
YL2300932-006	MW-02-230728	Chloride	16887-00-6	E235.Cl-L	103 mg/L	100 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 1067356)										
YL2300932-006	MW-02-230728	Fluoride	16984-48-8	E235.F-L	1.04 mg/L	1 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 1067357)										
YL2300932-006	MW-02-230728	Bromide	24959-67-9	E235.Br-U	0.580 mg/L	0.5 mg/L	116	75.0	125	----
Anions and Nutrients (QCLot: 1067358)										
YL2300932-006	MW-02-230728	Sulfate (as SO4)	14808-79-8	E235.SO4-L	102 mg/L	100 mg/L	102	75.0	125	----
Total Metals (QCLot: 1067021)										
FJ2301884-002	Anonymous	Aluminum, total	7429-90-5	E420	0.203 mg/L	0.2 mg/L	102	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0200 mg/L	0.02 mg/L	99.9	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0208 mg/L	0.02 mg/L	104	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	0.0398 mg/L	0.04 mg/L	99.6	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.00923 mg/L	0.01 mg/L	92.3	70.0	130	----
		Boron, total	7440-42-8	E420	0.091 mg/L	0.1 mg/L	91.0	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00395 mg/L	0.004 mg/L	98.7	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	0.0107 mg/L	0.01 mg/L	107	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0399 mg/L	0.04 mg/L	99.7	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0189 mg/L	0.02 mg/L	94.7	70.0	130	----
		Copper, total	7440-50-8	E420	0.0181 mg/L	0.02 mg/L	90.4	70.0	130	----
		Iron, total	7439-89-6	E420	1.99 mg/L	2 mg/L	99.4	70.0	130	----
		Lead, total	7439-92-1	E420	0.0184 mg/L	0.02 mg/L	91.8	70.0	130	----
		Lithium, total	7439-93-2	E420	0.0933 mg/L	0.1 mg/L	93.3	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	----

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: 1067021) - continued										
FJ2301884-002	Anonymous	Molybdenum, total	7439-98-7	E420	0.0212 mg/L	0.02 mg/L	106	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0369 mg/L	0.04 mg/L	92.2	70.0	130	----
		Phosphorus, total	7723-14-0	E420	11.6 mg/L	10 mg/L	116	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	97.4	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0458 mg/L	0.04 mg/L	115	70.0	130	----
		Silicon, total	7440-21-3	E420	10.2 mg/L	10 mg/L	102	70.0	130	----
		Silver, total	7440-22-4	E420	0.00390 mg/L	0.004 mg/L	97.5	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	0.0419 mg/L	0.04 mg/L	105	70.0	130	----
		Thallium, total	7440-28-0	E420	0.00369 mg/L	0.004 mg/L	92.2	70.0	130	----
		Thorium, total	7440-29-1	E420	0.0217 mg/L	0.02 mg/L	108	70.0	130	----
		Tin, total	7440-31-5	E420	0.0196 mg/L	0.02 mg/L	98.0	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0401 mg/L	0.04 mg/L	100	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.0188 mg/L	0.02 mg/L	93.9	70.0	130	----
		Uranium, total	7440-61-1	E420	ND mg/L	0.004 mg/L	ND	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.102 mg/L	0.1 mg/L	102	70.0	130	----
		Zinc, total	7440-66-6	E420	0.376 mg/L	0.4 mg/L	93.9	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.0419 mg/L	0.04 mg/L	105	70.0	130	----
Dissolved Metals (QCLot: 1069128)										
FJ2301856-002	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000979 mg/L	0.0001 mg/L	97.9	70.0	130	----
Dissolved Metals (QCLot: 1070929)										
YL2300961-001	Anonymous	Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
Volatile Organic Compounds (QCLot: 1066792)										
YL2300932-002	MW-03-230728	Benzene	71-43-2	E611A	103 µg/L	100 µg/L	103	60.0	140	----
		Ethylbenzene	100-41-4	E611A	114 µg/L	100 µg/L	114	60.0	140	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	112 µg/L	100 µg/L	112	60.0	140	----
		Styrene	100-42-5	E611A	113 µg/L	100 µg/L	113	60.0	140	----
		Toluene	108-88-3	E611A	107 µg/L	100 µg/L	107	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
Volatile Organic Compounds (QCLot: 1066792) - continued										
YL2300932-002	MW-03-230728	Xylene, m+p-	179601-23-1	E611A	222 µg/L	200 µg/L	111	60.0	140	----
		Xylene, o-	95-47-6	E611A	113 µg/L	100 µg/L	113	60.0	140	----
Hydrocarbons (QCLot: 1066791)										
YL2300932-003	Dup2-230728	F1 (C6-C10)	----	E581.VH+F1	5400 µg/L	6310 µg/L	85.6	60.0	140	----
		VHw (C6-C10)	----	E581.VH+F1	5560 µg/L	6310 µg/L	88.1	60.0	140	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 21 -

Page of

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Canada Toll Free: 1 800 668 9878

Report To	Contact and company name below will appear on the final report
Company:	KBL Environmental
Contact:	Katie Oliver
Phone:	780.452.7779
	Company address below will appear on the final report
Street:	3909, 68 Avenue
City/Province:	Leduc, AB
Postal Code:	T9E 0Z4
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	
Contact:	

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Merge QC/QCI Reports with COA ☐ YES ☐ NO ☐ N/A
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: Kklevgaard@kblenv.com
Email 2: GMRPMonitoring@kblenv.com
Email 3: kbl@esdat.net

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: accounting@kblenv.com
Email 2: Khaywoodfarmer@kblenv

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
☐ ~~1 day [E]~~ if received by 3pm M-F - 100% rush surcharge minimum
☐ Same day [E2] if received by 10am M-S - 200% rush surcharge.

Additional fees may apply to rush requests on weekends, statutory holidays and for non-routine tests.

Date and Time Required for all E&P TATs:

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	23-099NT	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner	
LSD:		Location:	
ALS Lab Work Order # (ALS use only):		ALS Contact: Oliver Greg	Sampler: MM

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Btex (F1-F4)	TSS	Routine	Total Metals (dissolved, Mercury)	Oil and Grease	Dissolved Oxygen	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	JF01-06-230728			Ground water	9	R	R	R	R	R	R			
	MW-03-230728			Ground water	4	R								
	Dup2-230728			Ground water	4	R								
	JF01-04-230728			Ground water	4	R								
	PW3-230728			Ground water	4	R								
	MW-02-230728			Ground water	9	R	R	R	R	R	R			

Environmental Division
Yellowknife
Work Order Reference
YL2300932

Telephone : +1 867 873 5593

Drinking Water (DW) Samples[1] (client use)	Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	
Are samples for human consumption/ use? ☐ YES ☑ NO	

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED
Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO
Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
14							

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by:	Date: 28-July-23	Time:	Received by:	Date: 28-July	Time: 13:20	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

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

ALS Canada Ltd.

right solutions. right partner.

CERTIFICATE OF ANALYSIS

Work Order	: **YL2301518**	Page	: 1 of 11
Client	: **KBL Environmental Ltd.**	Laboratory	: ALS Environmental - Yellowknife
Contact	: Katie Oliver	Account Manager	: Oliver Gregg
Address	: 17 Cameron Road PO Box 1895 Yellowknife NT Canada X1A 2P4	Address	: 314 Old Airport Road, Unit 116 Yellowknife NT Canada X1A 3T3
Telephone	: 780 893 3305	Telephone	: 1 867 445 7143
Project	: 23-099NT	Date Samples Received	: 25-Oct-2023 15:22
PO	: ----	Date Analysis Commenced	: 27-Oct-2023
C-O-C number	: 17-824361	Issue Date	: 02-Nov-2023 09:34
Sampler	: ----		
Site	: ----		
Quote number	: YL22-KBLE100-001		
No. of samples received	: 14		
No. of samples analysed	: 14		

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*
Alex Thornton	Analyst	Metals, Burnaby, British Columbia
Brieanna Allen	Production/Validation Manager	Inorganics, Burnaby, British Columbia
Erin Sanchez		Metals, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Owen Cheng		Metals, 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 units
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
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*
SUR-ND	*Surrogate recovery marginally exceeded ALS DQO. Reported non-detect results for associated samples were deemed to be unaffected.*

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	PW-01	PW-02	JF01-01	JF01-06	JF01-04
					Client sampling date / time	25-Oct-2023 00:00	25-Oct-2023 00:00	25-Oct-2023 00:00	25-Oct-2023 00:00	25-Oct-2023 00:00
						YL2301518-001	YL2301518-002	YL2301518-003	YL2301518-004	YL2301518-005
						Result	Result	Result	Result	Result
Physical Tests										
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	1.0	mg/L		----	----	----	126	----
Alkalinity, carbonate (as CaCO3)	----	E290/VA	1.0	mg/L		----	----	----	<1.0	----
Alkalinity, hydroxide (as CaCO3)	----	E290/VA	1.0	mg/L		----	----	----	<1.0	----
Alkalinity, phenolphthalein (as CaCO3)	----	E290/VA	1.0	mg/L		----	----	----	<1.0	----
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L		----	----	----	126	----
Conductivity	----	E100/VA	2.0	µS/cm		----	----	----	544	----
Hardness (as CaCO3), dissolved	----	EC100/VA	0.60	mg/L		----	----	----	176	----
pH	----	E108/VA	0.10	pH units		----	----	----	8.09	----
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L		----	----	----	312	----
Solids, total suspended [TSS]	----	E160/VA	3.0	mg/L		----	----	----	538	----
Anions and Nutrients										
Bromide	24959-67-9	E235.Br-U/VA	0.0050	mg/L		----	----	----	0.0446	----
Chloride	16887-00-6	E235.Cl-L/VA	0.10	mg/L		----	----	----	66.5	----
Fluoride	16984-48-8	E235.F-L/VA	0.010	mg/L		----	----	----	0.096	----
Nitrate (as N)	14797-55-8	E235.NO3-T/VA	0.0030	mg/L		----	----	----	0.352	----
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	0.0010	mg/L		----	----	----	0.0026	----
Sulfate (as SO4)	14808-79-8	E235.SO4-L/VA	0.050	mg/L		----	----	----	45.3	----
Dissolved Metals										
Aluminum, dissolved	7429-90-5	E421/VA	0.0010	mg/L		----	----	----	0.0042	----
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L		----	----	----	0.00123	----
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L		----	----	----	0.0644	----
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L		----	----	----	0.0339	----
Beryllium, dissolved	7440-41-7	E421/VA	0.000100	mg/L		----	----	----	<0.000100	----
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L		----	----	----	<0.000050	----
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L		----	----	----	0.034	----
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L		----	----	----	<0.0000050	----
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L		----	----	----	44.2	----

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	PW-01	PW-02	JF01-01	JF01-06	JF01-04
					Client sampling date / time	25-Oct-2023 00:00	25-Oct-2023 00:00	25-Oct-2023 00:00	25-Oct-2023 00:00	25-Oct-2023 00:00
						YL2301518-001	YL2301518-002	YL2301518-003	YL2301518-004	YL2301518-005
						Result	Result	Result	Result	Result
Dissolved Metals										
Cesium, dissolved	7440-46-2	E421/VA	0.000010	mg/L		----	----	----	<0.000010	----
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L		----	----	----	<0.00050	----
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L		----	----	----	<0.00010	----
Copper, dissolved	7440-50-8	E421/VA	0.00020	mg/L		----	----	----	0.00138	----
Iron, dissolved	7439-89-6	E421/VA	0.010	mg/L		----	----	----	<0.010	----
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L		----	----	----	<0.000050	----
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L		----	----	----	0.0030	----
Magnesium, dissolved	7439-95-4	E421/VA	0.0050	mg/L		----	----	----	15.9	----
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L		----	----	----	0.00800	----
Mercury, dissolved	7439-97-6	E509/VA	0.0000050	mg/L		----	----	----	<0.0000050	----
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L		----	----	----	0.000374	----
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L		----	----	----	0.00093	----
Phosphorus, dissolved	7723-14-0	E421/VA	0.050	mg/L		----	----	----	<0.050	----
Potassium, dissolved	7440-09-7	E421/VA	0.050	mg/L		----	----	----	2.91	----
Rubidium, dissolved	7440-17-7	E421/VA	0.00020	mg/L		----	----	----	0.00068	----
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L		----	----	----	0.000068	----
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L		----	----	----	6.08	----
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L		----	----	----	<0.000010	----
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L		----	----	----	35.1	----
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L		----	----	----	0.103	----
Sulfur, dissolved	7704-34-9	E421/VA	0.50	mg/L		----	----	----	17.0	----
Tellurium, dissolved	13494-80-9	E421/VA	0.00020	mg/L		----	----	----	<0.00020	----
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L		----	----	----	<0.000010	----
Thorium, dissolved	7440-29-1	E421/VA	0.00010	mg/L		----	----	----	<0.00010	----
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L		----	----	----	<0.00010	----
Titanium, dissolved	7440-32-6	E421/VA	0.00030	mg/L		----	----	----	<0.00030	----
Tungsten, dissolved	7440-33-7	E421/VA	0.00010	mg/L		----	----	----	<0.00010	----
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L		----	----	----	0.00145	----
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L		----	----	----	0.00184	----
Zinc, dissolved	7440-66-6	E421/VA	0.0010	mg/L		----	----	----	<0.0010	----

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	PW-01	PW-02	JF01-01	JF01-06	JF01-04
					Client sampling date / time	25-Oct-2023 00:00	25-Oct-2023 00:00	25-Oct-2023 00:00	25-Oct-2023 00:00	25-Oct-2023 00:00
						YL2301518-001	YL2301518-002	YL2301518-003	YL2301518-004	YL2301518-005
						Result	Result	Result	Result	Result
Dissolved Metals										
Zirconium, dissolved	7440-67-7	E421/VA	0.00020	mg/L		----	----	----	<0.00020	----
Dissolved mercury filtration location	----	EP509/VA	-	-		----	----	----	Field	----
Dissolved metals filtration location	----	EP421/VA	-	-		----	----	----	Field	----
Aggregate Organics										
Oil & grease (gravimetric)	----	E567/VA	5.0	mg/L		----	----	----	<5.0	----
Volatile Organic Compounds [Fuels]										
Benzene	71-43-2	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Ethylbenzene	100-41-4	E611A/VA	0.50	µg/L		0.71	<0.50	<0.50	<0.50	<0.50
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	100-42-5	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Toluene	108-88-3	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Xylene, m+p-	179601-23-1	E611A/VA	0.40	µg/L		5.84	<0.40	<0.40	<0.40	<0.40
Xylene, o-	95-47-6	E611A/VA	0.30	µg/L		4.36	<0.30	<0.30	<0.30	<0.30
Xylenes, total	1330-20-7	E611A/VA	0.50	µg/L		10.2	<0.50	<0.50	<0.50	<0.50
Hydrocarbons										
F1 (C6-C10)	----	E581.VH+F1/VA	100	µg/L		420	<100	<100	<100	<100
F2 (C10-C16)	----	E601/VA	300	µg/L		57100	1760	670	<300	<300
F3 (C16-C34)	----	E601/VA	300	µg/L		22400	1290	<300	<300	<300
F4 (C34-C50)	----	E601/VA	300	µg/L		950	<300	<300	<300	<300
VHw (C6-C10)	----	E581.VH+F1/VA	100	µg/L		480	<100	<100	<100	<100
F1-BTEX	----	EC580/VA	100	µg/L		409	<100	<100	<100	<100
VPHw	----	EC580A/VA	100	µg/L		470	<100	<100	<100	<100
Hydrocarbons Surrogates										
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	E601/VA	1.0	%		115	98.4	86.9	80.4	80.9
Dichlorotoluene, 3,4-	95-75-0	E581.VH+F1/VA	1.0	%		90.3	88.3	86.0	67.0 SUR-ND	89.2
Volatile Organic Compounds Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611A/VA	1.0	%		97.7	89.6	91.3	89.2	90.3
Difluorobenzene, 1,4-	540-36-3	E611A/VA	1.0	%		98.1	98.9	99.6	99.1	98.8

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MW-02	MW-03	MW-04	MW-06	MW-07
					Client sampling date / time	25-Oct-2023 00:00	25-Oct-2023 00:00	25-Oct-2023 00:00	25-Oct-2023 00:00	25-Oct-2023 00:00
						YL2301518-006	YL2301518-007	YL2301518-008	YL2301518-009	YL2301518-010
						Result	Result	Result	Result	Result
Physical Tests										
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	1.0	mg/L		111	----	----	----	----
Alkalinity, carbonate (as CaCO3)	----	E290/VA	1.0	mg/L		<1.0	----	----	----	----
Alkalinity, hydroxide (as CaCO3)	----	E290/VA	1.0	mg/L		<1.0	----	----	----	----
Alkalinity, phenolphthalein (as CaCO3)	----	E290/VA	1.0	mg/L		<1.0	----	----	----	----
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L		111	----	----	----	----
Conductivity	----	E100/VA	2.0	µS/cm		487	----	----	----	----
Hardness (as CaCO3), dissolved	----	EC100/VA	0.60	mg/L		153	----	----	----	----
pH	----	E108/VA	0.10	pH units		7.88	----	----	----	----
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L		286	----	----	----	----
Solids, total suspended [TSS]	----	E160/VA	3.0	mg/L		61.3	----	----	----	----
Anions and Nutrients										
Bromide	24959-67-9	E235.Br-U/VA	0.0050	mg/L		0.0550	----	----	----	----
Chloride	16887-00-6	E235.Cl-L/VA	0.10	mg/L		66.2	----	----	----	----
Fluoride	16984-48-8	E235.F-L/VA	0.010	mg/L		0.094	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-T/VA	0.0030	mg/L		0.136	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	0.0010	mg/L		0.0023	----	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4-L/VA	0.050	mg/L		28.9	----	----	----	----
Dissolved Metals										
Aluminum, dissolved	7429-90-5	E421/VA	0.0010	mg/L		0.0101	----	----	----	----
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L		0.00074	----	----	----	----
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L		0.0632	----	----	----	----
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L		0.0522	----	----	----	----
Beryllium, dissolved	7440-41-7	E421/VA	0.000100	mg/L		<0.000100	----	----	----	----
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L		<0.000050	----	----	----	----
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L		0.018	----	----	----	----
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L		0.0000136	----	----	----	----
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L		38.3	----	----	----	----
Cesium, dissolved	7440-46-2	E421/VA	0.000010	mg/L		<0.000010	----	----	----	----

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MW-02	MW-03	MW-04	MW-06	MW-07
					Client sampling date / time	25-Oct-2023 00:00	25-Oct-2023 00:00	25-Oct-2023 00:00	25-Oct-2023 00:00	25-Oct-2023 00:00
						YL2301518-006	YL2301518-007	YL2301518-008	YL2301518-009	YL2301518-010
						Result	Result	Result	Result	Result
Dissolved Metals										
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L		<0.00050	----	----	----	----
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L		0.00031	----	----	----	----
Copper, dissolved	7440-50-8	E421/VA	0.00020	mg/L		0.00233	----	----	----	----
Iron, dissolved	7439-89-6	E421/VA	0.010	mg/L		0.067	----	----	----	----
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L		<0.000050	----	----	----	----
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L		0.0029	----	----	----	----
Magnesium, dissolved	7439-95-4	E421/VA	0.0050	mg/L		13.9	----	----	----	----
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L		0.0265	----	----	----	----
Mercury, dissolved	7439-97-6	E509/VA	0.0000050	mg/L		<0.0000050	----	----	----	----
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L		0.00102	----	----	----	----
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L		0.00117	----	----	----	----
Phosphorus, dissolved	7723-14-0	E421/VA	0.050	mg/L		<0.050	----	----	----	----
Potassium, dissolved	7440-09-7	E421/VA	0.050	mg/L		4.25	----	----	----	----
Rubidium, dissolved	7440-17-7	E421/VA	0.00020	mg/L		0.00213	----	----	----	----
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L		<0.000050	----	----	----	----
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L		5.17	----	----	----	----
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L		<0.000010	----	----	----	----
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L		30.6	----	----	----	----
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L		0.101	----	----	----	----
Sulfur, dissolved	7704-34-9	E421/VA	0.50	mg/L		10.1	----	----	----	----
Tellurium, dissolved	13494-80-9	E421/VA	0.00020	mg/L		<0.00020	----	----	----	----
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L		0.000015	----	----	----	----
Thorium, dissolved	7440-29-1	E421/VA	0.00010	mg/L		<0.00010	----	----	----	----
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L		0.00041	----	----	----	----
Titanium, dissolved	7440-32-6	E421/VA	0.00030	mg/L		0.00031	----	----	----	----
Tungsten, dissolved	7440-33-7	E421/VA	0.00010	mg/L		<0.00010	----	----	----	----
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L		0.000591	----	----	----	----
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L		0.00106	----	----	----	----
Zinc, dissolved	7440-66-6	E421/VA	0.0010	mg/L		0.0017	----	----	----	----
Zirconium, dissolved	7440-67-7	E421/VA	0.00020	mg/L		<0.00020	----	----	----	----

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MW-02	MW-03	MW-04	MW-06	MW-07
					Client sampling date / time	25-Oct-2023 00:00	25-Oct-2023 00:00	25-Oct-2023 00:00	25-Oct-2023 00:00	25-Oct-2023 00:00
						YL2301518-006	YL2301518-007	YL2301518-008	YL2301518-009	YL2301518-010
						Result	Result	Result	Result	Result
Dissolved Metals										
Dissolved mercury filtration location	----	EP509/VA	-	-		Field	----	----	----	----
Dissolved metals filtration location	----	EP421/VA	-	-		Field	----	----	----	----
Aggregate Organics										
Oil & grease (gravimetric)	----	E567/VA	5.0	mg/L		<5.0	----	----	----	----
Volatile Organic Compounds [Fuels]										
Benzene	71-43-2	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Ethylbenzene	100-41-4	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	100-42-5	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Toluene	108-88-3	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Xylene, m+p-	179601-23-1	E611A/VA	0.40	µg/L		<0.40	<0.40	<0.40	<0.40	0.68
Xylene, o-	95-47-6	E611A/VA	0.30	µg/L		<0.30	<0.30	<0.30	<0.30	<0.30
Xylenes, total	1330-20-7	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	0.68
Hydrocarbons										
F1 (C6-C10)	----	E581.VH+F1/VA	100	µg/L		<100	<100	<100	<100	740
F2 (C10-C16)	----	E601/VA	300	µg/L		<300	<300	<300	1400	44100
F3 (C16-C34)	----	E601/VA	300	µg/L		<300	<300	<300	440	11800
F4 (C34-C50)	----	E601/VA	300	µg/L		<300	<300	<300	<300	710
VHw (C6-C10)	----	E581.VH+F1/VA	100	µg/L		<100	<100	<100	<100	830
F1-BTEX	----	EC580/VA	100	µg/L		<100	<100	<100	<100	740
VPHw	----	EC580A/VA	100	µg/L		<100	<100	<100	<100	830
Hydrocarbons Surrogates										
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	E601/VA	1.0	%		92.3	88.9	78.6	87.8	116
Dichlorotoluene, 3,4-	95-75-0	E581.VH+F1/VA	1.0	%		79.7	93.5	97.1	85.1	85.6
Volatile Organic Compounds Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611A/VA	1.0	%		85.4	99.9	101	87.7	93.4
Difluorobenzene, 1,4-	540-36-3	E611A/VA	1.0	%		97.8	99.5	100	95.4	95.4

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MW-09	MW-10	DUP1	DUP2	----
					Client sampling date / time	25-Oct-2023 00:00	25-Oct-2023 00:00	25-Oct-2023 00:00	25-Oct-2023 00:00	----
						YL2301518-011	YL2301518-012	YL2301518-013	YL2301518-014	--------
						Result	Result	Result	Result	----
Volatile Organic Compounds [Fuels]										
Benzene	71-43-2	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	----
Ethylbenzene	100-41-4	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	----
Styrene	100-42-5	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	----
Toluene	108-88-3	E611A/VA	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	----
Xylene, m+p-	179601-23-1	E611A/VA	0.40	µg/L		<0.40	<0.40	0.50	<0.40	----
Xylene, o-	95-47-6	E611A/VA	0.30	µg/L		<0.30	<0.30	<0.30	<0.30	----
Xylenes, total	1330-20-7	E611A/VA	0.50	µg/L		<0.50	<0.50	0.50	<0.50	----
Hydrocarbons										
F1 (C6-C10)	----	E581.VH+F1/VA	100	µg/L		<100	<100	450	<100	----
F2 (C10-C16)	----	E601/VA	300	µg/L		1140	340	31500	390	----
F3 (C16-C34)	----	E601/VA	300	µg/L		360	<300	8170	<300	----
F4 (C34-C50)	----	E601/VA	300	µg/L		<300	<300	450	<300	----
VHw (C6-C10)	----	E581.VH+F1/VA	100	µg/L		<100	<100	500	<100	----
F1-BTEX	----	EC580/VA	100	µg/L		<100	<100	450	<100	----
VPHw	----	EC580A/VA	100	µg/L		<100	<100	500	<100	----
Hydrocarbons Surrogates										
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	E601/VA	1.0	%		90.2	80.5	110	92.6	----
Dichlorotoluene, 3,4-	95-75-0	E581.VH+F1/VA	1.0	%		91.0	78.1	76.8	91.6	----
Volatile Organic Compounds Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611A/VA	1.0	%		90.5	88.3	94.0	91.4	----
Difluorobenzene, 1,4-	540-36-3	E611A/VA	1.0	%		96.3	97.3	97.3	97.0	----

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **YL2301518**	Page	: 1 of 17
Client	: **KBL Environmental Ltd.**	Laboratory	: ALS Environmental - Yellowknife
Contact	: Katie Oliver	Account Manager	: Oliver Gregg
Address	: 17 Cameron Road PO Box 1895 Yellowknife NT Canada X1A 2P4	Address	: 314 Old Airport Road, Unit 116 Yellowknife, Northwest Territories Canada X1A 3T3
Telephone	: 780 893 3305	Telephone	: 1 867 445 7143
Project	: 23-099NT	Date Samples Received	: 25-Oct-2023 15:22
PO	: ----	Issue Date	: 02-Nov-2023 09:35
C-O-C number	: 17-824361		
Sampler	: ----		
Site	: ----		
Quote number	: YL22-KBLE100-001		
No. of samples received	: 14		
No. of samples analysed	: 14		

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
- Matrix Spike outliers occur - please see following pages for full details.
- Test sample Surrogate recovery outliers exist for all regular sample matrices - please see following pages for full details.

