



ANNUAL REPORT

2021

Northwest Territories Power Corporation
Jackfish Power Generation Facilities

Water Licence No.: MV2019L1-0001

SUBMITTED TO:
MACKENZIE VALLEY LAND AND WATER BOARD

APRIL 2022



TABLE OF CONTENTS

List of Tables	ii
List of Figures	ii
List of Abbreviations	iii
Table of Concordance	iv
1 Introduction	1
2 Project Activities	4
3 Surveillance Network Program	4
4 Water Usage Records	7
5 Calibration and Status of Metres and Devices	11
6 Engagement	12
7 Modifications and Major Maintenance	13
8 Management Plans	13
8.1 Operations, Maintenance and Surveillance Manual	13
8.2 Waste Management	13
8.3 Closure and Reclamation	13
9 AEMP Monitoring Results	14
9.1 Thermal Plume Delineation Study	14
10 Spills	15
10.1 Spill Training Exercises	15
10.2 Spill Communications	15
10.3 Unauthorized Discharges	15
11 Regulatory	16
11.1 Submissions	16
11.2 Outstanding Submissions and Non-Compliance(s)	16
11.3 Groundwater Monitoring	17
11.4 Annual Water Licence Inspection	17
12 Other Board Requests, submissions and issuances	17
Closure	
Appendix A – Surveillance Network Program Data	A-1
Appendix B – Groundwater Monitoring Report	B-1
Appendix C – Regulatory Correspondence	C-1

LIST OF TABLES

Table 3-1 SNP Station 00-1	4
Table 3-2 SNP Station 00-2	5
Table 3-3 SNP Station JF01-06	5
Table 3-4 SNP Station MW2	5
Table 4-1 2021 Monthly and Annual Water Use at the Jackfish Facility	11
Table 12-1 Summary of Key Conditional Submissions Required	16

LIST OF FIGURES

Figure 1-1 Jackfish Hydroelectric Power Generation Facility Location	2
Figure 1-2 Jackfish Facility.....	3
Figure 4-1 Mean Daily Water Temperature Recorded at the SNP Stations Monitoring K Plant in 2021.....	8
Figure 4-2 Mean Daily Water Temperatures Recorded at the SNP Stations Associated with EMD Plant in 2021	9
Figure 4-3 Mean Daily Water Temperatures Recorded at SNP Stations Associated with CAT Plant in 2021	10

LIST OF ABBREVIATIONS

AEMP	Aquatic Effects Monitoring Program
CRP	Closure and Reclamation Plan
ENR	Department of Environment and Natural Resources
GNWT	Government of Northwest Territories
MVLWB	Mackenzie Valley Land and Water Board
NTPC	Northwest Territories Power Corporation
NWT	Northwest Territories
OMS	Operations, Maintenance, and Surveillance
SNP	Surveillance Network Program
WMP	Waste Management Plan

TABLE OF CONCORDANCE

The following Table of Concordance has been provided for Northwest Territories Power Corporation (NTPC) to track conditions for Water Licence No.: MV2019L1-0001, how they have been addressed in 2021, and a reference report discussed.

Source* and Topic	Comment	2021 Addressed
SNP Monitoring requirements*	Monitoring in 2020 at SNP stations JF01-06 and MW2 was non-compliant for the following reasons: 1. Not all required parameters were measured; 2. The collected water samples were not analyzed for all required analytes; and 3. The June 2020 monitoring event was not done.	NTPC developed the Jackfish Lake 2021 Groundwater Monitoring Program Plan which outlines: 1. Parameters for analysis. 2. Analytes specified for each SNP Station; 3. The monitoring schedule in accordance with the Licence; and 4. Guidance for conducting the monitoring in accordance with best practices.
Missing Reports**	Thermal Plume Delineation Study Design	NTPC submitted to the MVWLB the Thermal Plume Delineation Study Design on July 15, 2020. The MVLWB approved the submission on Oct. 9, 2020. NTPC was not able to meet the schedule in the approved study. An additional request for deferral of submission dates under MV2019L1-0001 was approved by the MVLWB on April 29, 2021. As per the updated Schedule in MV2019L1-0001 NTPC submitted the Thermal Plume Delineation Study Design V2.1 on May 28, 2021
Missing Reports**	Annual Water Licence Report 2019	Annual Water Licence Report 2019 was submitted January 8, 2021
Missing Reports**	Surveillance Network Program Monthly Monitoring Reports for: 2019: Nov., Dec. 2020: Jan. to Dec.	NTPC submitted to the MVLWB all outstanding SNP Monthly Reports on Jan. 29, 2021.
Missing Reports**	Standard Operating Procedures and Quality Assurance and Quality Control Plan	NTPC submitted to the MVLWB the Operations, Maintenance, and Surveillance Manual on Feb. 26, 2021. Updated Report outstanding

Source* and Topic	Comment	2021 Addressed
Missing Reports**	Thermal Plume Delineation Study Report (to be submitted after the design)	NTPC requested deferral of the Thermal Plume Delineation Study report submission until Jan. 30, 2023. The MVLWB approved the deferral request on April 29, 2021.
2020 Annual Report	2020 Annual Report not submitted by deadline (March 31, 2021)	The 2020 Annual Report not submitted by deadline of March 31, 2021. On March 26, 2021 NTPC requested an extension of the deadline to May 31, 2021 which was approved by the MVLWB. NTPC submitted the 2020 Annual Water Licence Report to ENR & MVLWB on May 31, 2021
Missing Reports**	Aquatic Effects Monitoring Program Design Plan	NTPC requested deferral of the AEMP Design Plan submission until Apr. 30, 2023. The MVLWB approved the deferral request on April 29, 2021.
SNP Monitoring requirements*	Jackfish Lake Instrumentation Study to be completed to ensure instrumentation changes confirm to the specifications in MV2019L1-0001 Annex A, Part B	NTPC submitted to the MVLWB the completed Study on Apr. 24, 2020. NTPC will have updated monitoring equipment operational by August 31, 2021.

* Email from Heather Beck, Water Resource Officer, ENR, provided to Matthew Miller, Senior Regulatory Specialist, NTPC, on January 12, 2021.

**Email from Heather Beck, Water Resource Officer, ENR, provided to Matthew Miller, Senior Regulatory Specialist, NTPC, on January 28, 2021.

1 INTRODUCTION

This 2021 Annual Report has been prepared for submission by Northwest Territories Power Corporation (NTPC) to Mackenzie Valley Land and Water Board (MVLWB) as part of the requirements of Type A Water Licence No.: MV2019L1-0001 (Water Licence) for operations between January 1 and December 31, 2021. The previous water licence was renewed in 2019, and this Water Licence became effective October 18, 2019, and will expire on October 17, 2044. This Water Licence regulates the use of water and deposit of waste for industrial activities at Jackfish Hydroelectric Power Generation Facility (Jackfish Facility), which includes the withdrawal of water for the cooling of the power generators, depositing of waste and progressive reclamation and associated closure and reclamation activities.

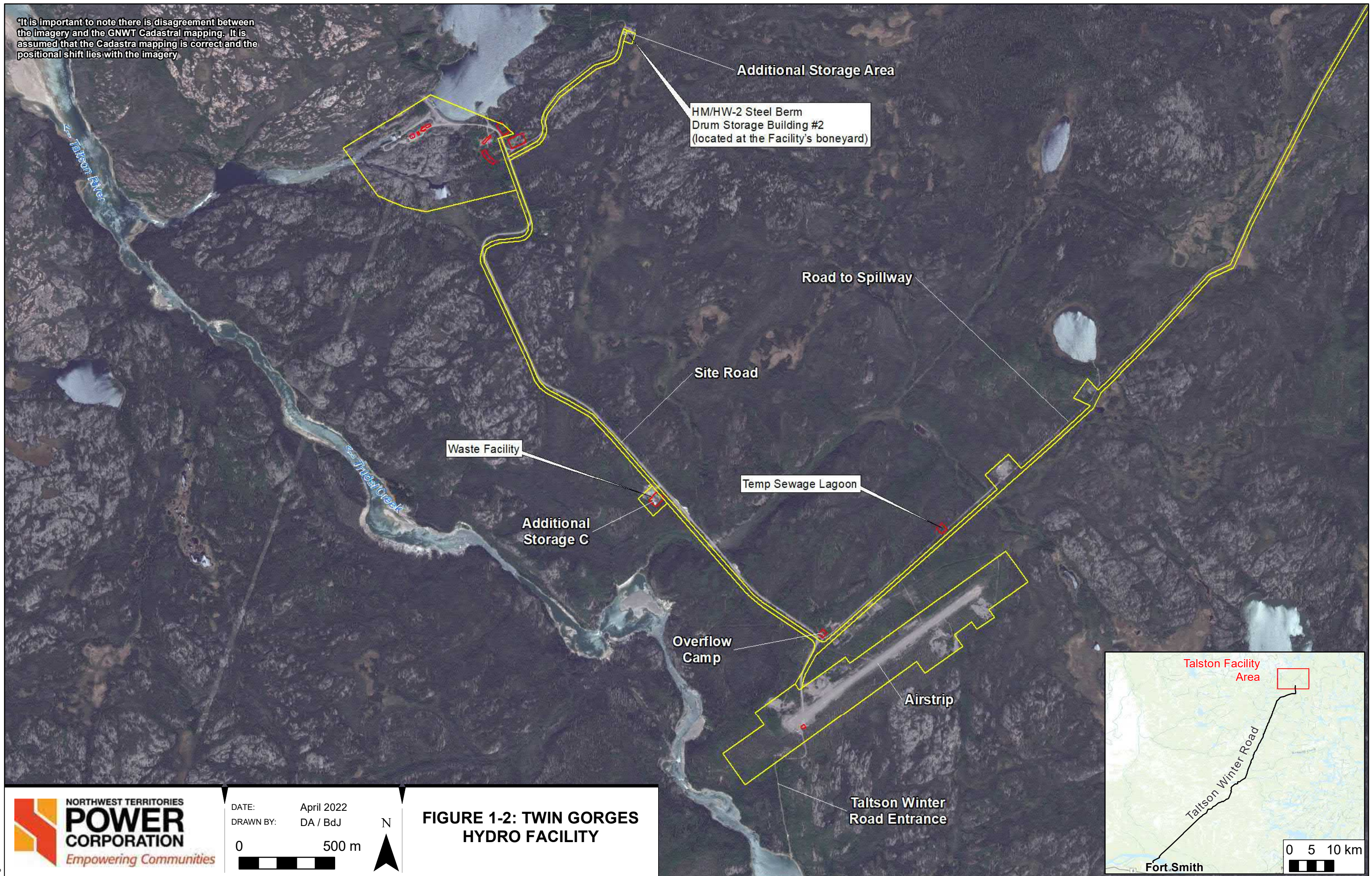
The NTPC operates the Jackfish Facility on Jackfish Lake, near Yellowknife, Northwest Territories (NWT). The facility is a diesel-operated electricity generation station, and through the Water Licence, NTPC uses water from Jackfish Lake to cool the facility generators.

There are four water intakes on Jackfish Lake (two intakes for K Plant cooling and one each for EMD Plant and CAT Plant). After the water is used for cooling, it is returned to Jackfish Lake via three discharges. NTPC operated the Jackfish Facility for standby and continuous power during the 2021 calendar year.

Figure 1-1 shows the location of the Jackfish Facility location. Figure 1-2 shows the Jackfish Facility.



*It is important to note there is disagreement between the imagery and the GNWT Cadastral mapping. It is assumed that the Cadastra mapping is correct and the positional shift lies with the imagery



2 PROJECT ACTIVITIES

No significant operational projects were undertaken in 2021 outside of the installation of the Jackfish Water Monitoring Project flow meter equipment.

The project activities that occurred at the Jackfish Facility in 2021 include the following:

- Jackfish Water Monitoring Project - Installation of flow meter instrumentation.
- SCADA Scoping & Energy Management – upgrade work continues on NTPC’s SCADA system used to monitor hydro and diesel plants.
- Control Replacement – Work was completed in 2021 to replace and update the electrical cabinets controlling the diesel generation units.

The planned roof upgrade and installation of a fall restraint at the CAT Plant was deferred again in 2021 due to COVID isolation requirements in place over the summer of 2021. Work will be completed in 2022.

3 SURVEILLANCE NETWORK PROGRAM

The details of the Surveillance Network Program (SNP) for the Jackfish Facility are provided in Tables 3-1, 3-2, 3-3, and 3,4. The tabulated temperature data and laboratory results are provided in Appendix A, and appended in digital format (.xlsx file) for submission to MVLWB

Table 3-1 SNP Station 00-1

Detail	SNP 00-1
Description	SNP 00-1 a,b,c,d – Intakes to the K (2 intakes), EMD (1 intake), and CAT (1 intake) plants
Location	<ul style="list-style-type: none"> • 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 <i>in-situ</i> measurements during discharge to Jackfish Lake
Sampling Parameters	Water temperature (°C) Flow (daily, monthly, and annual volumes in m ³)

Table 3-2 SNP Station 00-2

Detail	SNP 00-2
Description	SNP 00-2 a,b,c,d – Discharges from the K, EMD and CAT plants
Location	<ul style="list-style-type: none"> • 00-2a – K plant • 00-2b – EMD • 00-2c – CAT plant
Sampling Frequency	Continuous <i>in-situ</i> measurements during discharge to Jackfish Lake
Sampling Parameters	Water temperature (°C)

Table 3-3 SNP Station JF01-06

Detail	SNP JF01-06
Description	JF01-06 – Groundwater monitoring well
Location	Located at the lease boundary near the lakeshore near the warehouse near K Plant
Sampling Frequency	Sampled twice a year during June and September
Sampling Parameters	<p>Field parameters: pH, electrical conductivity, temp (°C), dissolved oxygen.</p> <p>Lab parameters: Major ions, total suspended solids (TSS), oil & grease (hexane extractable), pH, total petroleum hydrocarbons (F1-F4 CCME Fractions), benzene, toluene, ethylbenzene, and xylene (BTEX), dissolved metals (aluminum, antimony, arsenic, barium, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, thallium, uranium, and zinc)</p>

Table 3-4 SNP Station MW2

Detail	SNP MW2
Description	MW2 – Groundwater monitoring well
Location	Located at the lease boundary near the lakeshore between the EMD Plant and the CAT Plant
Sampling Frequency	Sampled twice a year during June and September
Sampling Parameters	<p>Field parameters: pH, electrical conductivity, temp (°C), dissolved oxygen.</p> <p>Lab parameters: Major ions, total suspended solids (TSS), oil & grease (hexane extractable), pH, total petroleum hydrocarbons (F1-F4 CCME Fractions), BTEX, dissolved metals (aluminum, antimony, arsenic, barium,</p>

Detail	SNP MW2
	boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, thallium, uranium, and zinc)

Groundwater samples were collected at SNP Stations JF01-06 and MW2 on two sampling events (July and September) and shipped to ALS Environmental (ALS) in Edmonton, AB, for laboratory analysis. July samples were collected on July 16, 2021, and analyzed on July 21-23, 2021, under Lab Work Order #YL2100787 (Appendix B, Groundwater Monitoring). September samples were collected on September 28 and analyzed on October 1-5, 2021 under Lab Work Order #YL2101418 (Appendix B, Groundwater Monitoring). ALS is a CALA-accredited analytical laboratory (CALA Member Number 1352).

The water samples were analyzed for the following analytes:

- Field parameters (pH, electrical conductivity, temperature, dissolved oxygen);
- Major ions;
- Total suspended solids;
- Benzene, toluene, ethylbenzene, and xylene (BTEX) and petroleum hydrocarbon (PHC) fractions F1 through F4;
- Petroleum hydrocarbons;
- Oil and grease (hexane extractable);
- pH; and
- Dissolved metals.

The Jackfish Lake Instrumentation Study was completed to ensure instrumentation changes confirm to the specifications in MV2019L1-0001 Annex A, Part B and submitted to the MVLWB on Apr. 24, 2020. NTPC committed to installing the updated monitoring equipment by August 31, 2021.

In January 2021 NTPC installed temperature loggers for cooling water used in some of NTPC's diesel plants at Jackfish Lake. The flow measuring equipment, to measure the flow of water being used to cool the gensets, originally purchased was not the correct equipment for the application. NTPC had to order new flow transducers and flow meters. This equipment was installed at each of the facility intake and discharge points for the majority of NTPC's generation units by October 4, 2021. Due to delays in delivery times for the new equipment, the project was completed one month later than anticipated. The flow loggers for the second Mirrlees Blackstone unit in the K-Plant is on order and will be installed in the summer of 2022. In-lake loggers were installed by Golder on October 5, 2021.

NTPC is working with Golder Associates Ltd. on the Thermal Plume Study Design to create a database using the temperature and engine running hours for the month of September 2021 to develop the information required for the Jackfish Lake Thermal Plume Study Design. The equipment began reporting data as soon as it was operational. NTPC uses a database to collect information from the system twice a day. The data logger pulls temperature and flow information in 15-minute intervals.

4 WATER USAGE RECORDS

In-situ water temperature data are continuously recorded by electronic dataloggers 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 – 00-2a;
- EMD Plant Discharge – 00-2b; and
- CAT Plant Discharge – 00-2c.

2021 mean daily water temperature records for the intakes and discharge from K Plant, EMD Plant, and CAT Plant are presented on Figure 4-1, Figure 4-2, and Figure 4-3, respectively. Tabulated data of the mean daily water temperature are provided in Appendix A, Surveillance Network Program Data and appended to this Annual Report in Microsoft Excel (.xlsx) digital format. The monthly and annual water use by the Jackfish Facility are summarized in Table 4-1. Flow information is not available prior to October 4, 2021 as data logger equipment was installed at each of the facility intake and discharge points for the majority of NTPC's generation units by October 4, 2021. The flow loggers for the second Mirrlees Blackstone unit in the Kplant is on order and will be installed in the summer of 2022.

Per Condition C.1 of the Licence, the daily water use did not exceed 50,000 m³ during the period October 4 to December 31, 2021.

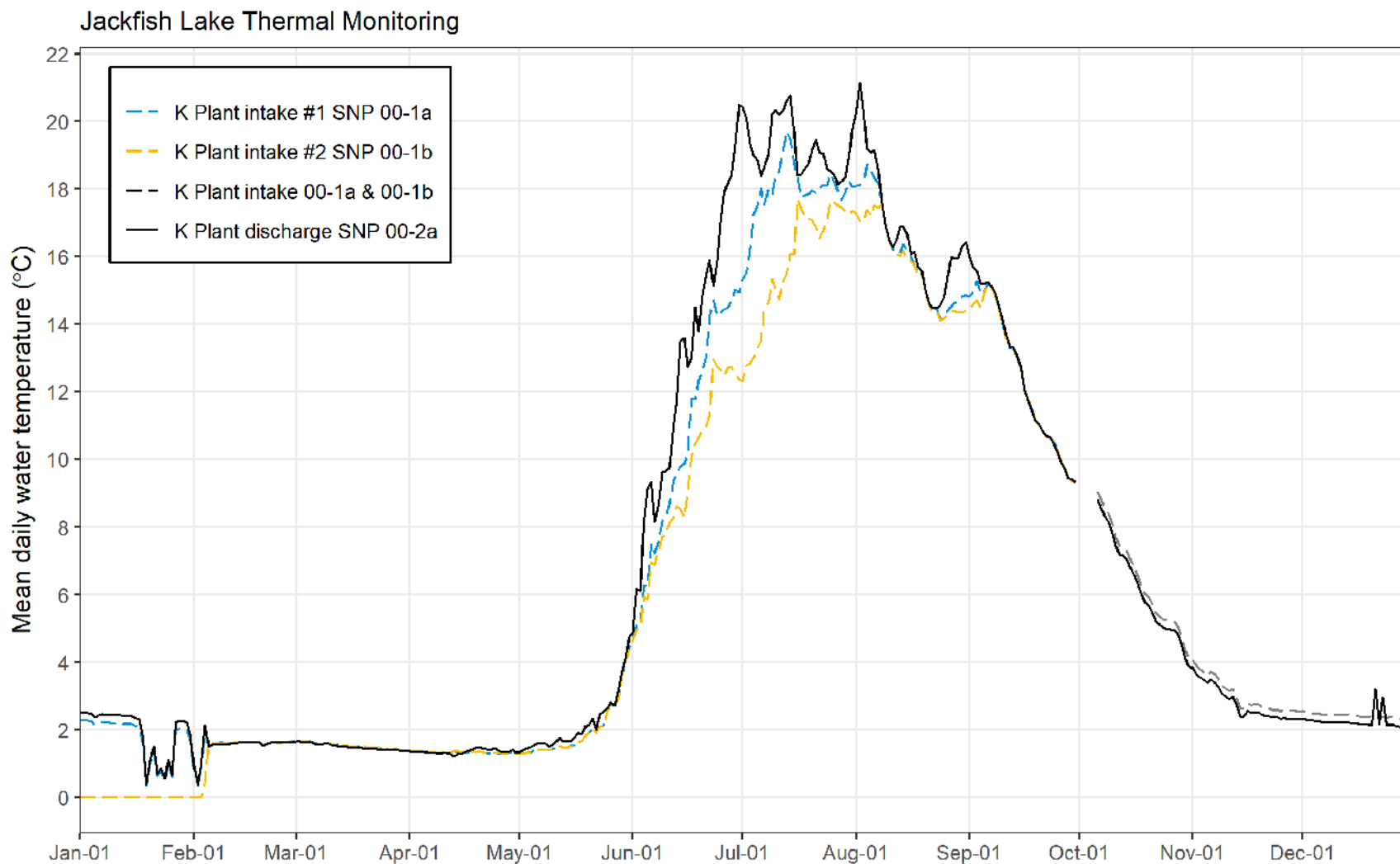


Figure 4-1 Mean Daily Water Temperature Recorded at the SNP Stations Monitoring K Plant in 2021

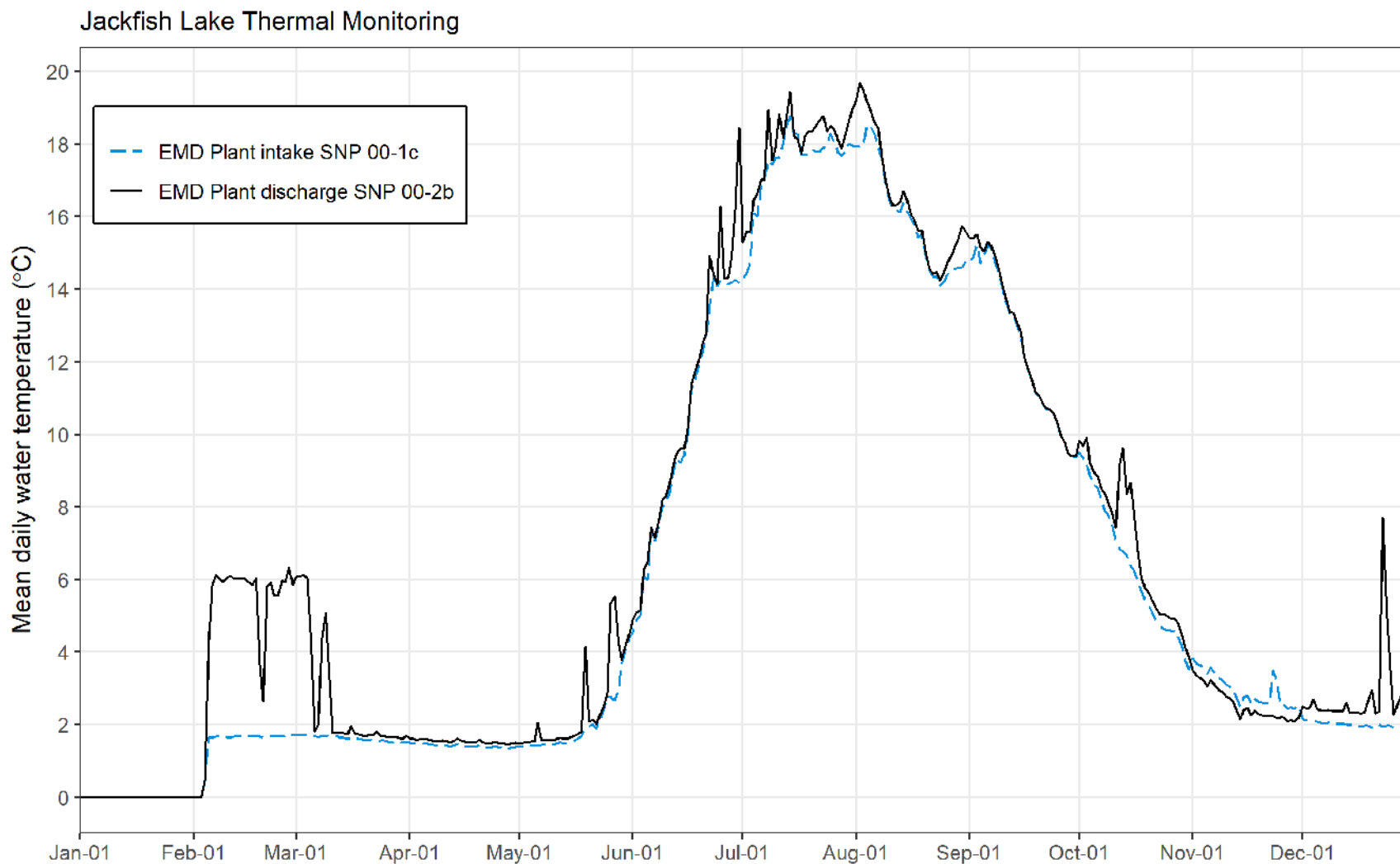


Figure 4-2 Mean Daily Water Temperatures Recorded at the SNP Stations Associated with EMD Plant in 2021

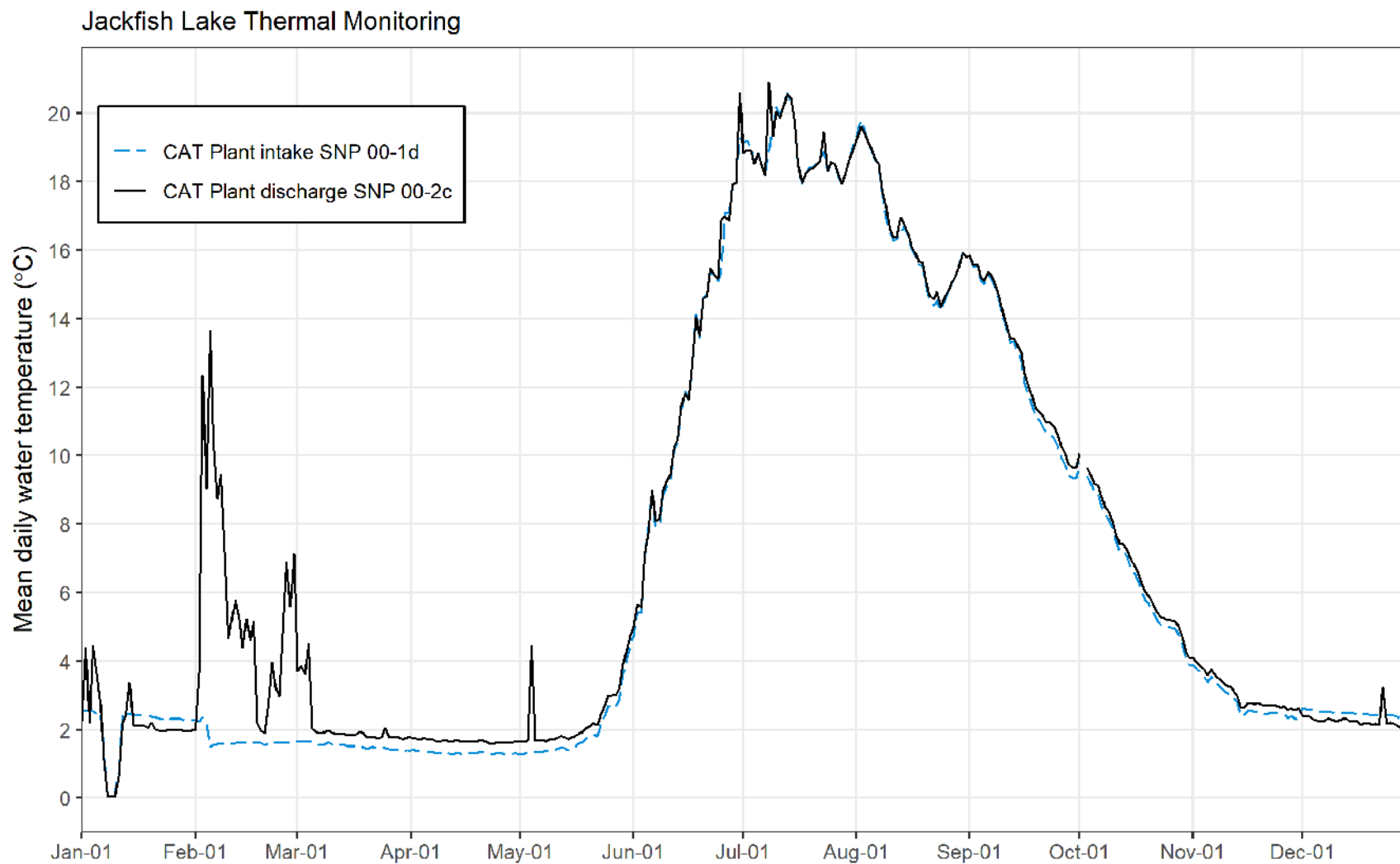


Figure 4-3 Mean Daily Water Temperatures Recorded at SNP Stations Associated with CAT Plant in 2021

Table 4-1 2021 Monthly and Annual Water Use at the Jackfish Facility

Month	Mean Daily (m ³)	Monthly Total (m ³)
January	-	-
February	-	-
March	-	-
April	-	-
May	-	-
June	-	-
July	-	-
August	-	-
September	-	-
October	18,405	570,553
November	18,726	561,781
December	18,833	583,641
Annual	-	-

Note: - Data not collected

5 CALIBRATION AND STATUS OF METRES AND DEVICES

The flow transducer installed is the Endress & Hauser Flowmeter Promag W400. The temperature transducer is the Endress & Hauser RTD assembly in Thermowell TH13.

These transducers send data through their respective transmitters to the datalogger which retrieves data from the transmitter every 15 minutes. The IT database retrieves data from the datalogger approximately twice per day. These transducers do not require calibration.

NTPC completed high order reasonability tests between October and December 2021 to ensure the devices were installed and working correctly. NTPC compared the temperature differential between the intake and output from day to day. When the diesel units were running, it was confirmed that the temperature was higher than periods when the units were not running. NTPC also tested the flow data against its historical calculations, which were based on pump name plate information and represented maximum expected water flows. Water flow information from the new loggers was lower than the name plate calculations expected.

6 ENGAGEMENT

NTPC openly engages with potential adversely affected water users, and the general public regarding the North Slave electrical system by:

- Providing information about electricity generation, transmission and distribution on the NTPC website (www.ntpc.com);
- Providing information about outages, safety, employment opportunities, community investments and other matters through:
 - NTPC Facebook page (<https://www.facebook.com/NTPC-Northwest-Territories-Power-Corporation-591764887576712/>);
 - Twitter (https://twitter.com/ntpc_news?lang=en);
- Issuing news releases on significant issues;
- Having NTPC staff attend trade shows, conferences and job fairs to engage directly with members of the public; and
- Placing paid advertising.

