



# Annual Report

2022

Northwest Territories Power Corporation  
Jackfish Power Generation Facility

Water Licence no. MV2019L1-0001

SUBMITTED TO:  
MACKENZIE VALLEY LAND AND WATER BOARD

MAY 2023



## TABLE OF CONTENTS

SECTION	PAGE NO.
Table of Contents	i
List of Tables	ii
List of Figures	iii
List of Abbreviations	iv
Table of Concordance	v
Conformity Table	vi
1 Introduction	1
2 Project Activities	4
3 Surveillance Network Program	4
4 Water Usage Records	6
5 Calibration and Status of Meters and Devices	10
6 Engagement	10
7 Modifications and Major Maintenance	11
8 Management Plan Revisions	11
8.1 Waste Management	11
8.2 Closure and Reclamation	11
9 AEMP Monitoring Results	11
9.1 Thermal Plume Delineation Study	12
10 Spills	12
10.1 Spill Training Exercises	12
10.2 Spill Communications	13
10.3 Unauthorized Discharges	13
11 Regulatory Requirements	14
11.1 Submissions	14
11.2 Outstanding Submissions and Non-compliances	16
11.3 Annual Water Licence Inspection	16
12 Other Board Requests	16
Closure	
Appendix A – Surveillance Network Program Data	A-1
Appendix B – Groundwater Monitoring Report	B-1

## LIST OF TABLES

	PAGE NO.	
Table 3-1	SNP Station 00-1	4
Table 3-2	SNP Station 00-2	4
Table 3-3	SNP Station JF01-06	5
Table 3-4	SNP Station MW2	5
Table 4-1	2022 Monthly and Annual Water Use at the Jackfish Facility	10
Table 10-1	Unauthorized Discharges in 2022	13
Table 11-1	Regulatory Communications for the CRP Submission in 2022	15
Table 11-2	Regulatory Communications for the 2021 Annual Water Licence Report Submission in 2022	16

## LIST OF FIGURES

	PAGE NO.
Figure 1-1 Jackfish Hydroelectric Power Generation Facility	2
Figure 1-2 Jackfish Lake Generating Station	3
Figure 4-1 Mean Daily Water Temperature Recorded at the SNP Stations Associated with the K Plant in 2022	7
Figure 4-2 Mean Daily Water Temperatures Recorded at the SNP Stations Associated with the EMP Plant in 2022	8
Figure 4-3 Mean Daily Water Temperatures Recorded at the SNP Stations Associated with the CAT Plant in 2022	9

## LIST OF ABBREVIATIONS

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

## TABLE OF CONCORDANCE

The following table of concordance has been provided for Northwest Territories Power Corporation to track conditions for Water Licence MV2019L1-0001 and how they were addressed in 2022.

Source and Topic	Comment	2022 Addressed (Yes/No)
SNP Monitoring Requirements	Monitoring in 2022 at SNP stations JF01-06 and MW2 was non-compliant because sampling was not completed on time due to the availability of staff in Yellowknife to complete the work.	Yes. The June 2022 sampling event was completed in August 2022.
Missing Reports	The 2021 Annual Water Licence Report remains outstanding.	Yes. NTPC submitted the 2021 Annual Water Licence Report on April 14, 2022.
Missing Reports	The following Surveillance Network Program Monthly Monitoring Reports remain outstanding: <ul style="list-style-type: none"> <li>2022: February</li> </ul>	No. The February 2022 remains outstanding. <ul style="list-style-type: none"> <li>December 2021 was submitted January 2022</li> <li>July 2022 was submitted August 2022</li> <li>August to December 2022 was submitted in May 2023</li> </ul>
Missing Reports	Operations Maintenance and Surveillance Manual	No. NTPC submitted the Operations, Maintenance, and Surveillance Manual to the MVLWB on February 26, 2021. Initially this updated version was meant to incorporate the updated monitoring equipment but given that the equipment is not fully installed and/or commissioned this is the same version of the OMS Manual that was submitted and revised as part of the water licence renewal process. NTPC is required to resubmit an updated version with the updated equipment included.
Missing Reports	Outstanding Interim Closure and Reclamation Plan submitted not submitted by the November 17, 2022 deadline.	Yes. The latest updated Plan was submitted to the MVLWB on December 22, 2022 <sup>1</sup> .
Missing Reports	AEMP Design Plan	NTPC requested deferral of the AEMP Design Plan submission until July 31, 2023. The MVLWB approved the deferral request on April 29, 2021.

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

<sup>1</sup> [NTPC - Jackfish - Interim Closure and Reclamation Plan V1.1 - Staff Conformity - Dec22\\_22.pdf \(mvlwb.ca\)](#)

## CONFORMITY TABLE

The following conformity table has been provided to outline the conditions of the Water Licence along with the sections of this report where each condition is addressed.

Water Licence MV2019L1-0001 Annual Report Requirements	Section in this Report
1. a) A brief summary of Project activities.	2
1. b) The monthly and annual quantities in cubic metres of fresh Water obtained from all sources and thermal data from intake and Discharge data loggers, as required in Part B, condition 14 and Part C, condition 1 of this Licence.	4
1. c) A summary of the calibration and status of the meters and devices referred to in Part B, condition 14 of this Licence.	5
1. d) A summary of engagement activities conducted in accordance with the approved Engagement Plan, referred to in Part B, condition 17 of this Licence.	6
1. e) A summary of modification activities conducted in accordance with Part D of this Licence.	7
1. f) A summary of major maintenance activities conducted in accordance with this Licence.	7
1. g) A summary of activities conducted in accordance with the approved Waste Management Plan, referred to in Part E, condition 2 of this Licence, including: i. A summary of approved updates or changes to the process or facilities required for the management of Waste; ii. A summary of approved updates or changes to the process or facilities required for the management of Waste	8.1
1. h) A summary of monitoring results and any Action Level exceedances as per the approved AEMP, required in Part F, condition 7 of this Licence	9
1. i) A summary of activities conducted in accordance with the approved Spill Contingency Plan, required in Part G, condition 2 of this Licence, including: i. A list and description for all Unauthorized Discharges, including the date, NWT spill number, volume, location, summary of the circumstances and follow-up actions taken, and status (i.e. open or closed), in accordance with the reporting requirements in Part G, condition 4 of this Licence; and ii. An outline of any spill training carried out.	10
1. j) A summary of any Closure and Reclamation work completed	8.2
1. k) Tabular summaries of all data and information generated under the monthly SNP annexed to this Licence, in Excel format	3, Appendix A and B
1. l) A list of any non-compliance(s) with the conditions of this Licence or any directive from the Board pursuant to the conditions of this Licence	Conformity Table, 11.2

Water Licence MV2019L1-0001 Annual Report Requirements	Section in this Report
1. m) A summary of actions taken to address concerns, non-conformances, or deficiencies in any reports filed by an Inspector	11.3
1. n) Any other details requested by the Board by November 1 of the year being reported.	12



# 1 INTRODUCTION

This 2022 Annual Report has been prepared for submission by Northwest Territories Power Corporation (NTPC) to the Mackenzie Valley Land and Water Board (MVLWB) as part of the requirements of Type A Water Licence no. MV2019L1-0001 (the Water Licence). The Water Licence regulates the use of water and the deposit of waste for industrial activities at the Jackfish Hydroelectric Power Generation Facility (Jackfish Facility), including withdrawal of water for the cooling of the power generators, depositing of waste, and progressive reclamation and associated closure and reclamation activities. The Water Licence became effective on October 18, 2019, and will expire on October 17, 2044.

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

Four water intakes exit on Jackfish Lake (two intakes for K Plant, and one each for the EMD Plant and the CAT Plant). After the water is used for cooling, it is returned to Jackfish Lake via three discharges. NTPC operated the Jackfish Facility for the purposes of standby and continuous power during the 2022 calendar year.