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
Matrix Spike (MS) Recoveries								
Dissolved Metals	Anonymous	Anonymous	Silver, dissolved	7440-22-4	E421	68.5 % MES	70.0-130%	Recovery less than lower data quality objective

Result Qualifiers

Qualifier	Description
MES	*Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*

Regular Sample Surrogates

Sub-Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Result	Limits	Comment
Samples Submitted							
Hydrocarbons Surrogates	YL2301518-004	JF01-06	Dichlorotoluene, 3,4-	95-75-0	67.0 %	70.0-130 %	Recovery less than lower data quality objective

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 : Analytical Method / 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) JF01-06	E567	25-Oct-2023	31-Oct-2023	28 days	6 days	✓	31-Oct-2023	40 days	0 days	✓
Aggregate Organics : Oil & Grease by Gravimetry										
Amber glass (hydrochloric acid) MW-02	E567	25-Oct-2023	31-Oct-2023	28 days	6 days	✓	31-Oct-2023	40 days	0 days	✓
Anions and Nutrients : Bromide by IC (Ultra Trace Level)										
HDPE JF01-06	E235.Br-U	25-Oct-2023	27-Oct-2023	28 days	3 days	✓	27-Oct-2023	28 days	3 days	✓
Anions and Nutrients : Bromide by IC (Ultra Trace Level)										
HDPE MW-02	E235.Br-U	25-Oct-2023	27-Oct-2023	28 days	3 days	✓	27-Oct-2023	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE JF01-06	E235.Cl-L	25-Oct-2023	27-Oct-2023	28 days	3 days	✓	27-Oct-2023	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE MW-02	E235.Cl-L	25-Oct-2023	27-Oct-2023	28 days	3 days	✓	27-Oct-2023	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC (Low Level)										
HDPE JF01-06	E235.F-L	25-Oct-2023	27-Oct-2023	28 days	3 days	✓	27-Oct-2023	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / 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 : Fluoride in Water by IC (Low Level)										
HDPE										
MW-02	E235.F-L	25-Oct-2023	27-Oct-2023	28 days	3 days	✓	27-Oct-2023	28 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Trace Level)										
HDPE										
JF01-06	E235.NO3-T	25-Oct-2023	27-Oct-2023	3 days	3 days	✓	27-Oct-2023	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Trace Level)										
HDPE										
MW-02	E235.NO3-T	25-Oct-2023	27-Oct-2023	3 days	3 days	✓	27-Oct-2023	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
JF01-06	E235.NO2-L	25-Oct-2023	27-Oct-2023	3 days	3 days	✓	27-Oct-2023	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
MW-02	E235.NO2-L	25-Oct-2023	27-Oct-2023	3 days	3 days	✓	27-Oct-2023	3 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC (Low Level)										
HDPE										
JF01-06	E235.SO4-L	25-Oct-2023	27-Oct-2023	28 days	3 days	✓	27-Oct-2023	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC (Low Level)										
HDPE										
MW-02	E235.SO4-L	25-Oct-2023	27-Oct-2023	28 days	3 days	✓	27-Oct-2023	28 days	3 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
JF01-06	E509	25-Oct-2023	31-Oct-2023	28 days	6 days	✓	31-Oct-2023	28 days	6 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
MW-02	E509	25-Oct-2023	31-Oct-2023	28 days	6 days	✓	31-Oct-2023	28 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / 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 (lab preserved) JF01-06	E421	25-Oct-2023	01-Nov-2023	180 days	7 days	✓	01-Nov-2023	180 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) MW-02	E421	25-Oct-2023	01-Nov-2023	180 days	7 days	✓	01-Nov-2023	180 days	8 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) JF01-01	E601	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	01-Nov-2023	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) JF01-04	E601	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	01-Nov-2023	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) JF01-06	E601	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	01-Nov-2023	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) MW-02	E601	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	01-Nov-2023	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) MW-03	E601	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	01-Nov-2023	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) MW-04	E601	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	01-Nov-2023	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) MW-06	E601	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	01-Nov-2023	40 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) MW-07	E601	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	01-Nov-2023	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) MW-09	E601	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	01-Nov-2023	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) MW-10	E601	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	01-Nov-2023	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) PW-01	E601	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	01-Nov-2023	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) PW-02	E601	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	01-Nov-2023	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) DUP1	E601	25-Oct-2023	31-Oct-2023	14 days	7 days	✓	01-Nov-2023	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) DUP2	E601	25-Oct-2023	31-Oct-2023	14 days	7 days	✓	01-Nov-2023	40 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) JF01-01	E581.VH+F1	25-Oct-2023	30-Oct-2023	14 days	5 days	✓	30-Oct-2023	14 days	6 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) JF01-04	E581.VH+F1	25-Oct-2023	30-Oct-2023	14 days	5 days	✓	30-Oct-2023	14 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) JF01-06	E581.VH+F1	25-Oct-2023	30-Oct-2023	14 days	5 days	✓	30-Oct-2023	14 days	6 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) PW-01	E581.VH+F1	25-Oct-2023	30-Oct-2023	14 days	5 days	✓	30-Oct-2023	14 days	6 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) PW-02	E581.VH+F1	25-Oct-2023	30-Oct-2023	14 days	5 days	✓	30-Oct-2023	14 days	6 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) DUP1	E581.VH+F1	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	31-Oct-2023	14 days	7 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) DUP2	E581.VH+F1	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	31-Oct-2023	14 days	7 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW-02	E581.VH+F1	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	31-Oct-2023	14 days	7 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW-03	E581.VH+F1	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	31-Oct-2023	14 days	7 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW-04	E581.VH+F1	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	31-Oct-2023	14 days	7 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW-06	E581.VH+F1	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	31-Oct-2023	14 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / 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) MW-07	E581.VH+F1	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	31-Oct-2023	14 days	7 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW-09	E581.VH+F1	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	31-Oct-2023	14 days	7 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) MW-10	E581.VH+F1	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	31-Oct-2023	14 days	7 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE JF01-06	E290	25-Oct-2023	27-Oct-2023	14 days	3 days	✓	28-Oct-2023	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MW-02	E290	25-Oct-2023	27-Oct-2023	14 days	3 days	✓	28-Oct-2023	14 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE JF01-06	E100	25-Oct-2023	27-Oct-2023	28 days	3 days	✓	28-Oct-2023	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE MW-02	E100	25-Oct-2023	27-Oct-2023	28 days	3 days	✓	28-Oct-2023	28 days	4 days	✓
Physical Tests : pH by Meter										
HDPE JF01-06	E108	25-Oct-2023	27-Oct-2023	0.25 hrs	69 hrs	× EHTR-FM	28-Oct-2023	0.25 hrs	86 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE MW-02	E108	25-Oct-2023	27-Oct-2023	0.25 hrs	69 hrs	× EHTR-FM	28-Oct-2023	0.25 hrs	86 hrs	× EHTR-FM

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Physical Tests : TDS by Gravimetry										
HDPE JF01-06	E162	25-Oct-2023	----	----	----		31-Oct-2023	7 days	6 days	✓
Physical Tests : TDS by Gravimetry										
HDPE MW-02	E162	25-Oct-2023	----	----	----		01-Nov-2023	7 days	8 days	✓
Physical Tests : TSS by Gravimetry										
HDPE JF01-06	E160	25-Oct-2023	----	----	----		31-Oct-2023	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE MW-02	E160	25-Oct-2023	----	----	----		31-Oct-2023	7 days	6 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) JF01-04	E611A	25-Oct-2023	30-Oct-2023	14 days	5 days	✓	30-Oct-2023	14 days	6 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) JF01-06	E611A	25-Oct-2023	30-Oct-2023	14 days	5 days	✓	30-Oct-2023	14 days	6 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) PW-01	E611A	25-Oct-2023	30-Oct-2023	14 days	5 days	✓	30-Oct-2023	14 days	6 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) PW-02	E611A	25-Oct-2023	30-Oct-2023	14 days	5 days	✓	30-Oct-2023	14 days	6 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) JF01-01	E611A	25-Oct-2023	30-Oct-2023	14 days	5 days	✓	30-Oct-2023	14 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) DUP1	E611A	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	31-Oct-2023	14 days	7 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) DUP2	E611A	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	31-Oct-2023	14 days	7 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-02	E611A	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	31-Oct-2023	14 days	7 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-03	E611A	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	31-Oct-2023	14 days	7 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-04	E611A	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	31-Oct-2023	14 days	7 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-06	E611A	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	31-Oct-2023	14 days	7 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-07	E611A	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	31-Oct-2023	14 days	7 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-09	E611A	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	31-Oct-2023	14 days	7 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW-10	E611A	25-Oct-2023	31-Oct-2023	14 days	6 days	✓	31-Oct-2023	14 days	7 days	✓

Legend & Qualifier Definitions

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

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	1210965	1	3	33.3	5.0	✓
Bromide by IC (Ultra Trace Level)	E235.Br-U	1210975	1	2	50.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1212294	2	34	5.8	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	1210973	1	2	50.0	5.0	✓
Conductivity in Water	E100	1210964	1	4	25.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	1214661	1	7	14.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1216983	1	5	20.0	5.0	✓
Fluoride in Water by IC (Low Level)	E235.F-L	1210974	1	2	50.0	5.0	✓
Nitrate in Water by IC (Trace Level)	E235.NO3-T	1210967	1	11	9.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1210968	1	13	7.6	5.0	✓
pH by Meter	E108	1210963	1	18	5.5	5.0	✓
Sulfate in Water by IC (Low Level)	E235.SO4-L	1210976	1	2	50.0	5.0	✓
TDS by Gravimetry	E162	1214547	1	17	5.8	5.0	✓
TSS by Gravimetry	E160	1214514	1	17	5.8	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	1212295	2	34	5.8	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1210965	1	3	33.3	5.0	✓
Bromide by IC (Ultra Trace Level)	E235.Br-U	1210975	1	2	50.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1212294	2	34	5.8	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601	1214779	2	32	6.2	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	1210973	1	2	50.0	5.0	✓
Conductivity in Water	E100	1210964	1	4	25.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	1214661	1	7	14.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1216983	1	5	20.0	5.0	✓
Fluoride in Water by IC (Low Level)	E235.F-L	1210974	1	2	50.0	5.0	✓
Nitrate in Water by IC (Trace Level)	E235.NO3-T	1210967	1	11	9.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1210968	1	13	7.6	5.0	✓
Oil & Grease by Gravimetry	E567	1215248	1	8	12.5	5.0	✓
pH by Meter	E108	1210963	1	18	5.5	5.0	✓
Sulfate in Water by IC (Low Level)	E235.SO4-L	1210976	1	2	50.0	5.0	✓
TDS by Gravimetry	E162	1214547	1	17	5.8	5.0	✓
TSS by Gravimetry	E160	1214514	1	17	5.8	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	1212295	2	34	5.8	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1210965	1	3	33.3	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							
Bromide by IC (Ultra Trace Level)	E235.Br-U	1210975	1	2	50.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1212294	2	34	5.8	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601	1214779	2	32	6.2	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	1210973	1	2	50.0	5.0	✓
Conductivity in Water	E100	1210964	1	4	25.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	1214661	1	7	14.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1216983	1	5	20.0	5.0	✓
Fluoride in Water by IC (Low Level)	E235.F-L	1210974	1	2	50.0	5.0	✓
Nitrate in Water by IC (Trace Level)	E235.NO3-T	1210967	1	11	9.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1210968	1	13	7.6	5.0	✓
Oil & Grease by Gravimetry	E567	1215248	1	8	12.5	5.0	✓
Sulfate in Water by IC (Low Level)	E235.SO4-L	1210976	1	2	50.0	5.0	✓
TDS by Gravimetry	E162	1214547	1	17	5.8	5.0	✓
TSS by Gravimetry	E160	1214514	1	17	5.8	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	1212295	2	34	5.8	5.0	✓
Matrix Spikes (MS)							
Bromide by IC (Ultra Trace Level)	E235.Br-U	1210975	1	2	50.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1212294	2	34	5.8	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	1210973	1	2	50.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	1214661	1	7	14.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1216983	1	5	20.0	5.0	✓
Fluoride in Water by IC (Low Level)	E235.F-L	1210974	1	2	50.0	5.0	✓
Nitrate in Water by IC (Trace Level)	E235.NO3-T	1210967	1	11	9.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1210968	1	13	7.6	5.0	✓
Sulfate in Water by IC (Low Level)	E235.SO4-L	1210976	1	2	50.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	1212295	2	34	5.8	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 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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.
TSS by Gravimetry	E160 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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.
Bromide by IC (Ultra Trace Level)	E235.Br-U ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Trace Level)	E235.NO3-T ALS Environmental - Vancouver	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
Sulfate in Water by IC (Low Level)	E235.SO4-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	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.
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Vancouver	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.
Dissolved Mercury in Water by CVAAS	E509 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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. Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
CCME PHCs - F2-F4 by GC-FID	E601 ALS Environmental - Vancouver	Water	CCME PHC in Soil - Tier 1	Sample extracts are analyzed by GC-FID for CCME hydrocarbon fractions (F2-F4). Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
BTEX by Headspace GC-MS	E611A ALS Environmental - Vancouver	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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Vancouver	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.
F1-BTEX	EC580 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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
Dissolved Metals Water Filtration	EP421 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration	EP509 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
Oil & Grease Extraction for Gravimetry	EP567 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

ALS Canada Ltd.

QUALITY CONTROL REPORT

Work Order	: **YL2301518**	Page	: 1 of 14
Client	: KBL Environmental Ltd.	Laboratory	: ALS Environmental - Yellowknife
Contact	: Katie Oliver	Account Manager	: Oliver Gregg
Address	: 17 Cameron Road PO Box 1895 Yellowknife NT Canada X1A 2P4	Address	: 314 Old Airport Road, Unit 116 Yellowknife, Northwest Territories Canada X1A 3T3
Telephone	:	Telephone	: 1 867 445 7143
Project	: 23-099NT	Date Samples Received	: 25-Oct-2023 15:22
PO	: ----	Date Analysis Commenced	: 27-Oct-2023
C-O-C number	: 17-824361	Issue Date	: 02-Nov-2023 09:35
Sampler	: ---- 780 893 3305		
Site	: ----		
Quote number	: YL22-KBLE100-001		
No. of samples received	: 14		
No. of samples analysed	: 14		

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*
Alex Thornton	Analyst	Vancouver Metals, Burnaby, British Columbia
Brieanna Allen	Production/Validation Manager	Vancouver Inorganics, Burnaby, British Columbia
Erin Sanchez		Vancouver Metals, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Vancouver Organics, Burnaby, British Columbia
Owen Cheng		Vancouver Metals, 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: 1210963)											
YL2301518-006	MW-02	pH	----	E108	0.10	pH units	7.88	7.93	0.683%	4%	----
Physical Tests (QC Lot: 1210964)											
YL2301518-006	MW-02	Conductivity	----	E100	2.0	µS/cm	487	486	0.206%	10%	----
Physical Tests (QC Lot: 1210965)											
YL2301518-006	MW-02	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	111	111	0.00%	200%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0.00%	200%	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0.00%	200%	----
		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	111	111	0.00%	20%	----
Physical Tests (QC Lot: 1214514)											
VA23C5798-007	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 1214547)											
VA23C5798-007	Anonymous	Solids, total dissolved [TDS]	----	E162	10	mg/L	38	34	5	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1210967)											
VA23C5455-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-T	0.0030	mg/L	0.154	0.154	0.0905%	20%	----
Anions and Nutrients (QC Lot: 1210968)											
VA23C5455-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1210973)											
YL2301518-004	JF01-06	Chloride	16887-00-6	E235.Cl-L	0.10	mg/L	66.5	66.3	0.267%	20%	----
Anions and Nutrients (QC Lot: 1210974)											
YL2301518-004	JF01-06	Fluoride	16984-48-8	E235.F-L	0.010	mg/L	0.096	0.095	0.001	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1210975)											
YL2301518-004	JF01-06	Bromide	24959-67-9	E235.Br-U	0.0050	mg/L	0.0446	0.0444	0.0002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1210976)											
YL2301518-004	JF01-06	Sulfate (as SO4)	14808-79-8	E235.SO4-L	0.050	mg/L	45.3	45.4	0.140%	20%	----
Dissolved Metals (QC Lot: 1214661)											
VA23C5904-002	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1216983)											
YL2301519-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0058	0.0054	0.0004	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: 1216983) - continued											
YL2301519-001	Anonymous	Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00233	0.00238	1.99%	20%	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.0214	0.0211	1.20%	20%	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0178	0.0178	0.372%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	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	0.082	0.082	0.0001	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000099	0.0000095	0.0000004	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	219	220	0.511%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000040	0.000039	0.000001	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	0.00342	0.00343	0.274%	20%	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00192	0.00191	0.00001	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.145	0.143	1.04%	20%	----
		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	0.0622	0.0617	0.872%	20%	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	92.7	90.3	2.64%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0716	0.0707	1.21%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00302	0.00304	0.771%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00157	0.00159	0.00002	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.513	0.528	2.80%	20%	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	8.48	8.32	1.85%	20%	----
		Rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00202	0.00207	2.35%	20%	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000329	0.000328	0.0000008	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	5.64	5.48	2.90%	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	24.4	23.7	2.56%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.866	0.884	2.01%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	265	265	0.117%	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	0.00134	0.00136	1.38%	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: 1216983) - continued											
YL2301519-001	Anonymous	Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.0645	0.0657	1.87%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00074	0.00072	0.00002	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0037	0.0034	0.0003	Diff <2x LOR	----
		Zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 1212294)											
VA23C5062-001	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	----
Volatile Organic Compounds (QC Lot: 1214559)											
VA23C5815-001	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: 1212295)											
VA23C5062-001	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%	----
Hydrocarbons (QC Lot: 1214558)											
VA23C5815-001	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: 1210964)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 1210965)						
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	----
Physical Tests (QCLot: 1214514)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Physical Tests (QCLot: 1214547)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 1210967)						
Nitrate (as N)	14797-55-8	E235.NO3-T	0.003	mg/L	<0.0030	----
Anions and Nutrients (QCLot: 1210968)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1210973)						
Chloride	16887-00-6	E235.Cl-L	0.1	mg/L	<0.10	----
Anions and Nutrients (QCLot: 1210974)						
Fluoride	16984-48-8	E235.F-L	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 1210975)						
Bromide	24959-67-9	E235.Br-U	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1210976)						
Sulfate (as SO4)	14808-79-8	E235.SO4-L	0.05	mg/L	<0.050	----
Dissolved Metals (QCLot: 1214661)						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
Dissolved Metals (QCLot: 1216983)						
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	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1216983) - continued						
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	----
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	----
Aggregate Organics (QCLot: 1215248)						
Oil & grease (gravimetric)	----	E567	5	mg/L	<5.0	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 1212294)						
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: 1214559)						
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: 1212295)						
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 1214558)						
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 1214779)						
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: 1214781)						
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: 1210963)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1210964)									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	101	90.0	110	----
Physical Tests (QCLot: 1210965)									
Alkalinity, phenolphthalein (as CaCO3)	----	E290	1	mg/L	229 mg/L	119	75.0	125	----
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	109	85.0	115	----
Physical Tests (QCLot: 1214514)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	105	85.0	115	----
Physical Tests (QCLot: 1214547)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	101	85.0	115	----
Anions and Nutrients (QCLot: 1210967)									
Nitrate (as N)	14797-55-8	E235.NO3-T	0.003	mg/L	2.5 mg/L	99.7	90.0	110	----
Anions and Nutrients (QCLot: 1210968)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.3	90.0	110	----
Anions and Nutrients (QCLot: 1210973)									
Chloride	16887-00-6	E235.Cl-L	0.1	mg/L	100 mg/L	99.2	90.0	110	----
Anions and Nutrients (QCLot: 1210974)									
Fluoride	16984-48-8	E235.F-L	0.01	mg/L	1 mg/L	99.9	90.0	110	----
Anions and Nutrients (QCLot: 1210975)									
Bromide	24959-67-9	E235.Br-U	0.005	mg/L	0.5 mg/L	103	85.0	115	----
Anions and Nutrients (QCLot: 1210976)									
Sulfate (as SO4)	14808-79-8	E235.SO4-L	0.05	mg/L	100 mg/L	99.5	90.0	110	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	104	80.0	120	----
Dissolved Metals (QCLot: 1216983)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	98.8	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	101	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	103	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	98.2	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	101	80.0	120	----