In 2021 there were no major project activities that required additional stakeholder engagement.

In January 2021 the Government of the Northwest Territories Water Management and Monitoring Division, Department of Environment and Natural Resources contacted NTPC to inquire on where the groundwater monitoring results were submitted and to clarify the temperature logger data from early 2019 from the 2019 Annual Report. On February 15, 2021 NTPC developed the responses below for ENR:

ENR Comment

There is a note that says groundwater monitoring data was submitted to ENR in December 2020. Is this going to the Inspector or where is this going? Is it submitted to the Board as well? Is this related to the water licence or specific to that follow-up to the spill?

NTPC Response:

- Each year the groundwater monitoring report for Jackfish (attached) is reported to Danielle Morin who is a Hazardous Substance Specialist for the GNWT. This is follow-up reporting from the spill at Jackfish.
- The water licence now has additional sampling requirements for JF01-06 in addition to the parameters required in the Groundwater Monitoring Program. These additional parameters were not sampled in 2020.
- NTPC developed the 2021 Groundwater Monitoring Plan attached to ensure the required sampling is completed in 2021.

ENR Comment

Page 3 states that temperature loggers were installed in March 2018 and later says continuous monitoring began in June 2019. The only data provided was since the June monitoring started. Was there any data available for the first half of 2019 as well under the old loggers?

NTPC Response:

The 2018 and early 2019 data was included in the Baseline Environmental Monitoring report. This report is not on the registry but it was included in the submission and review process for the water licence renewal. If you need the info let me know I can likely send over.

ENR confirmed that there was no additional information required on February 15, 2021.

The Thermal Plume Study Design complete the public review process and NTPC provided responses to comments as outlined in Section 9.1.

7 MODIFICATIONS AND MAJOR MAINTENANCE

No significant operational projects were undertaken in 2021 outside of the installation of the Jackfish Water Monitoring Project flow meter equipment.

8 MANAGEMENT PLANS

8.1 OPERATIONS, MAINTENANCE AND SURVEILLANCE MANUAL

The Jackfish Lake Generating Facility - Operations Maintenance and Surveillance Manual is attached. NTPC committed to submit this 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.

8.2 WASTE MANAGEMENT

The WMP was updated in 2019 as part of the Water Licence renewal process. The plan updates ensured the WMP represents all infrastructure, potential waste sources, and standard NTPC waste management practices that are employed at the site.

There were no updates or changes in 2021 to the process or facilities required for the management of waste as outlined in the WMP.

8.3 CLOSURE AND RECLAMATION

A CRP was submitted as part of the initial water licence in 2019. As per Part H, condition 1 of the WL an Interim CRP is required within 24 months following the effective date of the Licence. As the effective date of the Licence was October 18, 2019, the Interim CRP was to be submitted October 18, 2021.

NTPC understood the initial submission of the Interim CRP to be sufficient but upon correspondence with the MVLWB in March 2022 it was confirmed that the 2019 submission did not meet all requirements of

Schedule 4, condition 1. An updated document will be submitted in the first half of 2022 to complete minor deficiencies in the initial submission as confirmed through correspondence with the MVLWB in March 2022.

9 AEMP MONITORING RESULTS

A summary of results will be reported after the first AEMP Plan report is submitted to MVLWB in March 2023. On April 28, 2021 the MVLWB issued an approval to NTPC to defer AEMP submission dates. The approved timeline for the Aquatic Effects Monitoring Program (AEMP) is as follows:

- May 31, 2021- Thermal Plume Delineation Study Design
- January 30, 2023- Thermal Plume Delineation Study Report
- March 31, 2023: AEMP Design Plan
 - Incorporate results from the Thermal Plume Delineation Study
- March 31, 2024: AEMP Annual Report
- March 31, 2026: AEMP Re-evaluation Report
 - Additional Re-evaluation Reports are required every five years thereafter
- March 31, 2026: Revised AEMP Design Plan
 - Additional Revised Design Plans are required every five years thereafter;
 - Revised Design Plan must incorporate results from the AEMP Re-evaluation Report; and
 - If any Action Level of 'moderate' or 'high' status in the AEMP Design Plan is exceeded, an AEMP Response Plan is to be submitted to the MVLWB for approval.

9.1 THERMAL PLUME DELINEATION STUDY

As per the MVLWB approval of NTPC's request to defer submission dates of required reports and studies for MV2019L1-0001 on April 28, 2021, NTPC submitted the updated Thermal Plume Delineation Study Design for the Jackfish Water Licence MV2019L1-0001 to the MVLWB on May 28, 2021.

The Thermal Plume Delineation Study Design went through the public review process through the MVLWB Online Review System. Comments were provided by Environment and Climate Change Canada, GNWT- ENR, the MVLWB, and Tlicho Government.

In accordance with the approved schedule in the Thermal Plume Delineation Study Design, NTPC began gathering field data in September 2021 as part of the study for the Late Summer sampling program. The Late Fall sampling program was completed in late October 2021. The Thermal Plume Delineation Study will continue throughout 2022 with fieldwork occurring throughout the Late Winter, Spring Freshet, Early Summer and Late Summer. Operational data recorded under the surveillance network monitoring program will also be incorporated into the study.

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 in these systems is reviewed every three 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, with additional/replacement spill response kits placed at key locations throughout the site as identified in the Spill Response Plan.

Spill training is mandatory and is completed by all new operatives. The spill training is approximately 2 hours and covers the following topics:

- Facility Site specifics;
- Health and safety;
- Spill response; and
- General cleanup.

In 2021, no NTPC staff received spill training. NTPC has determined that it would be prudent to provide refresher spill training to employees. Starting in 2022, NTPC will be providing spill training as a refresher course once every three years.

10.2 SPILL COMMUNICATIONS

There were no spill communications that occurred during 2021 for the Jackfish Facility. Spill details are summarized in Section 10.3, and NTPC followed the Spill Communication Plan is outlined below:

- When a spill has been identified, the spill is reported to the Plant Operator. If the Plant Operations or Regional Manager cannot be reached, then the Central Control Room is to be contacted.
- In the event that the spill cannot be cleaned up internally, the Plant Operator/On-Scene Coordinator will contact the Director, Health, Safety and Environment and Plant Operations Manager, or the NTPC On-site Representative and The NWT 24-hour Spill Report Line.
- The President and CEO and the Director of Finance and CFO will determine if an Emergency Response Team is required.
- The Director of Health, Safety and Environment is to contact the appropriate regulator (GNWT ENR or Fisheries and Oceans Canada) to report the spill incident.

10.3 UNAUTHORIZED DISCHARGES

No unauthorized discharges occurred at the Jackfish facility in 2021.

11 REGULATORY

There were no concerns, non-conformances, or deficiencies in any reports filed by an inspector and, therefore, no actions were taken to address the inspector's report. The following sections discuss report submissions.

11.1 SUBMISSIONS

Thermal Plume Delineation Study Design

Following the renewal of the Water Licence in 2019, several conditions were required to be submitted by NTPC. On April 28, 2021, MVLWB provided revised submission dates (Appendix C, Regulatory Correspondence). Table 12-1 summarizes the document required, revised submission deadline, and status:

Table 12-1 Summary of Key Conditional Submissions Required

Document	Original Submission Deadline	Revised Submission Deadline	Status
Thermal Plume Delineation Study Design	January 29, 2020	May 31, 2021	Submitted to MVLWB on May 28, 2021
Thermal Plume Delineation Study Report	August 1, 2021	January 30, 2023	Not complete
AEMP Design Plan	November 1, 2021	April 30, 2023	Not complete
AEMP – Annual Report	March 31, 2023	March 31, 2024	Not complete

11.2 OUTSTANDING SUBMISSIONS AND NON-COMPLIANCE(S)

On January 8, 2021 NTPC submitted the outstanding 2019 Annual Water Licence Report as per the Concordance Table.

On January 28, 2021 NTPC submitted the outstanding Surveillance Network Monthly Reports for the Jackfish Lake Generating Station from August 2019 to December 2020.

On January 28, 2021, the GNWT-ENR Water Resource Officer Lead for the Jackfish Facility sent a notification stating that NTPC is not in compliance with Water Licence due to outstanding submissions. NTPC responded that a plan would be developed for the outstanding submissions. On March 5, 2021, NTPC submitted a request for a submission dates extension. This request completed a public review through the MVLWB Online Review System. On April 28, 2021, MVLWB provided NTPC with revised submission dates, summarized in Table 12-1. (See Table of Concordance; Appendix C, Regulatory Correspondence).

The 2020 Annual Report not submitted by deadline of March 31, 2021. On March 26, 2021 NTPC requested an extension of the deadline to May 31, 2021 which was approved by the MVLWB. NTPC submitted the 2020 Annual Water Licence Report to ENR & MVLWB on May 31, 2021,

The outstanding Jackfish Lake Generating Facility Operations Maintenance and Surveillance Manual and Interim Closure and Reclamation Plan will be submitted to the MVLWB in Spring 2022.

11.3 GROUNDWATER MONITORING

Groundwater sampling at Jackfish Facility is conducted to monitor impacts from a spill that occurred in 2004. Underwater licence MV2019L1-0001, new groundwater monitoring requirements were included in the water licensing reporting.

The 2021 Groundwater Monitoring Report at the Jackfish Power Plant is attached in Appendix B, Groundwater Monitoring.

11.4 ANNUAL WATER LICENCE INSPECTION

The annual Water Licence inspection was completed for the Jackfish Facility on August 18, 2021, with GNWT-ENR Water Resource Officers Ian Ziemann and David-Scott McQuinn. No formal inspection report was received by NTPC from GNWT-ENR. No major deficiencies were recorded on site.

12 OTHER BOARD REQUESTS, SUBMISSIONS AND ISSUANCES

- On April 13, 2021 the MVLWB issued approval notice for the 2019 Annual Water Licence Report
- On June 31, 2021 NTPC submitted the 2020 Annual Water Licence Report to the MVLWB
- On August 25, 2021 the MVLWB issued approval notice for the 2020 Annual Water Licence Report
- No other requests were made by the MVLWB.

CLOSURE

This 2021 Jackfish Annual Report was prepared by the Northwest Territories Power Corporation to meet the requirements of Water Licence MV2019L1-0001.

Respectfully submitted,

Alexander Love
Director, Hydro Operations
Northwest Territories Power Corporation

APPENDIX A – SURVEILLANCE NETWORK PROGRAM DATA

The SNP for the Jackfish Facility is summarized in the following Appendices with tabulated summaries of data generated in digital format (.xlsx files) attached to this report submission.

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

SNP Station:	00-1a K-Plant Intake #1	00-1b K-Plant Intake #2	00-1a 00-1b K-Plant Intake	00-2a K-Plant Discharge	00-1c EMD Plant Intake	00-2b EMD Plant Discharge	00-1d Cat Plant Intake	00-2c Cat Plant Discharge
Date	Water Temperature (°C)							
2021-01-01	2.27	0.00		2.50	0.00	0.00	2.55	2.23
2021-01-02	2.26	0.00		2.49	0.00	0.00	2.54	4.39
2021-01-03	2.27	0.00		2.50	0.00	0.00	2.54	2.21
2021-01-04	2.25	0.00		2.49	0.00	0.00	2.53	4.43
2021-01-05	2.15	0.00		2.37	0.00	0.00	2.46	3.63
2021-01-06	2.21	0.00		2.45	0.00	0.00	2.51	2.77
2021-01-07	2.23	0.00		2.47	0.00	0.00	1.27	1.11
2021-01-08	2.22	0.00		2.45	0.00	0.00	0.05	0.05
2021-01-09	2.20	0.00		2.44	0.00	0.00	0.05	0.05
2021-01-10	2.19	0.00		2.43	0.00	0.00	0.05	0.05
2021-01-11	2.20	0.00		2.45	0.00	0.00	0.72	0.64
2021-01-12	2.19	0.00		2.44	0.00	0.00	2.47	2.18
2021-01-13	2.17	0.00		2.42	0.00	0.00	2.45	2.43
2021-01-14	2.17	0.00		2.42	0.00	0.00	2.46	3.38
2021-01-15	2.17	0.00		2.41	0.00	0.00	2.43	2.13
2021-01-16	2.11	0.00		2.35	0.00	0.00	2.42	2.12
2021-01-17	2.09	0.00		2.32	0.00	0.00	2.43	2.12
2021-01-18	1.59	0.00		1.77	0.00	0.00	2.42	2.12
2021-01-19	0.33	0.00		0.37	0.00	0.00	2.39	2.07
2021-01-20	0.97	0.00		1.08	0.00	0.00	2.38	2.21
2021-01-21	1.36	0.00		1.51	0.00	0.00	2.36	2.01

Northwest Territories Power Corporation
2021 Jackfish Annual Report
Water Licence No.: MV2019L1-0001

SNP Station:	00-1a K-Plant Intake #1	00-1b K-Plant Intake #2	00-1a 00-1b K-Plant Intake	00-2a K-Plant Discharge	00-1c EMD Plant Intake	00-2b EMD Plant Discharge	00-1d Cat Plant Intake	00-2c Cat Plant Discharge
2021-01-22	0.63	0.00		0.70	0.00	0.00	2.34	1.98
2021-01-23	0.79	0.00		0.88	0.00	0.00	2.30	1.94
2021-01-24	0.49	0.00		0.55	0.00	0.00	2.33	1.97
2021-01-25	1.01	0.00		1.12	0.00	0.00	2.34	2.00
2021-01-26	0.59	0.00		0.66	0.00	0.00	2.31	1.98
2021-01-27	1.99	0.00		2.22	0.00	0.00	2.31	2.00
2021-01-28	2.03	0.00		2.25	0.00	0.00	2.32	1.99
2021-01-29	2.02	0.00		2.25	0.00	0.00	2.29	1.96
2021-01-30	2.00	0.00		2.23	0.00	0.00	2.27	1.95
2021-01-31	1.67	0.00		1.86	0.00	0.00	2.28	1.98
2021-02-01	0.82	0.00		0.91	0.00	0.00	2.28	1.97
2021-02-02	0.35	0.00		0.39	0.00	0.00	2.24	3.65
2021-02-03	0.90	0.00		0.99	0.00	0.00	2.36	12.34
2021-02-04	1.98	0.42		2.14	0.43	0.47	2.15	9.04
2021-02-05	1.54	1.55		1.51	1.65	4.33	1.50	13.64
2021-02-06	1.59	1.59		1.55	1.65	5.84	1.55	10.37
2021-02-07	1.61	1.61		1.58	1.67	6.14	1.58	8.75
2021-02-08	1.62	1.61		1.57	1.68	6.05	1.58	9.45
2021-02-09	1.62	1.61		1.57	1.67	5.94	1.58	7.20
2021-02-10	1.60	1.59		1.58	1.65	6.05	1.59	4.68
2021-02-11	1.61	1.60		1.58	1.65	6.10	1.59	5.20
2021-02-12	1.63	1.62		1.60	1.67	6.03	1.62	5.76
2021-02-13	1.64	1.63		1.62	1.68	6.01	1.62	5.22
2021-02-14	1.62	1.62		1.62	1.67	6.01	1.61	4.39
2021-02-15	1.63	1.62		1.62	1.68	6.03	1.62	5.23
2021-02-16	1.64	1.64		1.64	1.68	5.92	1.61	4.61

Northwest Territories Power Corporation
2021 Jackfish Annual Report
Water Licence No.: MV2019L1-0001

SNP Station:	00-1a K-Plant Intake #1	00-1b K-Plant Intake #2	00-1a 00-1b K-Plant Intake	00-2a K-Plant Discharge	00-1c EMD Plant Intake	00-2b EMD Plant Discharge	00-1d Cat Plant Intake	00-2c Cat Plant Discharge
2021-02-17	1.63	1.63		1.63	1.68	5.85	1.62	5.15
2021-02-18	1.62	1.62		1.64	1.68	6.03	1.62	2.19
2021-02-19	1.62	1.62		1.62	1.68	3.66	1.61	1.97
2021-02-20	1.57	1.57		1.54	1.64	2.65	1.55	1.89
2021-02-21	1.57	1.57		1.58	1.69	5.82	1.59	2.75
2021-02-22	1.62	1.62		1.62	1.68	5.91	1.61	3.96
2021-02-23	1.63	1.62		1.63	1.68	5.55	1.61	3.25
2021-02-24	1.61	1.61		1.62	1.68	5.56	1.60	2.98
2021-02-25	1.62	1.61		1.62	1.68	5.98	1.62	5.11
2021-02-26	1.63	1.63		1.64	1.70	5.92	1.62	6.88
2021-02-27	1.66	1.65		1.66	1.71	6.32	1.64	5.61
2021-02-28	1.66	1.65		1.64	1.71	5.86	1.64	7.13
2021-03-01	1.66	1.65		1.65	1.71	6.07	1.64	3.71
2021-03-02	1.66	1.65		1.65	1.71	6.10	1.64	3.85
2021-03-03	1.68	1.67		1.64	1.71	6.12	1.66	3.63
2021-03-04	1.67	1.67		1.63	1.72	6.05	1.66	4.49
2021-03-05	1.65	1.64		1.64	1.73	4.30	1.66	2.03
2021-03-06	1.60	1.61		1.59	1.68	1.81	1.60	1.94
2021-03-07	1.57	1.57		1.56	1.66	1.98	1.56	1.90
2021-03-08	1.57	1.58		1.55	1.69	4.40	1.56	1.91
2021-03-09	1.62	1.62		1.61	1.69	5.08	1.61	1.96
2021-03-10	1.60	1.61		1.60	1.68	3.48	1.60	1.94
2021-03-11	1.54	1.55		1.52	1.65	1.77	1.55	1.88
2021-03-12	1.55	1.56		1.52	1.68	1.80	1.54	1.87
2021-03-13	1.53	1.55		1.51	1.65	1.77	1.55	1.87
2021-03-14	1.52	1.53		1.50	1.65	1.76	1.55	1.87

Northwest Territories Power Corporation
2021 Jackfish Annual Report
Water Licence No.: MV2019L1-0001

SNP Station:	00-1a K-Plant Intake #1	00-1b K-Plant Intake #2	00-1a 00-1b K-Plant Intake	00-2a K-Plant Discharge	00-1c EMD Plant Intake	00-2b EMD Plant Discharge	00-1d Cat Plant Intake	00-2c Cat Plant Discharge
2021-03-15	1.51	1.52		1.49	1.62	1.73	1.51	1.84
2021-03-16	1.49	1.50		1.47	1.62	1.97	1.51	1.84
2021-03-17	1.50	1.52		1.48	1.63	1.77	1.52	1.86
2021-03-18	1.50	1.51		1.49	1.61	1.74	1.51	1.95
2021-03-19	1.48	1.48		1.46	1.59	1.71	1.49	1.89
2021-03-20	1.48	1.49		1.45	1.58	1.70	1.44	1.79
2021-03-21	1.46	1.48		1.44	1.61	1.72	1.48	1.80
2021-03-22	1.45	1.47		1.44	1.58	1.70	1.48	1.79
2021-03-23	1.44	1.45		1.42	1.56	1.81	1.46	1.74
2021-03-24	1.44	1.45		1.41	1.56	1.69	1.47	1.81
2021-03-25	1.44	1.45		1.43	1.57	1.68	1.46	2.04
2021-03-26	1.42	1.43		1.41	1.53	1.66	1.44	1.78
2021-03-27	1.40	1.41		1.39	1.53	1.65	1.42	1.78
2021-03-28	1.42	1.43		1.39	1.55	1.68	1.42	1.80
2021-03-29	1.41	1.41		1.39	1.52	1.64	1.40	1.75
2021-03-30	1.37	1.38		1.37	1.50	1.62	1.39	1.73
2021-03-31	1.37	1.38		1.36	1.51	1.68	1.39	1.77
2021-04-01	1.37	1.38		1.36	1.50	1.62	1.39	1.76
2021-04-02	1.37	1.38		1.35	1.50	1.62	1.40	1.76
2021-04-03	1.36	1.36		1.35	1.47	1.59	1.37	1.72
2021-04-04	1.35	1.36		1.35	1.49	1.61	1.37	1.74
2021-04-05	1.35	1.35		1.34	1.48	1.60	1.36	1.73
2021-04-06	1.36	1.37		1.33	1.48	1.60	1.35	1.72
2021-04-07	1.33	1.34		1.31	1.46	1.58	1.35	1.71
2021-04-08	1.32	1.32		1.31	1.43	1.55	1.30	1.66
2021-04-09	1.30	1.30		1.30	1.43	1.55	1.31	1.66

Northwest Territories Power Corporation
2021 Jackfish Annual Report
Water Licence No.: MV2019L1-0001

SNP Station:	00-1a K-Plant Intake #1	00-1b K-Plant Intake #2	00-1a 00-1b K-Plant Intake	00-2a K-Plant Discharge	00-1c EMD Plant Intake	00-2b EMD Plant Discharge	00-1d Cat Plant Intake	00-2c Cat Plant Discharge
2021-04-10	1.31	1.33		1.31	1.46	1.57	1.33	1.68
2021-04-11	1.32	1.33		1.31	1.44	1.55	1.32	1.67
2021-04-12	1.29	1.29		1.29	1.39	1.50	1.29	1.63
2021-04-13	1.34	1.36		1.22	1.43	1.55	1.31	1.69
2021-04-14	1.36	1.38		1.28	1.48	1.63	1.33	1.70
2021-04-15	1.33	1.34		1.29	1.45	1.58	1.29	1.63
2021-04-16	1.33	1.34		1.35	1.42	1.54	1.31	1.65
2021-04-17	1.33	1.33		1.38	1.40	1.52	1.32	1.65
2021-04-18	1.34	1.34		1.41	1.40	1.53	1.32	1.66
2021-04-19	1.34	1.34		1.45	1.40	1.52	1.33	1.66
2021-04-20	1.35	1.36		1.49	1.42	1.59	1.35	1.70
2021-04-21	1.35	1.35		1.44	1.40	1.52	1.34	1.67
2021-04-22	1.31	1.31		1.42	1.37	1.49	1.31	1.63
2021-04-23	1.30	1.30		1.39	1.37	1.48	1.28	1.58
2021-04-24	1.31	1.31		1.46	1.40	1.52	1.31	1.61
2021-04-25	1.32	1.32		1.40	1.39	1.51	1.32	1.60
2021-04-26	1.30	1.30		1.34	1.37	1.49	1.31	1.64
2021-04-27	1.30	1.30		1.35	1.36	1.47	1.28	1.63
2021-04-28	1.31	1.31		1.35	1.34	1.46	1.28	1.63
2021-04-29	1.30	1.30		1.40	1.37	1.49	1.30	1.65
2021-04-30	1.30	1.30		1.32	1.39	1.50	1.31	1.66
2021-05-01	1.29	1.29		1.34	1.38	1.50	1.29	1.64
2021-05-02	1.30	1.30		1.39	1.39	1.50	1.30	1.65
2021-05-03	1.32	1.32		1.44	1.39	1.51	1.32	1.69
2021-05-04	1.33	1.34		1.48	1.42	1.54	1.33	4.43
2021-05-05	1.37	1.37		1.56	1.42	1.54	1.35	1.67

Northwest Territories Power Corporation
2021 Jackfish Annual Report
Water Licence No.: MV2019L1-0001

SNP Station:	00-1a K-Plant Intake #1	00-1b K-Plant Intake #2	00-1a 00-1b K-Plant Intake	00-2a K-Plant Discharge	00-1c EMD Plant Intake	00-2b EMD Plant Discharge	00-1d Cat Plant Intake	00-2c Cat Plant Discharge
2021-05-06	1.40	1.40		1.60	1.43	2.06	1.36	1.68
2021-05-07	1.39	1.40		1.60	1.45	1.57	1.36	1.70
2021-05-08	1.42	1.41		1.59	1.44	1.57	1.40	1.66
2021-05-09	1.39	1.41		1.51	1.47	1.59	1.38	1.71
2021-05-10	1.42	1.43		1.55	1.46	1.59	1.39	1.72
2021-05-11	1.43	1.43		1.64	1.48	1.61	1.44	1.75
2021-05-12	1.53	1.53		1.74	1.52	1.64	1.49	1.81
2021-05-13	1.47	1.47		1.65	1.49	1.61	1.47	1.79
2021-05-14	1.47	1.47		1.69	1.50	1.61	1.41	1.72
2021-05-15	1.51	1.51		1.67	1.54	1.66	1.46	1.76
2021-05-16	1.54	1.54		1.77	1.57	1.69	1.51	1.82
2021-05-17	1.62	1.62		1.92	1.63	1.74	1.59	1.88
2021-05-18	1.67	1.67		1.86	1.68	1.80	1.64	1.94
2021-05-19	1.81	1.82		2.11	1.86	4.14	1.76	2.07
2021-05-20	1.91	1.92		2.14	1.96	2.08	1.77	2.08
2021-05-21	2.06	2.05		2.33	2.02	2.14	1.87	2.18
2021-05-22	1.89	1.89		2.01	1.90	2.02	1.81	2.13
2021-05-23	2.10	2.09		2.47	2.15	2.27	2.12	2.42
2021-05-24	2.12	2.12		2.53	2.41	2.51	2.38	2.69
2021-05-25	2.55	2.56		2.64	2.76	2.87	2.68	2.98
2021-05-26	2.77	2.80		2.83	2.77	5.35	2.67	3.00
2021-05-27	2.69	2.70		2.72	2.68	5.53	2.63	3.01
2021-05-28	2.90	2.91		3.18	2.99	4.26	2.89	3.20
2021-05-29	3.58	3.59		3.69	3.67	3.79	3.60	3.88
2021-05-30	4.01	4.01		4.11	4.05	4.17	4.02	4.30
2021-05-31	4.44	4.41		4.76	4.40	4.51	4.50	4.75

Northwest Territories Power Corporation
2021 Jackfish Annual Report
Water Licence No.: MV2019L1-0001

SNP Station:	00-1a K-Plant Intake #1	00-1b K-Plant Intake #2	00-1a 00-1b K-Plant Intake	00-2a K-Plant Discharge	00-1c EMD Plant Intake	00-2b EMD Plant Discharge	00-1d Cat Plant Intake	00-2c Cat Plant Discharge
2021-06-01	4.69	4.65		4.89	4.54	4.89	4.73	5.00
2021-06-02	5.10	4.96		6.18	4.90	5.10	5.43	5.66
2021-06-03	5.15	5.00		6.11	5.02	5.16	5.43	5.59
2021-06-04	6.27	5.94		8.16	6.10	6.27	7.01	7.10
2021-06-05	6.25	5.86		9.12	6.00	6.51	7.92	7.74
2021-06-06	7.50	6.95		9.35	7.29	7.45	8.97	8.99
2021-06-07	7.23	6.89		8.17	7.02	7.15	7.91	8.11
2021-06-08	7.59	7.33		8.70	7.49	7.61	7.98	8.15
2021-06-09	8.15	7.71		9.64	8.00	8.18	8.86	9.00
2021-06-10	8.33	7.74		9.64	8.06	8.29	9.08	9.21
2021-06-11	8.69	8.12		9.76	8.41	8.62	9.31	9.46
2021-06-12	9.35	8.29		10.99	8.97	9.18	10.20	10.28
2021-06-13	9.60	8.60		11.73	9.34	9.47	10.35	10.44
2021-06-14	9.78	8.54		13.49	9.22	9.62	11.36	11.46
2021-06-15	9.88	8.29		13.60	9.43	9.63	11.87	11.81
2021-06-16	10.18	9.06		12.7	9.95	10.2	11.66	11.6
2021-06-17	11.8	10.1		13.0	11.2	11.4	12.6	12.7
2021-06-18	11.8	10.5		14.5	11.5	11.7	14.1	14.0
2021-06-19	12.3	10.6		13.8	11.9	12.0	13.5	13.5
2021-06-20	12.6	10.9		14.9	12.2	12.5	14.6	14.6
2021-06-21	13.0	11.0		15.5	12.7	12.8	14.7	14.7
2021-06-22	14.2	11.3		15.9	13.4	14.9	15.4	15.5
2021-06-23	14.7	12.9		15.1	14.4	14.4	15.2	15.3
2021-06-24	14.3	12.7		15.9	14.1	14.2	15.1	15.2
2021-06-25	14.4	12.7		17.0	14.3	16.3	15.4	16.9
2021-06-26	14.4	12.5		17.9	14.2	14.3	17.1	17.0

Northwest Territories Power Corporation
2021 Jackfish Annual Report
Water Licence No.: MV2019L1-0001

SNP Station:	00-1a K-Plant Intake #1	00-1b K-Plant Intake #2	00-1a 00-1b K-Plant Intake	00-2a K-Plant Discharge	00-1c EMD Plant Intake	00-2b EMD Plant Discharge	00-1d Cat Plant Intake	00-2c Cat Plant Discharge
2021-06-27	14.5	12.8		18.2	14.1	14.3	17.1	16.9
2021-06-28	14.7	12.7		18.4	14.2	14.9	18.0	17.9
2021-06-29	15.0	12.5		19.3	14.3	16.2	18.0	18.0
2021-06-30	15.0	12.4		20.5	14.2	18.5	19.3	20.6
2021-07-01	15.3	12.3		20.4	14.3	15.3	19.1	18.8
2021-07-02	15.5	12.8		20.1	14.4	15.6	19.2	18.9
2021-07-03	16.3	12.8		19.3	14.7	15.6	19.0	18.9
2021-07-04	17.2	13.0		19.0	16.1	16.4	18.6	18.5
2021-07-05	17.5	13.3		18.9	16.0	16.7	18.8	18.8
2021-07-06	18.0	13.5		18.4	16.9	17.0	18.4	18.4
2021-07-07	17.6	14.5		18.7	17.0	17.0	18.2	18.2
2021-07-08	18.0	14.6		19.0	17.5	18.9	18.9	20.9
2021-07-09	17.8	15.4		20.2	17.4	17.6	19.6	19.3
2021-07-10	18.4	15.1		20.3	17.6	17.9	20.2	20.0
2021-07-11	18.5	14.7		20.2	17.6	18.8	20.0	19.9
2021-07-12	19.2	15.3		20.3	18.0	18.2	20.3	20.2
2021-07-13	19.7	15.5		20.6	18.5	18.7	20.6	20.6
2021-07-14	19.5	16.1		20.8	18.8	19.4	20.3	20.5
2021-07-15	18.8	16.1		19.7	18.3	18.2	19.7	19.8
2021-07-16	18.4	17.7		18.4	18.3	18.1	18.5	18.5
2021-07-17	17.8	17.4		18.5	17.7	17.7	17.9	18.0
2021-07-18	17.8	17.1		18.6	17.7	18.2	18.3	18.2
2021-07-19	17.9	17.2		18.7	17.7	18.4	18.4	18.4
2021-07-20	18.0	17.1		19.2	17.8	18.4	18.4	18.4
2021-07-21	17.9	16.9		19.5	17.8	18.5	18.6	18.5
2021-07-22	18.0	16.5		19.1	17.8	18.6	18.7	18.6