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



• Locations

Figure 1 NWT Location map.mxd / 5/17/2021 / 11:44:59 AM

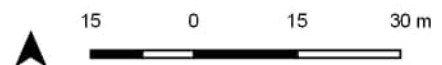
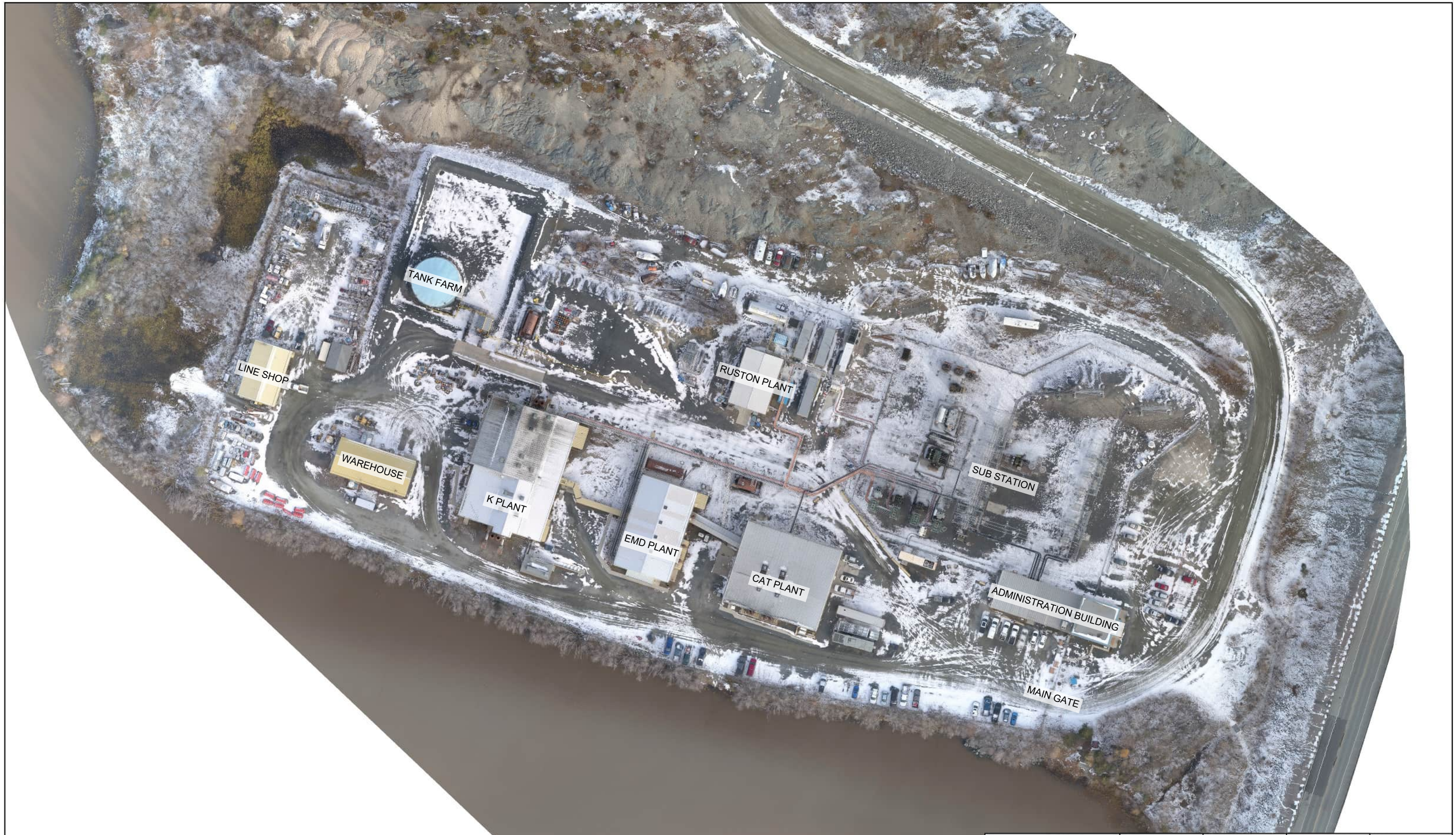


DATE: April 2023  
 DRAWN BY: DA

0 1  
 Kilometers



**FIGURE 1-1: JACKFISH HYDROELECTRIC POWER GENERATION FACILITY**



DRAWN BY: ALIETUM	DRAWN FOR: NTPC	DATE DRAWN: 2018-10-28	SCALE: 1:1,100
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JACKFISH LAKE  
GENERATING STATION  
OCTOBER 3, 2018

## 2 PROJECT ACTIVITIES

No significant projects were completed at the Jackfish Facility in 2022. Regular maintenance was completed on the diesel units to prepare for higher generation in winter 2022, as a result of the low-water situation in the Snare system. In 2023, NTPC will add a 4-megawatt genset to the Jackfish Facility to further support reliability of the Snare system.

## 3 SURVEILLANCE NETWORK PROGRAM

The Surveillance Network Program (SNP) for the Jackfish Facility is reflected in Tables 3-1, 3-2, 3-3, and 3-4, with tabulated temperature data and laboratory results in Appendix A. The tabulated data are also included in digital format (.xlsx file) and will be submitted to the MVLWB Registry with this report.

**Table 3-1 SNP Station 00-1**

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

**Table 3-2 SNP Station 00-2**

Detail	SNP 00-2
Description	SNP Station 00-2 a, b, c, and d – Discharges from the K, EMD, and CAT Plants
Location	<ul style="list-style-type: none"> <li>• 00-2a – K Plant</li> <li>• 00-2b – EMD Plant</li> <li>• 00-2c – CAT Plant</li> </ul>
Sampling frequency	Continuous in situ 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 lake shore near the warehouse near K Plant
Sampling frequency	Sampled twice a year, in June and September
Sampling parameters	<b>Field parameters:</b> pH, electrical conductivity, temp (°C), dissolved oxygen <b>Lab parameters:</b> Major ions, total suspended solids, oil and grease (hexane extractable), pH, total petroleum hydrocarbons (fractions 1 to 4), BTEX, dissolved metals (aluminum, antimony, arsenic, barium, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, thallium, uranium, and zinc)

BTEX – benzene, toluene, ethylbenzene, and xylenes

**Table 3-4 SNP Station MW2**

Detail	SNP MW2
Description	MW2 – Groundwater monitoring well
Location	Located at the lease boundary near the lake shore between the EMD Plant and the CAT Plant
Sampling frequency	Sampled twice a year, in June and September
Sampling parameters	<b>Field parameters:</b> pH, electrical conductivity, temp (°C), dissolved oxygen <b>Lab parameters:</b> Major ions, total suspended solids, oil and grease (hexane extractable), pH, total petroleum hydrocarbons (fractions 1 to 4), BTEX, dissolved metals (aluminum, antimony, arsenic, barium, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, thallium, uranium, and zinc)

BTEX – benzene, toluene, ethylbenzene, and xylenes

Groundwater samples were collected at SNP Stations JF01-06 and MW2 August 5, 2022, August 16 to 19, 2022, September 29, 2022, and October 6 to 12, 2022. The samples were shipped to ALS Environmental in Edmonton, AB, for laboratory analysis. ALS is accredited by the Canadian Association for Laboratory Accreditation (member number 1352). Results are included in Appendix B.

The water samples were analyzed for the following:

- Field parameters (pH, electrical conductivity, temperature, dissolved oxygen);
- Major ions;
- Total suspended solids;
- Benzene, toluene, ethylbenzene, and xylenes; and petroleum hydrocarbon fractions 1 to 4;
- Petroleum hydrocarbons;
- Oil and grease (hexane extractable);
- pH; and
- Dissolved metals.