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
Dissolved Metals (QCLot: 1216983) - continued									
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	91.1	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	100	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	98.3	80.0	120	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	105	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	98.6	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	98.4	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	96.6	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	102	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	101	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	99.9	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	101	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	98.8	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	102	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	96.8	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	103	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	99.5	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	108	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	113	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	96.7	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	104	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	114	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	100	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	99.7	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	94.6	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	101	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	100	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	99.8	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	98.3	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
Aggregate Organics (QCLot: 1215248)									
Oil & grease (gravimetric)	----	E567	5	mg/L	100 mg/L	99.5	70.0	130	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 1212294)									
Benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	102	70.0	130	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	93.7	70.0	130	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	97.4	70.0	130	----
Styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	107	70.0	130	----
Toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	93.7	70.0	130	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	98.4	70.0	130	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	97.5	70.0	130	----
Volatile Organic Compounds (QCLot: 1214559)									
Benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	105	70.0	130	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	104	70.0	130	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	100	70.0	130	----
Styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	95.4	70.0	130	----
Toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	106	70.0	130	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	106	70.0	130	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	106	70.0	130	----
Hydrocarbons (QCLot: 1212295)									
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	82.0	70.0	130	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	83.8	70.0	130	----
Hydrocarbons (QCLot: 1214558)									
F1 (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	77.9	70.0	130	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	79.4	70.0	130	----
Hydrocarbons (QCLot: 1214779)									
F2 (C10-C16)	----	E601	100	µg/L	3538 µg/L	124	70.0	130	----
F3 (C16-C34)	----	E601	250	µg/L	7053 µg/L	113	70.0	130	----
F4 (C34-C50)	----	E601	250	µg/L	5051 µg/L	118	70.0	130	----
Hydrocarbons (QCLot: 1214781)									
F2 (C10-C16)	----	E601	100	µg/L	3538 µg/L	120	70.0	130	----
F3 (C16-C34)	----	E601	250	µg/L	7053 µg/L	108	70.0	130	----
F4 (C34-C50)	----	E601	250	µg/L	5051 µg/L	119	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: 1210967)										
VA23C5455-005	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-T	2.50 mg/L	2.5 mg/L	99.8	75.0	125	----
Anions and Nutrients (QCLot: 1210968)										
VA23C5455-005	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.496 mg/L	0.5 mg/L	99.1	75.0	125	----
Anions and Nutrients (QCLot: 1210973)										
YL2301518-006	MW-02	Chloride	16887-00-6	E235.Cl-L	108 mg/L	100 mg/L	108	75.0	125	----
Anions and Nutrients (QCLot: 1210974)										
YL2301518-006	MW-02	Fluoride	16984-48-8	E235.F-L	1.10 mg/L	1 mg/L	110	75.0	125	----
Anions and Nutrients (QCLot: 1210975)										
YL2301518-006	MW-02	Bromide	24959-67-9	E235.Br-U	0.564 mg/L	0.5 mg/L	113	75.0	125	----
Anions and Nutrients (QCLot: 1210976)										
YL2301518-006	MW-02	Sulfate (as SO4)	14808-79-8	E235.SO4-L	108 mg/L	100 mg/L	108	75.0	125	----
Dissolved Metals (QCLot: 1214661)										
VA23C5904-003	Anonymous	Mercury, dissolved	7439-97-6	E509	0.000101 mg/L	0.0001 mg/L	101	70.0	130	----
Dissolved Metals (QCLot: 1216983)										
YL2301519-002	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.372 mg/L	0.4 mg/L	93.1	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	ND mg/L	0.04 mg/L	ND	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	ND mg/L	0.04 mg/L	ND	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	0.04 mg/L	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0714 mg/L	0.08 mg/L	89.2	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.0192 mg/L	0.02 mg/L	96.0	70.0	130	----
		Boron, dissolved	7440-42-8	E421	ND mg/L	0.2 mg/L	ND	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00759 mg/L	0.008 mg/L	94.9	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	8 mg/L	ND	70.0	130	----
		Cesium, dissolved	7440-46-2	E421	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0766 mg/L	0.08 mg/L	95.7	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0366 mg/L	0.04 mg/L	91.5	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0353 mg/L	0.04 mg/L	88.4	70.0	130	----
		Iron, dissolved	7439-89-6	E421	3.73 mg/L	4 mg/L	93.3	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0376 mg/L	0.04 mg/L	93.9	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: 1216983) - continued										
YL2301519-002	Anonymous	Lithium, dissolved	7439-93-2	E421	0.176 mg/L	0.2 mg/L	87.8	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.0364 mg/L	0.04 mg/L	91.0	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0391 mg/L	0.04 mg/L	97.9	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0728 mg/L	0.08 mg/L	91.0	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	19.6 mg/L	20 mg/L	97.9	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	ND mg/L	8 mg/L	ND	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	0.0370 mg/L	0.04 mg/L	92.5	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0808 mg/L	0.08 mg/L	101	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	20.1 mg/L	20 mg/L	100	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00548 mg/L	0.008 mg/L	68.5	70.0	130	MES
		Sodium, dissolved	7440-23-5	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.04 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	ND mg/L	40 mg/L	ND	70.0	130	----
		Tellurium, dissolved	13494-80-9	E421	0.0772 mg/L	0.08 mg/L	96.5	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00767 mg/L	0.008 mg/L	95.9	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.0388 mg/L	0.04 mg/L	96.9	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0395 mg/L	0.04 mg/L	98.8	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0754 mg/L	0.08 mg/L	94.2	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.0390 mg/L	0.04 mg/L	97.5	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	ND mg/L	0.008 mg/L	ND	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.192 mg/L	0.2 mg/L	96.0	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.722 mg/L	0.8 mg/L	90.2	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0792 mg/L	0.08 mg/L	99.0	70.0	130	----
Volatile Organic Compounds (QCLot: 1212294)										
VA23C5062-002	Anonymous	Benzene	71-43-2	E611A	103 µg/L	100 µg/L	103	60.0	140	----
		Ethylbenzene	100-41-4	E611A	97.8 µg/L	100 µg/L	97.8	60.0	140	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	100 µg/L	100 µg/L	100	60.0	140	----
		Styrene	100-42-5	E611A	109 µg/L	100 µg/L	109	60.0	140	----
		Toluene	108-88-3	E611A	97.8 µg/L	100 µg/L	97.8	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	101 µg/L	100 µg/L	101	60.0	140	----
Volatile Organic Compounds (QCLot: 1214559)										
VA23C5815-002	Anonymous	Benzene	71-43-2	E611A	106 µg/L	100 µg/L	106	60.0	140	----
		Ethylbenzene	100-41-4	E611A	104 µg/L	100 µg/L	104	60.0	140	----

Sub-Matrix: **Water**

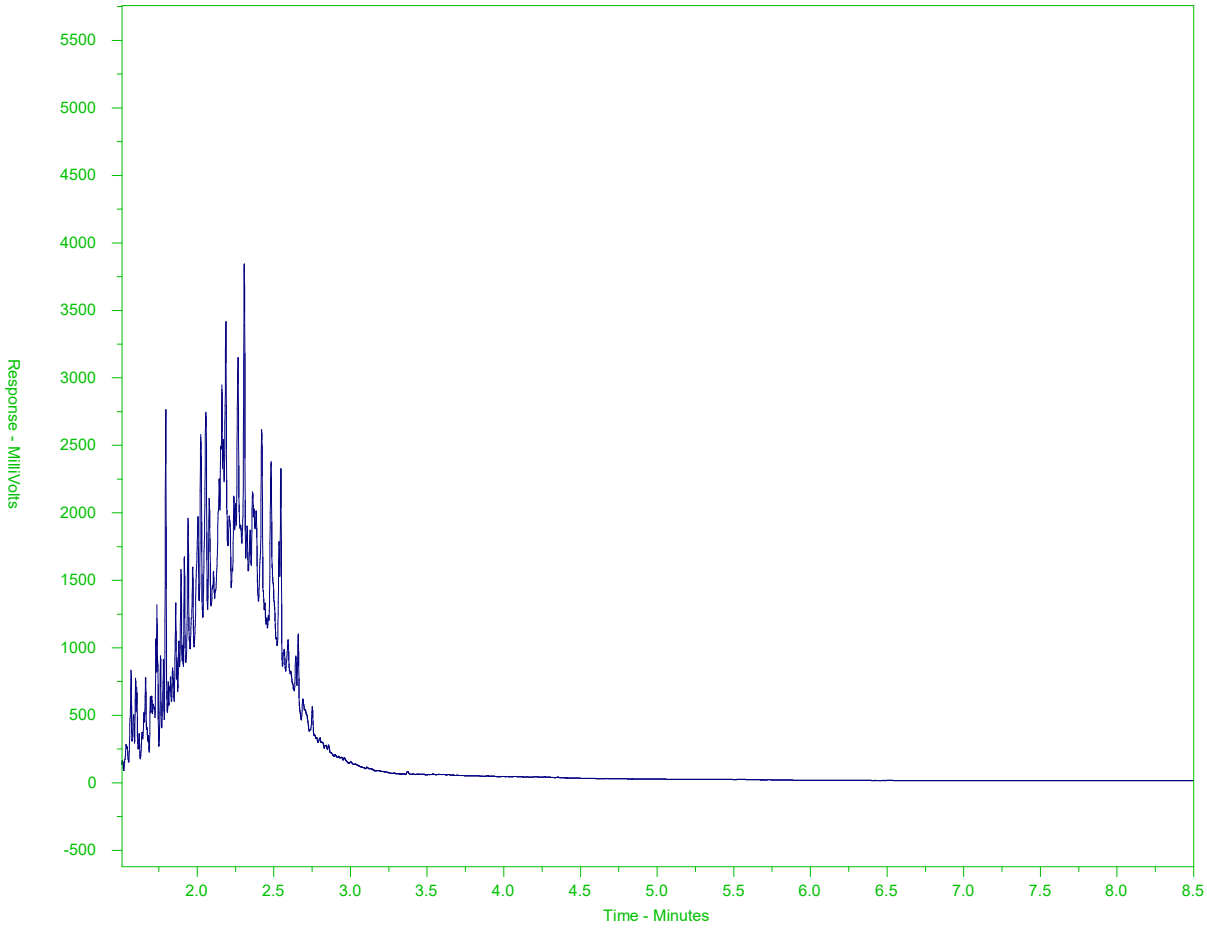
					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 1214559) - continued										
VA23C5815-002	Anonymous	Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	100 µg/L	100 µg/L	100	60.0	140	----
		Styrene	100-42-5	E611A	92.4 µg/L	100 µg/L	92.4	60.0	140	----
		Toluene	108-88-3	E611A	107 µg/L	100 µg/L	107	60.0	140	----
		Xylene, m+p-	179601-23-1	E611A	216 µg/L	200 µg/L	108	60.0	140	----
		Xylene, o-	95-47-6	E611A	106 µg/L	100 µg/L	106	60.0	140	----
Hydrocarbons (QCLot: 1212295)										
VA23C5062-003	Anonymous	F1 (C6-C10)	----	E581.VH+F1	4420 µg/L	6310 µg/L	70.0	60.0	140	----
		VHw (C6-C10)	----	E581.VH+F1	4590 µg/L	6310 µg/L	72.8	60.0	140	----
Hydrocarbons (QCLot: 1214558)										
VA23C5815-003	Anonymous	F1 (C6-C10)	----	E581.VH+F1	4120 µg/L	6310 µg/L	65.3	60.0	140	----
		VHw (C6-C10)	----	E581.VH+F1	4190 µg/L	6310 µg/L	66.4	60.0	140	----

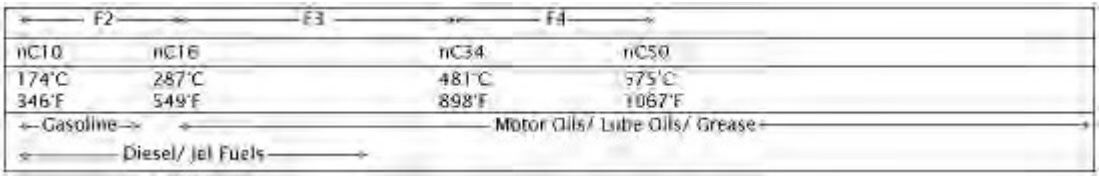
Qualifiers

Qualifier	Description
MES	*Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: YL2301518-001-E601
Client Sample ID: PW-01





The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

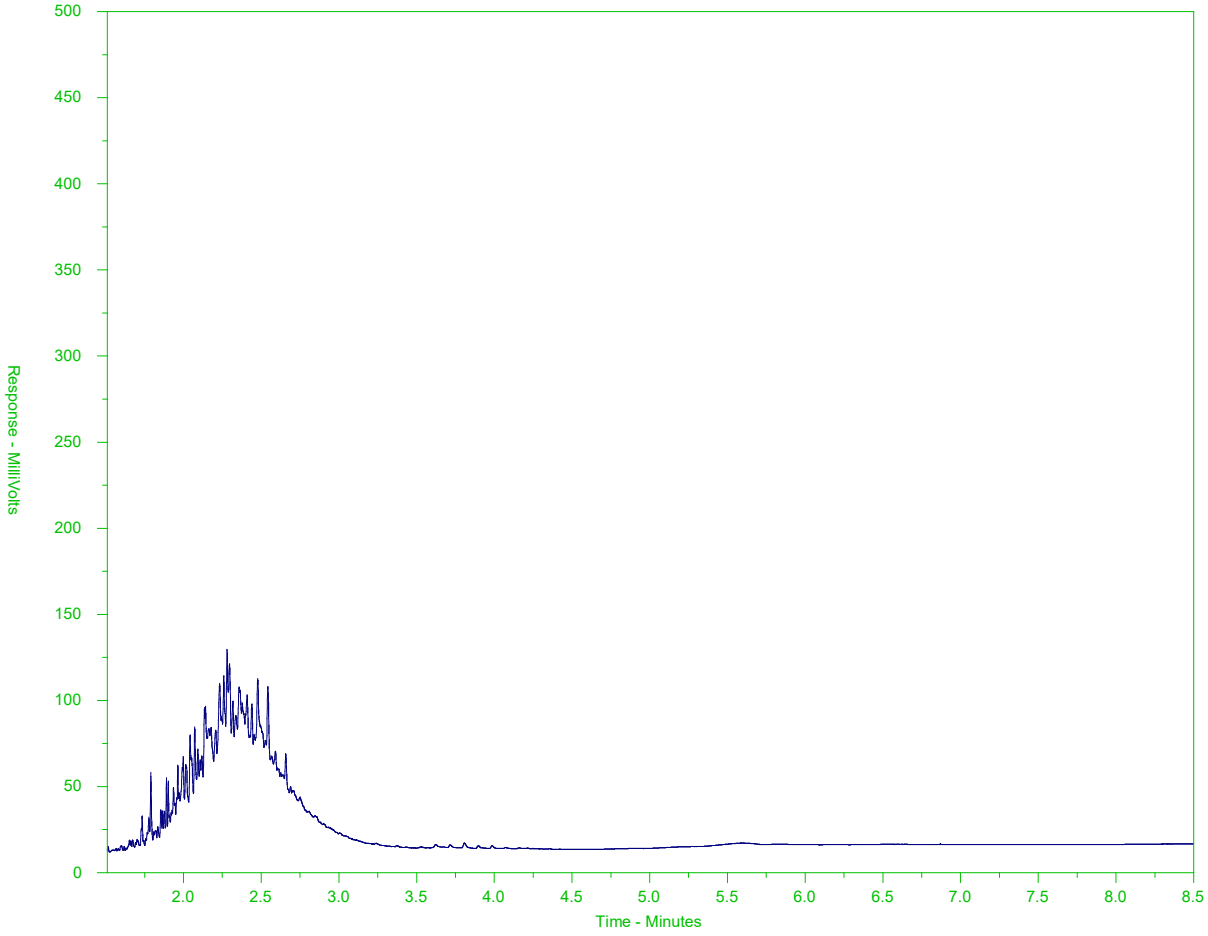
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: YL2301518-002-E601
Client Sample ID: PW-02



The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

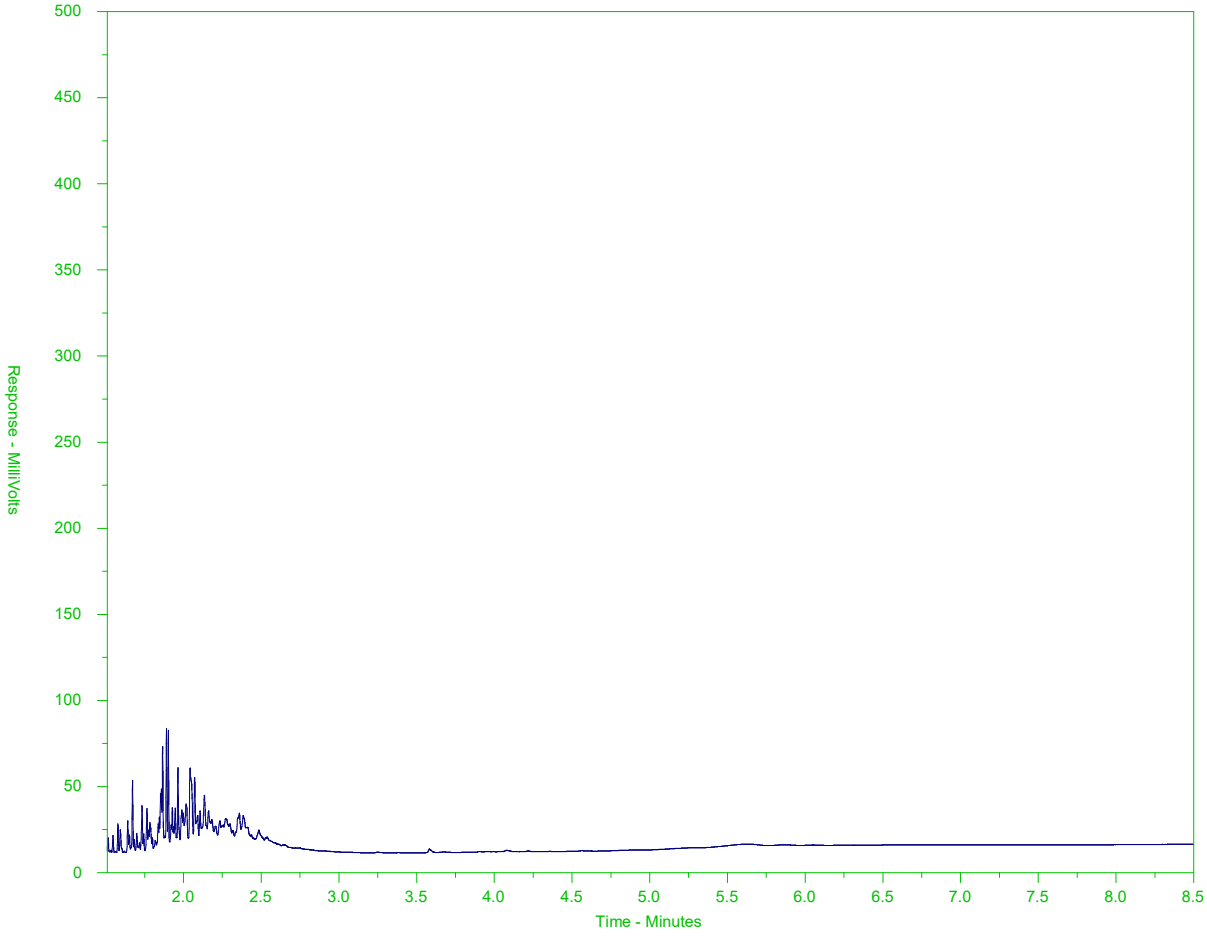
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

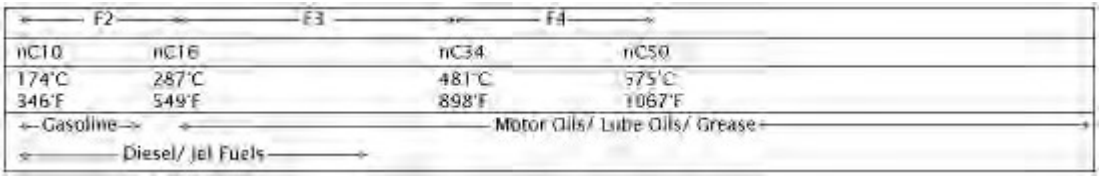
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: YL2301518-003-E601
Client Sample ID: JF01-01





The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

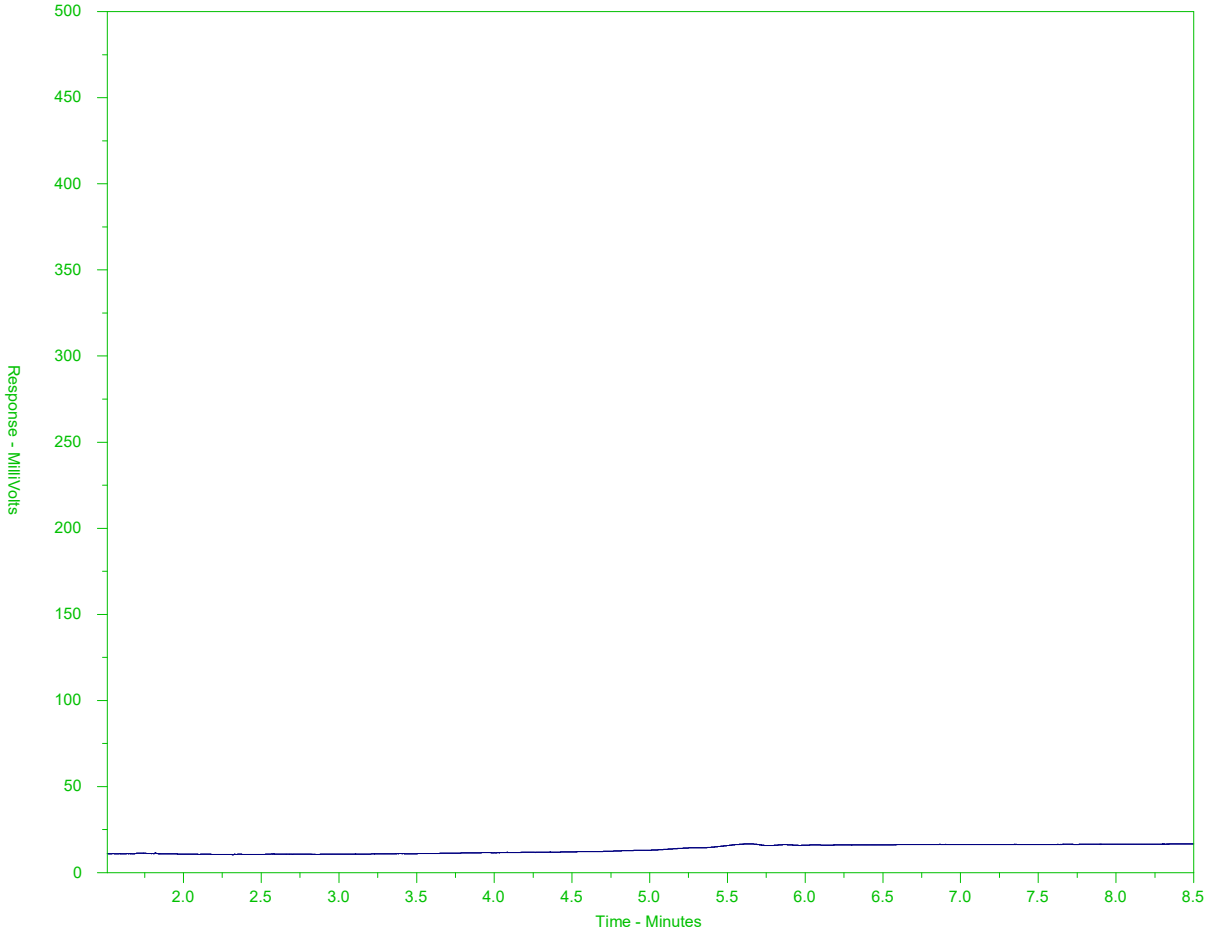
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

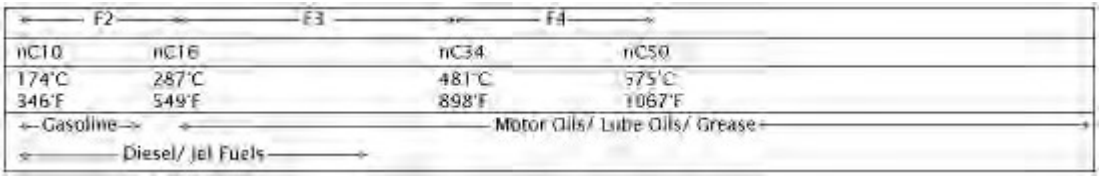
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: YL2301518-004-E601
Client Sample ID: JF01-06