Northwest Territories Power Corporation
2021 Jackfish Annual Report
Water Licence No.: MV2019L1-0001

SNP Station:	00-1a K-Plant Intake #1	00-1b K-Plant Intake #2	00-1a 00-1b K-Plant Intake	00-2a K-Plant Discharge	00-1c EMD Plant Intake	00-2b EMD Plant Discharge	00-1d Cat Plant Intake	00-2c Cat Plant Discharge
2021-07-23	18.1	16.7		19.1	17.9	18.8	18.9	19.5
2021-07-24	18.1	17.1		18.6	18.0	18.3	18.3	18.3
2021-07-25	18.4	17.6		18.5	18.3	18.5	18.6	18.6
2021-07-26	18.2	17.6		18.4	18.1	18.4	18.5	18.5
2021-07-27	17.9	17.5		18.1	17.8	18.1	18.1	18.2
2021-07-28	17.7	17.5		18.2	17.7	17.9	17.9	17.9
2021-07-29	17.9	17.4		18.3	17.8	18.2	18.3	18.3
2021-07-30	18.2	17.3		19.0	18.0	18.6	18.7	18.7
2021-07-31	18.1	17.4		19.8	18.0	18.9	19.1	18.9
2021-08-01	18.1	17.3		20.3	17.9	19.2	19.3	19.2
2021-08-02	18.1	17.1		21.2	18.0	19.7	19.8	19.6
2021-08-03	18.2	17.0		20.4	18.0	19.5	19.6	19.5
2021-08-04	18.7	17.4		19.2	18.5	19.2	19.2	19.2
2021-08-05	18.6	17.2		19.1	18.5	18.9	18.9	18.9
2021-08-06	18.3	17.5		19.2	18.3	18.6	18.6	18.7
2021-08-07	18.2	17.5		18.6	18.0	18.4	18.4	18.5
2021-08-08	17.6	17.5		17.6	17.6	17.6	17.6	17.7
2021-08-09	17.0	17.0		17.0	16.9	17.0	17.0	17.3
2021-08-10	16.5	16.5		16.5	16.5	16.6	16.5	16.6
2021-08-11	16.2	16.2		16.3	16.2	16.3	16.3	16.4
2021-08-12	16.2	16.1		16.5	16.2	16.3	16.3	16.4
2021-08-13	16.1	16.0		16.9	16.1	16.4	16.4	17.0
2021-08-14	16.4	16.2		16.9	16.4	16.7	16.7	16.8
2021-08-15	16.2	15.9		16.6	16.1	16.4	16.5	16.5
2021-08-16	16.0	15.9		16.1	16.0	16.1	16.0	16.1
2021-08-17	15.7	15.7		16.2	15.7	15.9	15.9	15.9

Northwest Territories Power Corporation
2021 Jackfish Annual Report
Water Licence No.: MV2019L1-0001

SNP Station:	00-1a K-Plant Intake #1	00-1b K-Plant Intake #2	00-1a 00-1b K-Plant Intake	00-2a K-Plant Discharge	00-1c EMD Plant Intake	00-2b EMD Plant Discharge	00-1d Cat Plant Intake	00-2c Cat Plant Discharge
2021-08-18	15.5	15.4		15.7	15.4	15.6	15.6	15.7
2021-08-19	15.5	15.5		15.6	15.5	15.6	15.6	15.6
2021-08-20	15.0	15.0		15.0	15.0	15.1	15.0	15.1
2021-08-21	14.5	14.5		14.6	14.5	14.6	14.6	14.7
2021-08-22	14.4	14.4		14.5	14.4	14.4	14.4	14.6
2021-08-23	14.5	14.4		14.5	14.3	14.5	14.5	14.8
2021-08-24	14.1	14.1		14.6	14.1	14.2	14.3	14.3
2021-08-25	14.2	14.2		14.8	14.2	14.5	14.5	14.6
2021-08-26	14.4	14.3		15.3	14.4	14.7	14.8	14.8
2021-08-27	14.5	14.4		16.0	14.6	14.9	15.0	15.0
2021-08-28	14.6	14.4		16.0	14.6	15.2	15.2	15.2
2021-08-29	14.6	14.4		16.0	14.6	15.4	15.6	15.5
2021-08-30	14.8	14.4		16.3	14.6	15.7	15.9	15.9
2021-08-31	14.9	14.4		16.4	14.8	15.6	15.8	15.8
2021-09-01	14.8	14.5		16.0	14.8	15.4	15.9	15.8
2021-09-02	15.0	14.6		15.7	14.9	15.4	15.5	15.6
2021-09-03	15.3	14.7		15.6	15.2	15.5	15.5	15.6
2021-09-04	14.9	14.5		15.2	14.7	15.2	15.1	15.2
2021-09-05	15.0	14.9		15.2	15.0	15.0	15.0	15.1
2021-09-06	15.2	15.2		15.3	15.2	15.3	15.3	15.4
2021-09-07	15.1	15.1		15.1	15.1	15.2	15.1	15.2
2021-09-08	14.9	14.8		14.9	14.7	14.9	14.9	15.0
2021-09-09	14.5	14.4		14.5	14.5	14.5	14.5	14.6
2021-09-10	14.1	14.1		14.2	14.1	14.2	14.1	14.2
2021-09-11	13.6	13.6		13.7	13.6	13.7	13.7	13.8
2021-09-12	13.3	13.3		13.3	13.3	13.3	13.3	13.4

Northwest Territories Power Corporation
2021 Jackfish Annual Report
Water Licence No.: MV2019L1-0001

SNP Station:	00-1a K-Plant Intake #1	00-1b K-Plant Intake #2	00-1a 00-1b K-Plant Intake	00-2a K-Plant Discharge	00-1c EMD Plant Intake	00-2b EMD Plant Discharge	00-1d Cat Plant Intake	00-2c Cat Plant Discharge
2021-09-13	13.3	13.3		13.3	13.3	13.4	13.3	13.4
2021-09-14	13.0	13.0		13.1	13.0	13.1	13.1	13.2
2021-09-15	12.7	12.7		12.7	12.7	12.8	12.7	13.0
2021-09-16	12.1	12.1		12.1	12.1	12.1	12.1	12.4
2021-09-17	11.8	11.8		11.8	11.8	11.8	11.8	12.0
2021-09-18	11.5	11.5		11.5	11.5	11.5	11.5	11.7
2021-09-19	11.2	11.2		11.1	11.2	11.2	11.1	11.4
2021-09-20	11.0	11.0		11.1	11.0	11.1	11.0	11.3
2021-09-21	10.8	10.9		10.8	10.9	10.9	10.8	11.1
2021-09-22	10.7	10.7		10.7	10.7	10.7	10.7	11.0
2021-09-23	10.6	10.6		10.7	10.7	10.7	10.6	11.0
2021-09-24	10.5	10.5		10.5	10.6	10.6	10.5	10.8
2021-09-25	10.3	10.3		10.3	10.3	10.3	10.3	10.6
2021-09-26	9.9	10.0		9.9	10.0	10.0	9.9	10.3
2021-09-27	9.8	9.8		9.7	9.7	9.8	9.7	10.1
2021-09-28	9.46	9.47		9.46	9.47	9.5	9.41	9.7
2021-09-29	9.37	9.37		9.43	9.37	9.4	9.36	9.7
2021-09-30	9.35	9.35		9.33	9.37	9.39	9.35	9.66
2021-10-01					9.50	9.82	9.81	10.06
2021-10-02					9.36	9.69		
2021-10-03					9.17	9.91	9.41	9.65
2021-10-04					8.87	9.20	9.22	9.46
2021-10-05					8.59	8.96	8.94	9.19
2021-10-06			9.05	8.81	8.53	8.86	8.87	9.12
2021-10-07			8.83	8.58	8.22	8.55	8.55	8.81
2021-10-08			8.56	8.31	7.89	8.36	8.28	8.51

Northwest Territories Power Corporation
2021 Jackfish Annual Report
Water Licence No.: MV2019L1-0001

SNP Station:	00-1a K-Plant Intake #1	00-1b K-Plant Intake #2	00-1a 00-1b K-Plant Intake	00-2a K-Plant Discharge	00-1c EMD Plant Intake	00-2b EMD Plant Discharge	00-1d Cat Plant Intake	00-2c Cat Plant Discharge
2021-10-09			8.39	8.15	7.75	8.08	8.11	8.34
2021-10-10			8.12	7.87	7.52	7.85	7.90	8.11
2021-10-11			7.69	7.44	7.10	7.42	7.47	7.68
2021-10-12			7.43	7.18	6.82	9.21	7.21	7.42
2021-10-13			7.42	7.17	6.79	9.63	7.21	7.41
2021-10-14			7.29	7.05	6.66	8.36	7.04	7.26
2021-10-15			7.01	6.77	6.38	8.65	6.72	6.96
2021-10-16			6.83	6.60	6.22	7.78	6.60	6.82
2021-10-17			6.56	6.32	5.97	6.78	6.33	6.56
2021-10-18			6.23	6.00	5.68	6.01	6.02	6.25
2021-10-19			6.02	5.78	5.44	5.77	5.80	6.02
2021-10-20			5.90	5.66	5.28	5.62	5.66	5.88
2021-10-21			5.69	5.45	5.08	5.41	5.45	5.68
2021-10-22			5.48	5.23	4.88	5.21	5.24	5.47
2021-10-23			5.34	5.09	4.72	5.06	5.09	5.31
2021-10-24			5.26	5.01	4.65	5.06	5.02	5.24
2021-10-25			5.24	4.99	4.61	5.00	4.99	5.21
2021-10-26			5.21	4.96	4.59	4.93	4.98	5.20
2021-10-27			5.19	4.94	4.58	4.92	4.95	5.17
2021-10-28			5.06	4.82	4.45	4.79	4.82	5.04
2021-10-29			4.75	4.51	4.17	4.51	4.50	4.72
2021-10-30			4.33	4.09	3.77	4.10	4.09	4.31
2021-10-31			4.10	3.86	3.52	3.86	3.90	4.11
2021-11-01			4.07	3.82	3.84	3.51	3.89	4.09
2021-11-02			3.90	3.65	3.69	3.35	3.75	3.95
2021-11-03			3.80	3.55	3.64	3.29	3.69	3.87

Northwest Territories Power Corporation
2021 Jackfish Annual Report
Water Licence No.: MV2019L1-0001

SNP Station:	00-1a K-Plant Intake #1	00-1b K-Plant Intake #2	00-1a 00-1b K-Plant Intake	00-2a K-Plant Discharge	00-1c EMD Plant Intake	00-2b EMD Plant Discharge	00-1d Cat Plant Intake	00-2c Cat Plant Discharge
2021-11-04			3.71	3.47	3.54	3.20	3.57	3.77
2021-11-05			3.62	3.38	3.39	3.05	3.39	3.60
2021-11-06			3.74	3.49	3.58	3.24	3.55	3.76
2021-11-07			3.65	3.41	3.43	3.09	3.40	3.61
2021-11-08			3.48	3.25	3.30	2.96	3.29	3.50
2021-11-09			3.30	3.07	3.25	2.91	3.20	3.41
2021-11-10			3.22	2.99	3.13	2.79	3.08	3.30
2021-11-11			3.16	2.92	3.07	2.73	3.05	3.26
2021-11-12			3.22	2.98	2.99	2.66	2.99	3.18
2021-11-13			2.96	2.72	2.73	2.39	2.80	2.99
2021-11-14			2.62	2.39	2.49	2.15	2.43	2.64
2021-11-15			2.62	2.39	2.76	2.42	2.43	2.65
2021-11-16			2.79	2.56	2.80	2.46	2.54	2.76
2021-11-17			2.73	2.50	2.60	2.26	2.56	2.79
2021-11-18			2.76	2.52	2.73	2.39	2.53	2.74
2021-11-19			2.73	2.51	2.63	2.30	2.53	2.77
2021-11-20			2.66	2.44	2.61	2.27	2.48	2.73
2021-11-21			2.62	2.40	2.59	2.25	2.44	2.70
2021-11-22			2.62	2.40	2.60	2.26	2.48	2.70
2021-11-23			2.58	2.38	3.50	2.25	2.47	2.69
2021-11-24			2.60	2.39	3.19	2.19	2.47	2.69
2021-11-25			2.55	2.32	2.54	2.20	2.45	2.66
2021-11-26			2.58	2.35	2.54	2.20	2.47	2.68
2021-11-27			2.55	2.32	2.44	2.09	2.33	2.59
2021-11-28			2.56	2.32	2.48	2.13	2.40	2.62
2021-11-29			2.57	2.34	2.43	2.09	2.32	2.57

Northwest Territories Power Corporation
2021 Jackfish Annual Report
Water Licence No.: MV2019L1-0001

SNP Station:	00-1a K-Plant Intake #1	00-1b K-Plant Intake #2	00-1a 00-1b K-Plant Intake	00-2a K-Plant Discharge	00-1c EMD Plant Intake	00-2b EMD Plant Discharge	00-1d Cat Plant Intake	00-2c Cat Plant Discharge
2021-11-30			2.52	2.30	2.53	2.18	2.35	2.62
2021-12-01			2.55	2.33	2.16	2.50	2.63	2.39
2021-12-02			2.53	2.30	2.11	2.45	2.61	2.38
2021-12-03			2.52	2.29	2.12	2.46	2.59	2.38
2021-12-04			2.49	2.26	2.10	2.70	2.55	2.29
2021-12-05			2.47	2.25	2.09	2.43	2.54	2.27
2021-12-06			2.46	2.24	2.06	2.40	2.52	2.25
2021-12-07			2.45	2.23	2.04	2.38	2.51	2.26
2021-12-08			2.46	2.22	2.05	2.39	2.52	2.34
2021-12-09			2.45	2.22	2.05	2.39	2.51	2.30
2021-12-10			2.44	2.21	2.02	2.36	2.49	2.25
2021-12-11			2.44	2.21	2.02	2.36	2.48	2.26
2021-12-12			2.46	2.22	2.03	2.37	2.49	2.31
2021-12-13			2.45	2.21	2.00	2.61	2.50	2.31
2021-12-14			2.43	2.20	1.99	2.33	2.47	2.25
2021-12-15			2.42	2.19	1.99	2.33	2.48	2.25
2021-12-16			2.42	2.19	2.00	2.34	2.47	2.23
2021-12-17			2.38	2.16	1.96	2.31	2.43	2.13
2021-12-18			2.38	2.15	1.97	2.34	2.44	2.18
2021-12-19			2.38	2.15	1.98	2.67	2.45	2.20
2021-12-20			2.37	2.15	1.94	2.96	2.41	2.16
2021-12-21			2.36	3.21	1.95	2.31	2.42	2.17
2021-12-22			2.38	2.16	2.01	2.37	2.42	2.15
2021-12-23			2.40	2.95	1.96	7.71	2.44	3.22
2021-12-24			2.36	2.13	1.97	5.15	2.42	2.18
2021-12-25			2.38	2.15	1.98	3.51	2.43	2.20

Northwest Territories Power Corporation
2021 Jackfish Annual Report
Water Licence No.: MV2019L1-0001

SNP Station:	00-1a K-Plant Intake #1	00-1b K-Plant Intake #2	00-1a 00-1b K-Plant Intake	00-2a K-Plant Discharge	00-1c EMD Plant Intake	00-2b EMD Plant Discharge	00-1d Cat Plant Intake	00-2c Cat Plant Discharge
2021-12-26			2.37	2.14	1.92	2.27	2.42	2.18
2021-12-27			2.33	2.10	1.88	2.55	2.37	2.11
2021-12-28			2.30	2.08	1.89	2.82	2.34	2.06
2021-12-29			2.30	2.08	1.90	3.85	2.35	2.08
2021-12-30			2.32	2.09	1.89	2.24	2.37	2.10
2021-12-31			2.29	2.07	1.84	2.20	2.33	2.05

APPENDIX B – GROUNDWATER MONITORING REPORT

The Golder 2021 Jackfish Groundwater Monitoring Report as Part of Water Licence (MV2019L-1001) document is available as a supplemental electronic document.

November 2021

CONFIDENTIAL

Subject: 2021 Groundwater Monitoring Report at the Jackfish Power Plant in Yellowknife, Northwest Territories

To whom it may concern;

This letter report is intended to present the results of the groundwater monitoring program carried out in 2021 at the Jackfish Power Plant in Yellowknife, NT. The sample locations on site are illustrated in Figures 1 and 2.

The scope of work included:

- Monitoring and sampling all pumping and monitoring wells located at the site. Samples were collected on June 23rd and October 6th; 2021.
- Completion of chemical analysis on all groundwater samples. Samples were analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX) and petroleum hydrocarbons (PHC) (F1 through F4);
- Analysis of results and preparation of a letter report summarizing the findings.

SELECTED GROUNDWATER QUALITY ASSESSMENT GUIDELINES

The guidelines for groundwater quality assessment were selected using a combination of guidelines from the Canadian Council of Ministers of the Environment (CCME), along with Albert-based values, in the absence of CCME guidelines. The selected guidelines

pertain to Industrial Land Use, coarse-grained soil for the protection of aquatic life.

The selected guidelines, which relate to the *Canadian Water Quality Guidelines for the Protection of Aquatic Life* (CCME, 1996), along with the *Alberta Tier 2 Soil and Groundwater Remediation Guidelines* (Alberta Environment and Parks (AEP), 2016) and *Environmental Quality Guidelines for Alberta Surface Waters* (AEP, 2014), are presented in Table 1.

DISCUSSION

Water samples were collected from pumping wells and monitoring wells on June 23rd and October 6th, 2021 and were analyzed for BTEX and PHC F1 and F4 parameters.

At the time of sampling in June 2021 monitoring wells; JF01-01, JF01-02, JF01-03, JF01-04, JF01-06, MW2, MW3 and MW4 remained frozen and samples were unable to be collected. All analysed samples collected during the fall sampling event within 10 m of the lakeshore reported non-detectable concentrations of BTEX F1-F2. The analytical results for samples collected greater than 10 m from the lakeshore during the spring monitoring event showed exceedances of the applicable criteria for PHC F2 in the following wells; pumping wells PW1 and PW2, and monitoring wells MW5, MW6, MW7 and MW9. Elevated concentrations ranged from 1.38 mg/L in MW9 to 14.5 mg/L in PW1. All other analyzed parameters were found to be below the applicable guidelines.

All analysed samples collected during the fall sampling event within 10 m of the lakeshore reported non-detectable concentrations of BTEX F1-F2. The analytical results for samples collected greater than 10 m from the lakeshore on October 21st showed exceedances of the applicable criteria for PHC F2 in the following wells; pumping wells PW1 and PW2, and monitoring wells MW5, MW6, MW7, MW9 and MW10. Elevated concentrations ranged from 1.49 mg/L in MW9 to 23.8 mg/L in PW2. All other analyzed parameters were found to be below the applicable guidelines.

Analytical results are presented in Table 2. Please note, during the fall sampling campaign pumping well PW3 was full of debris and MW1 and JF01-05 had insufficient water and therefore could not be sampled.

CLOSURE

Although historic impacts remain onsite surrounding the 2004 diesel fuel spill, risks associated with the nearby Jackfish Lake are considered low due to the marginal hydraulic gradient of the local groundwater. Impacts remain consistent with historical analysis and are not evident to be migrating towards the lake, as confirmed with the concentrations below detectable limits in each of the monitoring wells within 10 m of the lakeshore.

The Northwest Territories Power Corporation Jackfish Power plant supplies power to the City of Yellowknife. Due to the significant amount of onsite infrastructure, potential remedial efforts are limited at this time. Until the time that onsite infrastructure is removed, and significant remediation efforts can be accomplished, NTPC will continue to monitor groundwater conditions in select monitoring and pumping wells on a bi-annual basis to verify that conditions are stable and that risk to receptors does not increase; reporting annually. The next sampling campaign is scheduled for the spring of 2022.

If you have any questions or require additional information, please do not hesitate to contact me at (867) 874-5306.

Sincerely,

A handwritten signature in black ink, appearing to read "Travis Perkins". The signature is fluid and cursive, with the first name "Travis" and last name "Perkins" clearly distinguishable.

Travis Perkins
Environmental Analyst

Tables

- Table 1 Groundwater Quality Assessment Criteria**
- Table 2 Groundwater Chemical Analysis Results for BTEX and
 PHC F1 and F2 (June, 2021)**
- Table 3 Groundwater Chemical Analysis Results for BTEX and
 PHC F1 and F2 (October, 2021)**

Figures

- Figure 1 Groundwater Sampling Results (June 2021)**
- Figure 2 Groundwater Sampling Results (October 2021)**

Appendix

- Appendix A – Certificate of Analysis**

Table 1: Groundwater Quality Assessment Guidelines

Parameter	Selected Guidelines (mg/L)	
	<10 m from Lakeshore ⁽¹⁾	>10 m from Lakeshore
Benzene	0.04	0.69 ⁽²⁾
Toluene	0.0005	0.083 ⁽²⁾
Ethylbenzene	0.09	41 ⁽²⁾
Xylenes	0.03	18 ⁽²⁾
PHC (F1)	0.15	9.8 ⁽³⁾
PHC (F2)	0.11	1.3 ⁽³⁾

⁽¹⁾: *Environmental Quality Guidelines for Alberta Surface Waters* (AEP, 2014)

⁽²⁾: Values determined using the *Canadian Water Quality Guidelines for the Protection of Aquatic Life* (CCME, 1996)

⁽³⁾: *Alberta Tier 1 Groundwater Remediation Guidelines*, Protection of Aquatic Life (AEP, 2016)

PHC (F1): Petroleum hydrocarbons C₆ to C₁₀, does not include BTEX fractions

PHC (F2): Petroleum hydrocarbons C_{>10} to C₁₆

Table 2: Groundwater Chemical Analysis Results for BTEX and PHC F1 and F2 (June, 2021)

Sample Location		JF01-02	JF01-03	JF01-04	JF01-05	JF01-06	Selected Guidelines (<10 m from Lakeshore)
Sample ID		Frozen	Frozen	Frozen	L2606155-2	Frozen	
Sampling Date					23-JUN-21		
Parameters	Unit						
Benzene	mg/L				<0.00050		0.04
Toluene	mg/L				<0.00050		0.0005
Ethylbenzene	mg/L				<0.00050		0.09
Xylenes	mg/L				<0.00071		0.03
PHC (F1)	mg/L				<0.10		0.15
PHC (F2)	mg/L				<0.10		0.11

PHC (F1): Petroleum hydrocarbons C₆ to C₁₀, does not include BTEX fractions

PHC (F2): Petroleum hydrocarbons C_{>10} to C₁₆

TT: Duplicate sample

Table 2: Groundwater Chemical Analysis Results for BTEX and PHC F1 and F2 (June, 2021)

Sample Location		MW2	MW3	MW4	TRIP BLANK	Selected Guidelines (<10 m from Lakeshore)
Sample ID		Frozen	Frozen	Frozen	L2606155-1	
Sampling Date					23-JUN-21	
Parameters	Unit					
Benzene	mg/L				<0.00050	0.04
Toluene	mg/L				<0.00050	0.0005
Ethylbenzene	mg/L				<0.00050	0.09
Xylenes	mg/L				<0.00071	0.03
PHC (F1)	mg/L				<0.10	0.15
PHC (F2)	mg/L				<0.10	0.11

PHC (F1): Petroleum hydrocarbons C₆ to C₁₀, does not include BTEX fractions

PHC (F2): Petroleum hydrocarbons C_{>10} to C₁₆

Table 2: Groundwater Chemical Analysis Results for BTEX and PHC F1 and F2 (June, 2021)

Sample Location		PW1	PW2	MW5	MW9	MW9TT	Selected Guidelines (>10m from lakeshore)
Sample ID		L2606155-10	L2606155-6	L2606155-8	L2606155-4	L2606155-5	
Sampling Date		23-JUN-21	3-JUN-21	23-JUN-21	23-JUN-21	23-JUN-21	
Parameters	Unit						
Benzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.69
Toluene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.083
Ethylbenzene	mg/L	0.00135	<0.00050	<0.00050	<0.00050	<0.00050	41
Xylenes	mg/L	0.0113	<0.00071	<0.00071	<0.00071	<0.00071	18
PHC (F1)	mg/L	0.51	<0.10	0.12	<0.10	<0.10	9.8
PHC (F2)	mg/L	14.5	3.68	3.14	1.38	1.44	1.3

PHC (F1): Petroleum hydrocarbons C₆ to C₁₀, does not include BTEX fractions

PHC (F2): Petroleum hydrocarbons C_{>10} to C₁₆

TT: Duplicate sample

Table 2: Groundwater Chemical Analysis Results for BTEX and PHC F1 and F2 (June, 2021)

Sample Location		MW7	MW6	JF01-01	MW10	Selected Guidelines (>10m from lakeshore)
Sample ID		L2606155-7	L2606155-9	Frozen	L2606155-3	
Sampling Date		23-JUN-21	23-JUN-21		23-JUN-21	
Parameters	Unit					
Benzene	mg/L	<0.00050	<0.00050		<0.00050	0.69
Toluene	mg/L	<0.00050	<0.00050		<0.00050	0.083
Ethylbenzene	mg/L	<0.00050	<0.00050		<0.00050	41
Xylenes	mg/L	<0.00071	<0.00071		<0.00071	18
PHC (F1)	mg/L	0.36	<0.10		<0.10	9.8
PHC (F2)	mg/L	5.31	1.62		0.92	1.3

PHC (F1): Petroleum hydrocarbons C₆ to C₁₀, does not include BTEX fractions

PHC (F2): Petroleum hydrocarbons C_{>10} to C₁₆

Table 3: Groundwater Chemical Analysis Results for BTEX and PHC F1 and F2 (October, 2021)

Sample Location		JF01-02	JF01-03	JF01-04	JF01-05	JF01-06	Selected Guidelines (<10 m from Lakeshore)
Sample ID		L2648286-4	L2648286-5	L2648286-6	Dry	L2648286-7	
Sampling Date		06-OCT-21	06-OCT-21	06-OCT-21		06-OCT-21	
Parameters	Unit						
Benzene	mg/L	<0.00050	<0.00050	<0.00050		<0.00050	0.04
Toluene	mg/L	<0.00050	<0.00050	<0.00050		<0.00050	0.0005
Ethylbenzene	mg/L	<0.00050	<0.00050	<0.00050		<0.00050	0.09
Xylenes	mg/L	<0.00071	<0.00071	<0.00071		<0.00071	0.03
PHC (F1)	mg/L	<0.10	<0.10	<0.10		<0.10	0.15
PHC (F2)	mg/L	<0.10	<0.10	<0.10		<0.10	0.11

PHC (F1): Petroleum hydrocarbons C₆ to C₁₀, does not include BTEX fractions

PHC (F2): Petroleum hydrocarbons C_{>10} to C₁₆

TT: Duplicate sample

Table 3: Groundwater Chemical Analysis Results for BTEX and PHC F1 and F2 (October, 2021)

Sample Location		MW2	MW3	MW4	FIELD BLANK	TRIP BLANK	Selected Guidelines (<10 m from Lakeshore)
Sample ID		L2648286-8	2648286-9	L2648286-10	L2648286-16	L2648286-17	
Sampling Date		06-OCT-21	06-OCT-21	06-OCT-21	06-OCT-21	06-OCT-21	
Parameters	Unit						
Benzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.04
Toluene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0005
Ethylbenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.09
Xylenes	mg/L	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	0.03
PHC (F1)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.15
PHC (F2)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.11

PHC (F1): Petroleum hydrocarbons C₆ to C₁₀, does not include BTEX fractions

PHC (F2): Petroleum hydrocarbons C_{>10} to C₁₆

Table 3: Groundwater Chemical Analysis Results for BTEX and PHC F1 and F2 (October, 2021)

Sample Location		PW1	PW2	MW5	MW9	MW9 (Dup A)	Selected Guidelines (>10m from lakeshore)
Sample ID		L2648286-1	L2648286-2	L2648286-11	L2648286-14	2648286-17	
Sampling Date		06-OCT-21	06-OCT-21	06-OCT-21	06-OCT-21	06-OCT-21	
Parameters	Unit						
Benzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.69
Toluene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.083
Ethylbenzene	mg/L	0.00128	<0.00050	<0.00050	<0.00050	<0.00050	41
Xylenes	mg/L	0.00877	<0.00071	<0.00071	<0.00071	<0.00071	18
PHC (F1)	mg/L	0.34	<0.10	<0.10	<0.10	<0.10	9.8
PHC (F2)	mg/L	12.4	23.8	2.83	1.49	1.52	1.3

PHC (F1): Petroleum hydrocarbons C₆ to C₁₀, does not include BTEX fractions

PHC (F2): Petroleum hydrocarbons C_{>10} to C₁₆

TT: Duplicate sample

Table 3: Groundwater Chemical Analysis Results for BTEX and PHC F1 and F2 (October, 2021)