## 4 WATER USAGE RECORDS

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

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

The mean daily water temperature records for the intakes and discharge from the K Plant, EMD Plant, and CAT Plant are presented in Figure 4-1, Figure 4-2, and Figure 4-3, respectively. Tabulated data of the mean daily water temperature are provided in Appendix A. The tabulated data are also included in digital format (.xlsx file) and will be submitted to the MVLWB on the Registry with this report. Table 4-1 summarizes the monthly and annual water use by the Jackfish Facility. Per Condition C.1 of the Water Licence, the daily water use did not exceed 50,000 m<sup>3</sup> during 2022.

- The in-plant data logger for the CAT Plant was offline from 17:45 August 17 to 09:00 August 31. Temperature data for this period have been obtained from the legacy data logger installed for the thermal plume delineation and Aquatic Effects Monitoring Program (AEMP) study. Flow data have been estimated based on the average use between August 1 and August 18.
- The in-plant data logger for the EMD Plant was offline from 04:45 September 6 to 18:45 September 8. Temperature data for this period has been obtained from the legacy data logger installed for the thermal plume delineation and AEMP study. Flow data have been estimated based on the average use during the remainder of the month.
- The in-plant data logger for the K Plant was offline from 08:30 October 28 to 23:45 October 31. Temperature data for this period have been obtained from the legacy data logger installed for the thermal plume delineation and AEMP study. Flow data have been estimated based on the average use between October 1 and October 27.
- The in-plant data logger for the K Plant was offline from 00:00 to 15:15 on November 1. Temperature data for this period have been obtained from the legacy data logger installed for the thermal plume delineation and AEMP study. Flow data have been estimated based on the average use during the remainder of the month of November.
- In August 2022, a second data logger was installed at the K Plant. Data indicates a temperature drop; however the change in temperature is due to the data logger being installed at a greater depth with colder temperatures.
- Beginning in fall 2022, there was a significant increase in the amount of diesel generation at the Jackfish Facility due to low water in the Snare system. Discharge temperatures at the CAT and EMD Plants were variable from October to December due to changes in system demand from one day to the next. Engines were run at the two plants based on planned maintenance activities or unexpected downtime.

Figure 4-1 Mean Daily Water Temperature Recorded at the SNP Stations Associated with the K Plant in 2022

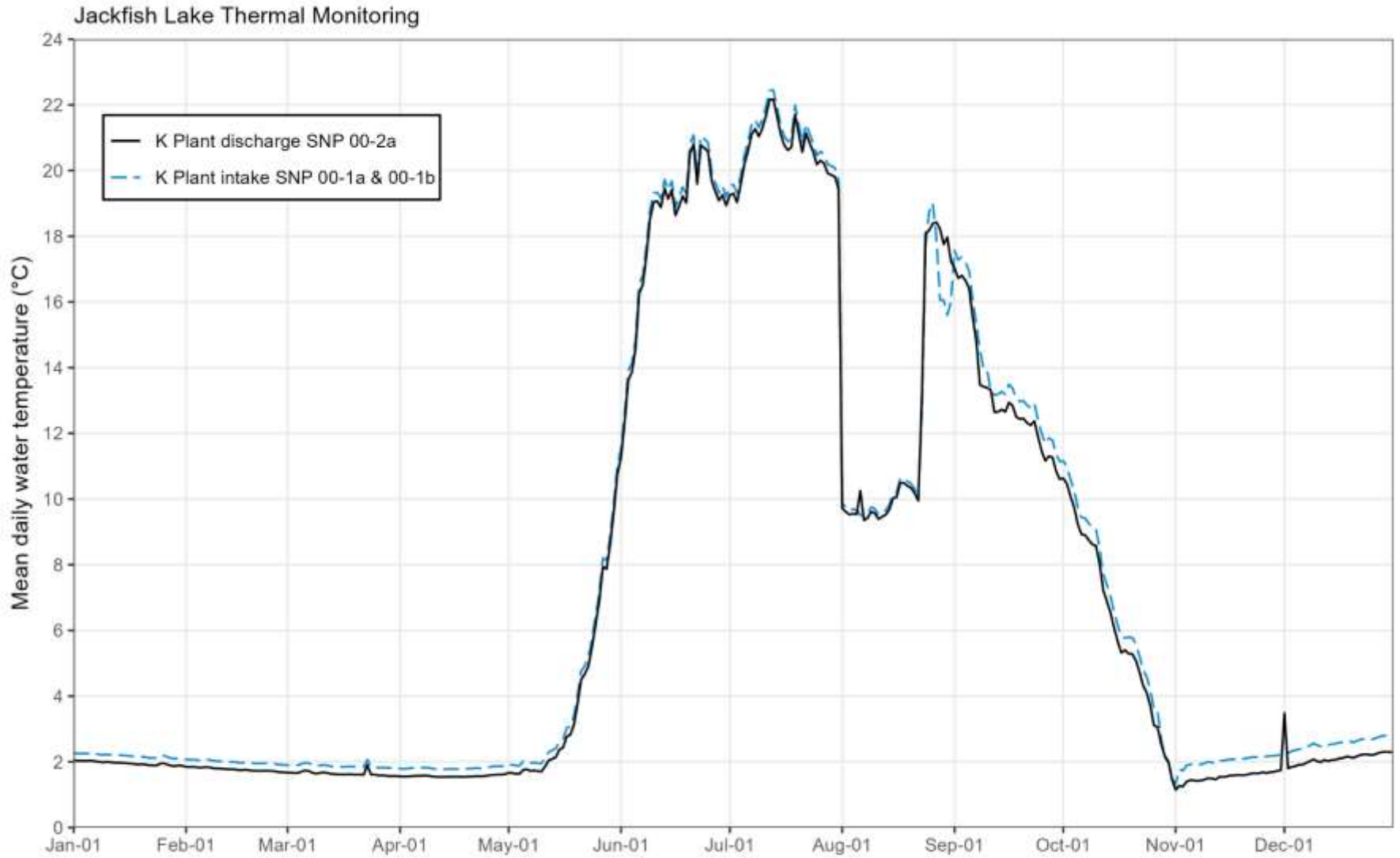


Figure 4-2 Mean Daily Water Temperatures Recorded at the SNP Stations Associated with the EMP Plant in 2022