The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

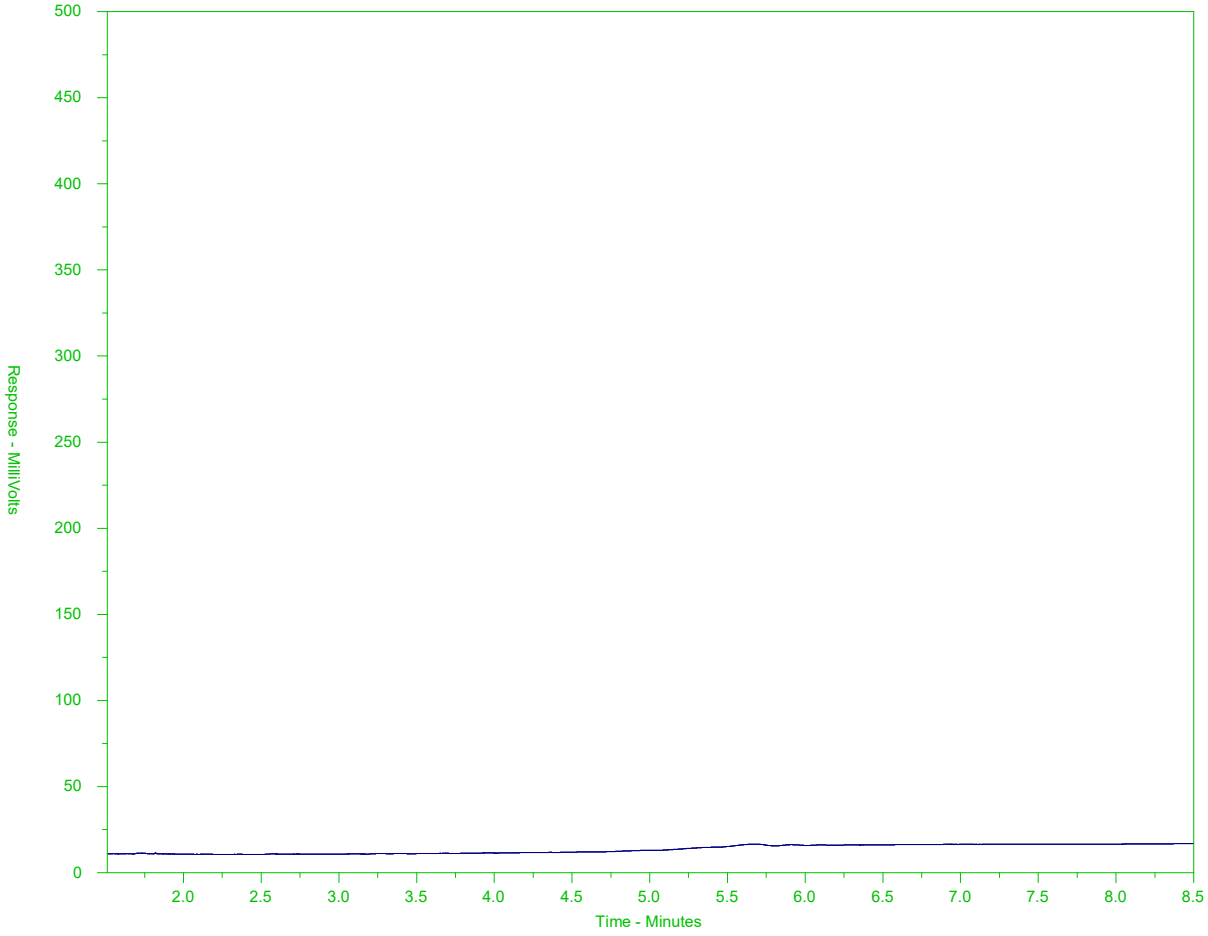
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

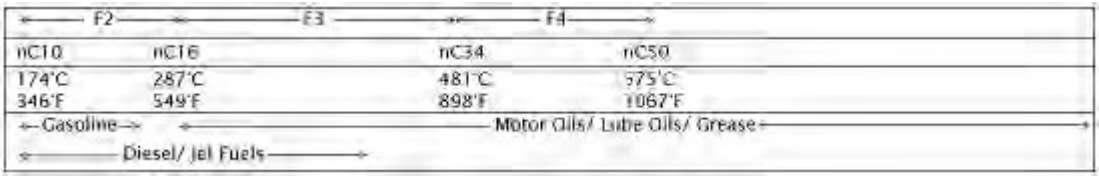
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: YL2301518-005-E601
Client Sample ID: JF01-04





The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

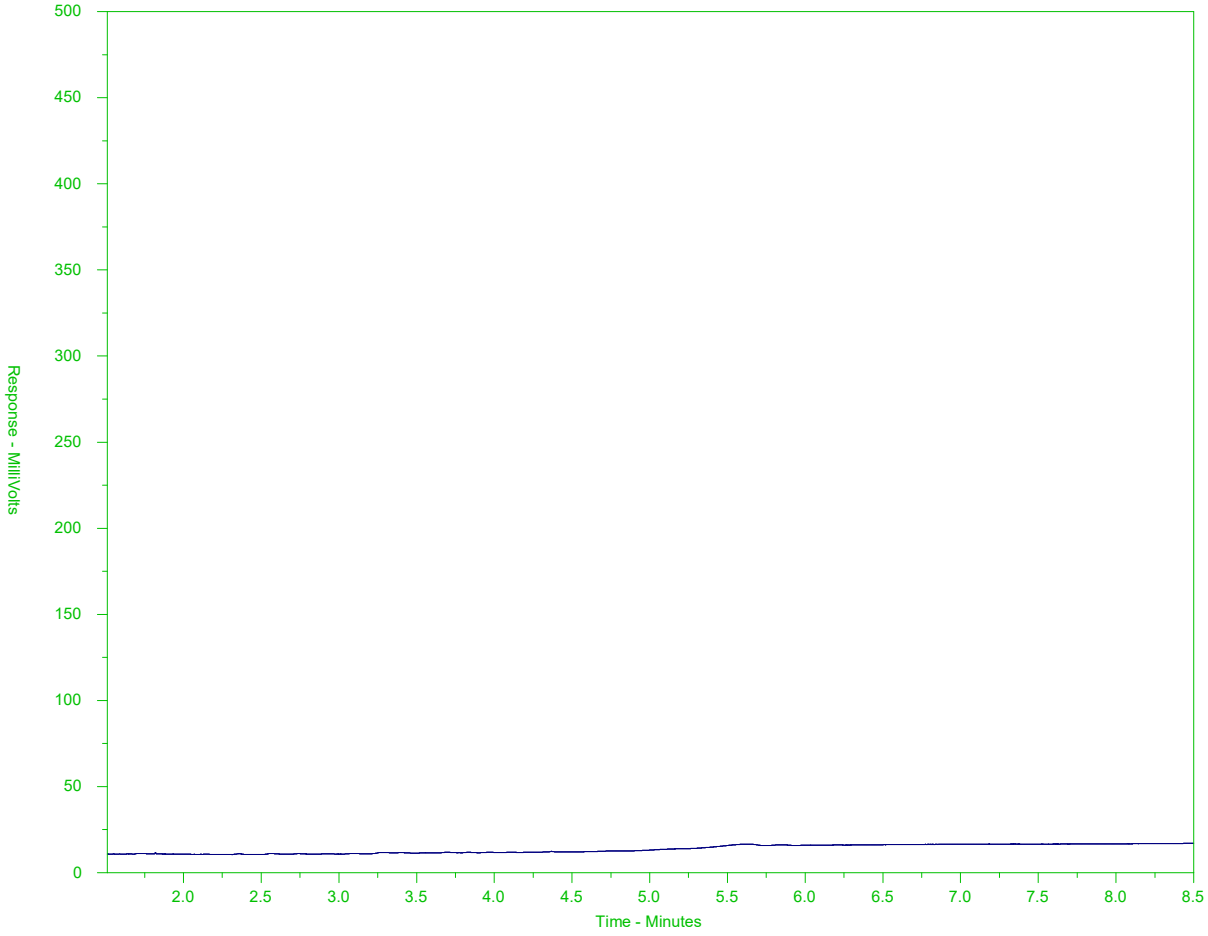
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

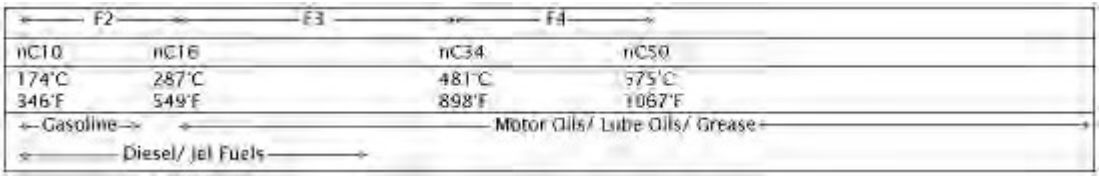
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: YL2301518-006-E601
Client Sample ID: MW-02





The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

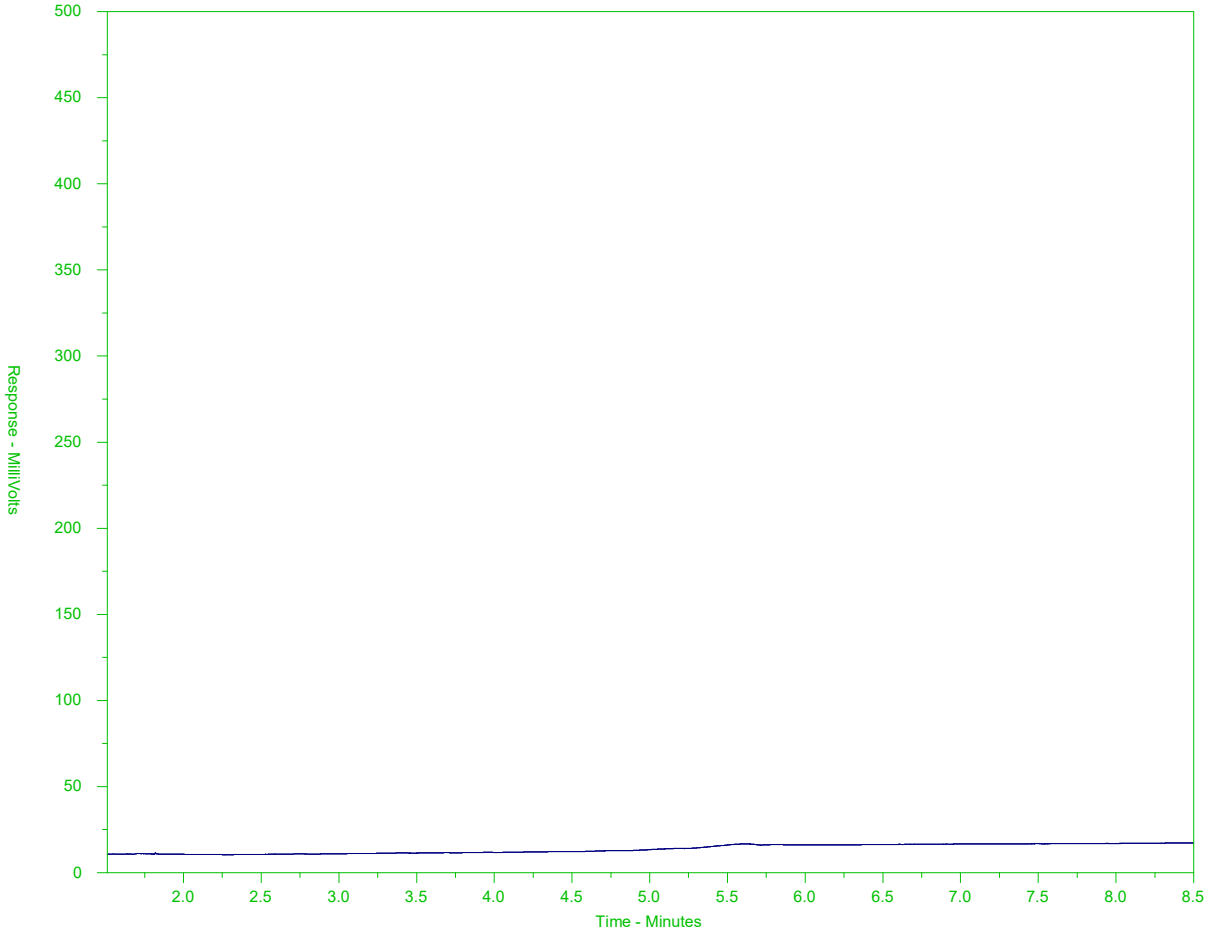
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: YL2301518-007-E601
Client Sample ID: MW-03



The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

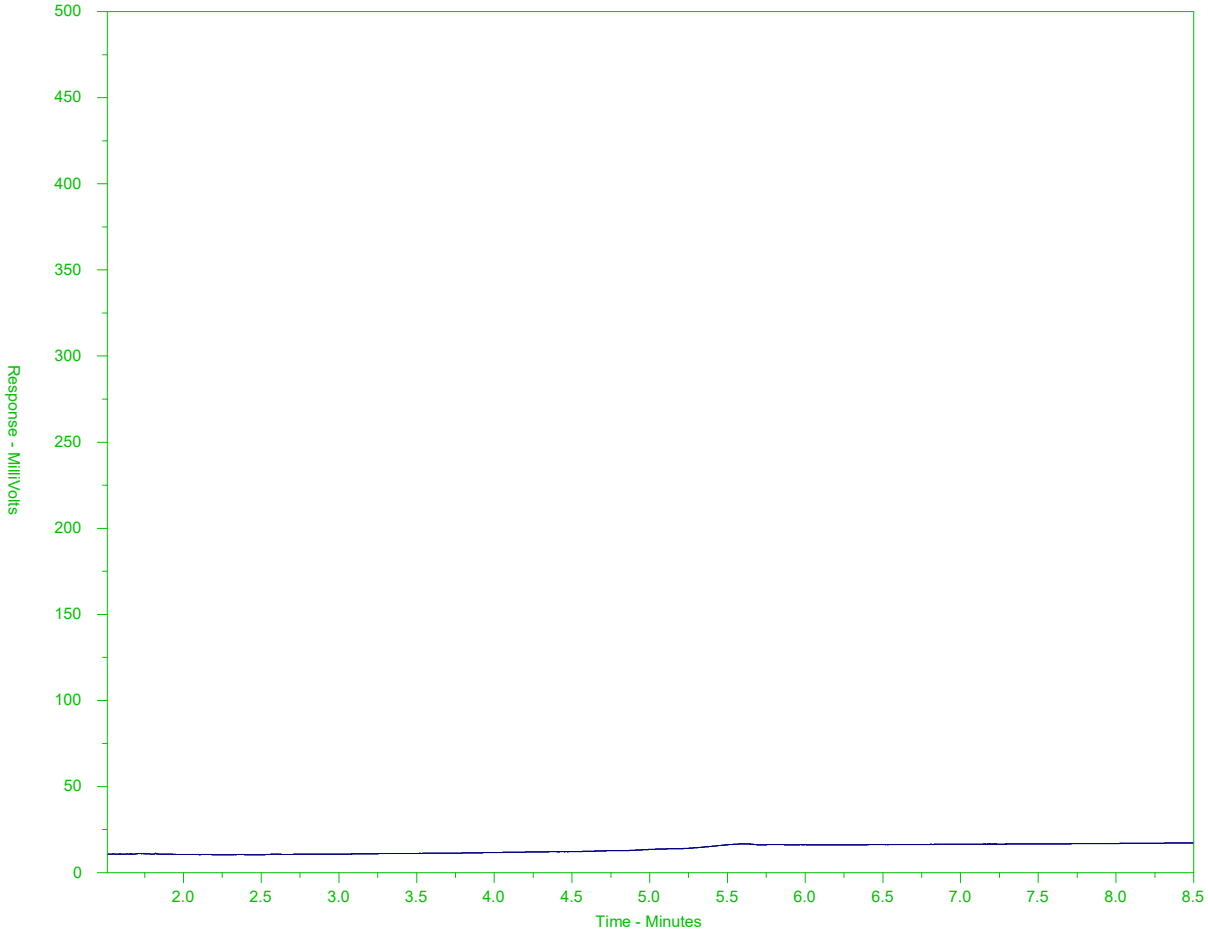
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

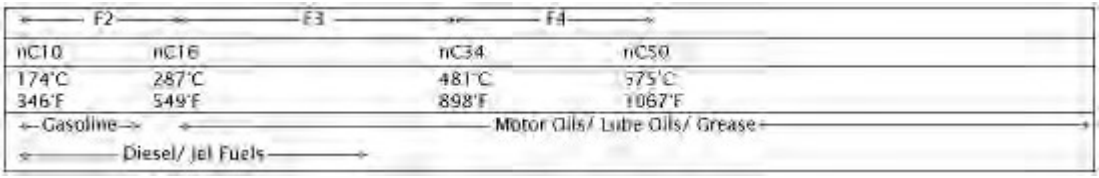
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: YL2301518-008-E601
Client Sample ID: MW-04





The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

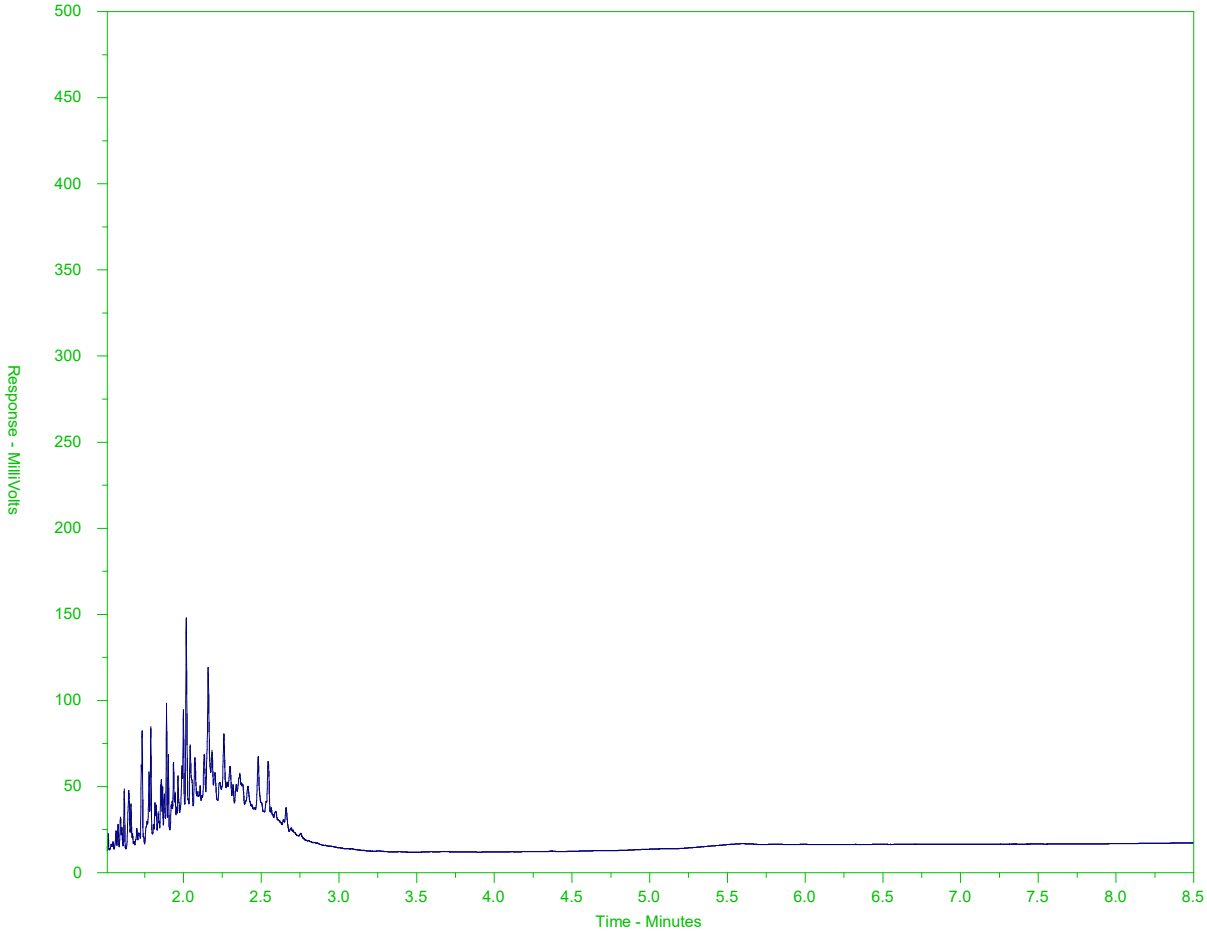
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

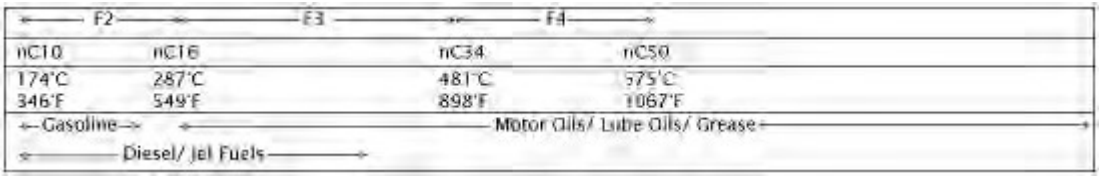
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: YL2301518-009-E601
Client Sample ID: MW-06





The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

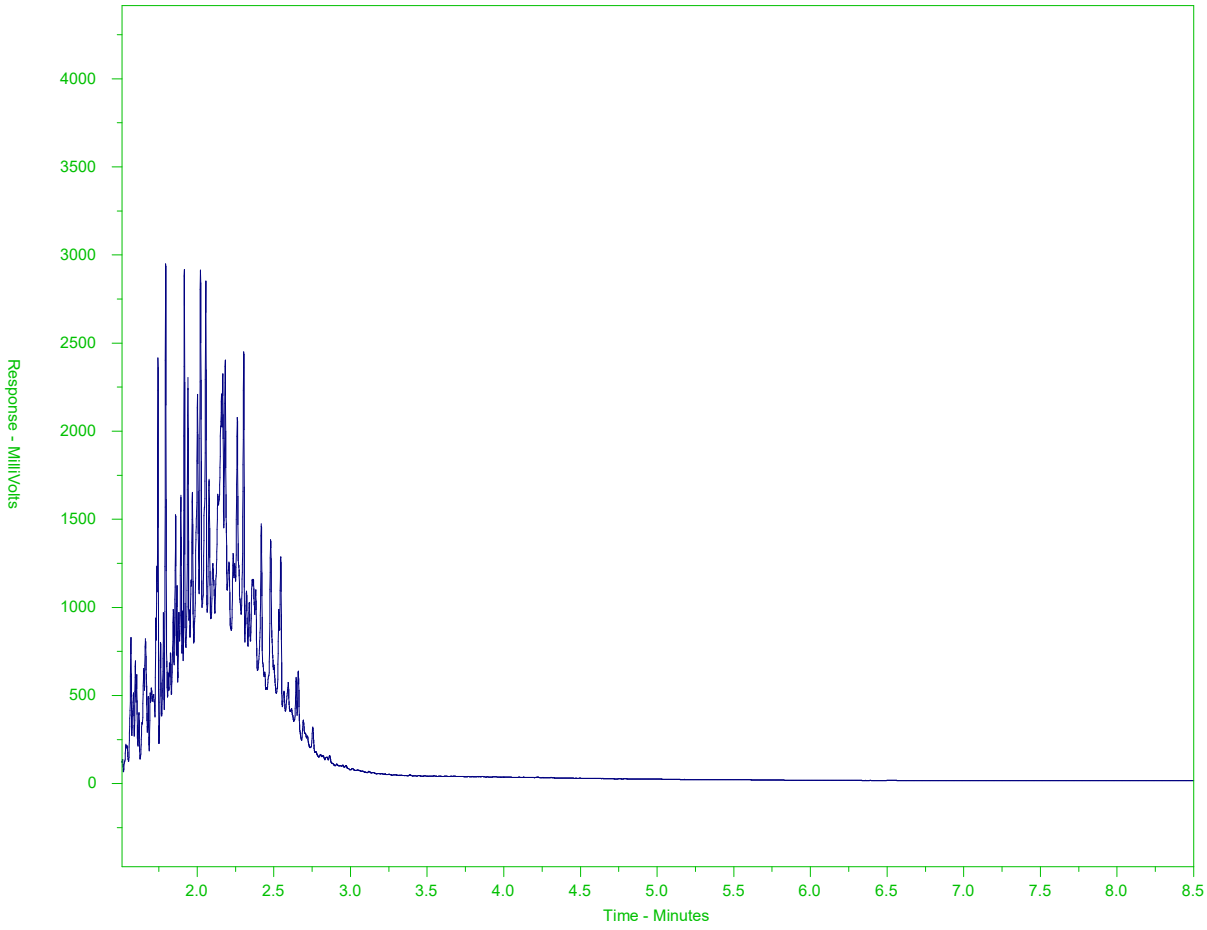
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

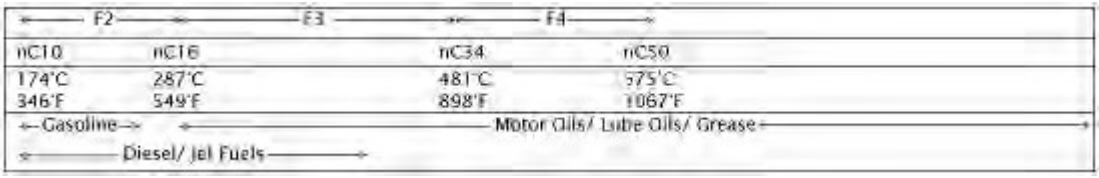
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: YL2301518-010-E601
Client Sample ID: MW-07