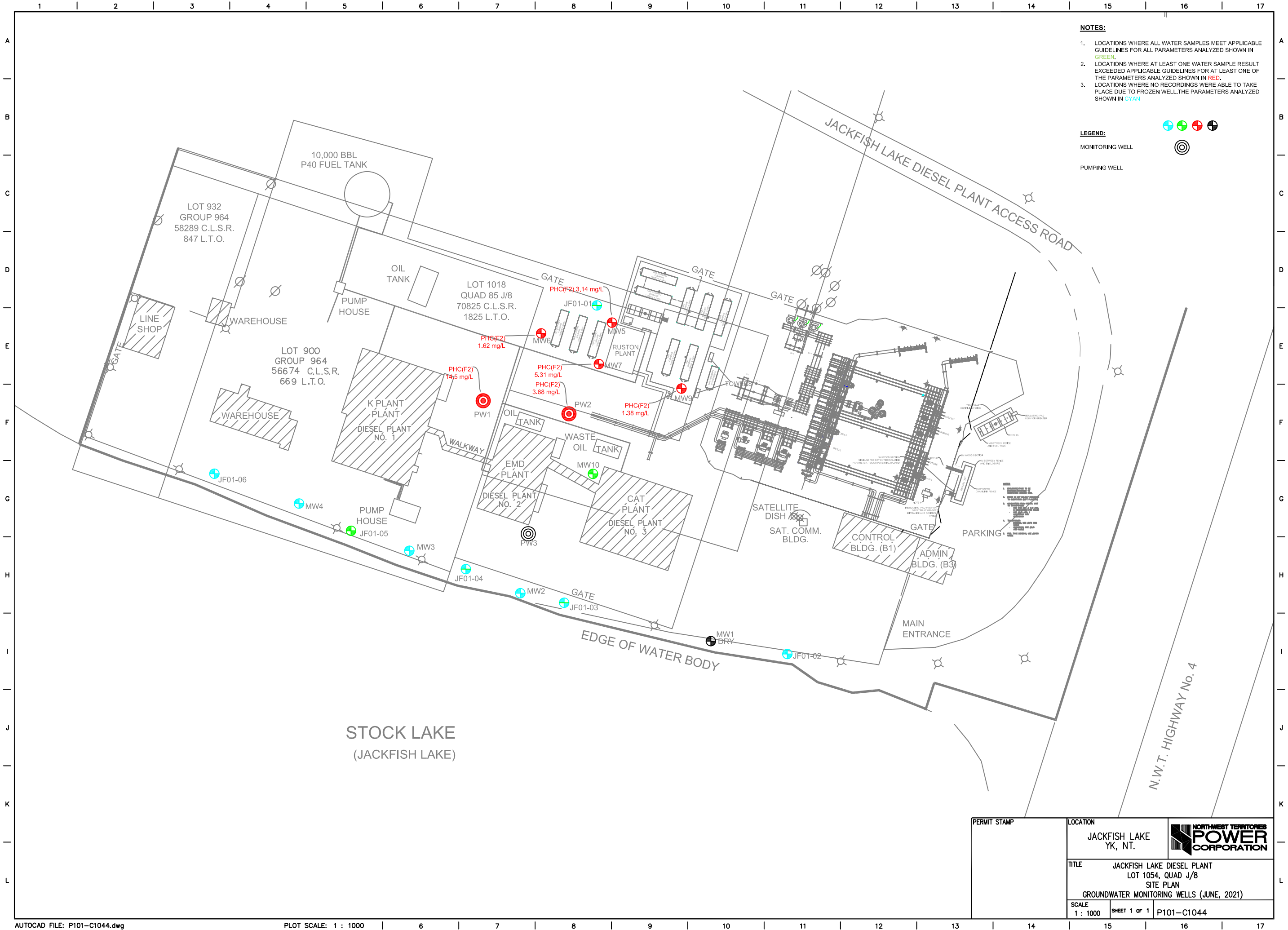
Sample Location		MW7	MW6	JF01-01	MW10	Selected Guidelines (>10m from lakeshore)
Sample ID		L2648286-13	L2648286-12	L2648286-3	L2648286-15	
Sampling Date		06-OCT-21	06-OCT-21	06-OCT-21	06-OCT-21	
Parameters	Unit					
Benzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.69
Toluene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.083
Ethylbenzene	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	41
Xylenes	mg/L	<0.00071	<0.00071	<0.00071	<0.00071	18
PHC (F1)	mg/L	0.14	<0.10	<0.10	<0.10	9.8
PHC (F2)	mg/L	15.6	2.40	0.51	4.86	1.3


PHC (F1): Petroleum hydrocarbons C₆ to C₁₀, does not include BTEX fractions

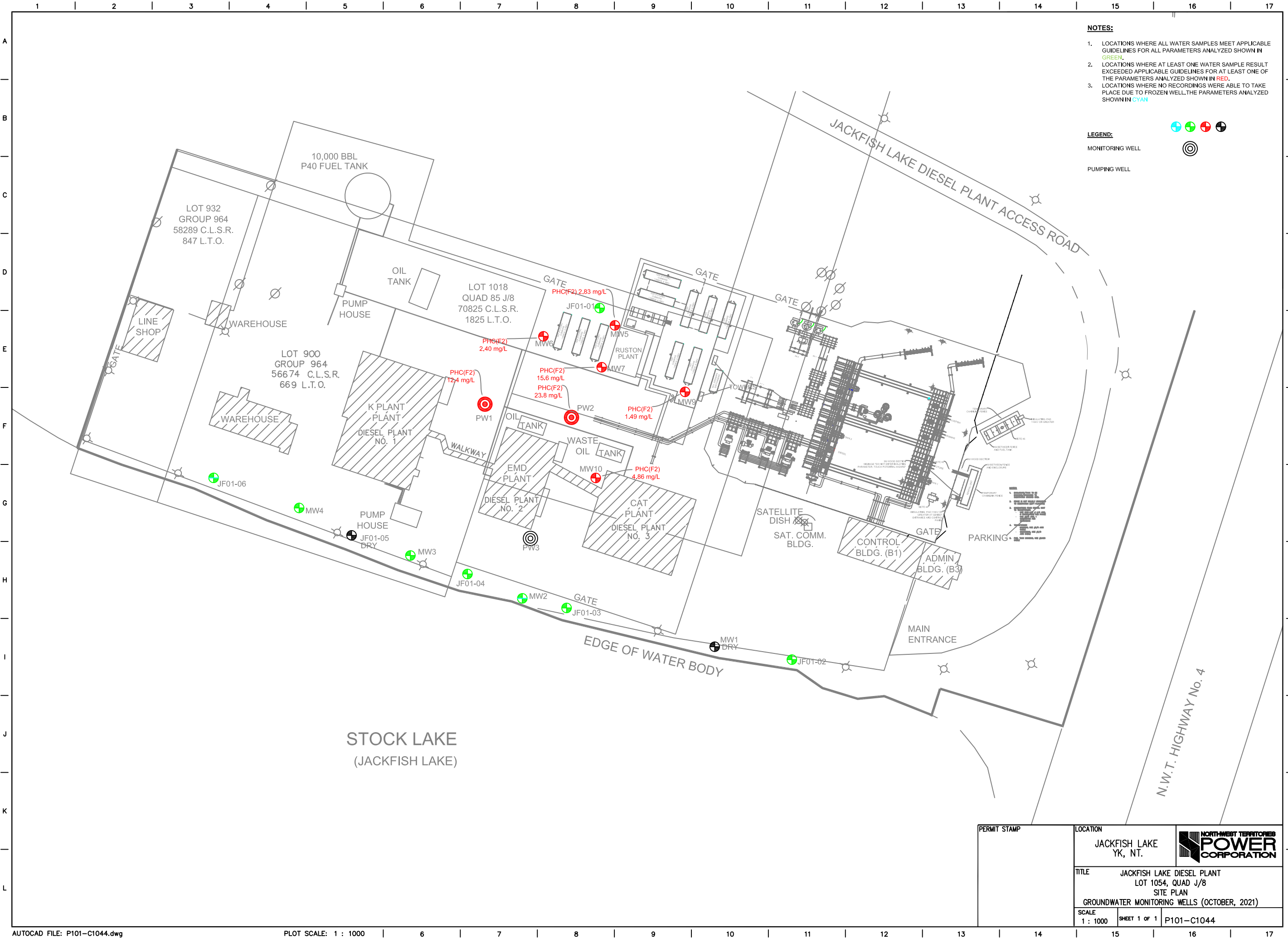
PHC (F2): Petroleum hydrocarbons C_{>10} to C₁₆

FIGURES

- Figure 1 Groundwater Sampling Results (June, 2021)
Figure 2 Groundwater Sampling Results (October, 2021)



LOCATION JACKFISH LAKE YK, NT.		 NORTHWEST TERRITORIES POWER CORPORATION
TITLE JACKFISH LAKE DIESEL PLANT LOT 1054, QUAD J/8 SITE PLAN GROUNDWATER MONITORING WELLS (JUNE, 2021)		
SCALE 1 : 1000	SHEET 1 OF 1	P101-C1044




- NOTES:**
1. LOCATIONS WHERE ALL WATER SAMPLES MEET APPLICABLE GUIDELINES FOR ALL PARAMETERS ANALYZED SHOWN IN **GREEN**.
 2. LOCATIONS WHERE AT LEAST ONE WATER SAMPLE RESULT EXCEEDED APPLICABLE GUIDELINES FOR AT LEAST ONE OF THE PARAMETERS ANALYZED SHOWN IN **RED**.
 3. LOCATIONS WHERE NO RECORDINGS WERE ABLE TO TAKE PLACE DUE TO FROZEN WELL. THE PARAMETERS ANALYZED SHOWN IN **CYAN**.

LEGEND:

MONITORING WELL

PUMPING WELL

PERMIT STAMP	LOCATION		 NORTH-WEST TERRITORIES POWER CORPORATION
	JACKFISH LAKE YK, NT.		
	TITLE		
	JACKFISH LAKE DIESEL PLANT LOT 1054, QUAD J/8 SITE PLAN GROUNDWATER MONITORING WELLS (OCTOBER, 2021)		
	SCALE 1 : 1000	SHEET 1 OF 1	P101-C1044

APPENDIX 1 CERTIFICATES OF ANALYSIS



NORTHWEST POWER CORP.
ATTN: JOSHUA CLARK
4 CAPITAL DRIVE
HAY RIVER NT X0E 1G2

Date Received: 23-JUN-21
Report Date: 06-JUL-21 15:52 (MT)
Version: FINAL

Client Phone: 867-874-5248

Certificate of Analysis

Lab Work Order #: L2606155
Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 17-818713
Legal Site Desc:


Harman Bhullar
Account Manager

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

ADDRESS: 9450 17 Avenue NW, Edmonton, AB T6N 1M9 Canada | Phone: +1 780 413 5227 | Fax: +1 780 437 2311
ALS CANADA LTD Part of the ALS Group An ALS Limited Company

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L2606155-1 WATER 23-JUN-21 09:44 TB (TRIP BLANK)	L2606155-2 WATER 23-JUN-21 10:22 JF01-05	L2606155-3 WATER 23-JUN-21 12:45 MW10	L2606155-4 WATER 23-JUN-21 13:05 MW9	L2606155-5 WATER 23-JUN-21 13:21 MW9 TT
Grouping	Analyte					
WATER						
Volatile Organic Compounds	Benzene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	EthylBenzene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Toluene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	o-Xylene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	m+p-Xylene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Xylenes (mg/L)	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071
	F1(C6-C10) (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	F1-BTEX (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Surrogate: 4-Bromofluorobenzene (SS) (%)	98.8	79.9	95.8	96.7	97.7
	Surrogate: 3,4-Dichlorotoluene (SS) (%)	95.9	113.4	117.6	82.2	82.3
	Surrogate: 1,4-Difluorobenzene (SS) (%)	98.1	99.4	103.9	99.7	93.7
Hydrocarbons	F2 (C10-C16) (mg/L)	<0.10	<0.10	0.92	1.38	1.44
	F3 (C16-C34) (mg/L)	0.28	<0.25	0.25	0.70	0.77
	F4 (C34-C50) (mg/L)	<0.25	<0.25	<0.25	<0.25	<0.25
	Surrogate: 2-Bromobenzotrifluoride (%)	106.5	112.0	106.5	107.9	106.3

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L2606155-6 WATER 23-JUN-21 13:38 PW2	L2606155-7 WATER 23-JUN-21 13:58 MW7	L2606155-8 WATER 23-JUN-21 14:19 MW5	L2606155-9 WATER 23-JUN-21 14:51 MW6	L2606155-10 WATER 23-JUN-21 15:18 PW1
Grouping	Analyte					
WATER						
Volatile Organic Compounds	Benzene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	EthylBenzene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	0.00135
	Toluene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	o-Xylene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	0.00417
	m+p-Xylene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	0.00711
	Xylenes (mg/L)	<0.00071	<0.00071	<0.00071	<0.00071	0.0113
	F1(C6-C10) (mg/L)	<0.10	0.36	0.12	<0.10	0.51
	F1-BTEX (mg/L)	<0.10	0.36	0.12	<0.10	0.49
	Surrogate: 4-Bromofluorobenzene (SS) (%)	96.8	145.8 ^{SHMI}	119.8	113.0	157.2 ^{SHMI}
	Surrogate: 3,4-Dichlorotoluene (SS) (%)	125.5	81.5	101.6	106.0	102.4
	Surrogate: 1,4-Difluorobenzene (SS) (%)	103.5	98.9	98.1	99.7	103.2
Hydrocarbons	F2 (C10-C16) (mg/L)	3.68	5.31	3.14	1.62	14.5
	F3 (C16-C34) (mg/L)	2.98	1.00	0.76	0.77	4.82
	F4 (C34-C50) (mg/L)	<0.25	<0.25	<0.25	<0.25	<0.25
	Surrogate: 2-Bromobenzotrifluoride (%)	108.8	108.9	106.9	105.6	112.9

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

Reference Information

Qualifiers for Individual Parameters Listed:

Qualifier	Description
SHMI	Surrogate recovery was outside ALS DQO (High) due to Matrix Interference.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BTXS,F1-ED	Water	BTEX, Styrene and F1 (C6-C10)	EPA 5021/8015&8260 GC-MS & FID
The water sample, with added reagents, is heated in a sealed vial to equilibrium. The headspace from the vial is transferred into a gas chromatograph. BTEX Target compound concentrations are measured using mass spectrometry detection. The instrumental portion of F1 analysis is carried out in accordance with the Canada Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method.			
F2,F3,F4-ED	Water	F2, F3, F4	EPA 3510/CCME PHC CWS-GC-FID
Water samples are spiked with 2-BBTF surrogate, and extracted by reciprocal action shaker for 30 minutes using a single micro-extraction with 2 mL hexane. After extraction, hexane extracts are dispensed into GC vials for GC-FID analysis.			

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

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

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA

Chain of Custody Numbers:

17-818713

GLOSSARY OF REPORT TERMS

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

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

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

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

mg/L - milligrams per litre.

< - Less than.

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

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

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

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

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



Quality Control Report

Workorder: L2606155

Report Date: 06-JUL-21

Page 1 of 2

Client: NORTHWEST POWER CORP.

4 CAPITAL DRIVE

HAY RIVER NT X0E 1G2

Contact: JOSHUA CLARK

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTXS,F1-ED		Water						
Batch	R5494432							
WG3564851-9	DUP	L2606155-1						
Benzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	02-JUL-21
Toluene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	02-JUL-21
EthylBenzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	02-JUL-21
m+p-Xylene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	02-JUL-21
o-Xylene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	02-JUL-21
F1(C6-C10)		<0.10	<0.10	RPD-NA	mg/L	N/A	30	02-JUL-21
WG3564851-7	LCS							
Benzene			123.5		%		70-130	02-JUL-21
Toluene			124.6		%		70-130	02-JUL-21
EthylBenzene			107.9		%		70-130	02-JUL-21
m+p-Xylene			128.6		%		70-130	02-JUL-21
o-Xylene			120.1		%		70-130	02-JUL-21
WG3564851-8	LCS							
F1(C6-C10)			98.1		%		70-130	02-JUL-21
WG3564851-6	MB							
Benzene			<0.00050		mg/L		0.0005	02-JUL-21
Toluene			<0.00050		mg/L		0.0005	02-JUL-21
EthylBenzene			<0.00050		mg/L		0.0005	02-JUL-21
m+p-Xylene			<0.00050		mg/L		0.0005	02-JUL-21
o-Xylene			<0.00050		mg/L		0.0005	02-JUL-21
F1(C6-C10)			<0.10		mg/L		0.1	02-JUL-21
Surrogate: 1,4-Difluorobenzene (SS)			109.3		%		70-130	02-JUL-21
Surrogate: 4-Bromofluorobenzene (SS)			111.6		%		70-130	02-JUL-21
Surrogate: 3,4-Dichlorotoluene (SS)			107.3		%		70-130	02-JUL-21
F2,F3,F4-ED		Water						
Batch	R5505052							
WG3564510-2	LCS	DIESEL / MOTOR OIL						
F2 (C10-C16)			99.4		%		70-130	27-JUN-21
F3 (C16-C34)			108.7		%		70-130	27-JUN-21
F4 (C34-C50)			113.7		%		70-130	27-JUN-21
WG3564510-1	MB							
F2 (C10-C16)			<0.10		mg/L		0.1	27-JUN-21
F3 (C16-C34)			<0.25		mg/L		0.25	27-JUN-21
F4 (C34-C50)			<0.25		mg/L		0.25	27-JUN-21
Surrogate: 2-Bromobenzotrifluoride			101.1		%		60-140	27-JUN-21

Quality Control Report

Workorder: L2606155

Report Date: 06-JUL-21

Page 2 of 2

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

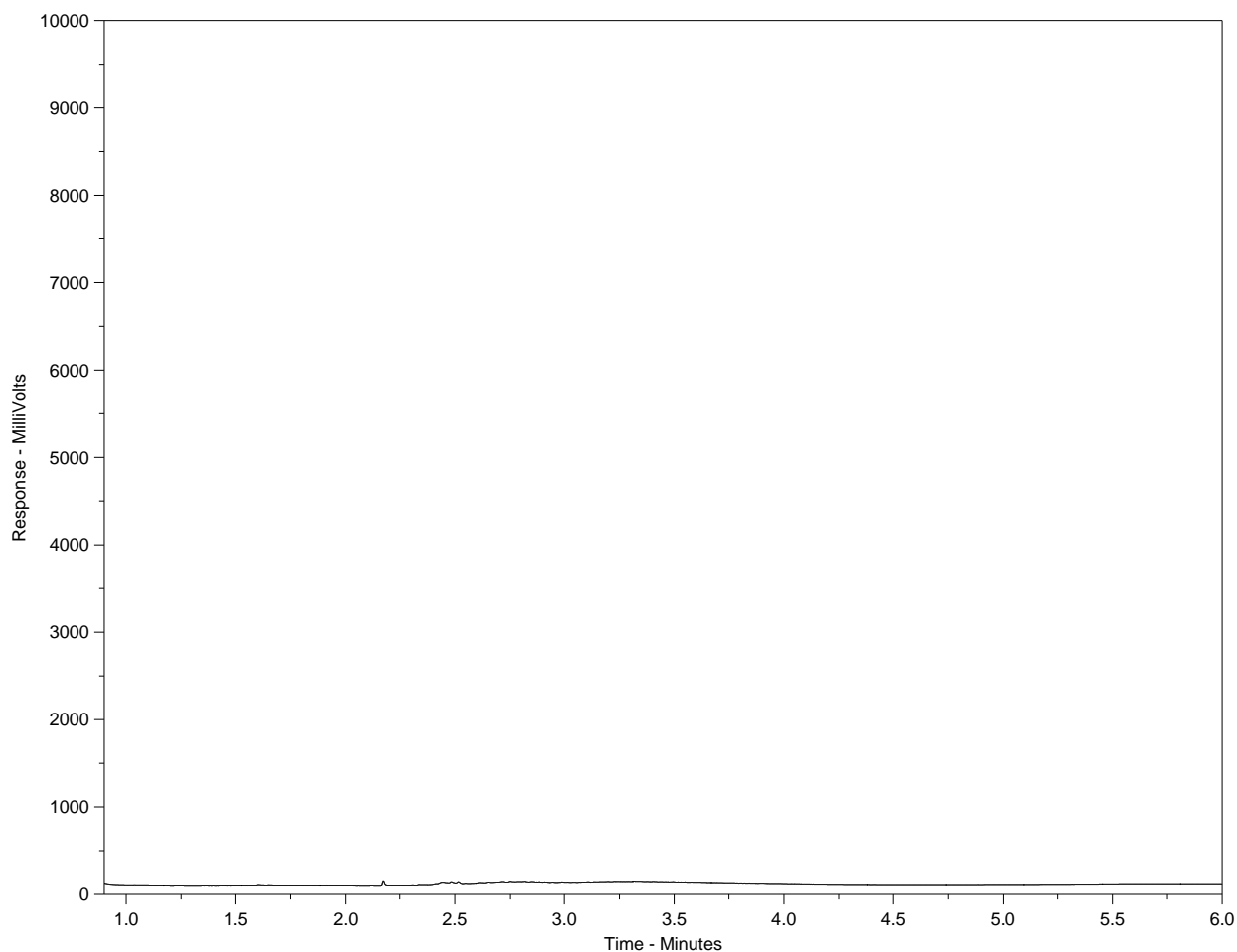
The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Hydrocarbon Distribution Report



ALS Sample ID: L2606155-1
Client ID: TB (TRIP BLANK)



F2		F3		F4		>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 Canada Wide Standard Hydrocarbon Distribution Report 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 as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

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.

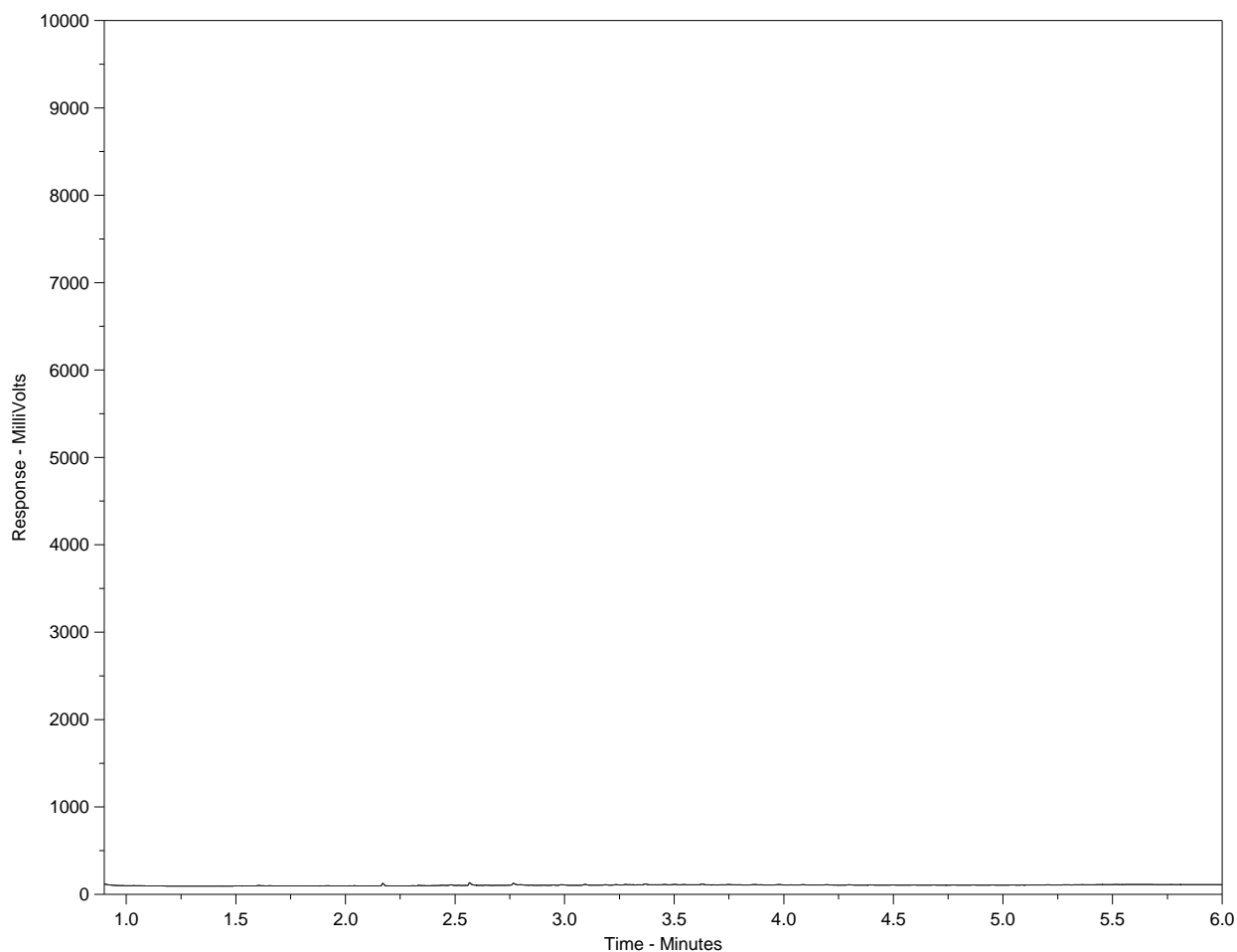
Note:

This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report



ALS Sample ID: L2606155-2
Client ID: JF01-05



F2		F3		F4		>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 Canada Wide Standard Hydrocarbon Distribution Report 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 as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

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.

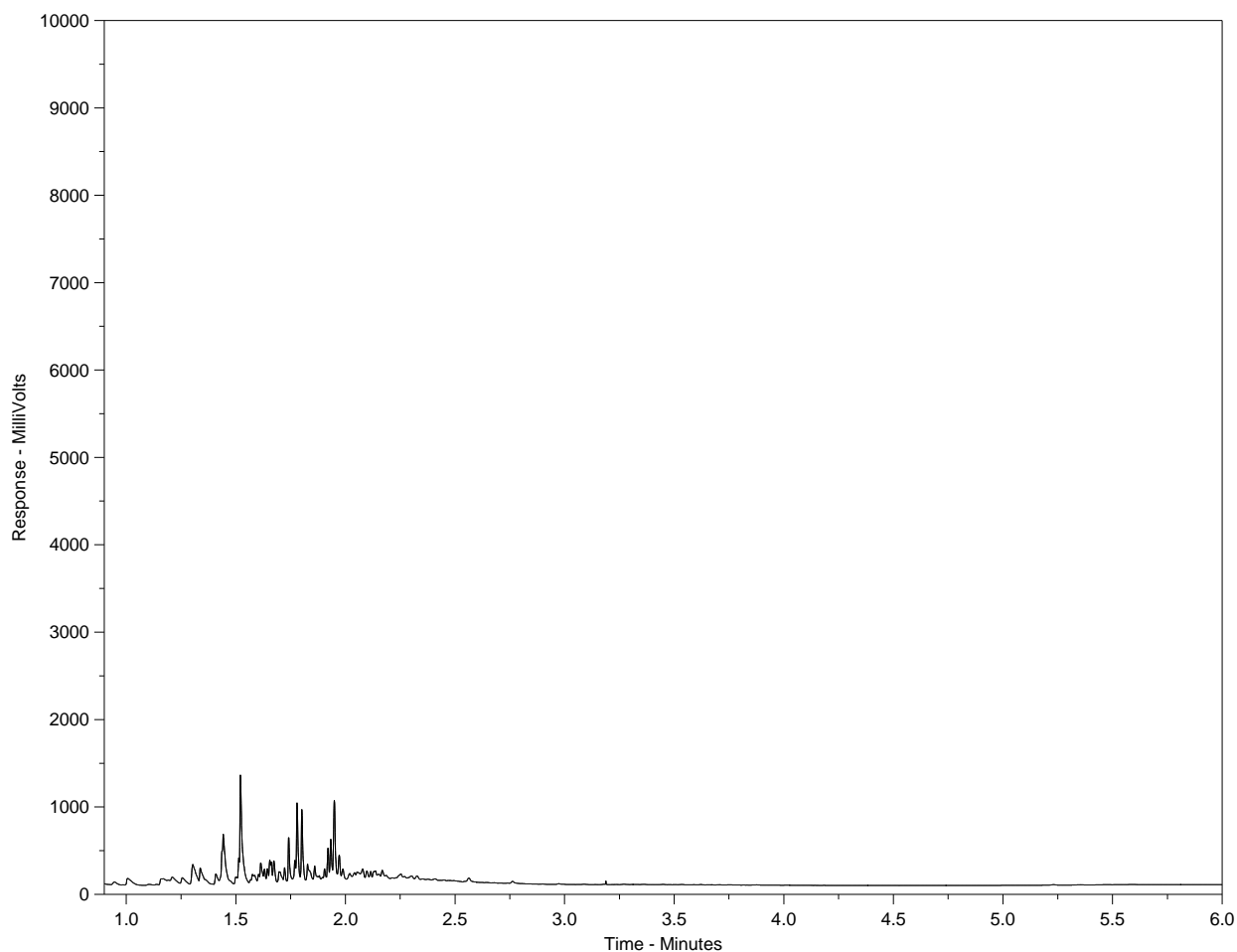
Note:

This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report



ALS Sample ID: L2606155-3
Client ID: MW10



F2		F3		F4		>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 Canada Wide Standard Hydrocarbon Distribution Report 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 as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

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.

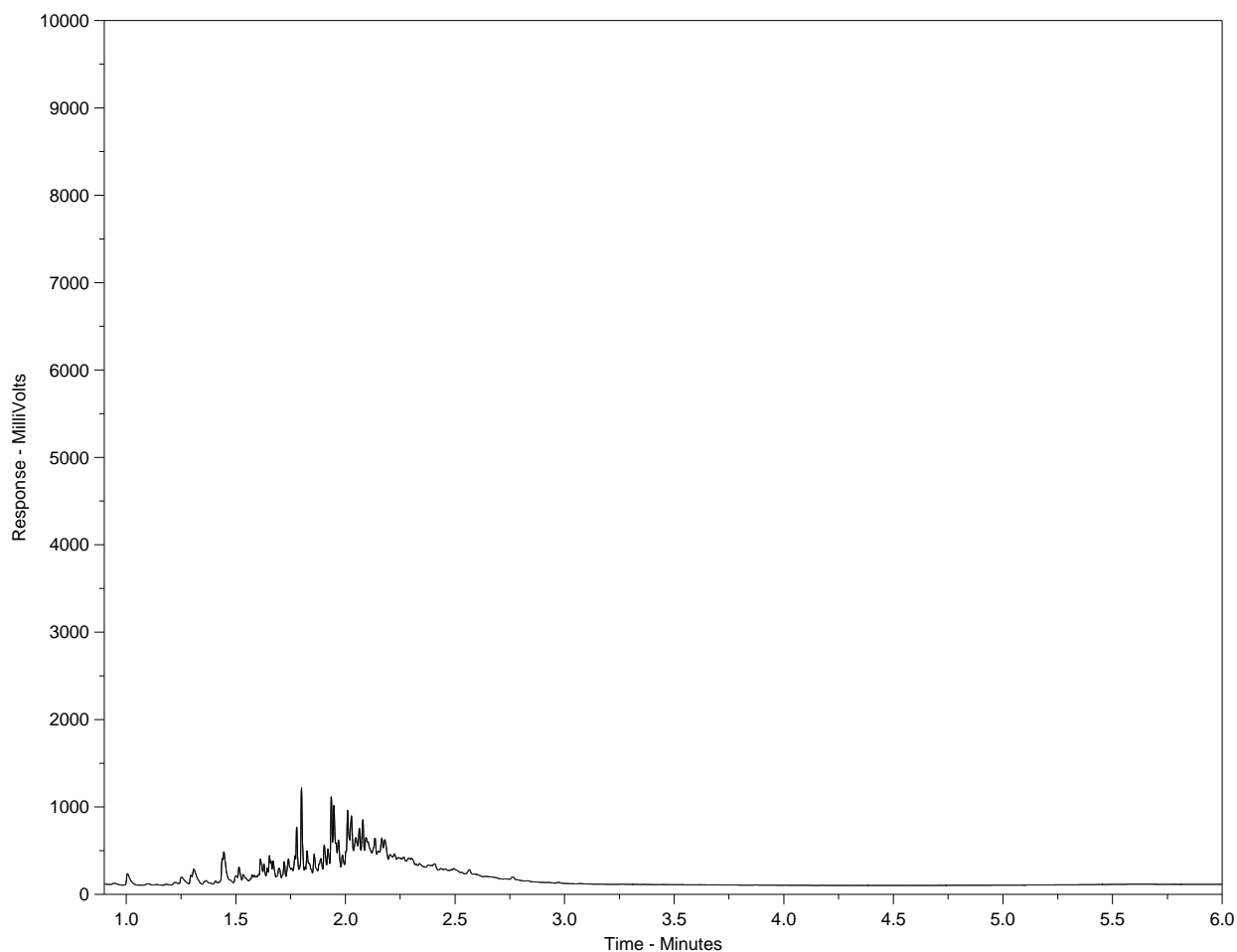
Note:

This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report



ALS Sample ID: L2606155-4
Client ID: MW9



F2		F3		F4		>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 Canada Wide Standard Hydrocarbon Distribution Report 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 as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

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.