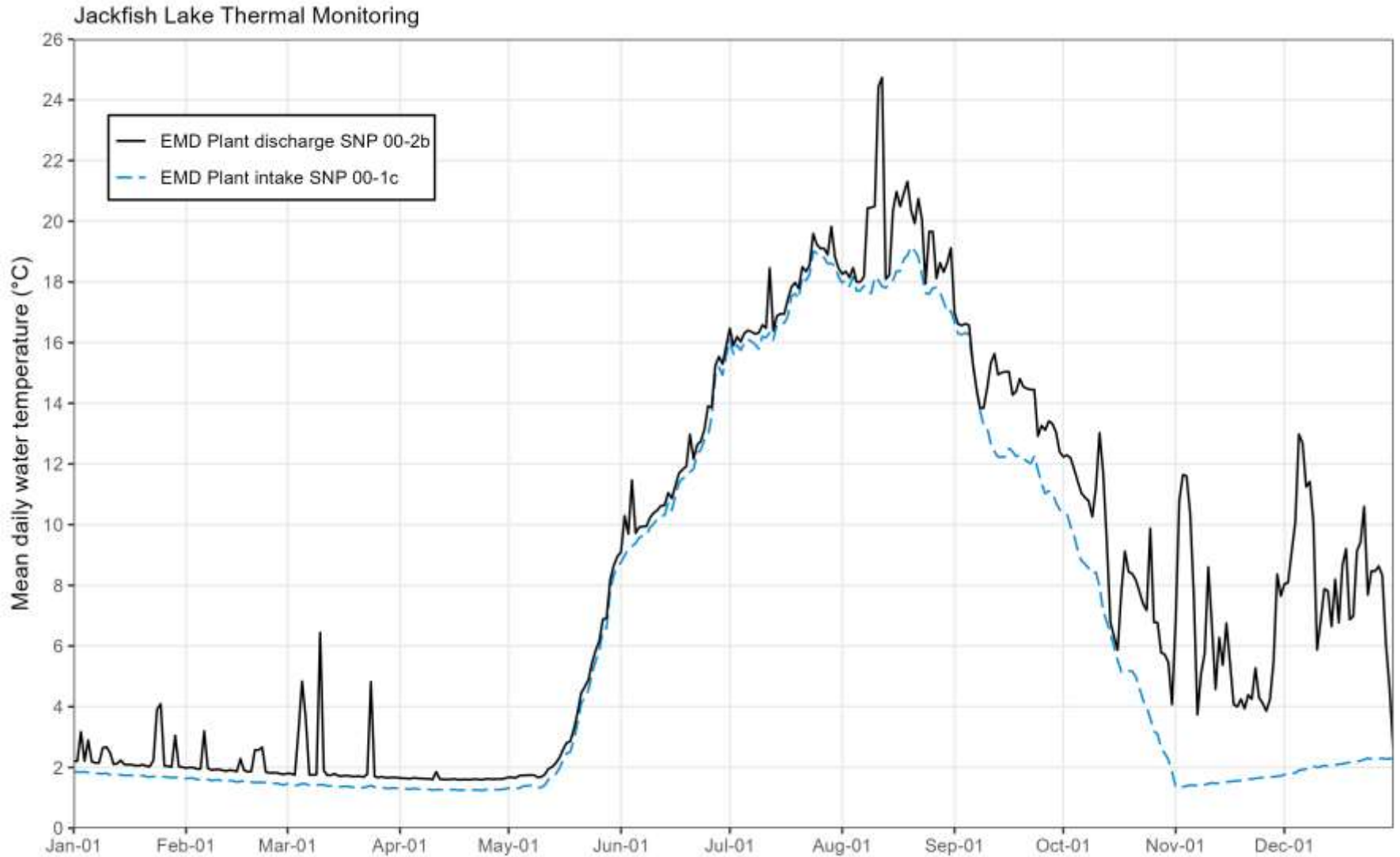
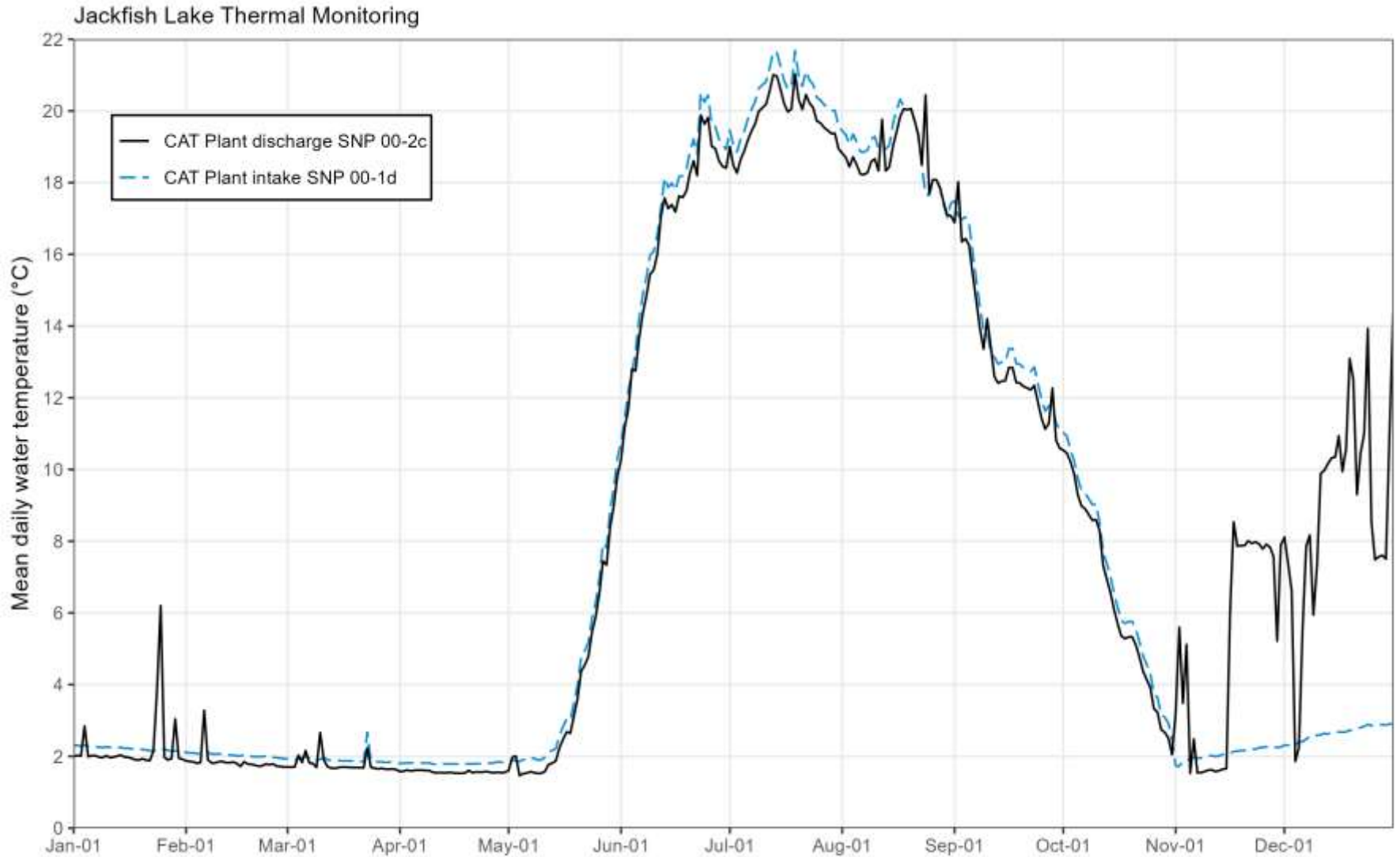




Figure 4-3 Mean Daily Water Temperatures Recorded at the SNP Stations Associated with the CAT Plant in 2022



**Table 4-1 2022 Monthly and Annual Water Use at the Jackfish Facility**

Month	Daily Mean (m <sup>3</sup> )	Monthly Total (m <sup>3</sup> )
January	16,722	518,376
February	16,687	467,234
March	16,629	515,496
April	16,669	500,075
May	16,901	523,918
June	16,894	506,818
July	16,962	525,823
August	15,670	485,773
September	18,747	562,396
October	19,036	590,125
November	19,729	591,869
December	19,966	618,946
Annual Total		6,406,849

## 5 CALIBRATION AND STATUS OF METERS AND DEVICES

2022 was the first year in which NTPC had automatic flow and temperature monitoring and data logging in place for the raw water cooling systems at the Jackfish Facility. As a result of power supply interruptions to the data logger, there were several data gaps in 2022. To mitigate this issue, NTPC is planning to transfer the data logger power supply to uninterruptable power supply-protected circuits in 2023.

## 6 ENGAGEMENT

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

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

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

No major project activities occurred in 2022 that required additional stakeholder engagement.

## 7 MODIFICATIONS AND MAJOR MAINTENANCE

The only significant operational project undertaken in 2022 was the installation of flow meter equipment. This was completed as a requirement of the Surveillance Network Program (SNP) for the Jackfish Facility reflected in Tables 3-1, 3-2, 3-3, and 3-4,

## 8 MANAGEMENT PLAN REVISIONS

### 8.1 Waste Management

No updates or changes to the process or facilities occurred in 2022 that required management of waste as outlined in the approved Waste Management Plan (Part E, condition 2 of the Licence).