The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

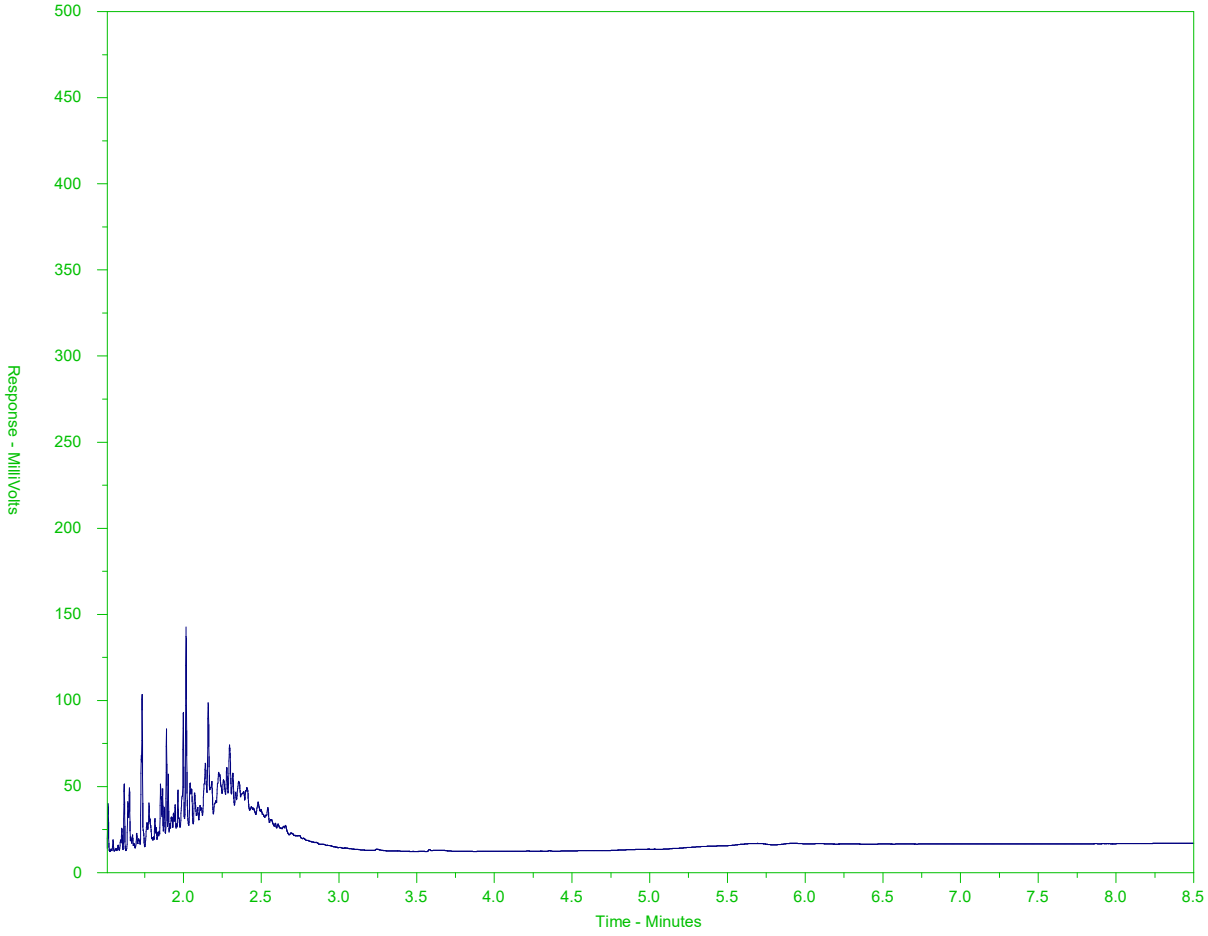
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

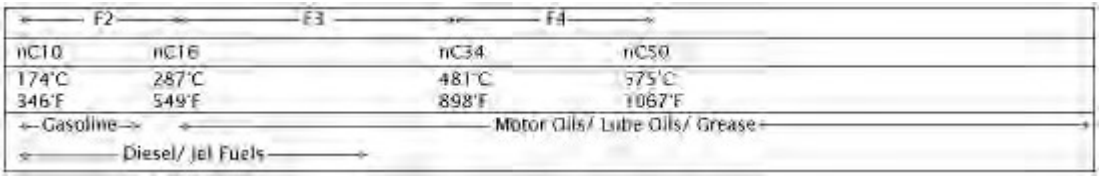
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: YL2301518-011-E601
Client Sample ID: MW-09





The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

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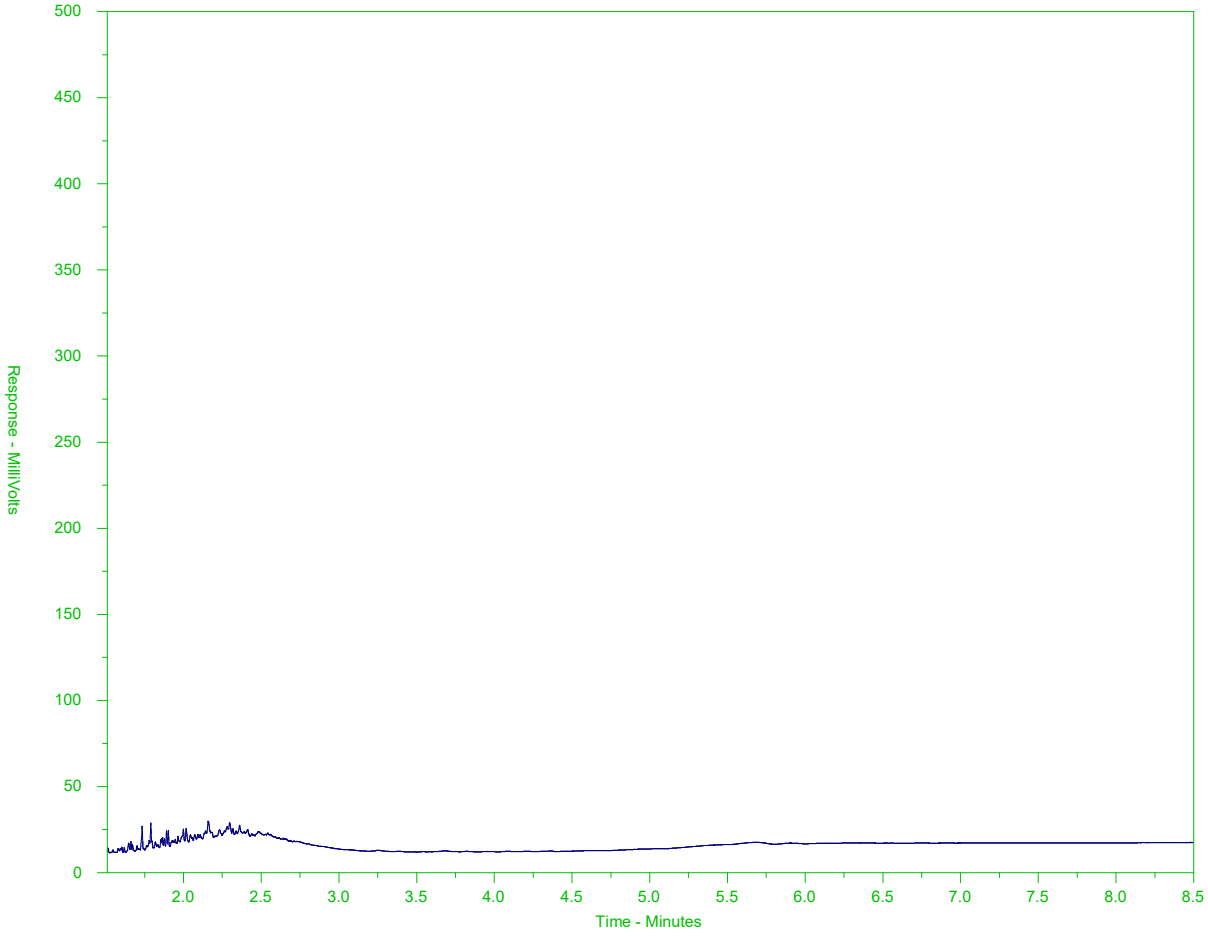
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: YL2301518-012-E601
Client Sample ID: MW-10



The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

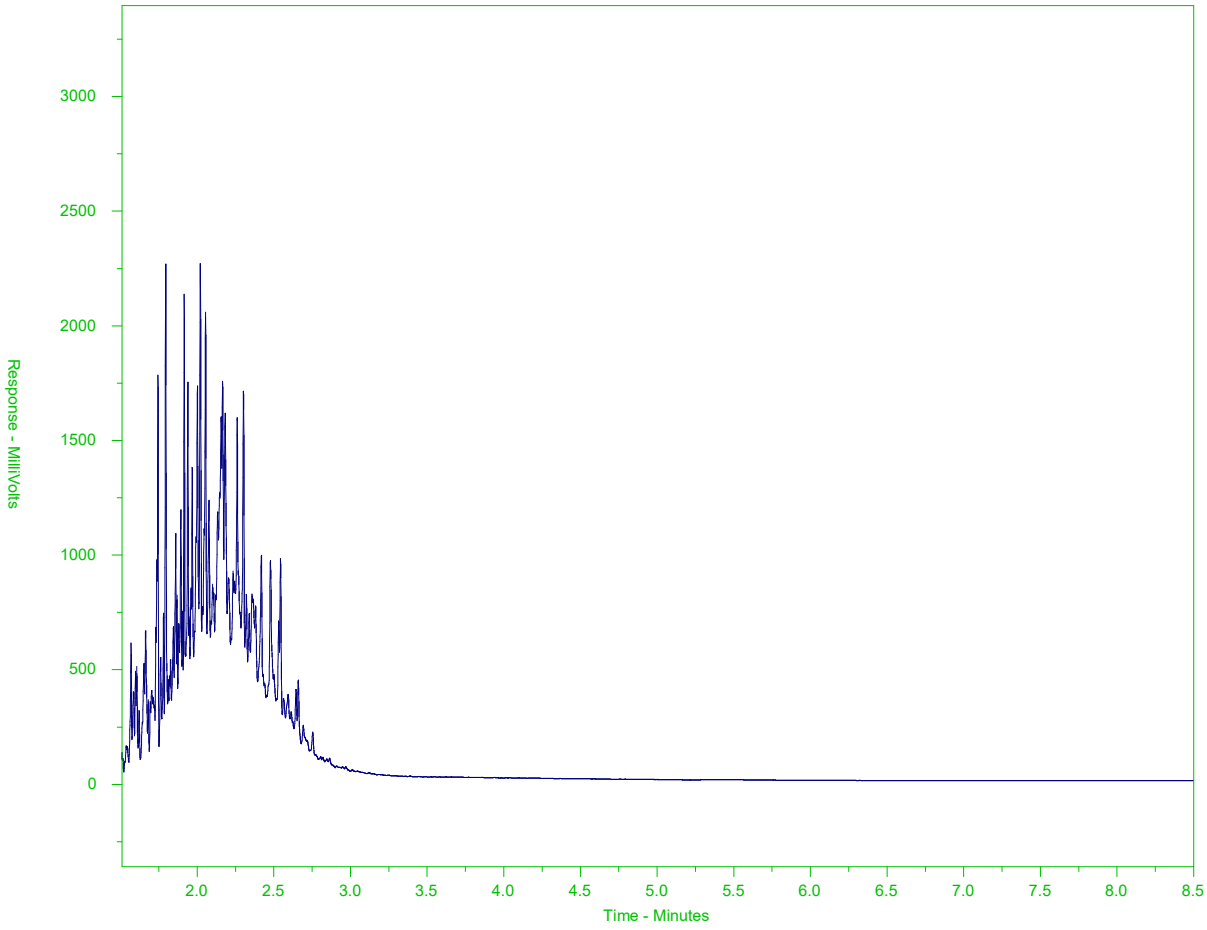
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

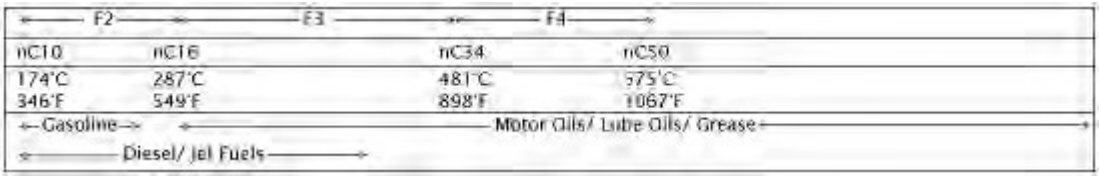
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: YL2301518-013-E601
Client Sample ID: DUP1





The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

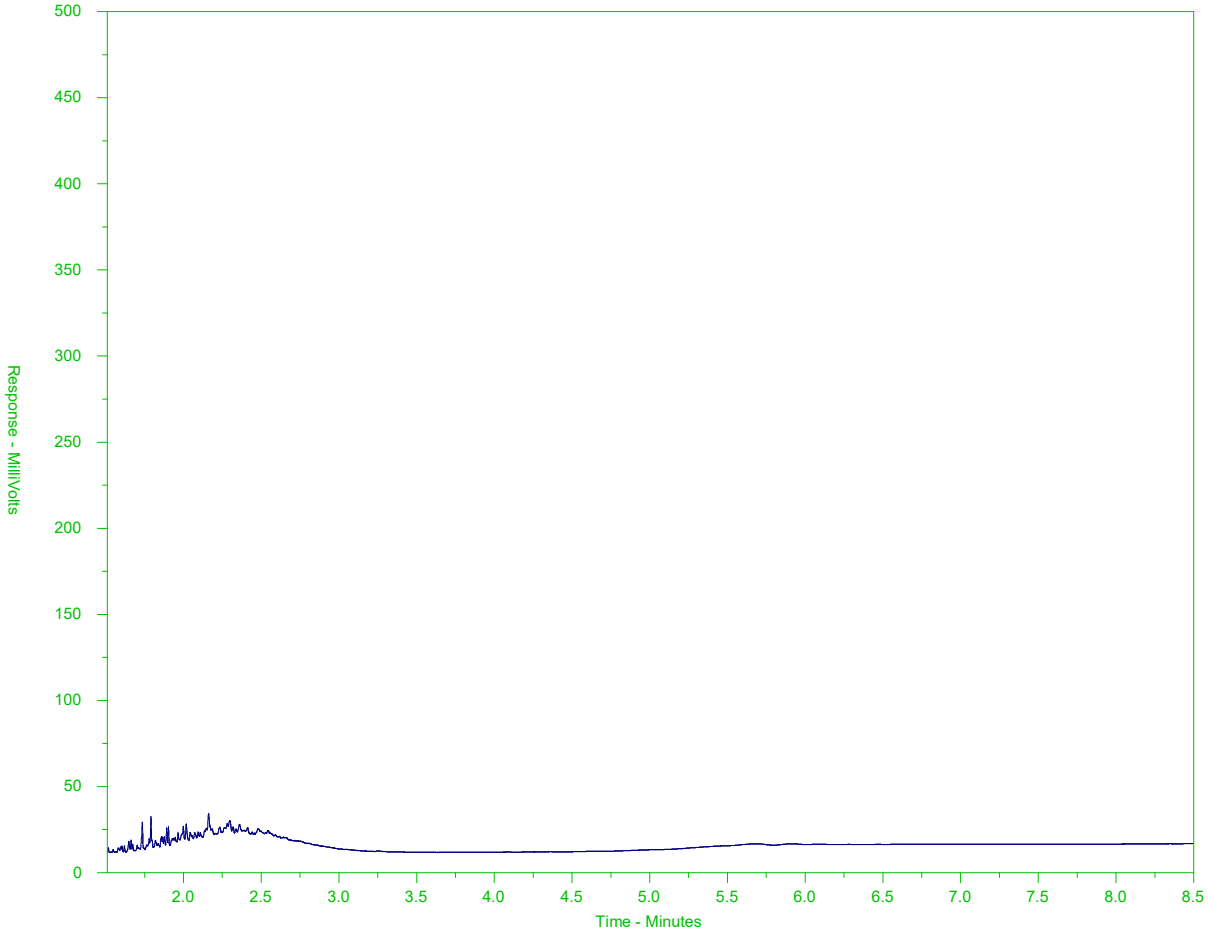
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

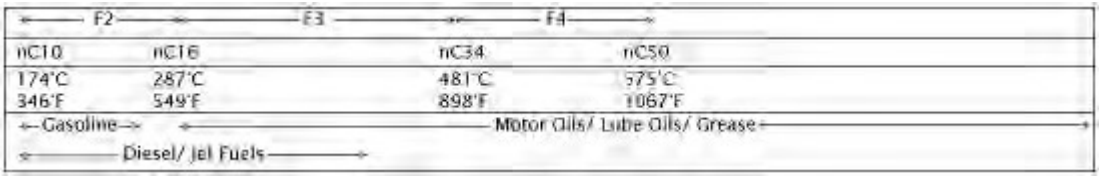
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: YL2301518-014-E601
Client Sample ID: DUP2





The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 17 - 824361

Page 1 of 2

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	KBL ENVIRONMENTAL	Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	ZORAN KOSANIC	Quality Control (QC) Report with Report ☐ YES ☐ NO	PRIORITY (Business Days): 4 day [P4-20%] ☐ / 3 day [P3-25%] ☐ / 2 day [P2-50%] ☐
Phone:	403 - 505 - 8308	☐ Compare Results to Criteria on Report - provide details below if box checked	EMERGENCY: 1 Business day [E - 100%] ☐ / Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐
	Company address below will appear on the final report	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:		Email 1 or Fax zkosanic@kblenv.com	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:		Email 2 rhogan@kblenv.com	
Postal Code:		Email 3 labresults@kblenv.com	
Invoice To	Same as Report To ☑ YES ☐ NO	Invoice Distribution	
	Copy of Invoice with Report ☐ YES ☑ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	
Company:	KBL ENVIRONMENTAL	Email 1 or Fax zkosanic@kblenv.com	
Contact:	ZORAN KOSANIC zkosanic@kblenv	Email 2 rhogan@kblenv.com	
Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	23-099 NT	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):		ALS Contact:	Sampler:

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	PHC BTEX F1-F4	TSS	ROUTINE	DISSOLVED METALS	DISSOLVED MERCURY	OIL & GREASE	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
	PW-01	OCT 25		WATER	4	✓							
	PW-02				4	✓							
	JF01-01				4	✓							
	JF01-06				10	✓	✓	✓	✓	✓	✓		
	JF01-04				4	✓							
	MW-02				10	✓	✓	✓	✓	✓	✓		
	MW-03				4	✓							
	MW-04				4	✓							
	MW-06				4	✓							
	MW-07				4	✓							
	MW-09				4	✓							
	MW-10				4	✓							

Environmental Division
Yellowknife
Work Order Reference
YL2301518
Telephone: +1 867 873 5593

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	METAL VIALS ARE FIELD FILTERED / NO PRESERVATIVE
Are samples for human consumption/ use? ☐ YES ☑ NO	DISSOLVED MERCURY VIALS ARE FIELD FILTERED

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐	SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐	Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐	

INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C
10.1	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
Z. KOSANIC	OCT 25 2023			OCT 25/23	15:22			

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JUNE 2015 FRONT

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

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 17 - 824362

Page 2 of 2

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	KBL ENVIRONMENTAL	Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	ZORAN KOSANIC	Quality Control (QC) Report with Report ☐ YES ☐ NO	PRIORITY (Business Days): 4 day [P4-20%] ☐ / 3 day [P3-25%] ☐ / 2 day [P2-50%] ☐
Phone:		☐ Compare Results to Criteria on Report - provide details below if box checked	EMERGENCY: 1 Business day [E - 100%] ☐ / Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐
Company address below will appear on the final report		Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:		Email 1 or Fax zkosanic@kblenv.com	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:		Email 2 rhogan@kblenv.com	
Postal Code:		Email 3 labresults@kblenv.com	

Invoice To		Invoice Distribution	
	Same as Report To ☑ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	
	Copy of Invoice with Report ☐ YES ☑ NO	Email 1 or Fax zkosanic@kblenv.com	
Company:	KBL ENVIRONMENTAL	Email 2 rhogan@kblenv.com	
Contact:	ZORAN KOSANIC zkosanic@kblenv.com		

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	23-099NT	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):		ALS Contact:	Sampler:

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	PHC BTEX F1-F4	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
	DUP1	OCT 25		WATER	4	✓		
	DUP 2	OCT 25		WATER	4	✓		

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	
Are samples for human consumption/ use? ☐ YES ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
13.1							

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
ZKosanic	Oct 25 2023			OCT 25/23	15:22			

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JUNE 2018 FRONT

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

APPENDIX E

Water Licence

Mackenzie Valley Land and Water Board
7th Floor - 4922 48th Street
P.O. Box 2130
YELLOWKNIFE NT X1A 2P6
Phone (867) 669-0506
FAX (867) 873-6610

October 18, 2019 File: MV2019L1-0001

Mr. Matthew Miller
Northwest Territories Power Corporation
4 Capital Drive
HAY RIVER NT X0E 1G2 Email: mmiller@ntpc.com

Dear Mr. Miller:

Issuance of Type A Water Licence
Jackfish Power Generating Facility, Yellowknife NT

Attached is Water Licence MV2019L1-0001 granted by the Minister of Environment and Natural Resources in accordance with the *Mackenzie Valley Resource Management Act* and *Waters Act*. This Licence has been approved for a period of 25 years effective October 18, 2019 and expiring October 17, 2044.

Conditions and General Procedures

Please read all the conditions carefully. For the purpose of submitting plans in accordance with this Licence, the date of the letter October 18, 2019, is the date of issuance. Also attached is a copy of the "General Procedures for the Administration of Licences in the Northwest Territories". The MVLWB requests that you review these and address any questions to the Board's office.

Plans and Reports

Below you will find a table outlining the Plans that that Board has approved as well as the Plans that are required for submission and approval by the Board.

Condition	Plan/Report	Submission Requirements
Annex A	Monthly SNP Report	Within 30 days of the end of the reporting month
Part B, condition 15	Annual Water Licence Report	March 31, 2020 and every March 31 thereafter.
Part B, condition 16	Standard Operating Procedures and Quality Assurance and Quality Control Plan	Within 90 days following issuance of this Licence
Part E, condition 4	Thermal Plume Delineation Study Design	A minimum of 90 days following the effective date of this Licence.

…/2

Part E, condition 5	Thermal Plume Delineation Study Report	August 1, 2021
Part F, condition 2	AEMP Design Plan	November 1, 2021
Part F, condition 3	Aquatic Effects Re-evaluation Report	Three years following implementation of the AEMP Design Plan and every five years thereafter, or as directed by the Board.
Part F, condition 4	AEMP Design Plan – Revised	Three years following implementation of the AEMP Design Plan and every five years thereafter, or as directed by the Board.
Part F, condition 5	AEMP Annual Report	March 31, 2023 and every year thereafter.
Part H, condition 1	Closure and Reclamation Plan	Within 24 months following the effective date of this Licence
Part H, condition 2	Closure and Reclamation Plan - Update	Three years prior to the expiration of this Licence

Public Registry

A copy of this Licence has been filed on the Public Registry at the office of the MVLWB. Please be advised that this letter, with attached procedures, all Inspection Reports, and correspondence related thereto is part of the Public Registry and is intended to keep all interested parties informed of the manner in which the Licence's requirements are being met. All Public Registry material will be considered if an amendment to the Licence is requested.

The full cooperation of Northwest Territories Power Corporation is anticipated and appreciated. If you have any questions or concerns, please contact Tyree Mullaney at (867) 766-7464 or email tyree@mvlwb.com.