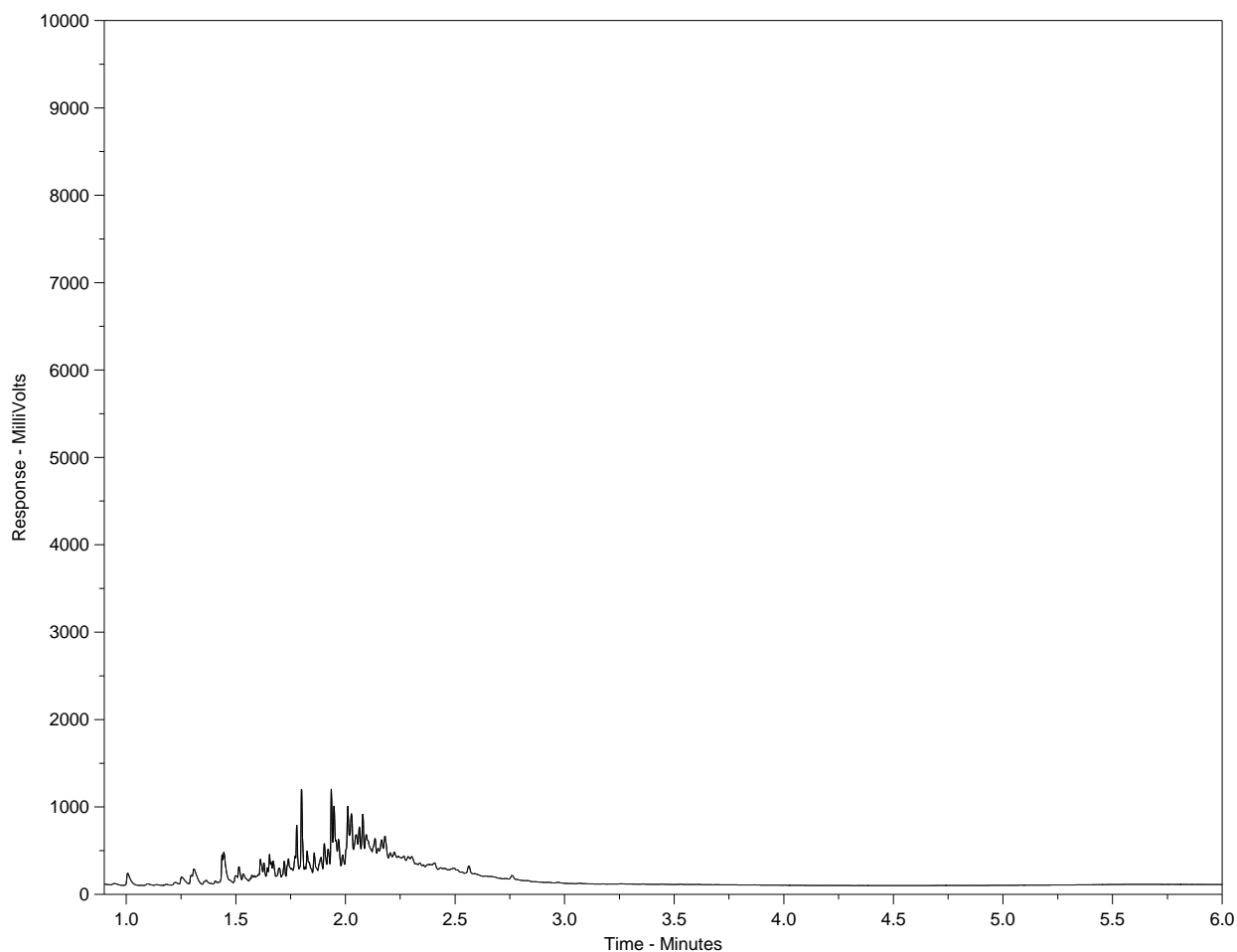
Note:

This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report



ALS Sample ID: L2606155-5
Client ID: MW9 TT



F2		F3		F4	>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 Canada Wide Standard Hydrocarbon Distribution Report 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 as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

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.

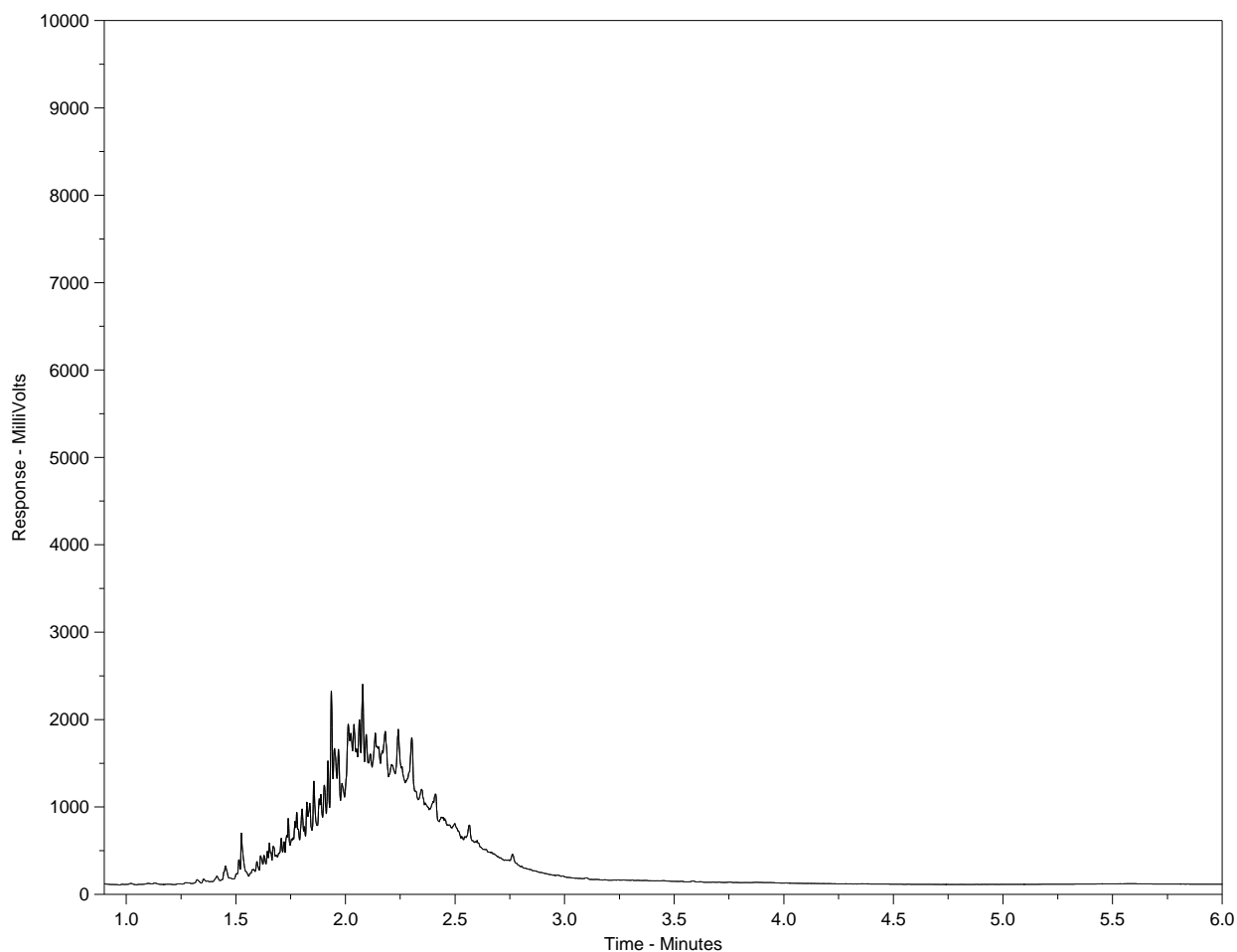
Note:

This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report



ALS Sample ID: L2606155-6
Client ID: PW2



F2		F3		F4	>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 Canada Wide Standard Hydrocarbon Distribution Report 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 as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

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.

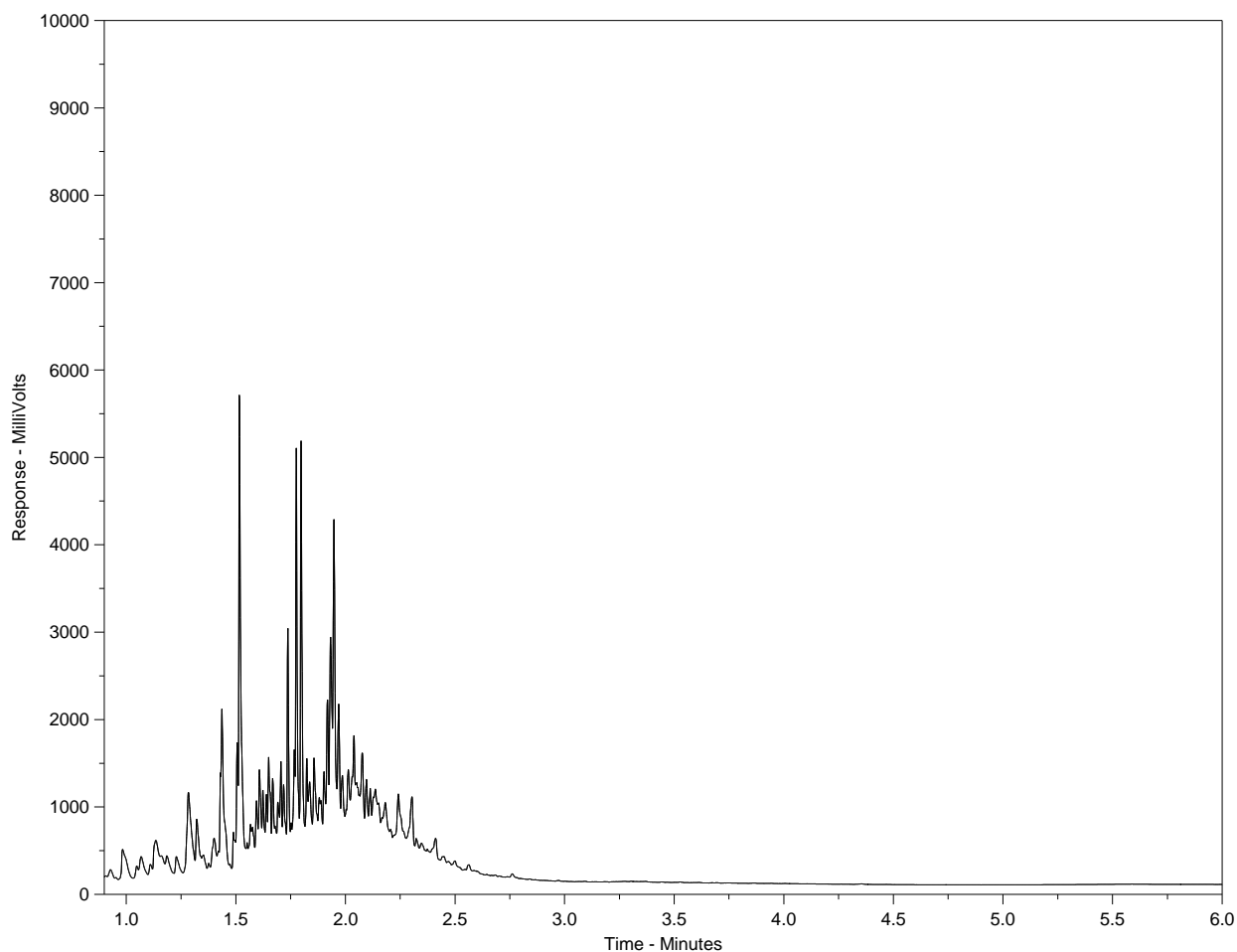
Note:

This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report



ALS Sample ID: L2606155-7
Client ID: MW7



F2		F3		F4		>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 Canada Wide Standard Hydrocarbon Distribution Report 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 as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

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.

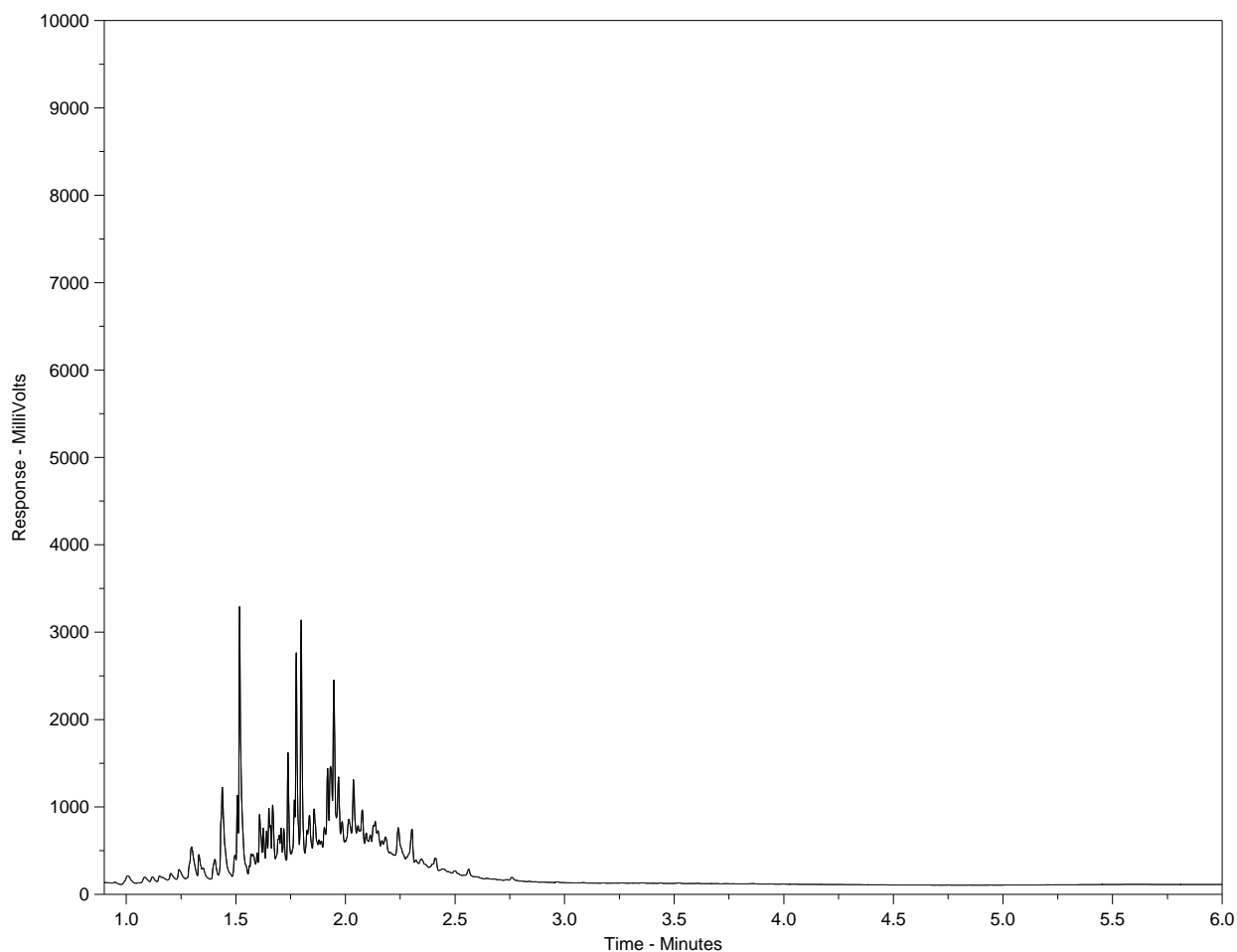
Note:

This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report



ALS Sample ID: L2606155-8
Client ID: MW5



F2		F3		F4		>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 Canada Wide Standard Hydrocarbon Distribution Report 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 as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

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.

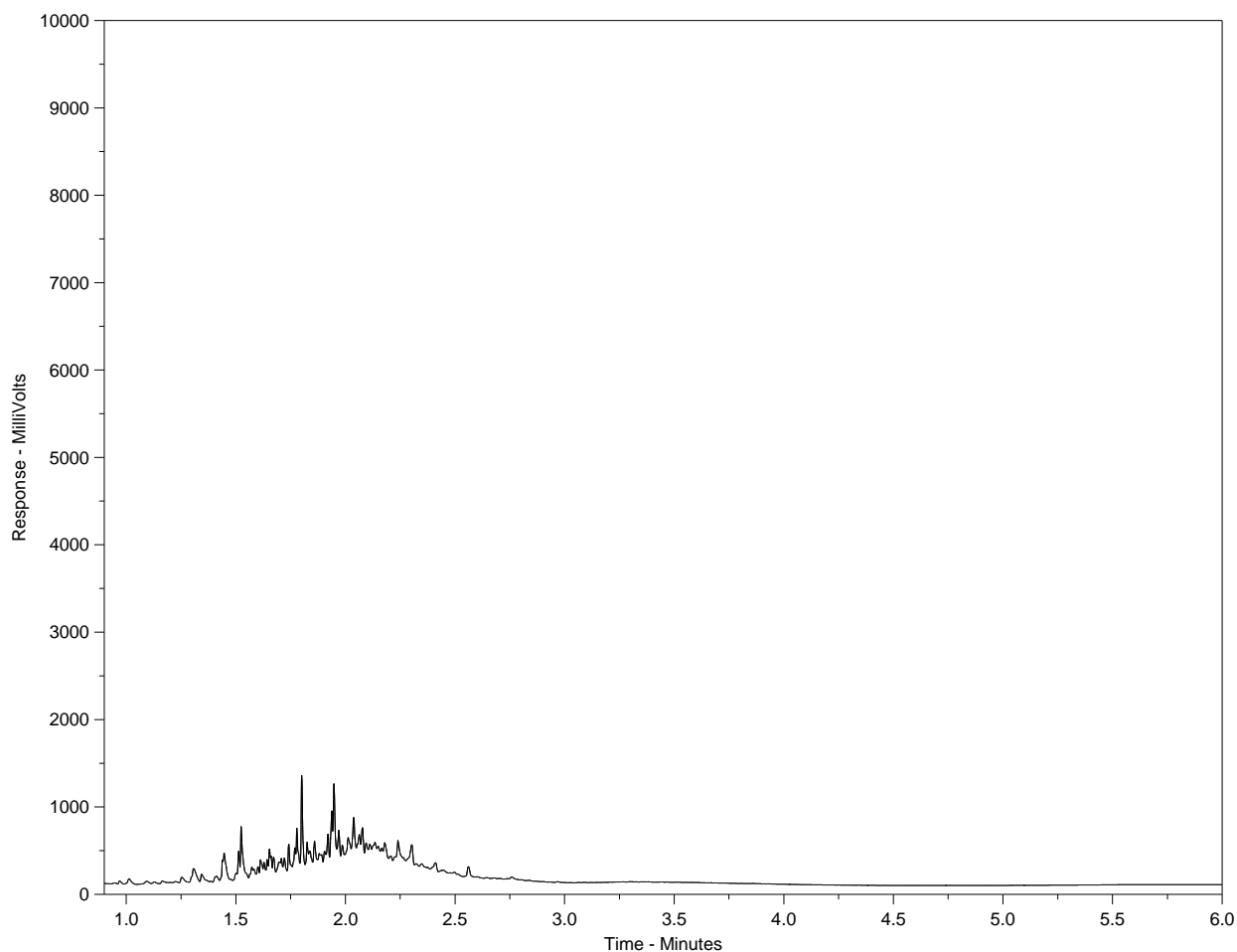
Note:

This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report



ALS Sample ID: L2606155-9
Client ID: MW6



F2		F3		F4		>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 Canada Wide Standard Hydrocarbon Distribution Report 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 as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

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.

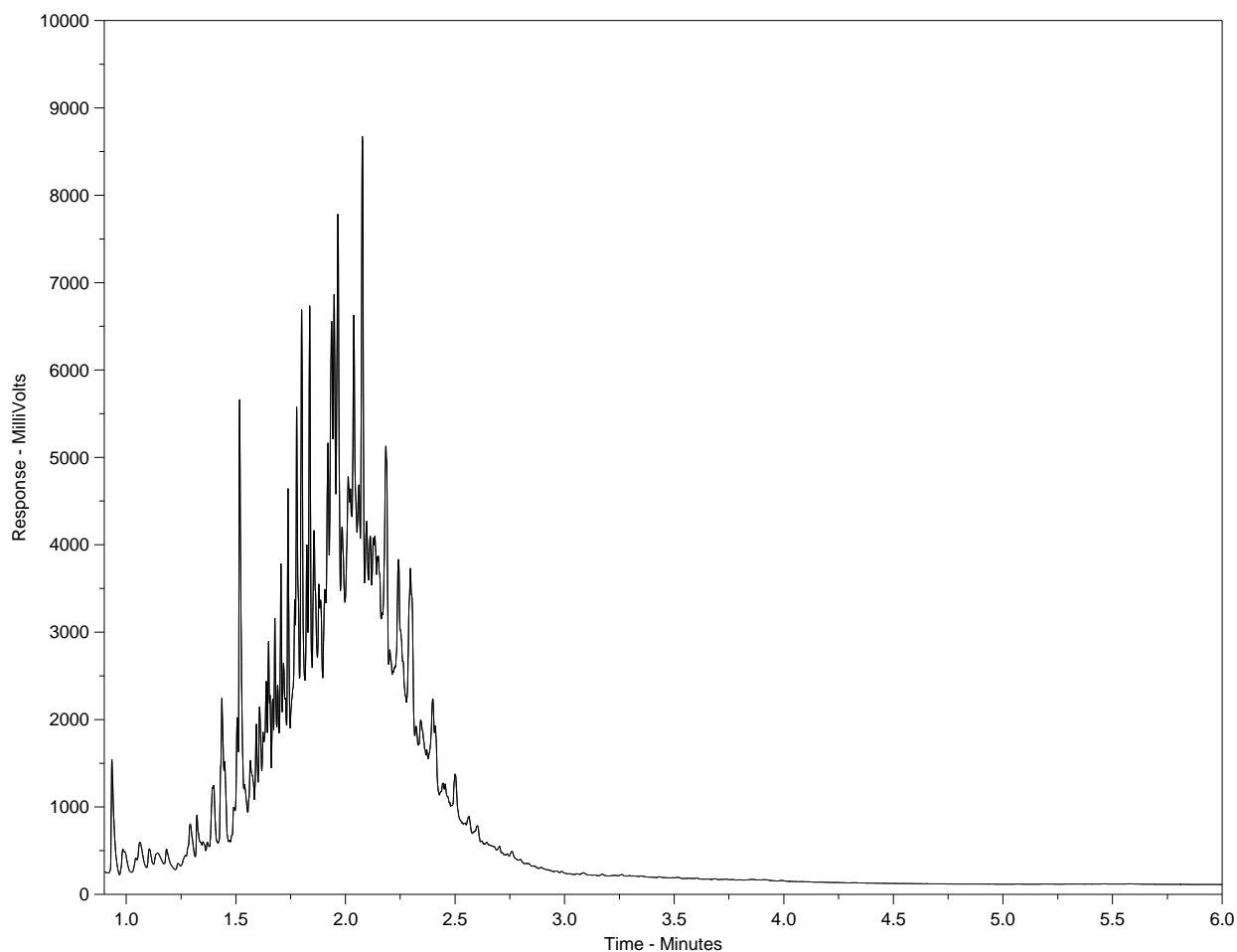
Note:

This chromatogram was produced with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Hydrocarbon Distribution Report



ALS Sample ID: L2606155-10
Client ID: PW1




F2		F3		F4		>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 Canada Wide Standard Hydrocarbon Distribution Report 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 as well as a number of specified n-alkane hydrocarbon marker compounds. Comparison of this report with those of reference standards may also assist in characterizing hydrocarbons present in the sample.

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 with a high temperature GC method that is specific to the Canada-Wide Standard method. Note that retention times and distribution profiles from reports produced using different GC programs will differ.

Report To Company: NWT POWER CORP Contact: JOSHUA CLARK Phone: 867-874-5248 Company address below will appear on the final report Street: 4 CAPITAL DRIVE City/Province: HAY RIVER / NT Postal Code: X0E 1G2		Report Format / Distribution Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL) Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX Email 1 or Fax: JCLARK@NTPC.COM Email 2: TPERKINS@NTPC.COM Email 3:		Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply) Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply 4 day [P4-20%] <input type="checkbox"/> 1 Business day [E - 100%] 3 day [P3-25%] <input type="checkbox"/> Same Day, Weekend or Statutory holiday [E2 -200%] 2 day [P2-50%] <input type="checkbox"/> (Laboratory opening fees may apply) Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm For tests that can not be performed according to the service level selected, you will be contacted.							
Invoice To Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO Company: Contact:		Invoice Distribution Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX Email 1 or Fax: JCLARK@NTPC.COM Email 2: TPERKINS@NTPC.COM		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th colspan="2">ANALYSIS REQUEST</th> </tr> <tr> <td style="width:50%;"> Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below </td> <td style="width:50%;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold; font-size: 1.2em;">SAMPLES ON HOLD</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: 0.8em;">SUSPECTED HAZARD (see Special Instructions)</div> </td> </tr> <tr> <td colspan="2" style="height: 200px; vertical-align: top;"> <div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold; font-size: 1.2em;">NUMBER OF CONTAINERS</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold; font-size: 1.2em;">BTEx/VOC PHC F2-F4</div> </div> </td> </tr> </table>		ANALYSIS REQUEST		Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below	<div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold; font-size: 1.2em;">SAMPLES ON HOLD</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: 0.8em;">SUSPECTED HAZARD (see Special Instructions)</div>	<div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold; font-size: 1.2em;">NUMBER OF CONTAINERS</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold; font-size: 1.2em;">BTEx/VOC PHC F2-F4</div> </div>	
ANALYSIS REQUEST											
Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below	<div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold; font-size: 1.2em;">SAMPLES ON HOLD</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: 0.8em;">SUSPECTED HAZARD (see Special Instructions)</div>										
<div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold; font-size: 1.2em;">NUMBER OF CONTAINERS</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold; font-size: 1.2em;">BTEx/VOC PHC F2-F4</div> </div>											
Project Information ALS Account # / Quote #: Job #: 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 # (lab use only):		ALS Contact:		Sampler:							
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	<div style="text-align: center;">  L2606155-COFC </div>						
	TB (TRIP BLANK)	23-JUN-21	09:44	WATER							
	JF01-05		10:22								
	MW10		12:45								
	MW9		13:05								
	MW9 TT		13:21								
	PW2		13:38								
	MW7		13:58								
	MW5		14:19								
	MW6		14:51								
	PW1		15:18								
Drinking Water (DW) Samples' (client use) Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)		SAMPLE CONDITION AS RECEIVED (lab use only) Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/> Ice Packs <input type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/> Cooling Initiated <input type="checkbox"/> INITIAL COOLER TEMPERATURES °C: 11.4 FINAL COOLER TEMPERATURES °C:							
SHIPMENT RELEASE (client use) Released by: JOSHUA CLARK Date: 23-JUN-21 Time: 1600		INITIAL SHIPMENT RECEPTION (lab use only) Received by: MA Date: June 23/21 Time: 1600		FINAL SHIPMENT RECEPTION (lab use only) Received by: Date: Time:							

GENERAL TERMS AND CONDITIONS:

These terms and conditions are incorporated in and form part of the Agreement between ALS Group's Environmental Division and the party named in the Offer (the "Client").

1. Definitions. Capitalized Terms not defined in these Terms and Conditions have the definitions set out in the other Agreement documents.
2. The Services. ALS will provide the Services to the Client as described in the Offer and in any chain of custody form provided with any sample.
3. Prices. ALS may review and change all prices, fees, surcharges or other charges set out in the Agreement if there are changes to ALS's cost beyond ALS's control, including changes in legislative requirements, Client variations of sample numbers and Client requests for changes to standard reporting requirements. Notwithstanding Condition 3, all quotations expire after three years.
4. Payment Terms. The Client shall pay ALS within 30 days of the invoice date OAC. ALS may, for reasonable business reasons, require the Client to arrange for payment in advance.
5. Quotation Numbers. The Client shall provide the quotation number to ALS (where applicable) to ensure correct pricing.
6. Taxes. Applicable taxes are not included in prices. Applicable surcharges and additional fees will be added at the time of invoicing.
7. Quality Control. ALS has an extensive QA/QC program. Clients' samples are analyzed using approved, referenced procedures followed by thorough data validation prior to reporting of the analytical results.
8. Test Results. Results are obtained from analytical measurements that are subject to inherent variability. Measurement results reflect characteristics of submitted test samples at time of analysis. The Client is responsible for informing itself on the limitation of test results and acknowledges that test results are not guaranteed. When statements of conformity are requested on test reports (e.g. within Criteria Reports), measurement uncertainty is not applied to test results prior to the evaluation.
9. Standard of Care. ALS will use reasonable care and diligence as required by the laws of the province or territory where the sample is tested.
10. Storage. Where possible, ALS will store; soil and water samples for 45 days from date of receipt, tissue/biota samples for 6 months from date of receipt, air samples or re-usable media for 14 days from date of receipt, and microbiological samples for 3 days from date of receipt.
11. Holds. If the Client requests a sample to be placed on hold, ALS will store the samples according to paragraph 10, after which ALS will invoice the Client and discard the sample. Each sample is subject to a minimum \$5.00 hold fee. Longer hold periods are available upon request. See paragraph 12.
12. Archives. If the Client requests a sample be archived, ALS will invoice in advance and store the sample for the period requested, after which ALS may discard the sample.
13. Legal Sample Handling Protocol. Legal sample handling protocol must be arranged before samples are collected. ALS charges a surcharge on the list price plus the hourly technologist or chemist rates for legal sample protocol. Additional charges will apply for samples that require storage by ALS.
14. Samples. The quality, condition, content and source of samples stored and tested are not known to ALS except as declared and described on the chain of custody form completed and submitted by the Client and accompanying the sample.
15. Risk of Loss. ALS will use reasonable care to protect samples during storage, however all samples are stored at the Client's risk and the Client is responsible for obtaining appropriate insurance, if desired. The Client acknowledges that during the performance of the Services samples may be altered, lost, damaged, or destroyed and the Client releases ALS from any claim the Client may have for any loss or damage to the sample.
16. Environmental. The Client must comply with all applicable environment legislation, including labeling all hazardous samples to comply with GHS and TDG regulations, and must provide appropriate Safety Data that include the nature of the hazard and a contact name and phone number to call for information. The Client will indemnify ALS for all loss or damages, including any fine or cost of complying with an order of any government authority, resulting from the Client's breach of this paragraph.
17. Hazardous Materials Disposal. ALS may return, at the Client's cost, hazardous material to the Client for disposal.
18. Hazardous Materials Surcharge. ALS may apply an additional surcharge for handling of hazardous samples or samples with Naturally Occurring Radioactive Materials (NORM), H2S, CN, etc.
19. Sample Containers. ALS may ship sample containers to the Client's location by the most cost effective means using ALS preferred courier suppliers, within the specified project timeline.
20. Additional Charges. ALS may charge the Client (a) its cost for emergency bottle shipments and shipments to and from a remote site, and (b) where pick up and delivery services are provided, subject in each instance to a minimum charge of \$25.00.
21. Re-Tests. ALS reserves the right to re-test any samples that remain in its possession. Re-tests requested by the Client may be subject to charges.
22. Waiver. The Client is responsible for making any assessment regarding the suitability of the Services and the intended results for the Client's purposes and waives any claims against ALS it may have as a result of the interpretation of the results. The Client shall indemnify ALS for all claims made by any third party against ALS in respect of all losses however arising from the performance of the Services or the use of any report provided in the performance of the Services.
23. Limitation of Liability. In no event shall ALS be liable for any consequential, indirect, incidental, special, exemplary, or punitive damages, whether foreseeable or unforeseeable (including claims for loss of profits or revenue or losses caused by stoppage of other work or impairment of other assets), incurred by the Client arising out of breach or failure of express or implied warranty, breach of contract, breach of warranty, misrepresentation, negligence, strict liability in tort or otherwise. In any event, the liability of ALS to the Client shall be limited to the cost of testing the sample as requested in the chain of custody form under which the sample was originally deposited. For the purposes of this paragraph and paragraphs 8, 15, 16, 22 and 24, as applicable, "ALS" includes without limitations its directors, officers, employees and affiliates and the "Client" includes without limitation any third party that may have a claim against ALS through the Client.
24. Notice of Liability. Notwithstanding paragraph 23, ALS shall not be liable to the Client unless the Client provides notice in writing to ALS of such loss or damage, together with full particulars thereof, within 30 days of the Client's receipt of the report of the analysis of the sample giving rise to such liability. The provisions of this paragraph allocate the risk under the Agreement between the Client and ALS, and the fees to be paid by the Client to ALS reflect this allocation of risks and the limitations of liability in this Agreement.
25. Third Party Service Provider Indemnity. For testing not performed at ALS, and where the Client requires ALS to forward samples to a third party service provider, the Client indemnifies ALS against any breach of this Agreement, all liabilities or losses incurred in connection with the third party service provider, including but not limited to courier services, testing turn-around time, and any additional costs associated with such third party.
26. Third Party Service Provider Indemnity. If ALS is required to engage a third party service provider for whatever reason, the Client indemnifies ALS against any breach of this Agreement, liabilities, or losses incurred in connection with the third party service provider, including but not limited to courier services, testing turn-around time, and any additional costs associated with such third party.
27. Entire Agreement. The Agreement is the entire agreement between the parties and supersedes and takes precedence over any terms and conditions contained in any documentation provided by the Client. ALS's execution of any subsequent documentation from the Client only acknowledges receipt and not acceptance of any terms or conditions therein. If there is a conflict between these terms and conditions and any other Agreement document, these terms and conditions prevail.
28. Term. Providing the first batch of samples to which this tender refers is submitted within three months of the starting date of this quotation, the following prices, terms and conditions will remain firm until the closing date. This offer, and its terms and conditions will automatically lapse if the offer has not been accepted and samples not delivered to ALS by the Closing Date.
29. Termination. (a) Either party may terminate this Agreement for any reason by giving the other party thirty (30) days written notice (Notice Period). (b) If the Agreement is terminated pursuant to clause (a), then the Client must pay ALS for all Services performed up to the expiry of the Notice Period.