### 8.2 Closure and Reclamation

A Closure and Reclamation Plan (CRP) was submitted as part of the initial Water Licence in 2019. As per Part H, Condition 1 of the Water Licence, an Interim CRP is required within 24 months of the effective date of the Water Licence (to be submitted on or before October 18, 2021).

In March 2022, the MVLWB confirmed that the 2019 submission did not meet the requirements of Schedule 4, Condition 1. NTPC submitted the updated Interim CRP to the MVLWB on July 5, 2022. Updates were addressed by November 17, 2022 in accordance with the comments, recommendations, and commitments made during the Online Review Systems (ORS) review process. The updated Plan was submitted to the MVLWB on December 22, 2022.<sup>2</sup> On December 22, 2022, the MVLWB issued an approval for the updated Interim CRP.<sup>3</sup>

## 9 AEMP MONITORING RESULTS

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

- May 31, 2021: Thermal Plume Delineation Study Design

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<sup>2</sup> NTPC. 2022. Conceptual Abandonment and Restoration Plan. [https://registry.mvlwb.ca/Documents/MV2019L1-0001/NTPC%20-%20Jackfish%20-%20Closure%20and%20Abandonment%20Plan%20-%20Dec22\\_22.pdf](https://registry.mvlwb.ca/Documents/MV2019L1-0001/NTPC%20-%20Jackfish%20-%20Closure%20and%20Abandonment%20Plan%20-%20Dec22_22.pdf)

<sup>3</sup> MVLWB. 2022. Interim Closure and Reclamation Plan, Version 1.1 – Approved. [https://registry.mvlwb.ca/Documents/MV2019L1-0001/NTPC%20-%20Jackfish%20-%20Interim%20Closure%20and%20Reclamation%20Plan%20%20V1.1%20-%20Staff%20%20Conformity%20-%20Dec22\\_22.pdf](https://registry.mvlwb.ca/Documents/MV2019L1-0001/NTPC%20-%20Jackfish%20-%20Interim%20Closure%20and%20Reclamation%20Plan%20%20V1.1%20-%20Staff%20%20Conformity%20-%20Dec22_22.pdf)

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

## 9.1 Thermal Plume Delineation Study

NTPC carried out the thermal plume delineation study in 2022.<sup>4</sup> The results of the study indicated that the Jackfish Facility has negligible impact on the temperature in Jackfish Lake, reflecting the highly intermittent nature and low heat of loads discharged to the lake by the facility. The thermal plume delineation study was submitted to the MVLWB on February 28, 2023. The report has completed the online public review and NTPC responded to comments from Environment and Climate Change Canada (ECCC), the MVLWB and GNWT-ECC.

Based on the results of the thermal plume delineation study, NTPC will develop and implement an AEMP with an adaptive management approach based on temperature values for initiation and further monitoring of water quality and biological components, if required.

# 10 SPILLS

## 10.1 Spill Training Exercises

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

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

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

In 2022, 73 NTPC staff received spill training on the following dates:

- February 10, 2022 (4 staff)
- June 7, 2022 (28 staff)
- June 16, 2022 (17 staff)
- June 20, 2022 (6 staff)
- September 23, 2022 (7 staff)

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<sup>4</sup> WSP. 2023. Jackfish Lake – Thermal Plume Delineation Report. [https://registry.mvlwb.ca/Documents/MV2019L1-0001/NTPC%20-%20Jackfish%20-%20Thermal%20Plume%20Delineation%20Study%20Report%20-%20Mar9\\_23.pdf](https://registry.mvlwb.ca/Documents/MV2019L1-0001/NTPC%20-%20Jackfish%20-%20Thermal%20Plume%20Delineation%20Study%20Report%20-%20Mar9_23.pdf)

- December 6, 2022 (11 staff)

## 10.2 Spill Communications

When a spill or unauthorized discharge occurs at the Jackfish Facility, NTPC employees follow the Spill Communication Plan outlined below:

- When a spill has been identified, the spill is reported to the Plant Operator. If the Plant Operator 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), Plant Operations Manager or 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 whether an emergency response team is required.
- The Director, Health, Safety, and Environment is to contact the appropriate regulator (GNWT – Environment and Climate Change, or Fisheries and Oceans Canada) to report the spill incident.

## 10.3 Unauthorized Discharges

Table 10-1 summarizes unauthorized discharges that occurred at the Jackfish Facility in 2022.

Table 10-1 Unauthorized Discharges in 2022

Spill Number	Date	Spill Type and Volume	Location	Summary of Circumstances and Actions Taken
2022038 <sup>5</sup>	February 10, 2022; reported on February 15, 2022	22 L wastewater (sewage)	NTPC Line Shop #1 Jackfish Rd	Kavanaugh vac truck driver alerted Kavanaugh Operations Supervisor of a spill at 6:40 a.m. and the supervisor notified Kavanaugh Dispatch at 6:42 a.m. Kavanaugh Dispatch alerted the NTPC control room of the spill at 6:43 a.m. Kavanaugh Operations Supervisor dispatched to the scene. Kavanaugh Dispatch contacted NTPC line manager at 7:15 a.m. Kavanaugh Operations Supervisor dispatched NDS for cleanup at 7:36 a.m. Cleanup began immediately and took half the day due to manual labour required to chip ice as part of the cleanup. The spill was mainly on the outside of the building, but a small amount got inside the main door. NDS performed the cleanup as requested by Kavanaugh.
2022414 <sup>6</sup>	August 12, 2022; reported	20 L propylene glycol	Yellowknife Jackfish Lake Plant	A pressure relief valve let go inside the B1 control room mechanical room. The relief valve was isolated, and approximately 20 L of propylene glycol mix was spilled on

<sup>5</sup> <https://www.ecc.gov.nt.ca/en/spill/spill-2022038>

<sup>6</sup> <https://www.ecc.gov.nt.ca/en/spill/spill-2022414>

Spill Number	Date	Spill Type and Volume	Location	Summary of Circumstances and Actions Taken
	on August 12, 2022		B1 building control room	the floor. The product was cleaned up and put into waste barrels.
N/A	August 12, 2022	5 L propylene glycol	Yellowknife Jackfish Lake Plant B1 building control room	An EMD Plant heating loop valve started leaking, and approximately 5 L of propylene glycol mix was spilled on the floor. The product was cleaned up and put into waste barrels. Operations opened up the sections of the heating loop to stop the leaks.
2022492 <sup>7</sup>	October 7, 2022; reported on October 7, 2022	10 L petroleum – fuel oil (diesel)	NTPC Jackfish Power Plant	Operator slipped on the concrete and hit a valve on the truck, which released a spray of diesel onto the concrete loading pad. The operator used absorbent pads from a nearby spill response kit to contain and clean the spill. There was a small amount of diesel that sprayed onto gravel beside the pad. Impacted gravel was scraped up to remove staining. The absorbent pads were placed into appropriate hazardous waste disposal container on site.

NDS – Northern Disaster Services; NTPC – Northwest Territories Power Corporation

## 11 REGULATORY REQUIREMENTS

### 11.1 Submissions

On March 24, 2022, the MVLWB emailed NTPC with a list of items to be submitted, including the 2021 Annual Water Licence Report (due March 31, 2022) and the Interim CRP (due on October 18, 2021, within 24 months of the effective date of the Water Licence—October 18, 2019). The Annual Water Licence Report was submitted to the MVLWB on April 14, 2022,<sup>8</sup> and the Interim CRP on July 5, 2022.<sup>9</sup> Table 11-1 provides the record of regulatory communications regarding the Interim CRP, and Table 11-2 provides the record of engagement regarding the 2021 Annual Water Licence Report.