Yours sincerely,

Mavis Cli-Michaud
MVLWB, Chair

Copied to: Distribution List

Attached: Water Licence MV2019L1-0001
Reasons for Decision
General Procedures for the Administration of Licences in the Northwest Territories

Mackenzie Valley Land and Water Board
Water Licence

Pursuant to the *Mackenzie Valley Resource Management Act, Waters Act,* and Waters Regulations, the Mackenzie Valley Land and Water Board, hereinafter referred to as the Board, hereby grants to:

Northwest Territories Power Corporation
(Licensee)

of 4 Capital Drive, Hay River NT X0E 1G2
(Mailing Address)

hereinafter called the Licensee, the right to alter, divert, or otherwise use water subject to the restrictions and conditions contained in the *Waters Act* and Regulations made thereunder and subject to and in accordance with the conditions specified in this Licence.

Licence Number:	MV2019L1-0001
Licence Type:	A
Water Management Area:	Northwest Territories 03
Location:	114° 23' 00" W - 62° 28'10" N
Purpose:	To use water and dispose of waste and associated uses
Description:	Industrial
Quantity of Water **not to be exceeded**:	50,000 cubic metres (m^3)/day
Effective date of Licence:	October 18, 2019
Expiry date of Licence:	October 17, 2044

This Licence issued and recorded at Yellowknife includes and is subject to the annexed conditions.

Mackenzie Valley Land and Water Board

Mavis Cli-Michaud, Chair

Amanda Gauthier, Witness

Approved by

Minister of Environment and Natural Resources

MV2019L1-0001
Northwest Territories Power Corporation - Jackfish Hydro Facility
Type A Water Licence

Part A: Scope and Definitions

Scope

1. This Licence entitles the Licensee to use Water, and deposit Waste for industrial activities at the Jackfish Power Generation Facility. **SCOPE**

   The scope of this Licence includes the following:

   a) Withdrawal of Water for the cooling of the power generators;
   b) Depositing of Waste; and
   c) Progressive Reclamation and associated Closure and Reclamation activities.

2. This Licence is issued subject to the conditions contained herein with respect to the use of Water and the deposit of Waste in any Waters or in any place under any conditions where such Waste or any other Waste that results from the deposits of such Waste may enter any Waters. Whenever new Regulations are made or existing Regulations are amended by the Commissioner in Executive Council under the *Waters Act*, or other statutes imposing more stringent conditions relating to the quantity or type of Waste that may be so deposited or under which any such Waste may be so deposited, this Licence shall be deemed, upon promulgation of such Regulations, to be automatically amended to conform with such Regulations. **REGULATIONS SUBJECT TO CHANGE**

3. Compliance with the defined terms and conditions of this Licence does not relieve the Licensee from responsibility for compliance with the requirements of any applicable federal, territorial or municipal legislation. **LEGISLATIVE COMPLIANCE**

Definitions[1]:

Defined Terms

Action Level – a predetermined qualitative or quantitative trigger which, if exceeded, requires the Licensee to take appropriate actions.

Analyst – an Analyst designated by the Minister under subsection 65(1) of the *Waters Act*.

Aquatic Effects Monitoring Program (AEMP) – a monitoring program developed for the Project in accordance with this Licence and the MVLWB/GNWT *Guidelines for Aquatic Effects Monitoring Programs*

Board – the Mackenzie Valley Land and Water Board established under subsection 99(1) of the *Mackenzie Valley Resource Management Act*.

Closure Criteria – has the same meaning as that in the MVLWB/AANDC *Guidelines for the Closure and Reclamation of Advance Mineral Exploration and Mine Sites in the Northwest Territories*.

[1] Defined terms are capitalized throughout the License, including when used in other definitions.

Defined Terms

Closure Objectives – has the same meaning as that in the MVLWB/AANDC *Guidelines for the Closure and Reclamation of Advance Mineral Exploration and Mine Sites in the Northwest Territories*.

Closure and Reclamation – the process and activities that facilitate the return of areas affected by the Project to viable and, wherever practicable, self-sustaining ecosystems that are compatible with a healthy environment and human activities.

Closure and Reclamation Plan (CRP) – a document, developed in accordance with this Licence and the MVLWB/AANDC *Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories*, that clearly describes the Closure and Reclamation for the Project.

Discharge – a direct or indirect deposit or release of any Waters or Waste to the Receiving Environment.

Discharge Water – wastewater specifically used for the cooling of the pumps associated with the power generators.

Engagement Plan – a document, developed in accordance with the MVLWB *Engagement and Consultation Policy* and the *Engagement Guidelines for Applicants and Holders of Water Licences and Land Use Permits*, that clearly describes how, when and which engagement activities will occur with an affected party during the life of the Project.

Inspector – an Inspector designated by the Minister under subsection 65(1) of the *Waters Act*.

Licensee – the holder of this Licence.

Minister – the Minister of the Government of the Northwest Territories (GNWT) – Environment and Natural Resources.

Modification - in respect of a structure, means a change, other than an expansion, that does not alter the purpose or function of a structure.

Professional Engineer – a person registered with the Northwest Territories and Nunavut Association of Professional Engineers and Geoscientists to practice as a Professional Engineer in the Northwest Territories as per the territorial *Engineering and Geoscience Professions Act*, and whose professional field of specialization is appropriate to address the components of the Project at hand.

Project – the undertaking described in Part A, condition 1.

Receiving Environment – the natural environment that, directly or indirectly, receives any deposit of Waste from the Project.

Remediation – the removal, reduction or neutralization of substances, Wastes or hazardous materials from a site in order to prevent or minimize any adverse effects on the environment and public safety, now or in the future.

Response Framework – a systematic approach to responding to the results of a monitoring program through adaptive management actions.

Response Plan – a document describing the actions that will be taken by a Licensee in response to an Action Level exceedance.

Runoff – the overland flow of Water or Wastewater that occurs when precipitation, meltwater, or other Water is not absorbed by the land, and instead drains downslope towards a Watercourse.

Seepage – any Water or Waste that drains, passes through, or escapes from any structure designed to contain, withhold, divert, or retain Water or Waste.

Spill Contingency Plan (SCP) – a document, developed in accordance with INAC's *Guidelines for Spill Contingency Planning.*

Temporary Closure – a state of care and maintenance, with the intent of resuming activities in the near future.

Waste – any substance defined as Waste by section 1 of the *Waters Act.*

Waste Management Plan (WMP) – a document, developed in accordance with the MVLWB *Guidelines for Developing a Waste Management Plan,* that describes the methods of Waste management from Waste generation to final disposal.

Wastewater – any Water that is generated by Project activities or originates on-site, and which contains Waste, and may include, but is not limited to, Runoff, Seepage, and Discharge Water.

Water – any Water as per section 1 of the *Waters Act*.

Watercourse – a natural watercourse, body of Water or Water supply, whether usually containing Water or not, and includes Groundwater, springs, swamps, and gulches.

Water Management Area – a geographical area of the Northwest Territories established by section 2 and Schedule A of the Waters Regulations.

Waters Regulations – the regulations proclaimed pursuant to section 63 of the *Waters Act*.

Water Use – a use of Water as per section 1 of the *Waters Act*.

Part B: General Conditions

	Condition	Title
1.	The Licensee shall ensure a copy of this Licence is maintained on site at all times.	**COPY OF LICENCE**
2.	The Licensee shall take every reasonable precaution to protect the environment.	**PRECAUTION TO PROTECT ENVIRONMENT**
3.	All references to policies, guidelines, codes of practice, statutes, regulations, or other authorities shall be read as a reference to the most recent versions, unless otherwise denoted.	**USE UP-TO-DATE REFERENCES**
4.	The Licensee shall ensure all submissions to the Board: a) Are in accordance with the MVLWB *Document Submission Standards*; b) Include a conformity table which identifies where the requirements of this Licence, or other directives from the Board, are addressed; and c) Include any additional information requested by the Board.	**SUBMISSION FORMAT AND CONFORMITY**
5.	The Licensee shall ensure management plans are submitted to the Board in a format consistent with the MVLWB *Standard Outline for Management Plans*, unless otherwise specified.	**MANAGEMENT PLAN FORMAT**
6.	The Licensee shall comply with all plans, programs, manuals approved pursuant to the conditions of this Licence, including such revisions made as per the conditions of this Licence, and as approved by the Board.	**COMPLY WITH SUBMISSIONS AND REVISIONS**
7.	The Licensee shall conduct an annual review of all plans, programs, manuals, studies and make any revisions necessary to reflect changes in operations, contact information, or other details. No later than March 31 each year, the Licensee shall send a notification letter to the Board, listing the documents that have been reviewed and do not require revisions as well as the ones which do require revisions.	**ANNUAL REVIEW**
8.	The Licensee may propose changes at any time by submitting revised plans, programs, manuals, or studies to the Board, for approval, a minimum of 90 days prior to the proposed implementation date for the changes. The Licensee shall not implement the changes until approved by the Board.	**REVISIONS**
9.	The Licensee shall revise any submission and submit it as per the Board's directive.	**REVISE AND SUBMIT**
10.	If any date for any submission falls on a weekend or holiday, the Licensee may submit the item on the following business day.	**SUBMISSION DATE**
11.	The Licensee shall comply with the Schedules, which are annexed to and form part of this Licence, and any updates to the Schedules as may be made by the Board.	**COMPLY WITH SCHEDULE(S)**
12.	The Licensee shall comply with the Surveillance Network Program (SNP), which is annexed to and forms part of this Licence, and any updates to the SNP as may be made by the Board.	**COMPLY WITH SNP**
13.	The Schedules and any compliance dates specified in this Licence may be updated at the discretion of the Board.	**UPDATES TO COMPLIANCE DATE(S)**

	Condition	Title
14.	The Licensee shall install, operate, and maintain meters/measuring, devices, loggers or other such methods used for measuring/monitoring the volumes of Water used and Waste Discharged to the satisfaction of an Inspector and in accordance with the approved **Standard Operating Procedures and Quality Assurance and Quality Control Plan**.	**MEASURE WATER USE AND WASTE DISCHARGED**
15.	Beginning March 31, 2020 and no later than every March 31 thereafter, the Licensee shall submit an **Annual Water Licence Report** to the Board and an Inspector**.** The Report shall be in accordance with the requirements of Schedule 1, condition 1.	**ANNUAL WATER LICENCE REPORT**
16.	Within 90 days following the effective date of this Licence, the Licensee shall submit to the Board, for approval, a **Standard Operating Procedures and Quality Assurance and Quality Control Plan.**	**STANDARD OPERATING PROCDURES AND QUALITY ASSURANCE AND QUALITY CONTROL PLAN**
17.	The Licensee shall comply with the **Engagement Plan**, once approved.	**ENGAGEMENT PLAN**
18.	The Licensee shall immediately provide written notification to the Board and an Inspector of any non-compliance with the conditions of this Licence or any direction from the Board pursuant to the conditions of this Licence.	**NOTIFICATION – NON-COMPLIANCE**

Part C: Conditions Applying to Water Use

	Condition	Title
1.	The Licensee shall only obtain fresh Water for the Project from Jackfish Lake. The Licensee may withdraw up to 50,000 m^3/day of Water from this source.	**WATER SOURCE AND MAXIMUM VOLUME**
2.	The Licensee shall construct and maintain the Water intake(s) with a screen designed to prevent impingement or entrapment of fish.	**WATER INTAKE SCREEN**

Part D: Conditions Applying to Modifications

	Condition	Title
1.	The Licensee may, without written approval from the Board, carry out a Modification to the existing or planned undertaking provided the following requirements are met: a) The Licensee has notified the Board and an Inspector, in writing, of such proposed Modification at least 90 days prior to the beginning of the Modification; b) The Modification does not place the Licensee in contravention of either this Licence or the Act; c) The Board has not, during the 60 days following notification of the proposed Modification, informed the Licensee that further information is required or that a review of the proposal will require more than 60 days; d) An Inspector has authorized the proposed Modification and provided a letter of notification to the Board; and e) The Board has not rejected the proposed Modification.	**MODIFICATION REQUIREMENTS**
2.	Modifications for which all of the conditions referred to in Part D, condition 1 have not been met, may only be carried out with written approval from the Board.	**MODIFICATION – WRITTEN APPROVAL REQUIRED**
3.	Within 90 days of the completion of the Modification referred to in Part D, condition 1, the Licensee shall submit to the Board an **As-built Report**, stamped and signed by a Professional Engineer, which shall include final as-built drawings and specifications of the modified structure.	**AS-BUILT REPORT – MODIFICATION**

Part E: Conditions Applying to Waste and Water Management

	Condition	Title
1.	The Licensee shall manage Waste and Water with the objective of minimizing the impacts of the Project on the quantity and quality of Water in the Receiving Environment through the use of appropriate mitigation measures, monitoring, and follow-up actions.	**OBJECTIVE – WASTE AND WATER MANAGEMENT**
2.	The Licensee shall comply with the **Waste Management Plan** once approved.	**WASTE MANAGEMENT PLAN**
3.	The Licensee shall direct all Discharge Water from the Jackfish Lake Power Generating Facility to Jackfish Lake as described in the approved Waste Management Plan.	**DISCHARGE WATER – JACKFISH LAKE POWER GENERATING FACILITY**
4.	A minimum of 90 days following the effective date of this Licence, a **Thermal Plume Delineation Study Design Plan**. The Plan shall be in accordance with the requirements of Schedule 2, Condition 1 and shall be submitted to the Board for approval.	**THERMAL PLUME DELINEATION STUDY DESIGN**
5.	The Licensee shall submit to the Board for approval, a **Thermal Plume Delineation Study Report** by August 1, 2021. The Plan shall be in accordance with the requirements of Schedule 2, condition 2.	**THERMAL PLUME DELINEATION STUDY REPORT**

Part F: Conditions Applying to Aquatic Effects Monitoring Program

	Condition	Title
1.	The Licensee shall design and implement an Aquatic Effects Monitoring Program (AEMP) in accordance with the MVLWB/GNWT *Guidelines for Aquatic Effects Monitoring Programs* to meet the following objectives: a) To determine the short- and long-term effects of the Project on the Receiving Environment; b) To assess the efficacy of mitigation that is used to minimize the effects of the Project on the Receiving Environment; c) To identify the need for additional mitigation measures to reduce or eliminate Project-related effects; and d) To provide an early warning system where the results of the **AEMP** are used to avoid adverse effects through the Response Framework and/or regular evaluation of the **AEMP.**	**OBJECTIVE – AEMP**
2.	The Licensee shall submit to the Board, for approval, an **AEMP Design Plan** by November 1, 2021. The Plan shall be in accordance with the MVLWB/GNWT *Guidelines for Aquatic Effects Monitoring Programs* and will incorporate the results from the Thermal Plume Delineation Study Report.	**AEMP DESIGN PLAN**
3.	Three years following implementation of the **AEMP Design Plan**, and every five years thereafter, or as directed by the Board, the Licensee shall submit to the Board, for approval, an **AEMP Re-Evaluation Report**. The Report shall be in accordance with the MVLWB/GNWT *Guidelines for Aquatic Effects Monitoring* Programs and shall evaluate the overall effectiveness of the AEMP to date.	**AEMP RE-EVALUATION REPORT**
4.	Three years following implementation of the **AEMP Design Plan** and every five years thereafter, or as directed by the Board, the Licensee shall submit to the Board, for approval, a revised **AEMP Design Plan,** which incorporates the results from the **AEMP Re-evaluation Report**. The revised Plan shall be in accordance with the MVLWB/GNWT *Guidelines for Aquatic Effects Monitoring Programs.*	**AEMP DESIGN PLAN – REVISED**
5.	Beginning March 31, 2023, and no later than March 31 of each year thereafter, the Licensee shall submit to the Board, for approval, an **AEMP Annual Report**. The Report shall be in accordance with the MVLWB/GNWT *Guidelines for Aquatic Effects Monitoring Programs* and the requirements of Schedule 3, condition 1.	**AEMP ANNUAL REPORT**
6.	If any low Action Level established in the approved **AEMP Design Plan** is exceeded, the Licensee shall, at a minimum, implement the response actions described in the approved **AEMP Design Plan**, and report the exceedance in the **AEMP Annual Report**.	**LOW ACTION LEVEL EXCEEDENCE**
7.	If any moderate or high Action Level established in the approved **AEMP Design Plan** is exceeded, the Licensee shall: a) Within the timeframe identified in the approved **AEMP Design Plan** notify the Board and an Inspector; and b) Within the timeframe identified in the approved **AEMP Design Plan** or as otherwise directed by the Board, submit an **AEMP Response Plan** to the Board for approval. The Response Plan shall be in accordance with the MVLWB/GNWT *Guidelines for Aquatic Effects Monitoring Programs.*	**MODERATE OR HIGH ACTION LEVEL EXCEEDENCE**

PART G: Conditions Applying to Spill Contingency Planning

	Condition	Title
1.	The Licensee shall ensure that Unauthorized Discharges associated with the Project do not enter any Waters.	**OBJECTIVE – PREVENT WASTE INTO WATER**
2.	The Licensee shall comply with the **Spill Contingency Plan**, once approved.	**SPILL CONTINGENCY PLAN**
3.	During the period of this Licence, if a spill or an Unauthorized Discharge occurs or is foreseeable, the Licensee shall: a) Implement the approved **Spill Contingency Plan** referred to in Part G, Condition 2; b) Report it immediately using the NU-NT Spill Report Form by one of the following methods: • Telephone: (867) 920-8130 • Fax: (867) 873-6924 • E-mail: spills@gov.nt.ca • Online: Spill Reporting and Tracking Database c) Within 24 hours, notify the Board and an Inspector; and d) Within 30 days of initially reporting the incident, submit a detailed report to the Board and an Inspector, including descriptions of causes, response actions, and any changes to procedures to prevent similar occurrences in the future. Written notification shall be provided to the Board and an Inspector if any changes occur.	**REPORT SPILLS**
4.	The Licensee shall ensure that spill prevention infrastructure and spill response equipment is in place prior to commencement of the Project.	**SPILL PREVENTION AND RESPONSE EQUIPMENT**
5.	The Licensee shall restore all areas affected by spills and Unauthorized Discharges to the satisfaction of an Inspector.	**CLEAN UP SPILLS**

PART H: Conditions Applying to Closure and Reclamation

	Condition	Title
1.	Within 24 months following the effective date of this Licence, the Licensee shall submit to the Board, for approval, an **Interim Closure and Reclamation Plan.** The Plan shall be in accordance with the requirements of Schedule 4, condition 1.	**CLOSURE AND RECLAMATION PLAN**
2.	Two years prior to the expiration of this Licence, the Licensee shall submit to the Board, for approval, an updated **Interim Closure and Reclamation Plan**.	**CLOSURE AND RECLAMATION PLAN – UPDATE**

Signed on behalf of the Mackenzie Valley Land and Water Board

Mavis Cli-Michaud, Chair

Amanda Gauthier, Witness

Schedule 1: Annual Water Licence Report

Condition

1. The **Annual Water Licence Report** referred to in Part B, condition 15 of this Licence shall include, but not be limited to, the following information about activities conducted during the previous calendar year:

a) A brief summary of Project activities;

b) The monthly and annual quantities in cubic metres of fresh Water obtained from all sources and thermal data from intake and Discharge data loggers, as required in Part B, condition 14 and Part C, condition 1 of this Licence;

c) A summary of the calibration and status of the meters and devices referred to in Part B, condition 14 of this Licence;

d) A summary of engagement activities conducted in accordance with the approved **Engagement Plan**, referred to in Part B, condition 17 of this Licence;

e) A summary of Modification activities conducted in accordance with Part D of this Licence;

f) A summary of major maintenance activities conducted in accordance with this Licence;

g) A summary of activities conducted in accordance with the approved **Waste Management Plan**, referred to in Part E, condition 2 of this Licence, including:

   i. A summary of approved updates or changes to the process or facilities required for the management of Waste;
   ii. A summary of approved updates or changes to the process or facilities required for the management of Waste

h) A summary of monitoring results and any Action Level exceedances as per the approved AEMP, required in Part F, condition 7 of this Licence;

i) A summary of activities conducted in accordance with the approved Spill Contingency Plan, required in Part G, condition 2 of this Licence, including:

   i. A list and description for all Unauthorized Discharges, including the date, NWT spill number, volume, location, summary of the circumstances and follow-up actions taken, and status (i.e. open or closed), in accordance with the reporting requirements in Part G, condition 4 of this Licence; and
   ii. An outline of any spill training carried out.

j) A summary of any Closure and Reclamation work completed.

k) Tabular summaries of all data and information generated under the monthly SNP annexed to this Licence, in Excel format.

l) A list of any non-compliance(s) with the conditions of this Licence or any directive from the Board pursuant to the conditions of this Licence;

m) A summary of actions taken to address concerns, non-conformances, or deficiencies in any reports filed by an Inspector;

n) Any other details requested by the Board by November 1 of the year being reported.

Schedule 2: Thermal Plume Delineation

Condition

1. The **Thermal Plume Delineation Study Design Plan** referred to in Part E, condition 6 of this Licence shall include, but not be limited to, the following:

   a) Seasonal delineation (spring freshet, late summer, late fall, and late under ice) of the thermal plume, include a calculation of maximum extent of plume as a percentage of lake area;

   b) Temperature, dissolved oxygen profiles and any other parameters deemed relevant to the understanding of the thermal plume and the lake stratification;

   c) An assessment of aquatic habitat within the thermal plume zone(s); and

   d) Seasonal chemical characterization[2] at a minimum of one station located outside of the potential plume but situated such that potential influence of inflow(s) can be characterized and one station located at or near the outflow of Jackfish Lake. Station locations and rational to be included.

2. The **Thermal Plume Delineation Study Report** referred to in Part E, condition 7 of this Licence shall include, but not be limited to, the following:

   a) Maps illustrating the extent of the thermal plume and any seasonal changes documented;

   b) Graphical representation of the thermal profile and applicable water quality data:

   c) Identification of the worse case thermal plume scenario of the four seasonal conditions identified in Schedule 1, item 1a;

   d) Discussion of results and potential impacts to the aquatic ecosystem in Jackfish Lake and recommendations to inform the Aquatic Effects Design Report; and

   e) Tabular summaries of all data and information generated under the Thermal Plume Delineation Study, in Excel format.

[2] Chemical characterization shall include, but not be limited to the following parameters:

- Field parameters (pH, Electrical Conductivity [EC], Temperature, Dissolved Oxygen [DO])
- Major Ions
- Total Suspended Solids (TSS)
- pH
- Oil and Grease (Hexane Extractable)
- Total Petroleum Hydrocarbons (F1, F2, F3, F4 CCME Fractions)
- Benzene, Toluene, Ethylbenzene, Xylene (BTEX)
- Total and Dissolved Metals (Metals shall include but not be limited to analysis of the following parameters: Aluminum, Antimony, Arsenic, Barium, Boron, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Thallium, Uranium, and Zinc)

Schedule 3: Aquatic Effects Monitoring Program

Condition

1. The **AEMP Annual Report** referred to in Part F, condition 5 of this Licence shall include, but not be limited to, the following:

a) A plain language summary and interpretation of the major results obtained in the preceding calendar year;

b) A summary of activities conducted under the AEMP;

c) A summary of any spills, activities, or other considerations within the report time frame that could influence the results of the AEMP;

d) Tabular summaries of all data and information generated under the AEMP, in Excel format;

e) A comparison of monitoring results from the annual AEMP and results from the Thermal Plume Delineation Study Report including an interpretation of the results, including an evaluation of any identified environmental effects and their potential ecological significance that occurred as a result of the Project;

f) A comparison of monitoring results to Action Levels as defined in the approved **AEMP Design Plan**;

g) For any low Action Level exceedances, a summary of the nature and extent of the exceedance, as well as a description of actions in response to the exceedance;

h) An evaluation of any adaptive management response actions implemented;

i) Recommendations, with rationale, for changes to any aspect of the **AEMP Design Plan**; and

j) Any other information specified in the approved **AEMP Design Plan**.