NORTHWEST POWER CORP.
ATTN: Travis Perkins
4 CAPITAL DRIVE
HAY RIVER NT XOE 1G2

Date Received: 06-OCT-21
Report Date: 18-OCT-21 16:37 (MT)
Version: FINAL

Client Phone: 867-874-5231

Certificate of Analysis

Lab Work Order #: L2648286
Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 17-818975, 17-818976
Legal Site Desc:

Dana Brown, Chem. Tech. DIPL
Account Manager

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

ADDRESS: 9450 17 Avenue NW, Edmonton, AB T6N 1M9 Canada | Phone: +1 780 413 5227 | Fax: +1 780 437 2311
ALS CANADA LTD Part of the ALS Group An ALS Limited Company

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L2648286-1 WATER 06-OCT-21 10:15 PW1	L2648286-2 WATER 06-OCT-21 09:10 PW2	L2648286-3 WATER 06-OCT-21 10:47 JFO1-01	L2648286-4 WATER 06-OCT-21 13:00 JFO1-02	L2648286-5 WATER 06-OCT-21 13:43 JFO1-03
Grouping	Analyte					
WATER						
Volatile Organic Compounds	Benzene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	EthylBenzene (mg/L)	0.00128	<0.00050	<0.00050	<0.00050	<0.00050
	Toluene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	o-Xylene (mg/L)	0.00324	<0.00050	<0.00050	<0.00050	<0.00050
	m+p-Xylene (mg/L)	0.00552	<0.00050	<0.00050	<0.00050	<0.00050
	Xylenes (mg/L)	0.00877	<0.00071	<0.00071	<0.00071	<0.00071
	F1(C6-C10) (mg/L)	0.35	<0.10	<0.10	<0.10	<0.10
	F1-BTEX (mg/L)	0.34	<0.10	<0.10	<0.10	<0.10
	Surrogate: 4-Bromofluorobenzene (SS) (%)	114.7	79.0	78.1	74.8	73.9
	Surrogate: 3,4-Dichlorotoluene (SS) (%)	73.8	89.8	94.7	93.4	78.6
	Surrogate: 1,4-Difluorobenzene (SS) (%)	100.0	100.4	100.9	102.4	100.0
Hydrocarbons	F2 (C10-C16) (mg/L)	12.4	23.8	0.51	<0.10	<0.10
	F3 (C16-C34) (mg/L)	6.23	19.6	<0.25	<0.25	<0.25
	F4 (C34-C50) (mg/L)	<0.25	1.47	<0.25	<0.25	<0.25
	Surrogate: 2-Bromobenzotrifluoride (%)	112.5	105.5	101.6	104.8	104.3

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L2648286-6 WATER 06-OCT-21 13:29 JFO1-04	L2648286-7 WATER 06-OCT-21 13:10 JFO1-06	L2648286-8 WATER 06-OCT-21 13:33 MW2	L2648286-9 WATER 06-OCT-21 13:26 MW3	L2648286-10 WATER 06-OCT-21 13:18 MW4
Grouping	Analyte					
WATER						
Volatile Organic Compounds	Benzene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	EthylBenzene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Toluene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	o-Xylene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	m+p-Xylene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Xylenes (mg/L)	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071
	F1(C6-C10) (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	F1-BTEX (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Surrogate: 4-Bromofluorobenzene (SS) (%)	74.4	81.8	87.5	86.8	73.7
	Surrogate: 3,4-Dichlorotoluene (SS) (%)	87.2	95.3	77.1	76.5	99.4
	Surrogate: 1,4-Difluorobenzene (SS) (%)	101.4	100.4	98.7	100.2	101.0
Hydrocarbons	F2 (C10-C16) (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	F3 (C16-C34) (mg/L)	<0.25	0.63	<0.25	<0.25	<0.25
	F4 (C34-C50) (mg/L)	<0.25	1.19	<0.25	<0.25	<0.25
	Surrogate: 2-Bromobenzotrifluoride (%)	101.0	101.3	101.5	101.4	101.1

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L2648286-11 WATER 06-OCT-21 10:45 MW5	L2648286-12 WATER 06-OCT-21 10:58 MW6	L2648286-13 WATER 06-OCT-21 10:37 MW7	L2648286-14 WATER 06-OCT-21 11:10 MW9	L2648286-15 WATER 06-OCT-21 10:20 MW10
Grouping	Analyte					
WATER						
Volatile Organic Compounds	Benzene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	EthylBenzene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Toluene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	o-Xylene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	m+p-Xylene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Xylenes (mg/L)	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071
	F1(C6-C10) (mg/L)	<0.10	<0.10	0.14	<0.10	<0.10
	F1-BTEX (mg/L)	<0.10	<0.10	0.14	<0.10	<0.10
	Surrogate: 4-Bromofluorobenzene (SS) (%)	77.0	74.9	89.3	77.3	81.1
	Surrogate: 3,4-Dichlorotoluene (SS) (%)	94.7	83.2	75.2	85.9	74.8
	Surrogate: 1,4-Difluorobenzene (SS) (%)	99.4	99.8	100.2	100.4	101.5
Hydrocarbons	F2 (C10-C16) (mg/L)	2.83	2.40	15.6	1.49	4.86
	F3 (C16-C34) (mg/L)	0.89	0.98	4.08	0.87	1.83
	F4 (C34-C50) (mg/L)	<0.25	<0.25	0.29	<0.25	<0.25
	Surrogate: 2-Bromobenzotrifluoride (%)	103.0	103.0	119.9	100.7	102.6

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L2648286-16 WATER 06-OCT-21 10:16 FB01	L2648286-17 WATER 06-OCT-21 11:08 DUP A	L2648286-18 WATER TRIP BLANK		
Grouping	Analyte					
WATER						
Volatile Organic Compounds	Benzene (mg/L)	<0.00050	<0.00050	<0.00050		
	EthylBenzene (mg/L)	<0.00050	<0.00050	<0.00050		
	Toluene (mg/L)	<0.00050	<0.00050	<0.00050		
	o-Xylene (mg/L)	<0.00050	<0.00050	<0.00050		
	m+p-Xylene (mg/L)	<0.00050	<0.00050	<0.00050		
	Xylenes (mg/L)	<0.00071	<0.00071	<0.00071		
	F1(C6-C10) (mg/L)	<0.10	<0.10	<0.10		
	F1-BTEX (mg/L)	<0.10	<0.10	<0.10		
	Surrogate: 4-Bromofluorobenzene (SS) (%)	74.8	77.9	76.1		
	Surrogate: 3,4-Dichlorotoluene (SS) (%)	96.6	88.2	100.8		
	Surrogate: 1,4-Difluorobenzene (SS) (%)	100.5	101.6	101.7		
Hydrocarbons	F2 (C10-C16) (mg/L)	<0.10	1.52	<0.10		
	F3 (C16-C34) (mg/L)	<0.25	0.81	<0.25		
	F4 (C34-C50) (mg/L)	<0.25	<0.25	<0.25		
	Surrogate: 2-Bromobenzotrifluoride (%)	100.9	103.3	103.7		

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BTXS,F1-ED	Water	BTEX, Styrene and F1 (C6-C10)	EPA 5021/8015&8260 GC-MS & FID
The water sample, with added reagents, is heated in a sealed vial to equilibrium. The headspace from the vial is transferred into a gas chromatograph. BTEX Target compound concentrations are measured using mass spectrometry detection. The instrumental portion of F1 analysis is carried out in accordance with the Canada Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method.			
F2,F3,F4-ED	Water	F2, F3, F4	EPA 3510/CCME PHC CWS-GC-FID
Water samples are spiked with 2-BBTF surrogate, and extracted by reciprocal action shaker for 30 minutes using a single micro-extraction with 2 mL hexane. After extraction, hexane extracts are dispensed into GC vials for GC-FID analysis.			

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

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

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA

Chain of Custody Numbers:

17-818975	17-818976
-----------	-----------

GLOSSARY OF REPORT TERMS

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

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

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

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

mg/L - milligrams per litre.

< - Less than.

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

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

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

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

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



Quality Control Report

Workorder: L2648286

Report Date: 18-OCT-21

Page 1 of 3

Client: NORTHWEST POWER CORP.

4 CAPITAL DRIVE

HAY RIVER NT XOE 1G2

Contact: Travis Perkins

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTXS,F1-ED		Water						
Batch	R5617306							
WG3637038-4	DUP	L2648286-12						
Benzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	16-OCT-21
Toluene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	16-OCT-21
EthylBenzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	16-OCT-21
m+p-Xylene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	16-OCT-21
o-Xylene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	16-OCT-21
F1(C6-C10)		<0.10	<0.10	RPD-NA	mg/L	N/A	30	16-OCT-21
WG3636991-2	LCS							
Benzene			115.1		%		70-130	17-OCT-21
Toluene			106.7		%		70-130	17-OCT-21
EthylBenzene			117.0		%		70-130	17-OCT-21
m+p-Xylene			118.8		%		70-130	17-OCT-21
o-Xylene			123.4		%		70-130	17-OCT-21
WG3636991-3	LCS							
F1(C6-C10)			112.1		%		70-130	17-OCT-21
WG3637038-2	LCS							
Benzene			113.2		%		70-130	16-OCT-21
Toluene			116.4		%		70-130	16-OCT-21
EthylBenzene			110.6		%		70-130	16-OCT-21
m+p-Xylene			115.0		%		70-130	16-OCT-21
o-Xylene			116.5		%		70-130	16-OCT-21
WG3637038-3	LCS							
F1(C6-C10)			97.1		%		70-130	16-OCT-21
WG3636991-1	MB							
Benzene			<0.00050		mg/L		0.0005	17-OCT-21
Toluene			<0.00050		mg/L		0.0005	17-OCT-21
EthylBenzene			<0.00050		mg/L		0.0005	17-OCT-21
m+p-Xylene			<0.00050		mg/L		0.0005	17-OCT-21
o-Xylene			<0.00050		mg/L		0.0005	17-OCT-21
F1(C6-C10)			<0.10		mg/L		0.1	17-OCT-21
Surrogate: 1,4-Difluorobenzene (SS)			101.7		%		70-130	17-OCT-21
Surrogate: 4-Bromofluorobenzene (SS)			75.7		%		70-130	17-OCT-21
Surrogate: 3,4-Dichlorotoluene (SS)			95.2		%		70-130	17-OCT-21
WG3637038-1	MB							
Benzene			<0.00050		mg/L		0.0005	16-OCT-21
Toluene			<0.00050		mg/L		0.0005	16-OCT-21

Quality Control Report

Workorder: L2648286

Report Date: 18-OCT-21

Page 2 of 3

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTXS,F1-ED		Water						
Batch	R5617306							
WG3637038-1	MB							
EthylBenzene			<0.00050		mg/L		0.0005	16-OCT-21
m+p-Xylene			<0.00050		mg/L		0.0005	16-OCT-21
o-Xylene			<0.00050		mg/L		0.0005	16-OCT-21
F1(C6-C10)			<0.10		mg/L		0.1	16-OCT-21
Surrogate: 1,4-Difluorobenzene (SS)			100.2		%		70-130	16-OCT-21
Surrogate: 4-Bromofluorobenzene (SS)			74.2		%		70-130	16-OCT-21
Surrogate: 3,4-Dichlorotoluene (SS)			98.8		%		70-130	16-OCT-21
WG3636991-5	MS	L2648286-11						
Benzene			113.3		%		50-140	17-OCT-21
Toluene			119.3		%		50-140	17-OCT-21
EthylBenzene			110.9		%		50-140	17-OCT-21
m+p-Xylene			107.9		%		50-140	17-OCT-21
o-Xylene			117.1		%		50-140	17-OCT-21
F2,F3,F4-ED		Water						
Batch	R5616850							
WG3635256-8	LCS	DIESEL / MOTOR OIL						
F2 (C10-C16)			89.9		%		70-130	13-OCT-21
F3 (C16-C34)			100.4		%		70-130	13-OCT-21
F4 (C34-C50)			97.9		%		70-130	13-OCT-21
WG3635258-2	LCS	DIESEL / MOTOR OIL						
F2 (C10-C16)			92.0		%		70-130	13-OCT-21
F3 (C16-C34)			101.2		%		70-130	13-OCT-21
F4 (C34-C50)			98.4		%		70-130	13-OCT-21
WG3635256-7	MB							
F2 (C10-C16)			<0.10		mg/L		0.1	13-OCT-21
F3 (C16-C34)			<0.25		mg/L		0.25	13-OCT-21
F4 (C34-C50)			<0.25		mg/L		0.25	13-OCT-21
Surrogate: 2-Bromobenzotrifluoride			102.6		%		60-140	13-OCT-21
WG3635258-1	MB							
F2 (C10-C16)			<0.10		mg/L		0.1	13-OCT-21
F3 (C16-C34)			<0.25		mg/L		0.25	13-OCT-21
F4 (C34-C50)			<0.25		mg/L		0.25	13-OCT-21
Surrogate: 2-Bromobenzotrifluoride			103.7		%		60-140	13-OCT-21

Quality Control Report

Workorder: L2648286

Report Date: 18-OCT-21

Page 3 of 3

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes 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 pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

GENERAL TERMS AND CONDITIONS:

These terms and conditions are incorporated in and form part of the Agreement between ALS Group's Environmental Division and the party named in the Offer (the "Client").

1. Definitions. Capitalized Terms not defined in these Terms and Conditions have the definitions set out in the other Agreement documents.
2. The Services. ALS will provide the Services to the Client as described in the Offer and in any chain of custody form provided with any sample.
3. Prices. ALS may review and change all prices, fees, surcharges or other charges set out in the Agreement if there are changes to ALS's cost beyond ALS's control, including changes in legislative requirements, Client variations of sample numbers and Client requests for changes to standard reporting requirements. Notwithstanding Condition 3, all quotations expire after three years.
4. Payment Terms. The Client shall pay ALS within 30 days of the invoice date OAC. ALS may, for reasonable business reasons, require the Client to arrange for payment in advance.
5. Quotation Numbers. The Client shall provide the quotation number to ALS (where applicable) to ensure correct pricing.
6. Taxes. Applicable taxes are not included in prices. Applicable surcharges and additional fees will be added at the time of invoicing.
7. Quality Control. ALS has an extensive QA/QC program. Clients' samples are analyzed using approved, referenced procedures followed by thorough data validation prior to reporting of the analytical results.
8. Test Results. Results are obtained from analytical measurements that are subject to inherent variability. Measurement results reflect characteristics of submitted test samples at time of analysis. The Client is responsible for informing itself on the limitation of test results and acknowledges that test results are not guaranteed. When statements of conformity are requested on test reports (e.g. within Criteria Reports), measurement uncertainty is not applied to test results prior to the evaluation.
9. Standard of Care. ALS will use reasonable care and diligence as required by the laws of the province or territory where the sample is tested.
10. Storage. Where possible, ALS will store: soil and water samples for 45 days from date of receipt, tissue/blota samples for 6 months from date of receipt, air samples or re-usable media for 14 days from date of receipt, and microbiological samples for 3 days from date of receipt.
11. Holds. If the Client requests a sample to be placed on hold, ALS will store the samples according to paragraph 10, after which ALS will invoice the Client and discard the sample. Each sample is subject to a minimum \$5.00 hold fee. Longer hold periods are available upon request. See paragraph 12.
12. Archives. If the Client requests a sample be archived, ALS will invoice in advance and store the sample for the period requested, after which ALS may discard the sample.
13. Legal Sample Handling Protocol. Legal sample handling protocol must be arranged before samples are collected. ALS charges a surcharge on the list price plus the hourly technologist or chemist rates for legal sample protocol. Additional charges will apply for samples that require storage by ALS.
14. Samples. The quality, condition, content and source of samples stored and tested are not known to ALS except as declared and described on the chain of custody form completed and submitted by the Client and accompanying the sample.
15. Risk of Loss. ALS will use reasonable care to protect samples during storage, however all samples are stored at the Client's risk and the Client is responsible for obtaining appropriate insurance, if desired. The Client acknowledges that during the performance of the Services samples may be altered, lost, damaged, or destroyed and the Client releases ALS from any claim the Client may have for any loss or damage to the sample.
16. Environmental. The Client must comply with all applicable environment legislation, including labeling all hazardous samples to comply with GHS and TDG regulations, and must provide appropriate Safety Data that include the nature of the hazard and a contact name and phone number to call for information. The Client will indemnify ALS for all loss or damages, including any fine or cost of complying with an order of any government authority, resulting from the Client's breach of this paragraph.
17. Hazardous Materials Disposal. ALS may return, at the Client's cost, hazardous material to the Client for disposal.
18. Hazardous Materials Surcharge. ALS may apply an additional surcharge for handling of hazardous samples or samples with Naturally Occurring Radioactive Materials (NORM), H2S, CN, etc.
19. Sample Containers. ALS may ship sample containers to the Client's location by the most cost effective means using ALS preferred courier suppliers, within the specified project timeline.
20. Additional Charges. ALS may charge the Client (a) its cost for emergency bottle shipments and shipments to and from a remote site, and (b) where pick up and delivery services are provided, subject in each instance to a minimum charge of \$25.00.
21. Re-Tests. ALS reserves the right to re-test any samples that remain in its possession. Re-tests requested by the Client may be subject to charges.
22. Waiver. The Client is responsible for making any assessment regarding the suitability of the Services and the intended results for the Client's purposes and waives any claims against ALS it may have as a result of the interpretation of the results. The Client shall indemnify ALS for all claims made by any third party against ALS in respect of all losses however arising from the performance of the Services or the use of any report provided in the performance of the Services.
23. Limitation of Liability. In no event shall ALS be liable for any consequential, indirect, incidental, special, exemplary, or punitive damages, whether foreseeable or unforeseeable (including claims for loss of profits or revenue or losses caused by stoppage of other work or impairment of other assets), incurred by the Client arising out of breach or failure of express or implied warranty, breach of contract, breach of warranty, misrepresentation, negligence, strict liability in tort or otherwise. In any event, the liability of ALS to the Client shall be limited to the cost of testing the sample as requested in the chain of custody form under which the sample was originally deposited. For the purposes of this paragraph and paragraphs 22, 23, 24, 25, 26, 27, 28 and 29, as applicable, "ALS" includes without limitations its directors, officers, employees and affiliates and the "Client" includes without limitation any third party that may have a claim against ALS through the Client.
24. Notice of Liability. Notwithstanding paragraph 23, ALS shall not be liable to the Client unless the Client provides notice in writing to ALS of such loss or damage, together with full particulars thereof, within 30 days of the Client's receipt of the report of the analysis of the sample giving rise to such liability. The provisions of this paragraph allocate the risk under the Agreement between the Client and ALS, and the fees to be paid by the Client to ALS reflect this allocation of risks and the limitations of liability in this Agreement.
25. Third Party Service Provider Indemnity. For testing not performed at ALS, and where the Client requires ALS to forward samples to a third party service provider, the Client indemnifies ALS against any breach of this Agreement, all liabilities or losses incurred in connection with the third party service provider, including but not limited to courier services, testing turn-around time, and any additional costs associated with such third party.
26. Third Party Service Provider Indemnity. If ALS is required to engage a third party service provider for whatever reason, the Client indemnifies ALS against any breach of this Agreement, liabilities, or losses incurred in connection with the third party service provider, including but not limited to courier services, testing turn-around time, and any additional costs associated with such third party.
27. Entire Agreement. The Agreement is the entire agreement between the parties and supersedes and takes precedence over any terms and conditions contained in any documentation provided by the Client. ALS's execution of any subsequent documentation from the Client only acknowledges receipt and not acceptance of any terms or conditions therein. If there is a conflict between these terms and conditions and any other Agreement document, these terms and conditions prevail.
28. Term. Providing the first batch of samples to which this tender refers is submitted within three months of the starting date of this quotation, the following prices, terms and conditions will remain firm until the closing date. This offer, and its terms and conditions will automatically lapse if the offer has not been accepted and samples not delivered to ALS by the Closing Date.
29. Termination. (a) Either party may terminate this Agreement for any reason by giving the other party thirty (30) days written notice (Notice Period). (b) If the Agreement is terminated pursuant to clause (a), then the Client must pay ALS for all Services performed up to the expiry of the Notice Period.

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:		Select Report Format: <input type="checkbox"/> PDF <input type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)		Regular [R] <input type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply																																																																																																																																																																																																																																																			
Contact:		Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		<div style="display: flex; justify-content: space-between;"> <div> PRIORITY (Business Days) 4 day [P4-20%] <input type="checkbox"/> 3 day [P3-25%] <input type="checkbox"/> 2 day [P2-50%] <input type="checkbox"/> </div> <div> EMERGENCY 1 Business day [E - 100%] Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] </div> </div>																																																																																																																																																																																																																																																			
Phone:		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked																																																																																																																																																																																																																																																					
Company address below will appear on the final report		Select Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX																																																																																																																																																																																																																																																					
Street:		Email 1 or Fax		Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm																																																																																																																																																																																																																																																			
City/Province:		Email 2		For tests that can not be performed according to the service level selected, you will be contacted.																																																																																																																																																																																																																																																			
Postal Code:		Email 3		Analysis Request																																																																																																																																																																																																																																																			
Invoice To		Invoice Distribution		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td colspan="12">Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below</td> <td rowspan="10" style="writing-mode: vertical-rl; text-align: center; font-weight: bold;">SAMPLES ON HOLD</td> <td rowspan="10" style="writing-mode: vertical-rl; text-align: center; font-weight: bold;">SUSPECTED HAZARD (see Special Instructions)</td> </tr> <tr> <td colspan="12"> <div style="display: flex;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold;">NUMBER OF CONTAINERS</div> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table> </div> </td> </tr> <tr><td colspan="12"></td></tr> <tr><td colspan="12"></td></tr> <tr><td colspan="12"></td></tr> <tr><td colspan="12"></td></tr> <tr><td colspan="12"></td></tr> <tr><td colspan="12"></td></tr> <tr><td colspan="12"></td></tr> <tr><td colspan="12"></td></tr> </table>		Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below												SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)	<div style="display: flex;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold;">NUMBER OF CONTAINERS</div> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table> </div>												4	X	X										4	X	X										4	X	X										4	X	X										4	X	X										4	X	X										4	X	X										4	X	X										4	X	X										4	X	X																																																																																																									
Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below												SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)																																																																																																																																																																																																																																										
<div style="display: flex;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold;">NUMBER OF CONTAINERS</div> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>X</td><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table> </div>														4	X	X												4	X	X										4	X	X										4	X	X										4	X	X										4	X	X										4	X	X										4	X	X										4	X	X										4	X	X																																																																																																																									
4	X	X																																																																																																																																																																																																																																																					
4	X	X																																																																																																																																																																																																																																																					
4	X	X																																																																																																																																																																																																																																																					
4	X	X																																																																																																																																																																																																																																																					
4	X	X																																																																																																																																																																																																																																																					
4	X	X																																																																																																																																																																																																																																																					
4	X	X																																																																																																																																																																																																																																																					
4	X	X																																																																																																																																																																																																																																																					
4	X	X																																																																																																																																																																																																																																																					
4	X	X																																																																																																																																																																																																																																																					
Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX																																																																																																																																																																																																																																																					
Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		Email 1 or Fax																																																																																																																																																																																																																																																					
Company:		Email 2																																																																																																																																																																																																																																																					
Contact:																																																																																																																																																																																																																																																							
Project Information		Oil and Gas Required Fields (client use)																																																																																																																																																																																																																																																					
ALS Account # / Quote #:		AFE/Cost Center:		PO#																																																																																																																																																																																																																																																			
Job #:		Major/Minor Code:		Routing Code:																																																																																																																																																																																																																																																			
PO / AFE:		Requisitioner:																																																																																																																																																																																																																																																					
LSD:		Location:																																																																																																																																																																																																																																																					
ALS Lab Work Order # (lab use only):		ALS Contact:		Sampler:																																																																																																																																																																																																																																																			
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type																																																																																																																																																																																																																																																			
10	MW4	06-Oct-21	13:18	water																																																																																																																																																																																																																																																			
11	MW5	↓	10:45																																																																																																																																																																																																																																																				
12	MW6		16:58																																																																																																																																																																																																																																																				
13	MW7		10:37																																																																																																																																																																																																																																																				
14	MW9		4:10																																																																																																																																																																																																																																																				
15	MW10		19:20																																																																																																																																																																																																																																																				
16	FB01		10:16																																																																																																																																																																																																																																																				
17	DUP A (limited sample)		11:08																																																																																																																																																																																																																																																				

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

GENERAL TERMS AND CONDITIONS:

These terms and conditions are incorporated in and form part of the Agreement between ALS Group's Environmental Division and the party named in the Offer (the "Client").