<sup>7</sup> <https://www.ecc.gov.nt.ca/en/spill/spill-2022492>

<sup>8</sup> NTPC. 2022. 2021 Jackfish Annual Report. [https://registry.mvlwb.ca/Documents/MV2019L1-0001/NTPC%20-%20Jackfish%20-%202021%20Annual%20Report%20-%20Apr14\\_22.pdf](https://registry.mvlwb.ca/Documents/MV2019L1-0001/NTPC%20-%20Jackfish%20-%202021%20Annual%20Report%20-%20Apr14_22.pdf)

<sup>9</sup> NTPC. 2022. Conceptual Abandonment and Restoration Plan. [https://registry.mvlwb.ca/Documents/MV2019L1-0001/NTPC%20-%20Jackfish%20-%20Conceptual%20Closure%20and%20Abandonment%20Restoration%20Plan%20-%20Jul5\\_22.pdf](https://registry.mvlwb.ca/Documents/MV2019L1-0001/NTPC%20-%20Jackfish%20-%20Conceptual%20Closure%20and%20Abandonment%20Restoration%20Plan%20-%20Jul5_22.pdf)

**Table 11-1 Regulatory Communications for the CRP Submission in 2022**

Date	Communications
March 28	NTPC responded to the MVLWB's email dated March 24, asking whether the Interim CRP that was submitted with the Water Licence renewal package would suffice for the submission request.
March 28	The MVLWB responded to NTPC, stating that the Interim CRP needs to be in accordance with Schedule 4, Condition 1 of the Water Licence.
March 28	NTPC responded to the MVLWB, stating that an updated Plan would be submitted by April 30, 2022.
May 1	NTPC provided the Jackfish Power Generation Facility Interim CRP to the MVLWB, as part of the requirements of the Type A Water Licence MV2019L1-0001.
May 2	The MVLWB responded to NTPC's May 1 email requesting revisions to the Interim CRP as it was missing information outlined in the Water Licence.
July 4	NTPC provided the revised Interim CRP to the MVLWB.
July 5	The MVLWB requested revision to the cover letter, allowing for the documents to be posted to the public registry.
July 5	NTPC submitted the revised cover letter for the Interim CRP to the MVLWB.
September 13	NTPC sent a follow-up email to the MVLWB to determine whether further action was required by NTPC for the Interim CRP.
September 14	The MVLWB responded to NTPC's email dated September 13, confirming that the Plan would be presented to the Board at the next meeting scheduled for October and that further communication would follow after the Board meeting.
September 14	NTPC responded to the MVLWB email dated September 14, thanking them for the update.
October 28	The MVLWB provided a letter requesting revisions to the Interim CRP V1.0 to include details on the frequency and timing of when the groundwater samples were collected, how contaminated soil and water will be remediated and disposed of, and to update Section 5.2.3 of the Interim CRP to indicate that the hazardous waste storage areas are shown in Figure 3.
November 15	NTPC provided the MVLWB with an update regarding the submission of the revised Interim CRP and stated that NTPC will not be able to meet the submission date of November 17, 2022, and that a new timeline would be provided at a later date.
December 22	NTPC provided the revised Interim CRP to the MVLWB, as per the letter issued to NTPC on October 28, 2022.
December 22	The MVLWB provided letter stating that the Board staff conducted a conformity check and determined that the submission of the Interim CRP V1.1 met the requirements of the MVLWB's Decision Letter and approved the Interim CRP V1.1.

CRP – Closure and Reclamation Plan; MVLWB – Mackenzie Valley Land and Water Board; NTPC – Northwest Territories Power Corporation

**Table 11-2 Regulatory Communications for the 2021 Annual Water Licence Report Submission in 2022**

Date	Communications
March 29	NTPC sent a request to the MVLWB to defer the submission date for the 2021 Annual Water Licence Report from March 31, 2022, to April 14, 2022.
March 30	The MVLWB responded to NTPC, indicating that the extension request from March 29 referenced the Water Licence number for the Taltson Hydro Facility, not the Jackfish Hydro Facility.
April 1	NTPC provided the MVLWB with an updated letter, requesting the 2021 Annual Water Licence Report extension, with a corrected Water Licence number.
April 14	NTPC submitted the 2021 Annual Water Licence Report to the MVLWB, as part of the requirements of the Type A Water Licence MV2019L1-0001. Operations between January 1 and December 31, 2022, were provided in the attached report.
April 14	NTPC provided an updated version of the 2021 Annual Water Licence Report, as the original version submitted had not been signed.

MVLWB – Mackenzie Land and Water Board; NTPC – Northwest Territories Power Corporation

## 11.2 Outstanding Submissions and Non-compliances

The outstanding Jackfish Lake Generating Facility Operations, Maintenance, and Surveillance Manual will be submitted to the MVLWB in 2023.

The February 2022 Surveillance Network monthly report remain outstanding.

- 2022 February

## 11.3 Annual Water Licence Inspection

The annual Water Licence inspection was completed for the Jackfish Facility on September 1, 2022, by GNWT – Environment and Climate Change Water Resource Officer Meg McCluskie. No formal inspection report was received by NTPC. No major deficiencies were recorded during the inspection.

# 12 OTHER BOARD REQUESTS

The following is a summary of other details on water or operating procedures requested by the MVLWB on or before November 1, 2022:

- On October 28, 2022, the MVLWB issued a letter requesting revisions to the Interim CRP.<sup>10</sup>

<sup>10</sup> MVLWB. 2022. Interim Closure and Reclamation Plan, Version 1.0 – Revisions Required. [https://registry.mvlwb.ca/Documents/MV2019L1-0001/NTPC%20%E2%80%93%20Jackfish%20-%20Revisions%20Required%20-%20Interim%20Closure%20and%20Reclamation%20Plan%20V1%20-%20Oct28\\_22.pdf](https://registry.mvlwb.ca/Documents/MV2019L1-0001/NTPC%20%E2%80%93%20Jackfish%20-%20Revisions%20Required%20-%20Interim%20Closure%20and%20Reclamation%20Plan%20V1%20-%20Oct28_22.pdf)



## CLOSURE

This 2022 Annual Report for the Jackfish Facility was prepared for Northwest Territories Power Corporation to meet the requirements of Water Licence MV2019L1-0001.

Respectfully submitted,



Belinda Whitford, CPA  
Chief Operating Officer  
Northwest Territories Power Corporation

## APPENDIX A – SURVEILLANCE NETWORK PROGRAM DATA

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

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

Date	CAT Plant Discharge (°C)	CAT Plant Intake (°C)	EMD Plant Discharge (°C)	EMD Plant Intake (°C)	K Plant Discharge (°C)	K Plant Intake Temp. (°C)
2022-01-01	2.00	2.30	2.21	1.85	2.05	2.27
2022-01-02	2.02	2.30	2.20	1.85	2.04	2.26
2022-01-03	2.01	2.29	3.18	1.84	2.03	2.25
2022-01-04	2.84	2.32	2.21	1.85	2.03	2.26
2022-01-05	1.99	2.28	2.90	1.83	2.03	2.25
2022-01-06	2.02	2.29	2.19	1.83	2.04	2.26
2022-01-07	2.02	2.28	2.15	1.80	2.02	2.24
2022-01-08	1.98	2.25	2.15	1.80	2.00	2.22
2022-01-09	1.97	2.25	2.64	1.79	1.98	2.21
2022-01-10	2.02	2.27	2.67	1.81	2.00	2.22
2022-01-11	1.96	2.25	2.49	1.76	1.99	2.21
2022-01-12	1.98	2.24	2.10	1.75	1.97	2.20
2022-01-13	2.01	2.25	2.12	1.77	1.97	2.20
2022-01-14	2.03	2.25	2.24	1.75	1.97	2.21
2022-01-15	1.98	2.22	2.09	1.74	1.96	2.19
2022-01-16	1.97	2.23	2.09	1.74	1.95	2.18
2022-01-17	1.95	2.22	2.09	1.74	1.94	2.17
2022-01-18	1.90	2.19	2.06	1.71	1.93	2.15
2022-01-19	1.90	2.18	2.06	1.71	1.92	2.15
2022-01-20	1.93	2.19	2.09	1.74	1.93	2.16
2022-01-21	1.89	2.18	2.05	1.70	1.91	2.14
2022-01-22	1.88	2.16	2.03	1.68	1.90	2.12
2022-01-23	2.15	2.15	2.24	1.70	1.89	2.12
2022-01-24	3.87	2.17	3.91	1.69	1.89	2.12
2022-01-25	6.20	2.22	4.09	1.71	1.95	2.19
2022-01-26	1.98	2.20	2.05	1.69	1.95	2.18
2022-01-27	1.90	2.16	2.04	1.68	1.91	2.14
2022-01-28	1.94	2.15	2.01	1.65	1.88	2.11
2022-01-29	3.04	2.15	3.06	1.66	1.86	2.09