Schedule 4: Closure and Reclamation

Condition

1. The **Interim Closure and Reclamation Plan** referred to in Part H, condition 1 of this Licence shall include, but not be limited to the following information:

a) A plain language summary of the Plan;

b) A description of the overall goals for Closure and Reclamation of the Project, including expected future land use;

c) A description of the Closure and Reclamation planning team;

d) A description of engagement related to Closure and Reclamation planning, including a summary of completed and planned engagement, and links to the **Engagement Plan** referred to in Part B, Condition 17 for the Project;

e) A list of any other regulatory instruments required for Closure and Reclamation of the Project;

f) A description of the pre-existing and current Project environment, including, but not limited to:

   i. climatic conditions;
   ii. physical conditions;
   iii. chemical conditions;
   iv. biological conditions; and
   v. any physical or chemical assessments of soil, water, and permafrost.

g) A description of the Project, including, but not limited to:

   i. site history;
   ii. Project development;
   iii. current status of the Project;
   iv. maps delineating all disturbed areas, borrow material locations, site facilities, hydrological features, and elevation contours; and
   v. photographs.

h) A description of each Project component, including, but not limited to:

   i. areas affected by spills or Unauthorized Discharges; and
   ii. other areas affected by Project activities.

i) For the Project site, a description of Closure and Reclamation plans, including, but not limited to:

   i. Closure Objectives and Criteria;
   ii. preferred Closure and Reclamation option and method for each Project component identified in condition (h) above;
   iii. design drawings, signed and stamped by a Professional Engineer, for any Engineered structures if applicable;
   iv. Water management and restoration of natural drainage;
   v. predicted environmental effects during and after Closure and Reclamation activities;
   vi. post-closure monitoring, maintenance, and reporting;
   vii. uncertainties and contingencies;
   viii. climate change considerations; and
   ix. Closure and Reclamation Research plans.

Condition

j) A description of any planned Progressive Reclamation;

k) A plan for Temporary Closure, including, but not limited to the following information:

   i. Temporary Closure goals and objectives;
   ii. a description of activities and methods;
   iii. a description of monitoring, maintenance, and reporting;
   iv. contingencies; and
   v. an implementation schedule.

l) An implementation schedule that includes Progressive Reclamation and final Closure and Reclamation activities.

ANNEX A: SURVEILLANCE NETWORK PROGRAM - annexed to Water Licence MV2019L1-0001

LICENSEE: Northwest Territories Power Corporation

LICENCE NUMBER: MV2019L1-0001

EFFECTIVE DATE OF LICENCE: October 18, 2019

EFFECTIVE DATE OF SURVEILLANCE NETWORK PROGRAM (SNP): October 18, 2019

Part A – Surveillance Network Program Description and Monitoring Requirements

1) The location of sampling sites and specific monitoring requirements are as follows:

a) **Surveillance Network Program (SNP) 00-1:**

Description: **Location:**	SNP 00-1a,b,c,d – Intakes to the K (2 intakes), EMD (1 intake), and CAT (1 intake) plants SNP 00-1a - K plant intake 1 SNP 00-1b - K plant intake 2 SNP 00-1c - EMD plant intake SNP 00-1d - CAT plant intake
Sampling Frequency:	Continuous in-situ measurements during periods of discharge to Jackfish Lake
Sampling Parameters:	Water Temperature Flow

b) **Surveillance Network Program (SNP) 00-2:**

Description:	SNP 00-2a,b,c - Discharges from the K, EMD and CAT plants, respectively
Location:	SNP 00-2a - K plant SNP 00-2b - EMD SNP 00-2c - CAT plant
Sampling Frequency:	Continuous in-situ measurements during periods of Discharge to Jackfish Lake
Sampling Parameters	Water Temperature

c) **Surveillance Network Program (SNP) JF01-06**

Description:	JF01-06 – Groundwater Monitoring Well
Location:	Located at the Lease Boundary near the lake shore near the warehouse near K Plant
Sampling Frequency:	Twice a year during June and September
Sampling Parameters	• Field parameters (pH, Electrical Conductivity [EC], Temperature, Dissolved Oxygen [DO]) • Major Ions • Total Suspended Solids (TSS) • Oil and Grease (Hexane Extractable) • pH • Total Petroleum Hydrocarbons (F1, F2, F3, F4 CCME Fractions) • Benzene, Toluene, Ethylbenzene, Xylene (BTEX) • Dissolved Metals (Metals shall include but not be limited to analysis of the following parameters: Aluminum, Antimony, Arsenic, Barium, Boron, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Thallium, Uranium, and Zinc)

d) **Surveillance Network Program (SNP) MW2**

Description:	MW2 – Groundwater Monitoring Well
Location:	Located at the Lease Boundary near the lake shore between the EMD Plant and the Cat Plant
Sampling Frequency:	Twice a year during June and September
Sampling Parameters	• Field parameters (pH, Electrical Conductivity [EC], Temperature, Dissolved Oxygen [DO]) • Major Ions • Total Suspended Solids (TSS) • Oil and Grease (Hexane Extractable) • pH • Total Petroleum Hydrocarbons (F1, F2, F3, F4 CCME Fractions) • Benzene, Toluene, Ethylbenzene, Xylene (BTEX) • Dissolved Metals (Metals shall include but not be limited to analysis of the following parameters: Aluminum, Antimony, Arsenic, Barium, Boron, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Thallium, Uranium, and Zinc)

2. The location of sampling sites is subject to approval of the Inspector.

3. More frequent sample collection may be required at the request of an Inspector.

4. All sampling, sample preservation, and analyses shall be conducted in accordance with methods prescribed in the current edition of "Standard Methods for the Examination of Water and Wastewater" at the time of analysis, or by such other methods approved by an Analyst.

5. All analyses shall be performed in a laboratory accredited by the Canadian Association for Laboratory Accreditation (CALA) or equivalent for the specific analyses to be performed or as approved by an Analyst.

6. The Licensee shall annually review the approved QA/QC Plan and modify the Plan as necessary. Proposed modifications shall be submitted to an Analyst for approval.

7. The QA/QC Plan referred to in SNP Section A, Item 6 shall be implemented as approved by an Analyst.

Part B – Volume and Temperature Measurement Requirements

1) All volume and temperature measurements shall be measured and recorded continuously (i.e., using electronic data storage chips or equivalent) during periods of Discharges and reported on a monthly basis:

a) The daily, monthly, and annual quantities of cooling water circulated from Surveillance Network Program Station Numbers 00-1a, 00-1b, 00-1c, and 00-1d shall be measured and recorded in cubic metres; and

b) The water temperature at Surveillance Network Program Station Numbers 00-1a, 00-1b, 00-1c, 00-1d, 00-2a, 00-2b, and 00-2c shall be measured and recorded in degrees Celsius.

ANNEX B: Concordance Table of items Requiring Submission – annexed to Water Licence MV2019L1-0001

This table summarizes the information the Licensee is required to submit as per the Water Licence conditions.

Part of Licence	Item	Date
Annex A	Monthly SNP Report	Within 30 days of the end of the reporting month
Part B, condition 15	Annual Water Licence Report	March 31, 2020 and every March 31 thereafter.
Part B, condition 16	Standard Operating Procedures and Quality Assurance and Quality Control Plan	Within 90 days following issuance of this Licence
Part E, condition 4	Thermal Plume Delineation Study Design	A minimum of 90 days following the effective date of this Licence.
Part E, condition 5	Thermal Plume Delineation Study Report	August 1, 2021
Part F, condition 2	AEMP Design Plan	November 1, 2021
Part F, condition 3	Aquatic Effects Re-evaluation Report	Three years following implementation of the AEMP Design Plan and every five years thereafter, or as directed by the Board.
Part F, condition 4	AEMP Design Plan – Revised	Three years following implementation of the AEMP Design Plan and every five years thereafter, or as directed by the Board.
Part F, condition 5	AEMP Annual Report	March 31, 2023 and every year thereafter.
Part H, condition 1	Closure and Reclamation Plan	Within 24 months following the effective date of this Licence
Part H, condition 2	Closure and Reclamation Plan - Update	Three years prior to the expiration of this Licence

ANNEX C: Table of Revision History – annexed to Water Licence MV2019L1-0001

Date	Location of change	Description of change
		-
		-

Mackenzie Valley Land and Water Board
7th Floor - 4922 48th Street
P.O. Box 2130
YELLOWKNIFE NT X1A 2P6
Phone (867) 669-0506
FAX (867) 873-6610

Reasons for Decision

Issued pursuant to Sections 72.25 and 121 of the *Mackenzie Valley Resource Management Act* (MVRMA)
and
Sections 36 and 54 of the *Waters Act*

Water Licence Application	
Preliminary Screener	MVLWB
File Number	MV2019L1-0001
Company	Northwest Territories Power Corporation
Project	Industrial, Jackfish Power Generating Station, Yellowknife NT
Date of Decision	September 26, 2019

Table of Contents

These Reasons for Decision set out the Mackenzie Valley Land and Water Board's (the MVLWB/Board) regulatory process and decisions made on **September 26, 2019** for the Application made by Northwest Territories Power Corporation (NTPC) for Water Licence (Licence) MV2019L1-0001 for the Jackfish Power Generating Project.

A summary of the Application is provided in Section 2 below, followed by the regulatory process in Section 3. Section 4 describes the legislative requirements applicable to this regulatory process, leading to the Board's decisions with supporting rationale in Section 5.

1.0 List of Abbreviations

Anniversary Date	Effective date of Licence as seen on the Licence cover page
Applicant	Northwest Territories Power Corporation
Application	Northwest Territories Power Corporation's submissions in support of Water Licence MV2019L1-0001
CIRNAC	Crown-Indigenous Relations and Northern Affairs Canada
DFO	Fisheries and Oceans Canada
DIAND	Department of Indigenous Affairs and Northern Development
ECCC	Environment and Climate Change Canada
GNWT	Government of the Northwest Territories
GNWT-ENR	Government of the Northwest Territories – Environment and Natural Resources
IR	Information Request
Inspector	Government of the Northwest Territories – Environment and Natural Resources – Water Resource Officer (Inspector)
Intervener	A reviewing Party that submits an intervention
Licence	Water Licence MV2019L1-0001
MVLWB or Board	Mackenzie Valley Land and Water Board
MVRMA	*Mackenzie Valley Resource Management Act*
Minister	Minister of Environment and Natural Resources for the Government of the Northwest Territories
Party	As per the Board's *Rules of Procedures*
Project	Jackfish Power Generating Project
Reviewer	As per the Board's *Rules of Procedures*

2.0 Summary of Application(s)

On February 26, 2019, NTPC submitted an Application for a new Licence MV2019L1-00001.[1] This Application is for the use of water for the cooling of the diesel power generating plants. The Jackfish Power Generating station is located within the City of Yellowknife, NT. These activities are located within a Non-Federal area.

The Application is to replace the current Licence N1L1-1632, which is set to expire on December 31, 2019. The current licence was issued for water use for cooling systems.

[1] See Water Licence MV2019L1-0001 Application (hyperlink), submitted to the MVLWB on February 26, 2019.

2.1 Distribution List

This document uses the term "distribution list" for the list of parties with whom materials from this regulatory process were circulated. As this Project is in the Akaitcho Territory, the appropriate core organizational reviewers, governments, First Nations, and Aboriginal organizations were included in the list. The list was periodically updated, and (when requested) individuals with specific interests in the Project were also added to the distribution list (see Table1: Organizations on the Distribution List).

3.0 Regulatory Process

3.1 Details of the Regulatory Process

On February 26, 2019, NTPC submitted an Application for a new Licence MV2019L1-0001. On March 4, 2019, the Application was deemed complete and the review commenced.[2] Distribution of the Application on the Online Review System advised the parties that the Application was in the form and contained the information required by section 72.1 of the MVRMA, and section 34 of the *Waters Act*, that the regulatory process would proceed, that the legislated timelines defined in subsection 47(1) of the *Waters Act* had commenced, and that the online review period was underway.

On March 4, 2019, Board staff distributed a draft work plan that included the scheduling of a public hearing as per paragraph 42(2)(a) of the *Waters Act*. At that time parties were requested to provide their comments and recommendations on the draft work plan.[3] Comments on the draft work plan were received by March 18, 2019 from the Government of the Northwest Territories – Environment and Natural Resources (GNWT-ENR)[4].

By April 2, 2019, comments and recommendations regarding the Applications were received by the Board from the following parties: GNWT-ENR, Environment and Climate Change Canada (ECCC), Fisheries and Oceans Canada (DFO), and MVLWB staff. [5] On April 15, 2019, NTPC responded to the parties' comments and recommendations.[6]

NTPC's Technical Session presentation was submitted on May 2, 2019.[7] A single Technical Session was held on May 2, 2019, in Yellowknife, NT, to discuss and seek clarity on issues raised by parties and Board staff, and to provide an opportunity to discuss the Application in advance of parties submitting comments and recommendations to the Board. The Technical Session was facilitated by Board staff and was transcribed.[8] Attendees included NTPC, Golder Associates Ltd (Golder; Technical Advisor to NTPC), GNWT-ENR, and ECCC.[9] There were two (2) Technical Session Information Requests (TS-IR#1 and TS-IR#2) resulting from this Technical Session, which were directed at NTPC. These two TS-IRs

[2] See MVLWB – Application Complete (hyperlink), dated March 4.
[3] See MVLWB – Draft Work Plan (hyperlink), dated March 4, 2019.
[4] See Comments on Draft Work Plan: GNWT-ENR (hyperlink) submitted to the MVLWB on March 18, 2019.
[5] See Review Comment Summary Table – Application (hyperlink), dated April 16, 2019.
[6] See Review Comment Summary Table – Application (hyperlink), dated April 16, 2019.
[7] See NTPC– Technical session presentation (hyperlink), submitted to the MVLWB on May 2, 2019
[8] See Technical session – Transcripts (hyperlink), dated May 2, 2019.
[9] See Technical session – Sign-in Sheet (hyperlink), dated May 2, 2019.

were circulated to the distribution list on May 2, 2019[10], and NTPC submitted responses to both TS-IRs on May 16, 2019.[11]

A public notice of the Application and the Public Hearing was published in *News North* during the week of May 20, 2019 to fulfill paragraphs 41(1)(a) and 43(2)(a) of the *Waters Act*.[12]

The pre-hearing conference was held on May 28, 2019 in Yellowknife, NT to discuss the potential content of the public hearing, written interventions and presentations, notices of intent to appear at the hearing, and to briefly outline the Board's (2004) *Rules of Procedure, Including Public Hearings*.[13] The pre-hearing conference was attended in-person by representatives from the MVLWB, GNWT – ENR, and Golder (Technical Advisor to NTPC); representatives from ECCC, NTPC, and NTPC Legal Support participated by teleconference. Summary notes were recorded and distributed on May 29, 2019.[14]

On June 11, 2019, written interventions were received from GNWT-ENR and ECCC.[15] Both interventions submitted indicated that the concerns that were brought forward during the initial review have been addressed by NTPC through responses as well as the Technical Session. NTPC did not have to respond to the written interventions.

The Board did not receive notification that any person intended to appear regarding the Application ten days prior to the scheduled hearing date. On July 22, 2019, the Public Hearing was cancelled as per paragraph 41(3)(a) of the *Waters Act*, and an updated work plan (Version 2) was distributed.[16]

On July 23, 2019, Board staff circulated draft Licence Conditions to parties for review and comment. The following parties responded by August 13, 2019; GNWT-ENR, ECCC and NTPC.[17] NTPC responded to all the parties' comments and provided comments of their own on August 30, 2019[18].

For a Type A Licence, as was the case in this Application, within nine months the Board shall make a decision. On September 26, 2019, the Board met to make decisions regarding the Application.

4.0 Legislative Requirements

In conducting the review process for the Application as described in Sections 2 and 3 above, the Board has ensured that all applicable legislative and procedural requirements have been satisfied, as required by section 62 of the MVRMA and as outlined below.

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[10] See Technical session – Information Requests (hyperlink), dated May 2, 2019.
[11] See NTPC – Response to Information Request #1&#2 (hyperlink), submitted to the MVLWB on May 16, 2019.
[12] See Notice of Application and public hearing (hyperlink), dated May 20, 2019.
[13] See Pre-hearing conference – Agenda (hyperlink), dated May 16, 2019.
[14] See Pre-hearing conference – Summary Notes (hyperlink), dated May 28, 2019.
[15] See Written Interventions: GNWT-ENR (hyperlink) and ECCC (hyperlink) submitted to the MVLWB on June 11, 2019
[16] See MVLWB Letter – Cancellation of Public Hearing (hyperlink) and Updated Work Plan (Version 2) (hyperlink), dated July 22, 2019.
[17] See Review Comment Summary Table – Draft Licence (hyperlink), dated September 4, 2019.
[18] See Review Comment Summary Table – Draft Licence (hyperlink), dated September 4. 2019

4.1 General

The use of water and the deposit of waste proposed is of a nature contemplated by the MVRMA and the *Waters Act*.

As this Project is located on a Non-Federal Area, the MVRMA and the *Waters Act* apply.

4.2 MVRMA Part 3: Duty to Consult (Aboriginal Matters)

In exercising its authority under the MVRMA, generally, the Board must ensure that the concerns of Aboriginal peoples have been taken into account as per paragraph 114(c) of the MVRMA. It must also consider the importance of conservation to the well-being and way of life of Aboriginal peoples of Canada, as per paragraph 60.1(a) of the MVRMA, specifically those to whom section 35 of the *Constitution Act*, *1982* applies and who use an area of the Mackenzie Valley. Accordingly, the Board works with applicants, affected parties (including Aboriginal organizations and governments), and other parties (such as other boards and regulators) to ensure that potential impacts of proposed projects are understood and carefully considered before decisions are made with respect to the issuance of Licences.

In order to address the question of Aboriginal consultation it is first helpful to understand the general process through which the Board considers an application.[19,20] Following the initiation of engagement and the submission of an application, a proposed project goes through several stages in the Board's approval process. The application is reviewed to ensure that all necessary information is included and to confirm that the right types of Permit and Licence have been applied for. This check for completeness is completed within ten days of receipt of the application.

The application and supporting documents are uploaded to the Board's online registry and then the application package is distributed to stakeholders, including appropriate federal and territorial government departments and agencies, landowners, affected communities and Aboriginal organizations, Renewable Resource Boards, heritage regulators, and other interested parties. The distribution list that the Board used for the NTPC Application is provided in Table 1.

[19] See www.mvlwb.com → Resources → Policies and Guidelines: MVLWB Guide to the Land Use Permitting Process 2013).

[20] See www.mvlwb.com → Resources → Policies and Guidelines: Guide to Completing Water Licence Applications to the Mackenzie Valley Land and Water Board (2003).

Table 1: Organizations on the Distribution List for Licence MV2019L1-0001

Akaitcho Interim Measures Agreement Implementation Office	Hamlet of Fort Resolution
Athabasca Denesuline Council C/O Prince Albert Council	Hay River Métis Council
Bathurst Inlet Development Ltd.	Crown-Indigenous Relations and Northern Affairs Canada – Contaminants and Remediation Directorate
Bathurst Inlet Lodge	Crown-Indigenous Relations and Northern Affairs Canada – NWT Inspectors
BNT Gold Resources Ltd.	K'atl'odeeche First Nation
Canadian Northern Economic Development Agency	Łutsel K'e Dene First Nation - Chief or Wildlife, Lands and Environment
CanNor NWT Region	Mackenzie Valley Environmental Impact Review Board
Chamber of Mines NWT & Nunavut	Manitoba Denesuline
City of Yellowknife	Miramar Northern Mining Ltd.
Dene Nation	National Energy Board
Deninu K'ue First Nation	North Slave Métis Alliance
Environment and Climate Change Canada	Northwest Territory Métis Nation
Fisheries and Oceans Canada	Salt River First Nations
Fort Resolution Métis Council	Smith's Landing First Nation
Fort Smith Métis Council	Snap Lake Environmental Monitoring Agency (SLEMA)
General Public	Tłı̨chǫ Government
Government of the Northwest Territories – Education, Culture and Employment	Tłı̨chǫ Government - Lands Protection Department
Government of the Northwest Territories – Environment and Natural Resources	Town of Fort Smith
Government of the Northwest Territories – Infrastructure	Wek'èezhìi Renewable Resources Board
Government of the Northwest Territories – Industry, Tourism and Investment	Wek'èezhìi Land and Water Board
Government of the Northwest Territories – Lands	West Point First Nation
Government of the Northwest Territories – Municipal and Community Affairs	Workers' Safety and Compensation Commission
Government of the Northwest Territories – Office of the Regulator of Oil and Gas	Yellowknives Dene First Nation
Golder Associates	
Government of Canada	

The Board requested that reviewers provide comments with respect to the Application and associated management plans. When the review was completed, comments were forwarded to the applicant for a response.

The Application is then assessed to determine if the activities are exempt from Part 5 of the MVRMA; if not, the Application moves to preliminary screening.

4.2.1 The Board's Role in Consultation

The Board's requirements for engagement are set out in its *Engagement and Consultation Policy*.[21] This Policy was developed to ensure that the Board's obligations for achieving meaningful consultation (as set out by the land claims and applicable legislation) with all affected parties, including Aboriginal groups in the Mackenzie Valley, are met and consultation results clearly articulated.

The core of the *Engagement and Consultation Policy* is as follows:

1) To require proponents to initiate dialogue and engagement planning with affected parties, particularly affected Aboriginal organizations/governments, in advance of an application with the goals of:
   - explaining the project;
   - identifying concerns and potential environmental impacts (including any potential for impacts to Aboriginal and treaty rights);
   - addressing concerns raised; and
   - ensuring appropriate levels and types of engagement are carried out over the life of an authorization or project.
2) To apply consultative approaches throughout a proceeding, which assist affected parties to meaningfully contribute to the assessment of impacts on the environment and the establishment of appropriate mitigations in order for the Boards to meet statutory responsibilities pursuant to the MVRMA and the *Waters Act* and their regulations.
3) To assist in ensuring, and if necessary, rule on, the adequacy of Crown consultation before making a final decision or recommendation, taking into account information gathered during proponent engagement and through its consultative processes.

4.2.2 Notifications and Initial Engagement

The following is a high-level summary of notifications and early engagement undertaken by NTPC for the Jackfish Power Generating Project. For more details on the timing of engagement activities, see material filed by NTPC in support of their Application.[22]

In accordance with the *Engagement and Consultation Policy* and associated guidelines, the Board requires proponents to engage with potentially affected parties prior to and during the operation of a project.[23] Engagement ensures that affected parties are able to develop an understanding of

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[21] See www.mvlwb.com → Resources → Policies and Guidelines: MVLWB Engagement and Consultation Policy (June 1, 2013).
[22] See NTPC Engagement Record (hyperlink) February 26, 2019
[23] See www.mvlwb.com → Resources → Policies and Guidelines: MVLWB Engagement and Consultation Policy (June 1, 2013).

a proposed project or component of a project, provide feedback during the engagement process on issuance of concern with regards to a project, and work towards building relationships with stakeholders that are operating in the area.[24]

NTPC included a record of engagement as part of the Application, which highlighted the engagement activities that took place prior to submitting the Application and a summary of the discussion topics. Where contact was made, the engagement record indicated that no concerns were raised.[25]

4.2.3 The Board's Process and Participation of Aboriginal Groups

Aboriginal communities and organizations were engaged throughout the review phase of the Board's process as well as on all public products of the Board's process.

*4.2.4 Views of the Boar*d

As noted above, in Section 4.2.2 (The Board's Role in Consultation), the Board's *Engagement and Consultation Policy* has three broad objectives: proactive engagement, facilitating the effective contributions of all reviewers, and Crown consultation.

Regarding the objective of proactive engagement, the Board has determined that the level of engagement by NTPC was adequate. In accordance with the *Engagement and Consultation Policy,* the MVLWB *Engagement Guidelines for Applicants and Holders of Water Licences and Land Use Permits* (Engagement Guidelines), NTPC initiated dialogue with Aboriginal organizations and governments starting in November 2018 and continuing through to February 8, 2019, prior to filing the Application with the Board on February 26, 2019.[26]

Regarding the objective of facilitating the effective contribution of all reviewers in the regulatory process, the Board has determined its process was sufficient and robust. The Board's process provided opportunities for the review of the Application, participation in a Technical Session, an opportunity to file written interventions, an opportunity for commenting on draft Licence conditions, and for Interveners to submit Closing Arguments.

Regarding the objective of Crown consultation, the Board has determined that the duty to consult in relation to matters within its jurisdiction has been satisfied. Administrative tribunals such as the Land and Water Boards under the MVRMA can rule on questions of law. The Board, therefore, has the authority, if necessary, to assess the adequacy of Crown consultation before making a final decision or making a recommendation to the responsible Minister and may use remedies available to it in addressing Aboriginal consultation issues.

In summation, the Board finds that parties were engaged throughout the Board's process. The Board's role in regard to the Crown's duty to consult was discharged in several ways, as identified

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[24] See www.mvlwb.com → Resources → Policies and Guidelines: MVLWB, Information for Proponents on the MVLWB's Engagement Requirements (2014).