1. Definitions. Capitalized Terms not defined in these Terms and Conditions have the definitions set out in the other Agreement documents.
2. The Services. ALS will provide the Services to the Client as described in the Offer and in any chain of custody form provided with any sample.
3. Prices. ALS may review and change all prices, fees, surcharges or other charges set out in the Agreement if there are changes to ALS's cost beyond ALS's control, including changes in legislative requirements, Client variations of sample numbers and Client requests for changes to standard reporting requirements. Notwithstanding Condition 3, all quotations expire after three years.
4. Payment Terms. The Client shall pay ALS within 30 days of the invoice date OAC. ALS may, for reasonable business reasons, require the Client to arrange for payment in advance.
5. Quotation Numbers. The Client shall provide the quotation number to ALS (where applicable) to ensure correct pricing.
6. Taxes. Applicable taxes are not included in prices. Applicable surcharges and additional fees will be added at the time of invoicing.
7. Quality Control. ALS has an extensive QA/QC program. Clients' samples are analyzed using approved, referenced procedures followed by thorough data validation prior to reporting of the analytical results.
8. Test Results. Results are obtained from analytical measurements that are subject to inherent variability. Measurement results reflect characteristics of submitted test samples at time of analysis. The Client is responsible for informing itself on the limitation of test results and acknowledges that test results are not guaranteed. When statements of conformity are requested on test reports (e.g. within Criteria Reports), measurement uncertainty is not applied to test results prior to the evaluation.
9. Standard of Care. ALS will use reasonable care and diligence as required by the laws of the province or territory where the sample is tested.
10. Storage. Where possible, ALS will store; soil and water samples for 45 days from date of receipt, tissue/biota samples for 6 months from date of receipt, air samples or re-usable media for 14 days from date of receipt, and microbiological samples for 3 days from date of receipt.
11. Holds. If the Client requests a sample to be placed on hold, ALS will store the samples according to paragraph 10, after which ALS will invoice the Client and discard the sample. Each sample is subject to a minimum \$5.00 hold fee. Longer hold periods are available upon request. See paragraph 12.
12. Archives. If the Client requests a sample be archived, ALS will invoice in advance and store the sample for the period requested, after which ALS may discard the sample.
13. Legal Sample Handling Protocol. Legal sample handling protocol must be arranged before samples are collected. ALS charges a surcharge on the list price plus the hourly technologist or chemist rates for legal sample protocol. Additional charges will apply for samples that require storage by ALS.
14. Samples. The quality, condition, content and source of samples stored and tested are not known to ALS except as declared and described on the chain of custody form completed and submitted by the Client and accompanying the sample.
15. Risk of Loss. ALS will use reasonable care to protect samples during storage, however all samples are stored at the Client's risk and the Client is responsible for obtaining appropriate insurance, if desired. The Client acknowledges that during the performance of the Services samples may be altered, lost, damaged, or destroyed and the Client releases ALS from any claim the Client may have for any loss or damage to the sample.
16. Environmental. The Client must comply with all applicable environment legislation, including labeling all hazardous samples to comply with GHS and TDG regulations, and must provide appropriate Safety Data that include the nature of the hazard and a contact name and phone number to call for information. The Client will indemnify ALS for all loss or damages, including any fine or cost of complying with an order of any government authority, resulting from the Client's breach of this paragraph.
17. Hazardous Materials Disposal. ALS may return, at the Client's cost, hazardous material to the Client for disposal.
18. Hazardous Materials Surcharge. ALS may apply an additional surcharge for handling of hazardous samples or samples with Naturally Occurring Radioactive Materials (NORM), H2S, CN, etc.
19. Sample Containers. ALS may ship sample containers to the Client's location by the most cost effective means using ALS preferred courier suppliers, within the specified project timeline.
20. Additional Charges. ALS may charge the Client (a) its cost for emergency bottle shipments and shipments to and from a remote site, and (b) where pick up and delivery services are provided, subject in each instance to a minimum charge of \$25.00.
21. Re-Tests. ALS reserves the right to re-test any samples that remain in its possession. Re-tests requested by the Client may be subject to charges.
22. Waiver. The Client is responsible for making any assessment regarding the suitability of the Services and the intended results for the Client's purposes and waives any claims against ALS it may have as a result of the interpretation of the results. The Client shall indemnify ALS for all claims made by any third party against ALS in respect of all losses however arising from the performance of the Services or the use of any report provided in the performance of the Services.
23. Limitation of Liability. In no event shall ALS be liable for any consequential, indirect, incidental, special, exemplary, or punitive damages, whether foreseeable or unforeseeable (including claims for loss of profits or revenue or losses caused by stoppage of other work or impairment of other assets), incurred by the Client arising out of breach or failure of express or implied warranty, breach of contract, breach of warranty, misrepresentation, negligence, strict liability in tort or otherwise. In any event, the liability of ALS to the Client shall be limited to the cost of testing the sample as requested in the chain of custody form under which the sample was originally deposited. For the purposes of this paragraph and paragraphs 8, 15, 16, 22 and 24, as applicable, "ALS" includes without limitations its directors, officers, employees and affiliates and the "Client" includes without limitation any third party that may have a claim against ALS through the Client.
24. Notice of Liability. Notwithstanding paragraph 23, ALS shall not be liable to the Client unless the Client provides notice in writing to ALS of such loss or damage, together with full particulars thereof, within 30 days of the Client's receipt of the report of the analysis of the sample giving rise to such liability. The provisions of this paragraph allocate the risk under the Agreement between the Client and ALS, and the fees to be paid by the Client to ALS reflect this allocation of risks and the limitations of liability in this Agreement.
25. Third Party Service Provider Indemnity. For testing not performed at ALS, and where the Client requires ALS to forward samples to a third party service provider, the Client indemnifies ALS against any breach of this Agreement, all liabilities or losses incurred in connection with the third party service provider, including but not limited to courier services, testing turn-around time, and any additional costs associated with such third party.
26. Third Party Service Provider Indemnity. If ALS is required to engage a third party service provider for whatever reason, the Client indemnifies ALS against any breach of this Agreement, liabilities, or losses incurred in connection with the third party service provider, including but not limited to courier services, testing turn-around time, and any additional costs associated with such third party.
27. Entire Agreement. The Agreement is the entire agreement between the parties and supersedes and takes precedence over any terms and conditions contained in any documentation provided by the Client. ALS's execution of any subsequent documentation from the Client only acknowledges receipt and not acceptance of any terms or conditions therein. If there is a conflict between these terms and conditions and any other Agreement document, these terms and conditions prevail.
28. Term. Providing the first batch of samples to which this tender refers is submitted within three months of the starting date of this quotation, the following prices, terms and conditions will remain firm until the closing date. This offer, and its terms and conditions will automatically lapse if the offer has not been accepted and samples not delivered to ALS by the Closing Date.
29. Termination. (a) Either party may terminate this Agreement for any reason by giving the other party thirty (30) days written notice (Notice Period). (b) If the Agreement is terminated pursuant to clause (a), then the Client must pay ALS for all Services performed up to the expiry of the Notice Period.

APPENDIX C – REGULATORY CORRESPONDENCE

1. Email dated January 28, 2021, to Matthew Miller, NTPC, from Heather E. Beck, GNWT Environment and Natural Resources. Jackfish water licence outstanding submissions.
2. Email dated February 2, 2021 to Heather E. Beck, GNWT Environment and Natural Resources, to Matthew Miller, NTPC. RE: Jackfish water licence outstanding submissions
3. Email dated February 26, 2021 to Heather E. Beck, GNWT Environment and Natural Resources, to Matthew Miller, NTPC. RE: Jackfish water licence outstanding submissions
4. Email dated March 1, 2021 to Matthew Miller, NTPC and Heather E. Beck, GNWT Environment and Natural Resources, from Tyree Mullaney, MVLWB. RE: Jackfish water licence outstanding submissions
5. Email dated March 5, 2021 to Tyree Mullaney, MVLWB and Heather E. Beck, GNWT Environment and Natural Resources, to Matthew Miller, NTPC. RE: Jackfish water licence outstanding submissions
6. Email dated April 29, 2021 to Matthew Miller, NTPC, from Amanda Gauthier, MVLWB. MV2019L1-0001 - Northwest Territories Power Corp - Approval - Submission Deferral

Belinda Whitford

From: Heather E. Beck <Heather_Beck@gov.nt.ca>
Sent: January 28, 2021 9:45 AM
To: Matthew Miller
Cc: David-Scott McQuinn; Bruno Croft
Subject: Jackfish water licence outstanding submissions

Email originated outside NTPC.

Good morning,

As discussed, please be advised that the following submissions are outstanding and as a result NTPC is not in compliance with water licence MV2019L1-0001:

- Thermal Plume Delineation Study Design
- Thermal Plume Delineation Study Design Report (to be submitted after the design)
- AEMP Design Plan

The thermal plume delineation has been outstanding going on 2 years, the plume itself is considered a waste and is why these studies are a requirement in the licence. This can no longer be put off and as such we need a firm commitment for completion of these submissions.

Heather Beck

Water Resource Officer

Water Division, North Slave Region

Environment and Natural Resources

Government of the Northwest Territories

2nd Floor, ENR Main Building

PO Box 2668

3803 Bretzlaff Drive

Yellowknife, NT X1A 2P9

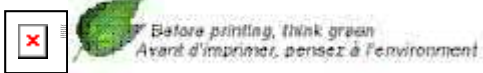
Phone: 867-767-9238 Ext. 53243

Cell: 867-445-3208

Fax: 867-873-6230

www.gov.nt.ca

This message is intended only for the use of the individual or entity to which it is addressed and may contain information that is privileged, confidential and exempt from disclosure under applicable law. If the reader of this message is not the intended recipient, or the employee or agent responsible for delivering the message to the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited. If you have received this communication in error, please delete it immediately and notify us by telephone. Thank you.



Belinda Whitford

From: Matthew Miller
Sent: February 2, 2021 2:24 PM
To: 'Heather E. Beck'
Cc: 'David-Scott McQuinn'; 'Bruno Croft'
Subject: RE: Jackfish water licence outstanding submissions

Thanks Heather,

We will work internally and with Golder to develop a response as soon as possible

Cheers,

Matt

From: Heather E. Beck <Heather_Beck@gov.nt.ca>
Sent: Thursday, January 28, 2021 9:45 AM
To: Matthew Miller <MMiller@ntpc.com>
Cc: David-Scott McQuinn <David-Scott_McQuinn@gov.nt.ca>; Bruno Croft <Bruno_Croft@gov.nt.ca>
Subject: Jackfish water licence outstanding submissions

Email originated outside NTPC.

Good morning,

As discussed, please be advised that the following submissions are outstanding and as a result NTPC is not in compliance with water licence MV2019L1-0001:

- Thermal Plume Delineation Study Design
- Thermal Plume Delineation Study Design Report (to be submitted after the design)
- AEMP Design Plan

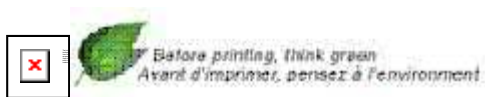
The thermal plume delineation has been outstanding going on 2 years, the plume itself is considered a waste and is why these studies are a requirement in the licence. This can no longer be put off and as such we need a firm commitment for completion of these submissions.

Heather Beck
Water Resource Officer
Water Division, North Slave Region
Environment and Natural Resources
Government of the Northwest Territories

2nd Floor, ENR Main Building
PO Box 2668
3803 Bretzlaff Drive
Yellowknife, NT X1A 2P9

Phone: 867-767-9238 Ext. 53243
Cell: 867-445-3208
Fax: 867-873-6230
www.gov.nt.ca

This message is intended only for the use of the individual or entity to which it is addressed and may contain information that is privileged, confidential and exempt from disclosure under applicable law. If the reader of this message is not the intended recipient, or the employee or agent responsible for delivering the message to the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited. If you have received this communication in error, please delete it immediately and notify us by telephone. Thank you.



Belinda Whitford

From: Matthew Miller
Sent: February 26, 2021 4:55 PM
To: Heather E. Beck; Tyree Mullaney (tyree@mvlwb.com)
Cc: David-Scott McQuinn; Bruno Croft; Katherine Harris; Eileen Hendry; Alex Love; Belinda Whitford; Eddie Smith; Rattray, Kevin; Hille, Kelly; Rose, Greg
Subject: RE: Jackfish Water Licence- Outstanding Submissions
Attachments: Jackfish Lake Generating Facility- Operations Maintenance and Surveillance Manual.pdf

Hello Tyree and Heather,

The Jackfish Lake Generating Facility- Operations Maintenance and Surveillance Manual is attached. NTPC committed to the MVLWB to submit this on February 26, 2021. Initially this updated version was meant to incorporate the updated monitoring equipment but given that this 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 will resubmit an updated version by December 31, 2021 that will have the updated equipment present once it has been successfully commissioned.

NTPC operations has deemed the current design for the updated flow monitoring equipment to be deficient. Some reworking of the piping systems within the plants is required to accurately record flow measurements. This reworking of the piping will require shutdowns which will not be possible until the late spring/summer when demand is reduced. NTPC expects that the updated instrumentation will be operational and recording flow by the end of August 2021.

NTPC and Golder also completed an investigation to determine if the Thermal Plume Study could proceed without the updated instrumentation and use pump readouts for the flow data. Golder determined that the pump read out data was not sufficient to complete the Thermal Plume Study and required thermal modelling.

Given the August 31, 2021 date for the flow meter data the new proposed timelines for the Thermal Plume and AEMP are provided below.

	From WL	New Submission Date
Thermal Plume Delineation Study Design (TPD SD)	A minimum of 90 days following the effective date of this Licence.	May 31, 2021
Thermal Plume Delineation Study Report	August 1, 2021	January 30, 2023
AEMP Design Plan	November 1, 2021	April 30, 2023
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.	No change
AEMP Design Plan – Revised	Three years following implementation of the AEMP Design Plan and every five years thereafter, or as directed by the Board.	No change
AEMP Annual Report	March 31, 2023 and every year thereafter.	March 31, 2024 and every year thereafter

--	--	--

Thanks for your time and please let us know if there is any other information we can provide or if you would like to set up a meeting to discuss.

Cheers,

Matt

From: Matthew Miller Hello Heather and
Sent: Tuesday, February 2, 2021 2:24 PM
To: Heather E. Beck <Heather_Beck@gov.nt.ca>
Cc: David-Scott McQuinn <David-Scott_McQuinn@gov.nt.ca>; Bruno Croft <Bruno_Croft@gov.nt.ca>
Subject: RE: Jackfish water licence outstanding submissions

Thanks Heather,

We will work internally and with Golder to develop a response as soon as possible

Cheers,

Matt

From: Heather E. Beck <Heather_Beck@gov.nt.ca>
Sent: Thursday, January 28, 2021 9:45 AM
To: Matthew Miller <MMiller@ntpc.com>
Cc: David-Scott McQuinn <David-Scott_McQuinn@gov.nt.ca>; Bruno Croft <Bruno_Croft@gov.nt.ca>
Subject: Jackfish water licence outstanding submissions

Email originated outside NTPC.

Good morning,

As discussed, please be advised that the following submissions are outstanding and as a result NTPC is not in compliance with water licence MV2019L1-0001:

- Thermal Plume Delineation Study Design
- Thermal Plume Delineation Study Design Report (to be submitted after the design)
- AEMP Design Plan

The thermal plume delineation has been outstanding going on 2 years, the plume itself is considered a waste and is why these studies are a requirement in the licence. This can no longer be put off and as such we need a firm commitment for completion of these submissions.

Heather Beck
 Water Resource Officer
 Water Division, North Slave Region
 Environment and Natural Resources
 Government of the Northwest Territories

2nd Floor, ENR Main Building
 PO Box 2668

3803 Bretzlaff Drive
Yellowknife, NT X1A 2P9

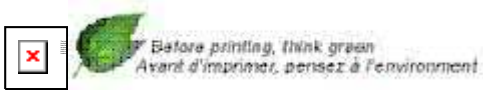
Phone: 867-767-9238 Ext. 53243

Cell: 867-445-3208

Fax: 867-873-6230

www.gov.nt.ca

This message is intended only for the use of the individual or entity to which it is addressed and may contain information that is privileged, confidential and exempt from disclosure under applicable law. If the reader of this message is not the intended recipient, or the employee or agent responsible for delivering the message to the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited. If you have received this communication in error, please delete it immediately and notify us by telephone. Thank you.



Belinda Whitford

From: Tyree Mullaney <tyree@mvnlwb.com>
Sent: March 1, 2021 5:59 AM
To: Matthew Miller; Heather E. Beck
Cc: David-Scott McQuinn; Bruno Croft; Katherine Harris; Eileen Hendry; Alex Love; Belinda Whitford; Eddie Smith; Rattray, Kevin; Hille, Kelly; Rose, Greg
Subject: RE: Jackfish Water Licence- Outstanding Submissions

Email originated outside NTPC.

Good morning Matt,

Can you please submit the information below in a formal request and submit to the Board, below is the request that was submitted in April 2020 by NTPC.

http://registry.mvnlwb.ca/Documents/MV2019L1-0001/MV2019L1-0001%20-%20NTPC%20-%20Jackfish%20-%20Request%20for%20Extension%20of%20Submission%20Dates%20-%20Apr23_20.pdf

If you have any questions, please feel free to reach out.

Thanks

Tyree

Tyree Mullaney, EP
Regulatory Specialist
Mackenzie Valley Land and Water Board
7th Floor, 4922 48th St, PO Box 2130 | Yellowknife, NT | X1A 2P
mobile 867.447.4643 | ph 867.766.7464 | fax 867.873.6610
tyree@mvnlwb.com | www.mvnlwb.com

Please note: All correspondence to the Board, including emails, letters, faxes and attachments are public documents and may be posted to the public registry.



From: Matthew Miller <MMiller@ntpc.com>
Sent: Friday, February 26, 2021 4:55 PM
To: Heather E. Beck <Heather_Beck@gov.nt.ca>; Tyree Mullaney <tyree@mvnlwb.com>
Cc: David-Scott McQuinn <David-Scott_McQuinn@gov.nt.ca>; Bruno Croft <Bruno_Croft@gov.nt.ca>; Katherine Harris <kharris@mvnlwb.com>; Eileen Hendry <Ehendry@ntpc.com>; Alex Love <ALove@ntpc.com>; Belinda Whitford <Bwhitford@ntpc.com>; Eddie Smith <ESmith@ntpc.com>; Rattray, Kevin <Kevin_Rattray@golder.com>; Hille, Kelly <Kelly_Hille@golder.com>; Rose, Greg <Greg_Rose@golder.com>
Subject: RE: Jackfish Water Licence- Outstanding Submissions

Hello Tyree and Heather,

The Jackfish Lake Generating Facility- Operations Maintenance and Surveillance Manual is attached. NTPC committed to the MVLWB to submit this on February 26, 2021. Initially this updated version was meant to incorporate the updated monitoring equipment but given that this 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 will resubmit an updated version by December 31, 2021 that will have the updated equipment present once it has been successfully commissioned.

NTPC operations has deemed the current design for the updated flow monitoring equipment to be deficient. Some reworking of the piping systems within the plants is required to accurately record flow measurements. This reworking of the piping will require shutdowns which will not be possible until the late spring/summer when demand is reduced. NTPC expects that the updated instrumentation will be operational and recording flow by the end of August 2021.

NTPC and Golder also completed an investigation to determine if the Thermal Plume Study could proceed without the updated instrumentation and use pump readouts for the flow data. Golder determined that the pump read out data was not sufficient to complete the Thermal Plume Study and required thermal modelling.

Given the August 31, 2021 date for the flow meter data the new proposed timelines for the Thermal Plume and AEMP are provided below.

	From WL	New Submission Date
Thermal Plume Delineation Study Design (TPD SD)	A minimum of 90 days following the effective date of this Licence.	May 31, 2021
Thermal Plume Delineation Study Report	August 1, 2021	January 30, 2023
AEMP Design Plan	November 1, 2021	April 30, 2023
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.	No change
AEMP Design Plan – Revised	Three years following implementation of the AEMP Design Plan and every five years thereafter, or as directed by the Board.	No change
AEMP Annual Report	March 31, 2023 and every year thereafter.	March 31, 2024 and every year thereafter

Thanks for your time and please let us know if there is any other information we can provide or if you would like to set up a meeting to discuss.

Cheers,

Matt

From: Matthew Miller Hello Heather and
Sent: Tuesday, February 2, 2021 2:24 PM
To: Heather E. Beck <Heather_Beck@gov.nt.ca>

Cc: David-Scott McQuinn <David-Scott_McQuinn@gov.nt.ca>; Bruno Croft <Bruno_Croft@gov.nt.ca>

Subject: RE: Jackfish water licence outstanding submissions

Thanks Heather,

We will work internally and with Golder to develop a response as soon as possible

Cheers,

Matt

From: Heather E. Beck <Heather_Beck@gov.nt.ca>

Sent: Thursday, January 28, 2021 9:45 AM

To: Matthew Miller <MMiller@ntpc.com>

Cc: David-Scott McQuinn <David-Scott_McQuinn@gov.nt.ca>; Bruno Croft <Bruno_Croft@gov.nt.ca>

Subject: Jackfish water licence outstanding submissions

Email originated outside NTPC.

Good morning,

As discussed, please be advised that the following submissions are outstanding and as a result NTPC is not in compliance with water licence MV2019L1-0001:

- Thermal Plume Delineation Study Design
- Thermal Plume Delineation Study Design Report (to be submitted after the design)
- AEMP Design Plan

The thermal plume delineation has been outstanding going on 2 years, the plume itself is considered a waste and is why these studies are a requirement in the licence. This can no longer be put off and as such we need a firm commitment for completion of these submissions.

Heather Beck

Water Resource Officer

Water Division, North Slave Region

Environment and Natural Resources

Government of the Northwest Territories

2nd Floor, ENR Main Building

PO Box 2668

3803 Bretzlaff Drive

Yellowknife, NT X1A 2P9

Phone: 867-767-9238 Ext. 53243

Cell: 867-445-3208

Fax: 867-873-6230

www.gov.nt.ca

This message is intended only for the use of the individual or entity to which it is addressed and may contain information that is privileged, confidential and exempt from disclosure under applicable law. If the reader of this message is not the intended recipient, or the employee or agent responsible for delivering the message to the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited. If you have received this communication in error, please delete it immediately and notify us by telephone. Thank you.



Before printing, think green
Avant d'imprimer, pensez à l'environnement

NOTICE - The information contained in this Northwest Territories Power Corporation email is intended for the sole use of the Northwest Territories Power Corporation or their designated agents and may contain information that is privileged and confidential, the disclosure of which is governed by law. If the reader of this document is not the intended recipient, or the employee or agent responsible to deliver it to the intended recipient, you are hereby notified that any review, dissemination, distribution or copying of this information is STRICTLY PROHIBITED. If you received this information in error, please call us immediately upon receipt and return the document(s) by mail to the address above. Thank you for your cooperation.

Belinda Whitford

From: Matthew Miller
Sent: March 5, 2021 12:47 PM
To: Tyree Mullaney; Heather E. Beck
Cc: David-Scott McQuinn; Bruno Croft; Katherine Harris; Eileen Hendry; Alex Love; Belinda Whitford; Eddie Smith; Rattray, Kevin; Hille, Kelly; Rose, Greg
Subject: RE: Jackfish Water Licence- Outstanding Submissions
Attachments: Jackfish Water Licence MV2019L1-0001- Submission Dates Extension Request- March 2021.pdf

Hey Tyree and Heather,

Please find the formal request for the Jackfish Water Licence MV2019L1-0001- Submission Dates Extension Request- March 2021.

Please let us know if there is anything else we can provide at this time.

Cheers,

Matt

From: Tyree Mullaney <tyree@mvlwb.com>
Sent: Monday, March 1, 2021 8:59 AM
To: Matthew Miller <MMiller@ntpc.com>; Heather E. Beck <Heather_Beck@gov.nt.ca>
Cc: David-Scott McQuinn <David-Scott_McQuinn@gov.nt.ca>; Bruno Croft <Bruno_Croft@gov.nt.ca>; Katherine Harris <kharris@mvlwb.com>; Eileen Hendry <Ehendry@ntpc.com>; Alex Love <ALove@ntpc.com>; Belinda Whitford <Bwhitford@ntpc.com>; Eddie Smith <ESmith@ntpc.com>; Rattray, Kevin <Kevin_Rattray@golder.com>; Hille, Kelly <Kelly_Hille@golder.com>; Rose, Greg <Greg_Rose@golder.com>
Subject: RE: Jackfish Water Licence- Outstanding Submissions

Email originated outside NTPC.

Good morning Matt,

Can you please submit the information below in a formal request and submit to the Board, below is the request that was submitted in April 2020 by NTPC.

[http://registry.mvlwb.ca/Documents/MV2019L1-0001/MV2019L1-0001%20-%20NTPC%20-%20Jackfish%20-%20Request%20for%20Extension%20of%20Submission%20Dates%20-%20Apr23 20.pdf](http://registry.mvlwb.ca/Documents/MV2019L1-0001/MV2019L1-0001%20-%20NTPC%20-%20Jackfish%20-%20Request%20for%20Extension%20of%20Submission%20Dates%20-%20Apr23%20.pdf)

If you have any questions, please feel free to reach out.

Thanks

Tyree

Tyree Mullaney, EP
Regulatory Specialist
Mackenzie Valley Land and Water Board

7th Floor, 4922 48th St, PO Box 2130 | Yellowknife, NT | X1A 2P

mobile 867.447.4643 | ph 867.766.7464 | fax 867.873.6610

tyree@mvlwb.com | www.mvlwb.com

Please note: All correspondence to the Board, including emails, letters, faxes and attachments are public documents and may be posted to the public registry.



From: Matthew Miller <MMiller@ntpc.com>

Sent: Friday, February 26, 2021 4:55 PM

To: Heather E. Beck <Heather_Beck@gov.nt.ca>; Tyree Mullaney <tyree@mvlwb.com>

Cc: David-Scott McQuinn <David-Scott_McQuinn@gov.nt.ca>; Bruno Croft <Bruno_Croft@gov.nt.ca>; Katherine Harris <kharris@mvlwb.com>; Eileen Hendry <Ehendry@ntpc.com>; Alex Love <ALove@ntpc.com>; Belinda Whitford <Bwhitford@ntpc.com>; Eddie Smith <ESmith@ntpc.com>; Rattray, Kevin <Kevin_Rattray@golder.com>; Hille, Kelly <Kelly_Hille@golder.com>; Rose, Greg <Greg_Rose@golder.com>

Subject: RE: Jackfish Water Licence- Outstanding Submissions

Hello Tyree and Heather,

The Jackfish Lake Generating Facility- Operations Maintenance and Surveillance Manual is attached. NTPC committed to the MVLWB to submit this on February 26, 2021. Initially this updated version was meant to incorporate the updated monitoring equipment but given that this 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 will resubmit an updated version by December 31, 2021 that will have the updated equipment present once it has been successfully commissioned.

NTPC operations has deemed the current design for the updated flow monitoring equipment to be deficient. Some reworking of the piping systems within the plants is required to accurately record flow measurements. This reworking of the piping will require shutdowns which will not be possible until the late spring/summer when demand is reduced. NTPC expects that the updated instrumentation will be operational and recording flow by the end of August 2021.

NTPC and Golder also completed an investigation to determine if the Thermal Plume Study could proceed without the updated instrumentation and use pump readouts for the flow data. Golder determined that the pump read out data was not sufficient to complete the Thermal Plume Study and required thermal modelling.

Given the August 31, 2021 date for the flow meter data the new proposed timelines for the Thermal Plume and AEMP are provided below.

	From WL	New Submission Date
Thermal Plume Delineation Study Design (TPD SD)	A minimum of 90 days following the effective date of this Licence.	May 31, 2021
Thermal Plume Delineation Study Report	August 1, 2021	January 30, 2023
AEMP Design Plan	November 1, 2021	April 30, 2023
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.	No change

AEMP Design Plan – Revised	Three years following implementation of the AEMP Design Plan and every five years thereafter, or as directed by the Board.	No change
AEMP Annual Report	March 31, 2023 and every year thereafter.	March 31, 2024 and every year thereafter

Thanks for your time and please let us know if there is any other information we can provide or if you would like to set up a meeting to discuss.

Cheers,

Matt

From: Matthew Miller Hello Heather and
Sent: Tuesday, February 2, 2021 2:24 PM
To: Heather E. Beck <Heather_Beck@gov.nt.ca>
Cc: David-Scott McQuinn <David-Scott_McQuinn@gov.nt.ca>; Bruno Croft <Bruno_Croft@gov.nt.ca>
Subject: RE: Jackfish water licence outstanding submissions

Thanks Heather,

We will work internally and with Golder to develop a response as soon as possible

Cheers,

Matt

From: Heather E. Beck <Heather_Beck@gov.nt.ca>
Sent: Thursday, January 28, 2021 9:45 AM
To: Matthew Miller <MMiller@ntpc.com>
Cc: David-Scott McQuinn <David-Scott_McQuinn@gov.nt.ca>; Bruno Croft <Bruno_Croft@gov.nt.ca>
Subject: Jackfish water licence outstanding submissions

Email originated outside NTPC.

Good morning,

As discussed, please be advised that the following submissions are outstanding and as a result NTPC is not in compliance with water licence MV2019L1-0001:

- Thermal Plume Delineation Study Design
- Thermal Plume Delineation Study Design Report (to be submitted after the design)
- AEMP Design Plan

The thermal plume delineation has been outstanding going on 2 years, the plume itself is considered a waste and is why these studies are a requirement in the licence. This can no longer be put off and as such we need a firm commitment for completion of these submissions.

Heather Beck

Water Resource Officer
Water Division, North Slave Region
Environment and Natural Resources
Government of the Northwest Territories

2nd Floor, ENR Main Building
PO Box 2668
3803 Bretzlaff Drive
Yellowknife, NT X1A 2P9

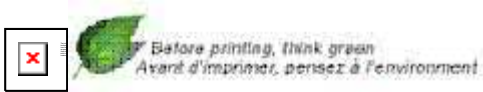
Phone: 867-767-9238 Ext. 53243

Cell: 867-445-3208

Fax: 867-873-6230

www.gov.nt.ca

This message is intended only for the use of the individual or entity to which it is addressed and may contain information that is privileged, confidential and exempt from disclosure under applicable law. If the reader of this message is not the intended recipient, or the employee or agent responsible for delivering the message to the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited. If you have received this communication in error, please delete it immediately and notify us by telephone. Thank you.



NOTICE - The information contained in this Northwest Territories Power Corporation email is intended for the sole use of the Northwest Territories Power Corporation or their designated agents and may contain information that is privileged and confidential, the disclosure of which is governed by law. If the reader of this document is not the intended recipient, or the employee or agent responsible to deliver it to the intended recipient, you are hereby notified that any review, dissemination, distribution or copying of this information is STRICTLY PROHIBITED. If you received this information in error, please call us immediately upon receipt and return the document(s) by mail to the address above. Thank you for your cooperation.

Belinda Whitford

From: Amanda Gauthier <agauthier@mvlwb.com>
Sent: April 29, 2021 5:06 PM
To: Matthew Miller
Cc: Tyree Mullaney
Subject: MV2019L1-0001 - Northwest Territories Power Corp - Approval - Submission Deferral
Attachments: MV2019L1-0001 - Northwest Territories Power Corp - Approval - Submission Deferral.pdf

Email originated outside NTPC.

Good day,

Please see the attached document. If you have questions please contact Tyree Mullaney at tyree@mvlwb.com.

Regards,

Amanda Gauthier
Executive Coordinator
Mackenzie Valley Land and Water Board
7th Floor, 4922 48th St, PO Box 2130 | Yellowknife, NT | X1A 2P6
ph 867.766.7460 | cell 867.688.0895 | fax 867.873.6610
agauthier@mvlwb.com | www.mvlwb.com

Please note: All correspondence to the Board, including emails, letters, faxes and attachments are public documents and may be posted to the public registry.