Date	CAT Plant Discharge (°C)	CAT Plant Intake (°C)	EMD Plant Discharge (°C)	EMD Plant Intake (°C)	K Plant Discharge (°C)	K Plant Intake Temp. (°C)
2022-01-30	1.95	2.17	2.03	1.68	1.89	2.12
2022-01-31	1.92	2.14	2.01	1.65	1.87	2.10
2022-02-01	1.88	2.11	1.98	1.63	1.85	2.07
2022-02-02	1.86	2.09	2.00	1.65	1.84	2.06
2022-02-03	1.85	2.10	1.99	1.65	1.85	2.07
2022-02-04	1.81	2.08	1.95	1.60	1.83	2.05
2022-02-05	1.83	2.07	1.95	1.60	1.82	2.04
2022-02-06	3.28	2.11	3.20	1.64	1.84	2.06
2022-02-07	1.91	2.11	1.97	1.60	1.84	2.07
2022-02-08	1.82	2.07	1.91	1.57	1.81	2.04
2022-02-09	1.81	2.06	1.93	1.58	1.80	2.03
2022-02-10	1.85	2.07	1.93	1.59	1.80	2.02
2022-02-11	1.86	2.07	1.91	1.56	1.79	2.02
2022-02-12	1.82	2.04	1.88	1.53	1.78	2.01
2022-02-13	1.82	2.03	1.91	1.56	1.77	1.99
2022-02-14	1.84	2.04	1.90	1.55	1.77	2.00
2022-02-15	1.80	2.01	1.86	1.52	1.76	1.98
2022-02-16	1.72	2.01	2.29	1.54	1.74	1.97
2022-02-17	1.85	2.04	1.90	1.54	1.76	1.98
2022-02-18	1.79	2.00	1.86	1.50	1.75	1.97
2022-02-19	1.78	2.00	1.87	1.52	1.73	1.96
2022-02-20	1.75	1.99	2.58	1.50	1.73	1.95
2022-02-21	1.73	1.99	2.57	1.51	1.73	1.95
2022-02-22	1.74	1.99	2.66	1.51	1.72	1.95
2022-02-23	1.79	2.01	1.85	1.50	1.73	1.96
2022-02-24	1.77	1.98	1.82	1.47	1.72	1.95
2022-02-25	1.79	1.97	1.82	1.47	1.72	1.95
2022-02-26	1.73	1.96	1.82	1.48	1.70	1.93
2022-02-27	1.72	1.96	1.79	1.44	1.69	1.91
2022-02-28	1.70	1.93	1.77	1.42	1.68	1.91
2022-03-01	1.70	1.94	1.81	1.46	1.67	1.90
2022-03-02	1.70	1.93	1.79	1.44	1.67	1.90
2022-03-03	1.71	1.91	1.75	1.40	1.66	1.89

Date	CAT Plant Discharge (°C)	CAT Plant Intake (°C)	EMD Plant Discharge (°C)	EMD Plant Intake (°C)	K Plant Discharge (°C)	K Plant Intake Temp. (°C)
2022-03-04	2.03	1.92	3.17	1.42	1.66	1.90
2022-03-05	1.83	1.97	4.84	1.46	1.71	1.95
2022-03-06	2.16	1.99	3.65	1.46	1.74	1.97
2022-03-07	1.82	1.96	1.76	1.41	1.72	1.95
2022-03-08	1.80	1.91	1.75	1.40	1.66	1.89
2022-03-09	1.69	1.90	1.77	1.42	1.64	1.87
2022-03-10	2.66	1.92	6.44	1.43	1.66	1.89
2022-03-11	1.90	1.96	1.89	1.43	1.68	1.91
2022-03-12	1.72	1.91	1.74	1.38	1.66	1.89
2022-03-13	1.67	1.88	1.74	1.39	1.63	1.86
2022-03-14	1.67	1.88	1.79	1.37	1.62	1.85
2022-03-15	1.69	1.88	1.72	1.37	1.62	1.85
2022-03-16	1.70	1.87	1.71	1.36	1.62	1.85
2022-03-17	1.70	1.87	1.73	1.38	1.61	1.85
2022-03-18	1.69	1.87	1.72	1.37	1.62	1.86
2022-03-19	1.69	1.87	1.70	1.34	1.62	1.85
2022-03-20	1.69	1.87	1.71	1.35	1.61	1.85
2022-03-21	1.69	1.87	1.70	1.35	1.61	1.86
2022-03-22	1.68	1.84	1.68	1.33	1.60	1.84
2022-03-23	2.24	2.67	1.77	1.36	1.90	2.06
2022-03-24	1.69	1.87	4.82	1.40	1.61	1.85
2022-03-25	1.67	1.87	1.71	1.35	1.61	1.84
2022-03-26	1.65	1.84	1.66	1.31	1.59	1.82
2022-03-27	1.67	1.85	1.69	1.34	1.59	1.82
2022-03-28	1.64	1.83	1.66	1.31	1.58	1.82
2022-03-29	1.64	1.84	1.66	1.31	1.57	1.81
2022-03-30	1.65	1.84	1.67	1.32	1.57	1.81
2022-03-31	1.63	1.84	1.66	1.32	1.57	1.81
2022-04-01	1.57	1.80	1.65	1.30	1.56	1.79
2022-04-02	1.59	1.81	1.64	1.29	1.56	1.79
2022-04-03	1.62	1.82	1.63	1.28	1.56	1.79
2022-04-04	1.59	1.82	1.63	1.28	1.56	1.81
2022-04-05	1.61	1.82	1.66	1.31	1.57	1.81