[25] See NTPC – Engagement Log submitted with the Application (hyperlink) – dated February 26, 2019

[26] See www.mvlwb.com → Resources → Policies and Guidelines: MVLWB Engagement Guidelines for Applicants and Holders of Water Licences and Land Use Permits (September 2014).

above and as directed by its own Engagement Policy. The Board finds that Crown consultation has been adequate on the Application related to the Jackfish Power Generating project.

4.3 MVRMA Part 3 and 4 and *Waters Act*: Land and Water Regulation and MVLWB

The Board has jurisdiction to issue this Licence as per subsection 60(1.1) of the MVRMA.

4.3.1 General

The Board has considered the people and users of the Mackenzie Valley, and any traditional knowledge and scientific information that was made available to it during this regulatory proceeding, as per section 60.1 of the MVRMA.

4.3.2 Public Notice

Notice and copies of the Application were given to fulfill sections 63 and 64 of the MVRMA. The Board is satisfied that a reasonable amount of time was given to communities, First Nations, and the public to participate in this regulatory process to make submissions to the Board.

4.3.3 Water Use Fees

NTPC is exempt from paying fees for the right to use water and deposit waste due to the exemption in section 3 of the Waters Regulations because NTPC is a Crown corporation.

4.3.4 Existing Licences

With respect to 26(5)(a) of the *Waters Act*, no other Licensees contacted the Board during the statutory period, and there are no applicants with precedence in the watershed as per subsection 72.26(1) of the MVRMA/59(1) of the *Waters Act*. The Board is satisfied that the granting of this Licence will not adversely affect, in a significant way, any existing Licensee if compliance with the Licence occurs.

4.3.5 Compensation to Existing Water Uses

Paragraph 26(5)(b) of the *Waters Act* prohibits the issuance of the Licence unless the Board is satisfied that appropriate compensation has been or will be paid by the applicant to persons who would be adversely affected by the use of waters, or deposit of waste proposed by the applicant, at the time when the applicant filed its application with the Board.

The Board received no claims for compensation either during the prescribed period or afterwards. Provided compliance with the Licence conditions takes place, the Board finds that there are no water users or persons listed in paragraph26(5)(b) of the *Waters Act* who will be adversely affected by the use of waters or the deposit of waste proposed.

4.3.6 Water Quality Standards

With regards to 26(5)(c)(i) of the *Waters Act*, the Board is satisfied that compliance with the Licence conditions will ensure that waste will be collected and disposed of in a manner that will maintain water quality consistent with applicable standards

4.3.7 Effluent Quality Standards

There are no effluent quality standards prescribed in the Waters Regulations. The Board is satisfied that compliance with the Licence conditions will protect the receiving waters and environment.

4.3.8 Financial Responsibility

The Board must satisfy itself of the financial responsibility of NTPC per paragraph 26(5)(c) of the *Waters Act* before it can issue the Licence.

NTPC is a Crown Corporation under the Government of the Northwest Territories; therefore, the Board is confident that NTPC is capable of meeting any financial obligations set out in the *Waters Act* and Licence concerning the use of water and deposit of waste for industrial purposes for the Jackfish Power Generating project.

On April 11, 2012, NTPC submitted a letter to the Board indicating that NTPC became a Crown Corporation on May 4, 1988 when the Northern Canada Power Commission was acquired from Her Majesty the Queen in Rights of Canada by the Government of the Northwest Territories[27].

As a result, and for the reasons set out above, the Board is satisfied that the financial capacity of the Applicant, in this case, is adequate and meets the requirements of 26(5)(c) of the *Waters Act*.

4.3.9 Minimization of Adverse Effects

With regards to subsection 27(2) of the *Waters Act*, it is the opinion of the Board that compliance with the Licence will ensure that any potential adverse effects on other water users, which might arise because of the issuance of the Licence, will be minimized.

4.3.10 Time Limit

The Board is satisfied it has adhered to subsection 47(1) of the *Waters Act*, which requires it to make a decision within a period of nine months after the day on which an application is made or a notice advertised as per subsections 43(1) and 43(2) of the *Waters Act*.

4.4 MVRMA Part 5: Environmental Review

4.4.1 Preliminary Screening

On May 1, 2019, the Board met and conducted a preliminary screening of the activities associated with the Application, to fulfill subsection 124(1) of the MVRMA. As per paragraph 125(1)(a) of the MVRMA, the Board determined that the activities associated with the Application would not have a significant adverse impact on the environment and would not be a cause of public concern. The Board's Preliminary Screening Report includes its reasons for that decision and is available on the Board's public registry.[28] The Board is satisfied the proposed development has been screened pursuant to the MVRMA.

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[27] See Letter from NTPC relating to Crow Corporation – (hyperlink) – April 11, 2012
[28] See MVLWB Preliminary Screening and Reasons for Decision (hyperlink), dated May 1, 2019.

5.0 Decision – Water Licence MV2019L1-0001

In making its decision and preparing these Reasons for Decision, the Board has reviewed and considered:

1) The comments and recommendations made during the regulatory process;
2) The evidence and submissions from NTPC received by the Board;
3) The written comments and submissions from parties received by the Board; and
4) The Staff Report prepared for the Board.

Having due regard to the facts, circumstances, and the merits of the submissions made to it, and to the purpose, scope, and intent of the MVRMA and the *Waters Act*, the Board has determined that Licence MV2019L1-0001 should be issued, subject to the scope, definitions, conditions, and term contained therein. The Board's reasons for this decision are set out below.

The scope, definitions, conditions, and term set forth in the Licence have been developed to address the Board's statutory responsibilities and the concerns that arose during the regulatory process. The Reasons for Decision set out below focus on the major concerns and issues raised by parties, including those that were the subject of substantive argument submitted by one or more parties.

5.1 Term of Licence

NTPC has applied for a term of 20 years for the Licence as noted in their Application. NTPC stated at the Technical Session that the proposed term being requested is simply based on the longevity and stability of operations of the facility. NTPC also indicated that requesting the term would help keep electricity rates as low as possible for customers by minimizing regulatory costs.[29] Also during the Technical Session, a GNWT – ENR Water Resource Officer questioned why an even longer term was not requested as the Board has to ability to issue terms for longer. NTPC indicated that they would not object to a longer term than what they initially requested.[30]

Subsection 26(2) of the *Waters Act* allows for a Licence term of not more than 25 years or the duration of the undertaking. After reviewing the submissions made during this regulatory process, the Board has determined an appropriate term for this undertaking is 25 years.

5.2 Part A: Scope and Definitions

Part A of the Licence contains the scope and definitions for terms used throughout.

Scope

The scope of the Licence ensures the Licensee is entitled to conduct activities that have been applied for and screened by the Board. In setting out the scope of the Licence, the Board endeavoured to provide enough detail to identify and describe the authorized activities, without being unduly restrictive or prescriptive, and to allow for project flexibility throughout the life of the Licence.

Part A, conditions 1 through 3 are consistent with previous Licences issued by the Board. These conditions ensure that the scope of the authorization includes all water uses and deposits of waste associated with the Project, reflect and comply with all applicable legislation for the life of the

[29] See MVLWB Technical Session Transcripts (page 78) – (hyperlink) – May 2, 2019
[30] See MVLWB Technical Session Transcripts (page 79) – (hyperlink) – May 2, 2019

authorization, and consider and incorporate scientific and Traditional Knowledge where available in the Licensee's effort to protect the environment.

Definitions

The Board defined items in the Licence to ensure a common understanding of conditions, to avoid future differences in interpretation, and to use wording similar to that found in previously issued Licences.

During the review of the Licence it was noted by the reviewers that definitions have been included that are not applicable to the project such as construction, greywater, sewage, sump, toilet waste, and unauthorized discharge. These definitions have been removed from the Licence.

5.3 Part B: General Conditions and Schedule 1

Part B and Schedule 1 of the Licence contain general administrative conditions regarding compliance and conformity with the *Waters Act* that are reflective of current Board terminology and consistent with standard conditions found in previous Licences issued by the Board.

Part B, condition 4: Measure Water Use and Waste Discharge

The Board has updated this condition based on reviewer comments relating to providing clarity to the measuring and monitoring devices used.

Part B, condition 17: Engagement

The Board assesses engagement adequacy of applications through the Board's *Engagement Guidelines for Applicants and Holders of Water Licences and Land Use Permits*, and the Board's *Engagement and Consultation Policy*. The Board notes that NTPC's pre-engagement for the Application was determined to be in accordance with the Guidelines and Policy. NTPC included an Engagement Plan and Log in the Application.

The Board has approved the Engagement Plan as it meets the Board's Guideline and Policy, and sufficiently reflects the scope of the proposed activities.

Part B, condition 19: Notification – Non-Compliance

The Board has included this condition to assist the Board, Inspectors, and reviewers in tracking compliance.

Schedule 1: Annual Water Licence Report

During the review of the draft licence it was noted that under 1(g) there were a number of items that do not apply to the Project; therefore, the Board has removed 1(g) iii, iv, v, and vi.

5.4 Part C: Conditions Applying to Water Use

Part C of the Licence contains conditions related to water use for Jackfish Power Generating Project. These are consistent with standard conditions found in previous Licences issued by the Board.

The maximum quantity of water that can be withdrawn from Jackfish Lake is 50,000 m^3/day.

During the Technical Session NTPC indicated that average water use per day is around 16,400 m^3/day and the maximum water use for the facility based on full operating capacity is 50,000 m^3/day. NTPC noted that they are requesting keeping the water volume as currently authorized to act as a backup if a power line was to go down or if there was a low water event at the hydro-generation facilities.[31]

5.1 Part D: Conditions Applying to Modifications

Part D of the Licence contains conditions outlining when and how modifications of existing or planned physical works may be authorized. They ensure the Board and the Inspector are kept informed and have the opportunity to request more information or reject the proposed modification. This section relies on the definition of a modification, outlined in Part A, "does not include expansions, nor alternations of the purpose of function of a structure." These conditions are consistent with standard conditions found in previous Licences issued by the Board. The purpose of Part D is to streamline the process for authorizing modifications and ensure that any proposed changes to structures that might be outside the scope of the Licence are brought to the Board's attention.

5.2 Part E: Conditions Applying to Waste and Water Management

Part E of the Licence contains conditions applying to waste and water management activities for the Jackfish Power Generating Project and are consistent with standard conditions included in previous Licences issued by the Board. Site-specific conditions were developed where necessary.

Part E, condition 1 sets out the objectives for the management of water and waste for the Jackfish Power Generating Project. This condition is consistent with the principles of objective-based regulation: it essentially defines the objectives of any required management actions, plans or reports. This condition is standard for Licences issued by the Board and reminds the Licensee of the need to manage water and waste with the goal of minimizing impacts on the receiving environment.

Part E, condition 2: Waste Management Plan

The Board's authority to regulate the management of waste is described in subsection 26(1) of the MVLUR and sections 11 and 27 of the *Waters Act*. As such, the Board developed and approved the *Guidelines for Developing a Waste Management Plan*.[32] These guidelines can be applied to a wide range of projects and are intended to ensure that all waste management activities specific to each project are carried out in a way that is consistent with best practices and applicable guidelines to minimize waste released from the Project. Waste Management Plan is a defined term in the Licence, ensuring that this required Plan adheres to the Board's Guidelines.

Submittal and compliance with a Waste Management Plan is standard for Licences issued by the Board. NTPC included a Waste Management Plan in the Application. The Board has approved the Waste Management Plan because it meets the Board's *Guidelines for Developing a Waste Management Plan*, and sufficiently reflects the scope of the proposed activities.

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[31] See MVLWB Technical Session Transcripts pg 70 (hyperlink) – May 2, 2019

[32] See www.mvlwb.com → Resources → Policies and Guidelines: *MVLWB Guidelines for Developing a Waste Management Plan* (March 31, 2011).

Part E, condition 4: Daily Inspections of Discharge Locations

The Board has removed this condition as it was noted during the review of the draft conditions that the discharge locations are under water and, therefore, the condition is not applicable.

Part E, conditions 6 and 7 and Schedule 2, conditions 1 and 2: Thermal Plume Delineation Study Design Plan and Thermal Plume Delineation Study Report

Part E, conditions 6 and 7 and Schedule 2, conditions 1 and 2, outline the requirements for a Thermal Plume Delineation Study Design Plan (Design Plan) and a Thermal Plume Delineation Study Report (Report) to be filed with the Board. The Design Plan and Report are required by the Licence to assist in the establishment of the Aquatic Effects Monitoring Program (AEMP).

During the initial review of the application, ECCC recommended that NTPC provide information relating to the details of facility discharge management (e.g., discharge method(s), rates, volumes, frequency, duration, locations), identification of mitigations currently in place to minimize the effects of thermal discharges on the aquatic receiving environment, as well as identify potential mitigation options to further minimize the effects of thermal discharges on the aquatic receiving environment[33]. During the May 2, 2019 Technical Session, ECCC requested additional information relating to the aquatic habitat types in the vicinity of the discharges and potential thermal-related effects on fish. NTPC indicated that the information was not available at the time of the Application, that baseline work has begun, and that they would be open to completing a further study to gather the additional information.[34] An assessment of aquatic habitat within the thermal plume zone has been included as a requirement under Schedule 2, condition 1.

During the May 2, 2019 Technical Session, discussion regarding the potential influence of additional development on Jackfish Lake, the current trophic status, and recently documented algal blooms occurred.[35] In 2018, NTPC completed a comprehensive environmental monitoring program to characterize the existing conditions within Jackfish Lake (Golder 2019)[36]. Results of this monitoring program suggest that it was unlikely that the cyanobacterial bloom was a thermal-related effect; however, given the uncertainty, additional chemical characterization to further support the development of the AEMP Design Plan is required. A minimum of one station should be located near the inflow areas, but outside of the thermal plume, to assess the potential influence of other anthropogenic effects unrelated to the Jackfish Power Generating Project and determine if the thermal plume is contributing to the formation of the cyanobacterial bloom. An additional station should be located at the outflow area to better define the potential influence the Jackfish Lake outflow may have on the downstream Yellowknife Bay of Great Slave Lake.

[33] See Comment Summary Table – ECCC (hyperlink) – April 16, 2019
[34] See Technical Session Transcripts pg. 36-48 (hyperlink) – May 2, 2019
[35] See Technical Session Transcripts pg. 27-34 (hyperlink) – May 2, 2019
[36] See Golder Associates Ltd. 2019. 2018 Environmental Monitoring Report Jackfish Lake Generating Facility. Submitted to Northwest Territories Power Corporation. 105 pp + appendices- (hyperlink) – February 26, 2019

5.3 Part F: Conditions Applying to Aquatic Effects Monitoring Program and Schedule 3

Part F and Schedule 3 of the Licence contain conditions applying to the AEMP for the NTPC Jackfish Power Generating Project. The Board has set out the standard conditions for the submission of an AEMP Design Plan, an AEMP Annual Report, a periodic AEMP Re-evaluation Report, a revised AEMP Design Plan (as required based on the conclusions of the AEMP Re-Evaluation Report) and AEMP Response Plans (as needed). More detailed information requirements for each condition are set out in Schedule 3. The AEMP should be designed in accordance with the applicable guidelines.[37,38,39]

At the May 2, 2019 Technical Session, GNWT-ENR recommended that an AEMP be developed and consideration be given to including sampling under late ice-covered conditions (e.g., April) to document potential issues related to low dissolved oxygen concentrations.[40] ECCC had further questions in relation to low dissolved oxygen levels and potential impacts on fish within Jackfish Lake.[41]

NTPC included a draft Licence as part of the Application, which included a condition requiring the submission of an AEMP Design Plan for approval within 90 days of Licence issuance. Due to the nature of the deposited waste being restricted to thermal waste only, the Board determined that a Thermal Plume Delineation Study Design and Report would be required to verify the appropriate extent of monitoring thermal in Jackfish Lake. Results from the Thermal Plume Delineation Study Report will be used to inform the AEMP Design Plan. The requirement for the Thermal Plume Delineation Study to be completed results in a delay in the submission of the AEMP Design Plan (i.e., 90 days after the submission of the Thermal Plume Delineation Study Report). Although this delays the AEMP Design Plan approval, and in turn the AEMP implementation, the Board recognizes that an understanding of the thermal plume is required to properly design an appropriate AEMP. Additional information gathered through the chemical characterization at the inflow and outflow of Jackfish Lake, which will be completed as part of the Thermal Plume Delineation Study, will also be used to confirm if additional parameters and stations are required as part of the AEMP.

5.4 Part G: Conditions Applying to Contingency Planning

Part G of the Licence contains conditions related to spill contingency planning and reporting, reclamation of spills and unauthorized discharges, and emergency response for the Jackfish Power Generating Project. The purpose of this part is to ensure that NTPC is fully prepared to respond to spills and unauthorized discharges. The planning and reporting requirements in this part ensure that NTPC has identified the lines of authority and responsibility, has an action plan(s) for responses to spills and unauthorized discharges, and has established reliable reporting and communication procedures. This will ensure that any spills or unauthorized discharges are effectively controlled and cleaned up, with the goal of preventing or limiting damage to the receiving environment. The

[37] See Guidelines for Aquatic Effects Monitoring Program (MVLWB & GNWT 2019) – (hyperlink) - 2019
[38] See Draft Guidelines for Adaptive Management – A Response Framework for Aquatic Effect Monitoring (hyperlink) - 2010
[39] See Guidelines for Designing and Implementing Aquatic Effects Monitoring Programs for Development Project in the Northwest Territories (hyperlink) - 2009
[40] See Technical Session Transcripts pg. 35 and pg. 36 (hyperlink) – May 2, 2019
[41] See Technical Session Transcripts pg. 39 to pg. 40 (hyperlink) – May 2, 2019

conditions in Part G are consistent with standard conditions found in previous Licences issued by the Board.

Part G, condition 2: Spill Contingency Plan

Spill Contingency Plan is a defined term in the Licence, referencing the Indian and Northern Affairs Canada's *Guidelines for Spill Contingency Planning*.[42] NTPC included a Spill Contingency Plan in the Application.

The Board has approved the Spill Contingency Plan because it sufficiently meets the guidelines and reflects the scope of the proposed activities.

5.5 Part H: Conditions Applying to Closure and Reclamation and Schedule 4

Part H and Schedule 4 of the Licence contain conditions applying to closure and reclamation of the Jackfish Power Generating Project.

As outlined in the Application, NTPC noted that the power generating system is a standby plant for the North Slave System and that this system in not anticipated to close or be decommissioned. NTPC submitted a Conceptual Abandonment and Restoration Plan, which outlines a brief closure plan for the facility. Although the facility is not anticipated to close, the requirement for a Closure and Reclamation Plan for the facility is needed to address the potential closing of the facility.

The Board notes that all Closure and Reclamation Plans (including Interim and Final) shall be in accordance with the Mackenzie Valley Land and Water Board and Aboriginal Affairs and Northern Development Canada's *Guidelines for the Closure and Reclamation of Advances Mineral Exploration and Mine Sites in the Northwest Territories* (Closure Guidelines)].[43] While the Board acknowledges that the Jackfish Power Generating Project is not this type of project, these guidelines can still be applied to the project in principle.

Part H, condition 1 and Schedule 4, condition 1 requires NTPC to submit an Interim Closure and Reclamation Plan to the Board within 24 months following the effective date of this Licence. This is a standard requirement of a Licence issued by the Board and will ensure the Project is reclaimed in accordance with established guidelines and expectation of reviewers and the Board.

Part H, condition 2, requires NTPC to submit an updated Interim Closure and Reclamation Plan to the Board for approval two years prior to the expiration of the Licence.

5.6 Annex A: Surveillance Network Program

Annex A of the Licence contains conditions applying to the Surveillance Network Program (SNP). The SNP details the sampling and monitoring requirements for compliance with numerous conditions and plans required by the Licence. Requirements for measuring flows, volumes, and meteorological data are based on standard water licence conditions as are the reporting requirements.

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[42] See www.mvlwb.com → Resources → Policies and Guidelines: *INAC Guidelines for Spill Contingency Planning* (2007).

[43] See www.mvlwb.com → Resources → Policies and Guidelines: *MVLWB/AANDC Guidelines for the Closure and Reclamation of Advances Mineral Exploration and Mine Sites in the Northwest Territories* (2013).

5.7 Annex B: Table of Submissions

Annex B of the Licence contains a table that summarizes the information NTPC is required to submit as required by the Licence conditions.

5.8 Annex C: Table of Revision History

Annex C of the Licence contains a table that identifies updates and tracks changes made to the Licence. This table is currently blank because this is a new Licence, but it will be updated throughout the life of the Licence.

6.0 Conclusion

Subject to the scope, definitions, conditions, and terms set out in the Licence, and for the reasons expressed herein, the MVLWB is of the opinion that the water use, and waste disposal associated with the Jackfish Power Generating Project can be completed by NTPC while providing for the conservation, development, and utilization of waters in a manner that will provide the optimum benefit for all Canadians and in particular for the residents of the Mackenzie Valley.

Water Licence MV2019L1-0001 contains provisions that the Board deems necessary to ensure and monitor compliance with the MVRMA, *Waters Act*, and the Regulations made thereunder, and to provide appropriate safeguards in respect of NTPC's use of the land and water affected by the Licence.

SIGNATURE

Mackenzie Valley Land and Water Board

Mavis Cli-Michaud, Chair

September 26, 2019

Date

General Procedures for the Administration of Licences
Issued Under the *Waters Act*
in the Northwest Territories

1. At the time of issuance, a copy of the Licence is placed on the Public Registry in the office of the Mackenzie Valley Land and Water Board (MVLWB or the Board) in Yellowknife and is then available to the public.

2. To enforce the terms and conditions of the Licence, the Minister of Environment and Natural Resources has appointed Inspectors in accordance with subsection 65(1) of the *Waters Act*. The Inspectors coordinate their activities with staff of the MVLWB. The Inspector responsible for Licence MV2019L1-0001 is located in the North Slave office.

3. To keep the MVLWB and members of the public informed of the Licensee's conformity to the Licence's conditions, the inspectors prepare reports which detail observations on how each item in the Licence has been met. These reports are forwarded to the Licensee with a covering letter indicating which action, if any, should be taken. The inspection reports and cover letters are placed on the Public Registry, as are any responses received from the Licensee pertaining to the inspection reports. It is therefore of prime importance that you react in all areas of concern regarding all inspection reports so that these concerns may be clarified.

4. Licence MV2019L1-0001 will expire on October 17, 2044, if required; it is the responsibility of the Licensee to apply to the MVLWB for a new licence. The past performance of the Licensee, new documentation and information, and points raised during a public hearing, if required, will be used to determine the terms and conditions of any new licence. Please note that if the Licence expires and another has not been issued, then water and waste disposal must cease, or you, the Licensee, would be in contravention of the *Waters Act*. For a Type A Licence, an application for a new licence shall be made at least one year in advance of the Licence's expiry date. In the case of a Type B Licence, an application shall be made at least six months in advance of the Licence's expiry date.

5. If, for some reason, Licence MV2019L1-0001 requires amendment, a public hearing may be required. You are reminded that applications for amendments should be submitted as soon as possible to provide the MVLWB ample time to complete the amendment process. The process may take up to six months or more depending on the scope of the amendment requested.

6. Specific clauses of your Licence make reference to the Board, Analyst, or Inspector. The contact person, address, phone, and fax number of each is:

Mackenzie Valley Land and Water Board:

Public Registry Clerk
Mackenzie Valley Land and Water Board
7th Floor - 4922 48 Street,
P.O. Box 2130
YELLOWKNIFE NT XIA 2P6
Phone: (867) 669-0506
Fax: (867) 873-6610

Analyst:

Street Address:
Taiga Environmental Laboratory
4601 – 52nd Ave
Yellowknife, NT
X1A 1L4

Mailing Address:
Taiga Environmental Laboratory
P.O. Box 1320
Yellowknife, NT
X1A 2L9

Phone: (867) 767-9235, ext 53151
Fax: (867) 920-8740
General Email: taiga@gov.nt.ca

Inspector:

Water Resource Officer (Inspector)
North Slave Regional Office
Department of Environment and Natural Resources
Government of the Northwest Territories
Box 2668
YELLOWKNIFE NT X1A 2P9
Phone: (867) 873-7443
Fax: (867) 873-6230