Jackfish Lake SNP Thermal Monitoring 2021

SNP Station:	00-1a						
	00-1a	00-1b	00-1b	00-2a	00-1c	00-2b	00-1d
Date	K-Plant Intake #1 (°C)	K-Plant Intake #2 (°C)	K-Plant Intake (°C)	K-Plant Discharge (°C)	EMD Plant Intake (°C)	EMD Plant Discharge (°C)	Cat Plant Intake (°C)
1/1/2021	2.27	0.00		2.50	0.00	0.00	2.55
1/2/2021	2.26	0.00		2.49	0.00	0.00	2.54
1/3/2021	2.27	0.00		2.50	0.00	0.00	2.54
1/4/2021	2.25	0.00		2.49	0.00	0.00	2.53
1/5/2021	2.15	0.00		2.37	0.00	0.00	2.46
1/6/2021	2.21	0.00		2.45	0.00	0.00	2.51
1/7/2021	2.23	0.00		2.47	0.00	0.00	1.27
1/8/2021	2.22	0.00		2.45	0.00	0.00	0.05
1/9/2021	2.20	0.00		2.44	0.00	0.00	0.05
1/10/2021	2.19	0.00		2.43	0.00	0.00	0.05
1/11/2021	2.20	0.00		2.45	0.00	0.00	0.72
1/12/2021	2.19	0.00		2.44	0.00	0.00	2.47
1/13/2021	2.17	0.00		2.42	0.00	0.00	2.45
1/14/2021	2.17	0.00		2.42	0.00	0.00	2.46
1/15/2021	2.17	0.00		2.41	0.00	0.00	2.43
1/16/2021	2.11	0.00		2.35	0.00	0.00	2.42
1/17/2021	2.09	0.00		2.32	0.00	0.00	2.43
1/18/2021	1.59	0.00		1.77	0.00	0.00	2.42
1/19/2021	0.33	0.00		0.37	0.00	0.00	2.39
1/20/2021	0.97	0.00		1.08	0.00	0.00	2.38
1/21/2021	1.36	0.00		1.51	0.00	0.00	2.36
1/22/2021	0.63	0.00		0.70	0.00	0.00	2.34
1/23/2021	0.79	0.00		0.88	0.00	0.00	2.30
1/24/2021	0.49	0.00		0.55	0.00	0.00	2.33
1/25/2021	1.01	0.00		1.12	0.00	0.00	2.34
1/26/2021	0.59	0.00		0.66	0.00	0.00	2.31
1/27/2021	1.99	0.00		2.22	0.00	0.00	2.31
1/28/2021	2.03	0.00		2.25	0.00	0.00	2.32
1/29/2021	2.02	0.00		2.25	0.00	0.00	2.29
1/30/2021	2.00	0.00		2.23	0.00	0.00	2.27
1/31/2021	1.67	0.00		1.86	0.00	0.00	2.28
2/1/2021	0.82	0.00		0.91	0.00	0.00	2.28
2/2/2021	0.35	0.00		0.39	0.00	0.00	2.24
2/3/2021	0.90	0.00		0.99	0.00	0.00	2.36
2/4/2021	1.98	0.42		2.14	0.43	0.47	2.15
2/5/2021	1.54	1.55		1.51	1.65	4.33	1.50

2/6/2021	1.59	1.59	1.55	1.65	5.84	1.55
2/7/2021	1.61	1.61	1.58	1.67	6.14	1.58
2/8/2021	1.62	1.61	1.57	1.68	6.05	1.58
2/9/2021	1.62	1.61	1.57	1.67	5.94	1.58
2/10/2021	1.60	1.59	1.58	1.65	6.05	1.59
2/11/2021	1.61	1.60	1.58	1.65	6.10	1.59
2/12/2021	1.63	1.62	1.60	1.67	6.03	1.62
2/13/2021	1.64	1.63	1.62	1.68	6.01	1.62
2/14/2021	1.62	1.62	1.62	1.67	6.01	1.61
2/15/2021	1.63	1.62	1.62	1.68	6.03	1.62
2/16/2021	1.64	1.64	1.64	1.68	5.92	1.61
2/17/2021	1.63	1.63	1.63	1.68	5.85	1.62
2/18/2021	1.62	1.62	1.64	1.68	6.03	1.62
2/19/2021	1.62	1.62	1.62	1.68	3.66	1.61
2/20/2021	1.57	1.57	1.54	1.64	2.65	1.55
2/21/2021	1.57	1.57	1.58	1.69	5.82	1.59
2/22/2021	1.62	1.62	1.62	1.68	5.91	1.61
2/23/2021	1.63	1.62	1.63	1.68	5.55	1.61
2/24/2021	1.61	1.61	1.62	1.68	5.56	1.60
2/25/2021	1.62	1.61	1.62	1.68	5.98	1.62
2/26/2021	1.63	1.63	1.64	1.70	5.92	1.62
2/27/2021	1.66	1.65	1.66	1.71	6.32	1.64
2/28/2021	1.66	1.65	1.64	1.71	5.86	1.64
3/1/2021	1.66	1.65	1.65	1.71	6.07	1.64
3/2/2021	1.66	1.65	1.65	1.71	6.10	1.64
3/3/2021	1.68	1.67	1.64	1.71	6.12	1.66
3/4/2021	1.67	1.67	1.63	1.72	6.05	1.66
3/5/2021	1.65	1.64	1.64	1.73	4.30	1.66
3/6/2021	1.60	1.61	1.59	1.68	1.81	1.60
3/7/2021	1.57	1.57	1.56	1.66	1.98	1.56
3/8/2021	1.57	1.58	1.55	1.69	4.40	1.56
3/9/2021	1.62	1.62	1.61	1.69	5.08	1.61
3/10/2021	1.60	1.61	1.60	1.68	3.48	1.60
3/11/2021	1.54	1.55	1.52	1.65	1.77	1.55
3/12/2021	1.55	1.56	1.52	1.68	1.80	1.54
3/13/2021	1.53	1.55	1.51	1.65	1.77	1.55
3/14/2021	1.52	1.53	1.50	1.65	1.76	1.55
3/15/2021	1.51	1.52	1.49	1.62	1.73	1.51
3/16/2021	1.49	1.50	1.47	1.62	1.97	1.51
3/17/2021	1.50	1.52	1.48	1.63	1.77	1.52
3/18/2021	1.50	1.51	1.49	1.61	1.74	1.51
3/19/2021	1.48	1.48	1.46	1.59	1.71	1.49
3/20/2021	1.48	1.49	1.45	1.58	1.70	1.44
3/21/2021	1.46	1.48	1.44	1.61	1.72	1.48
3/22/2021	1.45	1.47	1.44	1.58	1.70	1.48
3/23/2021	1.44	1.45	1.42	1.56	1.81	1.46
3/24/2021	1.44	1.45	1.41	1.56	1.69	1.47

3/25/2021	1.44	1.45	1.43	1.57	1.68	1.46
3/26/2021	1.42	1.43	1.41	1.53	1.66	1.44
3/27/2021	1.40	1.41	1.39	1.53	1.65	1.42
3/28/2021	1.42	1.43	1.39	1.55	1.68	1.42
3/29/2021	1.41	1.41	1.39	1.52	1.64	1.40
3/30/2021	1.37	1.38	1.37	1.50	1.62	1.39
3/31/2021	1.37	1.38	1.36	1.51	1.68	1.39
4/1/2021	1.37	1.38	1.36	1.50	1.62	1.39
4/2/2021	1.37	1.38	1.35	1.50	1.62	1.40
4/3/2021	1.36	1.36	1.35	1.47	1.59	1.37
4/4/2021	1.35	1.36	1.35	1.49	1.61	1.37
4/5/2021	1.35	1.35	1.34	1.48	1.60	1.36
4/6/2021	1.36	1.37	1.33	1.48	1.60	1.35
4/7/2021	1.33	1.34	1.31	1.46	1.58	1.35
4/8/2021	1.32	1.32	1.31	1.43	1.55	1.30
4/9/2021	1.30	1.30	1.30	1.43	1.55	1.31
4/10/2021	1.31	1.33	1.31	1.46	1.57	1.33
4/11/2021	1.32	1.33	1.31	1.44	1.55	1.32
4/12/2021	1.29	1.29	1.29	1.39	1.50	1.29
4/13/2021	1.34	1.36	1.22	1.43	1.55	1.31
4/14/2021	1.36	1.38	1.28	1.48	1.63	1.33
4/15/2021	1.33	1.34	1.29	1.45	1.58	1.29
4/16/2021	1.33	1.34	1.35	1.42	1.54	1.31
4/17/2021	1.33	1.33	1.38	1.40	1.52	1.32
4/18/2021	1.34	1.34	1.41	1.40	1.53	1.32
4/19/2021	1.34	1.34	1.45	1.40	1.52	1.33
4/20/2021	1.35	1.36	1.49	1.42	1.59	1.35
4/21/2021	1.35	1.35	1.44	1.40	1.52	1.34
4/22/2021	1.31	1.31	1.42	1.37	1.49	1.31
4/23/2021	1.30	1.30	1.39	1.37	1.48	1.28
4/24/2021	1.31	1.31	1.46	1.40	1.52	1.31
4/25/2021	1.32	1.32	1.40	1.39	1.51	1.32
4/26/2021	1.30	1.30	1.34	1.37	1.49	1.31
4/27/2021	1.30	1.30	1.35	1.36	1.47	1.28
4/28/2021	1.31	1.31	1.35	1.34	1.46	1.28
4/29/2021	1.30	1.30	1.40	1.37	1.49	1.30
4/30/2021	1.30	1.30	1.32	1.39	1.50	1.31
5/1/2021	1.29	1.29	1.34	1.38	1.50	1.29
5/2/2021	1.30	1.30	1.39	1.39	1.50	1.30
5/3/2021	1.32	1.32	1.44	1.39	1.51	1.32
5/4/2021	1.33	1.34	1.48	1.42	1.54	1.33
5/5/2021	1.37	1.37	1.56	1.42	1.54	1.35
5/6/2021	1.40	1.40	1.60	1.43	2.06	1.36
5/7/2021	1.39	1.40	1.60	1.45	1.57	1.36
5/8/2021	1.42	1.41	1.59	1.44	1.57	1.40
5/9/2021	1.39	1.41	1.51	1.47	1.59	1.38
5/10/2021	1.42	1.43	1.55	1.46	1.59	1.39

5/11/2021	1.43	1.43	1.64	1.48	1.61	1.44
5/12/2021	1.53	1.53	1.74	1.52	1.64	1.49
5/13/2021	1.47	1.47	1.65	1.49	1.61	1.47
5/14/2021	1.47	1.47	1.69	1.50	1.61	1.41
5/15/2021	1.51	1.51	1.67	1.54	1.66	1.46
5/16/2021	1.54	1.54	1.77	1.57	1.69	1.51
5/17/2021	1.62	1.62	1.92	1.63	1.74	1.59
5/18/2021	1.67	1.67	1.86	1.68	1.80	1.64
5/19/2021	1.81	1.82	2.11	1.86	4.14	1.76
5/20/2021	1.91	1.92	2.14	1.96	2.08	1.77
5/21/2021	2.06	2.05	2.33	2.02	2.14	1.87
5/22/2021	1.89	1.89	2.01	1.90	2.02	1.81
5/23/2021	2.10	2.09	2.47	2.15	2.27	2.12
5/24/2021	2.12	2.12	2.53	2.41	2.51	2.38
5/25/2021	2.55	2.56	2.64	2.76	2.87	2.68
5/26/2021	2.77	2.80	2.83	2.77	5.35	2.67
5/27/2021	2.69	2.70	2.72	2.68	5.53	2.63
5/28/2021	2.90	2.91	3.18	2.99	4.26	2.89
5/29/2021	3.58	3.59	3.69	3.67	3.79	3.60
5/30/2021	4.01	4.01	4.11	4.05	4.17	4.02
5/31/2021	4.44	4.41	4.76	4.40	4.51	4.50
6/1/2021	4.69	4.65	4.89	4.54	4.89	4.73
6/2/2021	5.10	4.96	6.18	4.90	5.10	5.43
6/3/2021	5.15	5.00	6.11	5.02	5.16	5.43
6/4/2021	6.27	5.94	8.16	6.10	6.27	7.01
6/5/2021	6.25	5.86	9.12	6.00	6.51	7.92
6/6/2021	7.50	6.95	9.35	7.29	7.45	8.97
6/7/2021	7.23	6.89	8.17	7.02	7.15	7.91
6/8/2021	7.59	7.33	8.70	7.49	7.61	7.98
6/9/2021	8.15	7.71	9.64	8.00	8.18	8.86
6/10/2021	8.33	7.74	9.64	8.06	8.29	9.08
6/11/2021	8.69	8.12	9.76	8.41	8.62	9.31
6/12/2021	9.35	8.29	10.99	8.97	9.18	10.20
6/13/2021	9.60	8.60	11.73	9.34	9.47	10.35
6/14/2021	9.78	8.54	13.49	9.22	9.62	11.36
6/15/2021	9.88	8.29	13.60	9.43	9.63	11.87
6/16/2021	10.18	9.06	12.7	9.95	10.2	11.66
6/17/2021	11.8	10.1	13.0	11.2	11.4	12.6
6/18/2021	11.8	10.5	14.5	11.5	11.7	14.1
6/19/2021	12.3	10.6	13.8	11.9	12.0	13.5
6/20/2021	12.6	10.9	14.9	12.2	12.5	14.6
6/21/2021	13.0	11.0	15.5	12.7	12.8	14.7
6/22/2021	14.2	11.3	15.9	13.4	14.9	15.4
6/23/2021	14.7	12.9	15.1	14.4	14.4	15.2
6/24/2021	14.3	12.7	15.9	14.1	14.2	15.1
6/25/2021	14.4	12.7	17.0	14.3	16.3	15.4
6/26/2021	14.4	12.5	17.9	14.2	14.3	17.1

6/27/2021	14.5	12.8	18.2	14.1	14.3	17.1
6/28/2021	14.7	12.7	18.4	14.2	14.9	18.0
6/29/2021	15.0	12.5	19.3	14.3	16.2	18.0
6/30/2021	15.0	12.4	20.5	14.2	18.5	19.3
7/1/2021	15.3	12.3	20.4	14.3	15.3	19.1
7/2/2021	15.5	12.8	20.1	14.4	15.6	19.2
7/3/2021	16.3	12.8	19.3	14.7	15.6	19.0
7/4/2021	17.2	13.0	19.0	16.1	16.4	18.6
7/5/2021	17.5	13.3	18.9	16.0	16.7	18.8
7/6/2021	18.0	13.5	18.4	16.9	17.0	18.4
7/7/2021	17.6	14.5	18.7	17.0	17.0	18.2
7/8/2021	18.0	14.6	19.0	17.5	18.9	18.9
7/9/2021	17.8	15.4	20.2	17.4	17.6	19.6
7/10/2021	18.4	15.1	20.3	17.6	17.9	20.2
7/11/2021	18.5	14.7	20.2	17.6	18.8	20.0
7/12/2021	19.2	15.3	20.3	18.0	18.2	20.3
7/13/2021	19.7	15.5	20.6	18.5	18.7	20.6
7/14/2021	19.5	16.1	20.8	18.8	19.4	20.3
7/15/2021	18.8	16.1	19.7	18.3	18.2	19.7
7/16/2021	18.4	17.7	18.4	18.3	18.1	18.5
7/17/2021	17.8	17.4	18.5	17.7	17.7	17.9
7/18/2021	17.8	17.1	18.6	17.7	18.2	18.3
7/19/2021	17.9	17.2	18.7	17.7	18.4	18.4
7/20/2021	18.0	17.1	19.2	17.8	18.4	18.4
7/21/2021	17.9	16.9	19.5	17.8	18.5	18.6
7/22/2021	18.0	16.5	19.1	17.8	18.6	18.7
7/23/2021	18.1	16.7	19.1	17.9	18.8	18.9
7/24/2021	18.1	17.1	18.6	18.0	18.3	18.3
7/25/2021	18.4	17.6	18.5	18.3	18.5	18.6
7/26/2021	18.2	17.6	18.4	18.1	18.4	18.5
7/27/2021	17.9	17.5	18.1	17.8	18.1	18.1
7/28/2021	17.7	17.5	18.2	17.7	17.9	17.9
7/29/2021	17.9	17.4	18.3	17.8	18.2	18.3
7/30/2021	18.2	17.3	19.0	18.0	18.6	18.7
7/31/2021	18.1	17.4	19.8	18.0	18.9	19.1
8/1/2021	18.1	17.3	20.3	17.9	19.2	19.3
8/2/2021	18.1	17.1	21.2	18.0	19.7	19.8
8/3/2021	18.2	17.0	20.4	18.0	19.5	19.6
8/4/2021	18.7	17.4	19.2	18.5	19.2	19.2
8/5/2021	18.6	17.2	19.1	18.5	18.9	18.9
8/6/2021	18.3	17.5	19.2	18.3	18.6	18.6
8/7/2021	18.2	17.5	18.6	18.0	18.4	18.4
8/8/2021	17.6	17.5	17.6	17.6	17.6	17.6
8/9/2021	17.0	17.0	17.0	16.9	17.0	17.0
8/10/2021	16.5	16.5	16.5	16.5	16.6	16.5
8/11/2021	16.2	16.2	16.3	16.2	16.3	16.3
8/12/2021	16.2	16.1	16.5	16.2	16.3	16.3

8/13/2021	16.1	16.0	16.9	16.1	16.4	16.4
8/14/2021	16.4	16.2	16.9	16.4	16.7	16.7
8/15/2021	16.2	15.9	16.6	16.1	16.4	16.5
8/16/2021	16.0	15.9	16.1	16.0	16.1	16.0
8/17/2021	15.7	15.7	16.2	15.7	15.9	15.9
8/18/2021	15.5	15.4	15.7	15.4	15.6	15.6
8/19/2021	15.5	15.5	15.6	15.5	15.6	15.6
8/20/2021	15.0	15.0	15.0	15.0	15.1	15.0
8/21/2021	14.5	14.5	14.6	14.5	14.6	14.6
8/22/2021	14.4	14.4	14.5	14.4	14.4	14.4
8/23/2021	14.5	14.4	14.5	14.3	14.5	14.5
8/24/2021	14.1	14.1	14.6	14.1	14.2	14.3
8/25/2021	14.2	14.2	14.8	14.2	14.5	14.5
8/26/2021	14.4	14.3	15.3	14.4	14.7	14.8
8/27/2021	14.5	14.4	16.0	14.6	14.9	15.0
8/28/2021	14.6	14.4	16.0	14.6	15.2	15.2
8/29/2021	14.6	14.4	16.0	14.6	15.4	15.6
8/30/2021	14.8	14.4	16.3	14.6	15.7	15.9
8/31/2021	14.9	14.4	16.4	14.8	15.6	15.8
9/1/2021	14.8	14.5	16.0	14.8	15.4	15.9
9/2/2021	15.0	14.6	15.7	14.9	15.4	15.5
9/3/2021	15.3	14.7	15.6	15.2	15.5	15.5
9/4/2021	14.9	14.5	15.2	14.7	15.2	15.1
9/5/2021	15.0	14.9	15.2	15.0	15.0	15.0
9/6/2021	15.2	15.2	15.3	15.2	15.3	15.3
9/7/2021	15.1	15.1	15.1	15.1	15.2	15.1
9/8/2021	14.9	14.8	14.9	14.7	14.9	14.9
9/9/2021	14.5	14.4	14.5	14.5	14.5	14.5
9/10/2021	14.1	14.1	14.2	14.1	14.2	14.1
9/11/2021	13.6	13.6	13.7	13.6	13.7	13.7
9/12/2021	13.3	13.3	13.3	13.3	13.3	13.3
9/13/2021	13.3	13.3	13.3	13.3	13.4	13.3
9/14/2021	13.0	13.0	13.1	13.0	13.1	13.1
9/15/2021	12.7	12.7	12.7	12.7	12.8	12.7
9/16/2021	12.1	12.1	12.1	12.1	12.1	12.1
9/17/2021	11.8	11.8	11.8	11.8	11.8	11.8
9/18/2021	11.5	11.5	11.5	11.5	11.5	11.5
9/19/2021	11.2	11.2	11.1	11.2	11.2	11.1
9/20/2021	11.0	11.0	11.1	11.0	11.1	11.0
9/21/2021	10.8	10.9	10.8	10.9	10.9	10.8
9/22/2021	10.7	10.7	10.7	10.7	10.7	10.7
9/23/2021	10.6	10.6	10.7	10.7	10.7	10.6
9/24/2021	10.5	10.5	10.5	10.6	10.6	10.5
9/25/2021	10.3	10.3	10.3	10.3	10.3	10.3
9/26/2021	9.9	10.0	9.9	10.0	10.0	9.9
9/27/2021	9.8	9.8	9.7	9.7	9.8	9.7
9/28/2021	9.46	9.47	9.46	9.47	9.5	9.41

9/29/2021	9.37	9.37	9.43	9.37	9.4	9.36
9/30/2021	9.35	9.35	9.33	9.37	9.39	9.35
10/1/2021				9.50	9.82	9.81
10/2/2021				9.36	9.69	
10/3/2021				9.17	9.91	9.41
10/4/2021				8.87	9.20	9.22
10/5/2021				8.59	8.96	8.94
10/6/2021		9.05	8.81	8.53	8.86	8.87
10/7/2021		8.83	8.58	8.22	8.55	8.55
10/8/2021		8.56	8.31	7.89	8.36	8.28
10/9/2021		8.39	8.15	7.75	8.08	8.11
10/10/2021		8.12	7.87	7.52	7.85	7.90
10/11/2021		7.69	7.44	7.10	7.42	7.47
10/12/2021		7.43	7.18	6.82	9.21	7.21
10/13/2021		7.42	7.17	6.79	9.63	7.21
10/14/2021		7.29	7.05	6.66	8.36	7.04
10/15/2021		7.01	6.77	6.38	8.65	6.72
10/16/2021		6.83	6.60	6.22	7.78	6.60
10/17/2021		6.56	6.32	5.97	6.78	6.33
10/18/2021		6.23	6.00	5.68	6.01	6.02
10/19/2021		6.02	5.78	5.44	5.77	5.80
10/20/2021		5.90	5.66	5.28	5.62	5.66
10/21/2021		5.69	5.45	5.08	5.41	5.45
10/22/2021		5.48	5.23	4.88	5.21	5.24
10/23/2021		5.34	5.09	4.72	5.06	5.09
10/24/2021		5.26	5.01	4.65	5.06	5.02
10/25/2021		5.24	4.99	4.61	5.00	4.99
10/26/2021		5.21	4.96	4.59	4.93	4.98
10/27/2021		5.19	4.94	4.58	4.92	4.95
10/28/2021		5.06	4.82	4.45	4.79	4.82
10/29/2021		4.75	4.51	4.17	4.51	4.50
10/30/2021		4.33	4.09	3.77	4.10	4.09
10/31/2021		4.10	3.86	3.52	3.86	3.90
11/1/2021		4.07	3.82	3.84	3.51	3.89
11/2/2021		3.90	3.65	3.69	3.35	3.75
11/3/2021		3.80	3.55	3.64	3.29	3.69
11/4/2021		3.71	3.47	3.54	3.20	3.57
11/5/2021		3.62	3.38	3.39	3.05	3.39
11/6/2021		3.74	3.49	3.58	3.24	3.55
11/7/2021		3.65	3.41	3.43	3.09	3.40
11/8/2021		3.48	3.25	3.30	2.96	3.29
11/9/2021		3.30	3.07	3.25	2.91	3.20
11/10/2021		3.22	2.99	3.13	2.79	3.08
11/11/2021		3.16	2.92	3.07	2.73	3.05
11/12/2021		3.22	2.98	2.99	2.66	2.99
11/13/2021		2.96	2.72	2.73	2.39	2.80
11/14/2021		2.62	2.39	2.49	2.15	2.43

11/15/2021	2.62	2.39	2.76	2.42	2.43
11/16/2021	2.79	2.56	2.80	2.46	2.54
11/17/2021	2.73	2.50	2.60	2.26	2.56
11/18/2021	2.76	2.52	2.73	2.39	2.53
11/19/2021	2.73	2.51	2.63	2.30	2.53
11/20/2021	2.66	2.44	2.61	2.27	2.48
11/21/2021	2.62	2.40	2.59	2.25	2.44
11/22/2021	2.62	2.40	2.60	2.26	2.48
11/23/2021	2.58	2.38	3.50	2.25	2.47
11/24/2021	2.60	2.39	3.19	2.19	2.47
11/25/2021	2.55	2.32	2.54	2.20	2.45
11/26/2021	2.58	2.35	2.54	2.20	2.47
11/27/2021	2.55	2.32	2.44	2.09	2.33
11/28/2021	2.56	2.32	2.48	2.13	2.40
11/29/2021	2.57	2.34	2.43	2.09	2.32
11/30/2021	2.52	2.30	2.53	2.18	2.35
12/1/2021	2.55	2.33	2.16	2.50	2.63
12/2/2021	2.53	2.30	2.11	2.45	2.61
12/3/2021	2.52	2.29	2.12	2.46	2.59
12/4/2021	2.49	2.26	2.10	2.70	2.55
12/5/2021	2.47	2.25	2.09	2.43	2.54
12/6/2021	2.46	2.24	2.06	2.40	2.52
12/7/2021	2.45	2.23	2.04	2.38	2.51
12/8/2021	2.46	2.22	2.05	2.39	2.52
12/9/2021	2.4532068	2.2228184	2.0465284	2.3873443	2.5059327
12/10/2021	2.4405063	2.2107558	2.0229262	2.3627838	2.4867696
12/11/2021	2.4391788	2.2080096	2.0248815	2.3646716	2.4835817
12/12/2021	2.462308	2.2234891	2.0300066	2.3721388	2.4949095
12/13/2021	2.4498547	2.2144209	2.0029229	2.6123085	2.5042878
12/14/2021	2.430317	2.1998946	1.9860344	2.3269618	2.4709907
12/15/2021	2.4247719	2.1935175	1.9910316	2.3322899	2.478475
12/16/2021	2.4197626	2.1908961	1.9955115	2.3371252	2.4667411
12/17/2021	2.3849694	2.160434	1.9592754	2.3135489	2.4266076
12/18/2021	2.3751857	2.1489842	1.9734766	2.3360443	2.4384887
12/19/2021	2.3785447	2.1510928	1.9841559	2.6731381	2.4475378
12/20/2021	2.3671464	2.1452828	1.9366561	2.9610428	2.4129481
12/21/2021	2.362712	3.21416	1.9480986	2.3057922	2.4207526
12/22/2021	2.3810188	2.1581496	2.0109589	2.3676241	2.4216761
12/23/2021	2.4026007	2.9543216	1.9590187	7.7086901	2.4419585
12/24/2021	2.355358	2.131019	1.9699189	5.1505029	2.4180367
12/25/2021	2.3820987	2.154973	1.9843444	3.5102859	2.4255281
12/26/2021	2.3676021	2.1392809	1.916459	2.2744998	2.419067
12/27/2021	2.3272392	2.1031133	1.8789453	2.5497724	2.3706392
12/28/2021	2.300701	2.0785335	1.8896552	2.8194959	2.3399602
12/29/2021	2.3040955	2.0832188	1.8953205	3.8510831	2.3504009
12/30/2021	2.3154303	2.0897077	1.8869962	2.2429268	2.3694077
12/31/2021	2.2909785	2.067083	1.8410476	2.196685	2.3289643

Jackfish Lake SNP Flow 2021

00-2c Total Water Usage (m³)

Cat Plant Discharge (°C)	Month	Mean Daily	Monthly Total
2.23	January		
4.39	February		
2.21	March		
4.43	April		
3.63	May		
2.77	June		
1.11	July		
0.05	August		
0.05	September		
0.05	October	18405	570553
0.64	November	18726	561781
2.18	December	18833	583641
2.43	Annual		

K-Plant Intake water temperature data are unavailable for September to October, 2021.

Water usage data are unavailable for January to September, 2021

2.23
4.39
2.21
4.43
3.63
2.77
1.11
0.05
0.05
0.05
0.64
2.18
2.43
3.38
2.13
2.12
2.12
2.12
2.07
2.21
2.01
1.98
1.94
1.97
2.00
1.98
2.00
1.99
1.96
1.95
1.98
1.97
3.65
12.34
9.04
13.64

10.37
8.75
9.45
7.20
4.68
5.20
5.76
5.22
4.39
5.23
4.61
5.15
2.19
1.97
1.89
2.75
3.96
3.25
2.98
5.11
6.88
5.61
7.13
3.71
3.85
3.63
4.49
2.03
1.94
1.90
1.91
1.96
1.94
1.88
1.87
1.87
1.87
1.84
1.84
1.86
1.95
1.89
1.79
1.80
1.79
1.74
1.81

2.04
1.78
1.78
1.80
1.75
1.73
1.77
1.76
1.76
1.72
1.74
1.73
1.72
1.71
1.66
1.66
1.68
1.67
1.63
1.69
1.70
1.63
1.65
1.65
1.66
1.66
1.70
1.67
1.63
1.58
1.61
1.60
1.64
1.63
1.63
1.65
1.66
1.64
1.65
1.69
4.43
1.67
1.68
1.70
1.66
1.71
1.72

1.75
1.81
1.79
1.72
1.76
1.82
1.88
1.94
2.07
2.08
2.18
2.13
2.42
2.69
2.98
3.00
3.01
3.20
3.88
4.30
4.75
5.00
5.66
5.59
7.10
7.74
8.99
8.11
8.15
9.00
9.21
9.46
10.28
10.44
11.46
11.81
11.6
12.7
14.0
13.5
14.6
14.7
15.5
15.3
15.2
16.9
17.0

16.9
17.9
18.0
20.6
18.8
18.9
18.9
18.5
18.8
18.4
18.2
20.9
19.3
20.0
19.9
20.2
20.6
20.5
19.8
18.5
18.0
18.2
18.4
18.4
18.5
18.6
19.5
18.3
18.6
18.5
18.2
17.9
18.3
18.7
18.9
19.2
19.6
19.5
19.2
18.9
18.7
18.5
17.7
17.3
16.6
16.4
16.4

17.0
16.8
16.5
16.1
15.9
15.7
15.6
15.1
14.7
14.6
14.8
14.3
14.6
14.8
15.0
15.2
15.5
15.9
15.8
15.8
15.6
15.6
15.2
15.1
15.4
15.2
15.0
14.6
14.2
13.8
13.4
13.4
13.2
13.0
12.4
12.0
11.7
11.4
11.3
11.1
11.0
11.0
10.8
10.6
10.3
10.1
9.7

9.7
9.66
10.06

9.65
9.46
9.19
9.12
8.81
8.51
8.34
8.11
7.68
7.42
7.41
7.26
6.96
6.82
6.56
6.25
6.02
5.88
5.68
5.47
5.31
5.24
5.21
5.20
5.17
5.04
4.72
4.31
4.11
4.09
3.95
3.87
3.77
3.60
3.76
3.61
3.50
3.41
3.30
3.26
3.18
2.99
2.64

2.65
2.76
2.79
2.74
2.77
2.73
2.70
2.70
2.69
2.69
2.66
2.68
2.59
2.62
2.57
2.62
2.39
2.38
2.38
2.29
2.27
2.25
2.26
2.34

2.2966126
2.2505272
2.2633783
2.3134108
2.3118169
2.2532411
2.2523376
2.2265005
2.1347202
2.1828563
2.1952462
2.1557993
2.1668301
2.1532454
3.2233919
2.1841474
2.2045736
2.1837647
2.1097368
2.0607666
2.0823782
2.0982454
2.0505748

SNP Station JF01-06
Fall 2021 Groundwater Sampling

10/6/2021			Sample ID
Sampling			L2648286-7
Date	Parameter	Units	Sample Concentration
	Benzene	mg/L	<0.00050
	Toluene	mg/L	<0.00050
	Ethylbenzene	mg/L	<0.00050
	Xylenes	mg/L	<0.00071
	PHC (F1)	mg/L	<0.10
	PHC (F2)	mg/L	<0.10
	PHC (F3)	mg/L	<0.25
	PHC (F4)	mg/L	<0.25

Notes:

PHC F1: Petroleum hydrocarbons C₆ to C₁₀ does not include BTEX fractions

PHC F2: Petroleum hydrocarbons C_{>10} to C₁₆

PHC F3: Petroleum hydrocarbons C_{>16} to C₃₄

PHC F4: Petroleum hydrocarbons C_{>34} to C₅₀

Sample analysis completed by ALS Environment under Lab Work Order # L2512806

SNP Station MW2
Fall 2021 Groundwater Sampling

6-Oct-21			Sample ID
			L2648286-8
			Sample
Sampling Date	Parameter	Units	Concentration
	Benzene	mg/L	<0.00050
	Toluene	mg/L	<0.00050
	Ethylbenzene	mg/L	<0.00050
	Xylenes	mg/L	<0.00071
	PHC (F1)	mg/L	<0.10
	PHC (F2)	mg/L	<0.10
	PHC (F3)	mg/L	<0.25
	PHC (F4)	mg/L	<0.25

Notes:

PHC F1: Petroleum hydrocarbons C₆ to C₁₀ does not include BTEX fractions

PHC F2: Petroleum hydrocarbons C_{>10} to C₁₆

PHC F3: Petroleum hydrocarbons C_{>16} to C₃₄

PHC F4: Petroleum hydrocarbons C_{>34} to C₅₀

Sample analysis completed by ALS Environment under Lab Work Order # L2512806