Date	CAT Plant Discharge (°C)	CAT Plant Intake (°C)	EMD Plant Discharge (°C)	EMD Plant Intake (°C)	K Plant Discharge (°C)	K Plant Intake Temp. (°C)
2022-04-06	1.61	1.82	1.63	1.29	1.58	1.82
2022-04-07	1.61	1.82	1.63	1.28	1.57	1.82
2022-04-08	1.61	1.81	1.62	1.28	1.58	1.83
2022-04-09	1.61	1.82	1.62	1.28	1.57	1.81
2022-04-10	1.56	1.78	1.60	1.25	1.56	1.79
2022-04-11	1.54	1.78	1.85	1.26	1.54	1.78
2022-04-12	1.55	1.79	1.62	1.27	1.54	1.77
2022-04-13	1.54	1.79	1.61	1.26	1.54	1.78
2022-04-14	1.54	1.78	1.60	1.25	1.54	1.78
2022-04-15	1.55	1.79	1.61	1.26	1.55	1.79
2022-04-16	1.53	1.79	1.62	1.27	1.55	1.78
2022-04-17	1.53	1.79	1.59	1.25	1.54	1.78
2022-04-18	1.53	1.78	1.59	1.25	1.54	1.78
2022-04-19	1.54	1.79	1.61	1.26	1.54	1.78
2022-04-20	1.61	1.79	1.59	1.25	1.55	1.80
2022-04-21	1.54	1.79	1.61	1.26	1.55	1.79
2022-04-22	1.56	1.80	1.61	1.26	1.57	1.81
2022-04-23	1.56	1.80	1.60	1.25	1.56	1.80
2022-04-24	1.56	1.79	1.60	1.24	1.56	1.81
2022-04-25	1.58	1.81	1.63	1.28	1.58	1.82
2022-04-26	1.55	1.81	1.61	1.26	1.60	1.85
2022-04-27	1.54	1.82	1.61	1.26	1.60	1.86
2022-04-28	1.55	1.84	1.62	1.27	1.61	1.86
2022-04-29	1.54	1.83	1.62	1.27	1.61	1.86
2022-04-30	1.56	1.85	1.64	1.29	1.62	1.87
2022-05-01	1.61	1.88	1.68	1.32	1.67	1.92
2022-05-02	1.98	1.88	1.67	1.32	1.66	1.91
2022-05-03	2.01	1.88	1.65	1.31	1.63	1.88
2022-05-04	1.46	1.86	1.73	1.31	1.63	1.88
2022-05-05	1.52	1.90	1.74	1.39	1.75	2.01
2022-05-06	1.53	1.91	1.74	1.39	1.77	2.03
2022-05-07	1.57	1.96	1.75	1.40	1.72	1.97
2022-05-08	1.54	1.94	1.75	1.40	1.74	1.98

Date	CAT Plant Discharge (°C)	CAT Plant Intake (°C)	EMD Plant Discharge (°C)	EMD Plant Intake (°C)	K Plant Discharge (°C)	K Plant Intake Temp. (°C)
2022-05-09	1.53	1.90	1.67	1.33	1.72	1.96
2022-05-10	1.53	1.89	1.69	1.34	1.70	1.95
2022-05-11	1.58	1.98	1.77	1.42	1.85	2.10
2022-05-12	1.77	2.13	1.96	1.61	2.04	2.30
2022-05-13	1.81	2.17	2.02	1.67	2.09	2.35
2022-05-14	1.87	2.21	2.14	1.79	2.14	2.40
2022-05-15	2.23	2.57	2.32	1.97	2.37	2.63
2022-05-16	2.47	2.83	2.59	2.24	2.43	2.69
2022-05-17	2.68	3.04	2.81	2.47	2.77	3.03
2022-05-18	2.64	3.00	2.86	2.51	2.83	3.09
2022-05-19	3.13	3.49	3.27	2.92	3.13	3.39
2022-05-20	3.62	3.99	3.80	3.45	3.77	4.04
2022-05-21	4.38	4.77	4.45	4.11	4.50	4.76
2022-05-22	4.55	4.94	4.66	4.32	4.67	4.92
2022-05-23	4.79	5.18	4.89	4.55	4.91	5.17
2022-05-24	5.47	5.87	5.44	5.11	5.50	5.76
2022-05-25	5.89	6.28	5.85	5.51	6.19	6.46
2022-05-26	6.53	6.94	6.16	5.83	6.90	7.17
2022-05-27	7.45	7.93	6.88	6.55	7.93	8.20
2022-05-28	7.34	7.82	6.91	6.58	7.87	8.14
2022-05-29	8.39	8.89	8.18	7.85	8.62	8.89
2022-05-30	8.99	9.49	8.66	8.33	9.62	9.88
2022-05-31	9.83	10.31	8.95	8.62	10.77	11.04
2022-06-01	10.27	10.77	9.10	8.76	11.26	11.53
2022-06-02	11.17	11.41	10.29	8.98	12.35	12.63
2022-06-03	11.68	12.21	9.69	9.21	13.63	13.90
2022-06-04	12.79	12.69	11.47	9.28	13.87	14.14
2022-06-05	12.75	13.30	9.72	9.39	14.58	14.86
2022-06-06	13.68	14.23	9.91	9.57	16.26	16.53
2022-06-07	14.35	14.88	9.94	9.63	16.53	16.81
2022-06-08	14.84	15.36	9.95	9.65	17.42	17.70
2022-06-09	15.44	15.97	10.23	9.91	18.53	18.81
2022-06-10	15.56	16.08	10.38	10.03	19.04	19.31

Date	CAT Plant Discharge (°C)	CAT Plant Intake (°C)	EMD Plant Discharge (°C)	EMD Plant Intake (°C)	K Plant Discharge (°C)	K Plant Intake Temp. (°C)
2022-06-11	16.00	16.53	10.48	10.19	19.07	19.34
2022-06-12	17.05	17.29	10.63	10.28	18.88	19.15
2022-06-13	17.57	18.14	10.64	10.31	19.46	19.73
2022-06-14	17.28	17.87	11.05	10.72	19.14	19.41
2022-06-15	17.39	17.99	10.87	10.47	19.41	19.68
2022-06-16	17.18	17.79	11.28	10.96	18.63	18.90
2022-06-17	17.63	18.17	11.70	11.39	18.91	19.18
2022-06-18	17.58	18.19	11.82	11.53	19.22	19.50
2022-06-19	17.76	18.36	11.92	11.57	19.01	19.29
2022-06-20	18.26	18.87	12.97	11.74	20.52	20.80
2022-06-21	18.61	19.21	12.17	11.83	20.81	21.09
2022-06-22	18.20	18.80	12.63	12.34	19.59	19.86
2022-06-23	19.88	20.51	12.75	12.47	20.77	21.04
2022-06-24	19.63	20.24	13.13	12.80	20.69	20.96
2022-06-25	19.82	20.44	13.91	12.91	20.58	20.85
2022-06-26	19.01	19.63	13.86	13.59	19.68	19.95
2022-06-27	18.95	19.56	15.24	14.93	19.36	19.63
2022-06-28	18.61	19.22	15.54	15.20	19.08	19.31
2022-06-29	18.45	19.04	15.30	14.93	19.26	19.53
2022-06-30	18.40	18.93	15.88	15.57	18.93	19.20
2022-07-01	19.01	19.46	16.47	16.09	19.26	19.53
2022-07-02	18.47	19.05	15.91	15.62	19.30	19.58
2022-07-03	18.27	18.85	16.20	15.92	19.03	19.31
2022-07-04	18.65	19.23	16.03	15.75	19.57	19.85
2022-07-05	18.89	19.44	16.31	15.99	20.19	20.47
2022-07-06	19.19	19.78	16.40	16.11	20.59	20.87
2022-07-07	19.44	20.05	16.35	16.04	21.10	21.38
2022-07-08	19.65	20.26	16.28	15.94	21.27	21.55
2022-07-09	19.99	20.63	16.32	15.79	21.04	21.31
2022-07-10	20.09	20.73	16.58	16.21	21.29	21.56
2022-07-11	20.19	20.82	16.48	16.16	21.68	21.96
2022-07-12	20.56	21.20	18.46	16.33	22.16	22.44
2022-07-13	21.01	21.66	16.39	16.10	22.17	22.45

Date	CAT Plant Discharge (°C)	CAT Plant Intake (°C)	EMD Plant Discharge (°C)	EMD Plant Intake (°C)	K Plant Discharge (°C)	K Plant Intake Temp. (°C)
2022-07-14	20.97	21.62	16.88	16.60	21.67	21.94
2022-07-15	20.60	21.24	16.95	16.66	21.13	21.40
2022-07-16	20.20	20.84	16.94	16.64	20.77	21.05
2022-07-17	19.97	20.61	17.41	16.86	20.62	20.89
2022-07-18	20.05	20.69	17.83	17.53	20.71	20.99
2022-07-19	21.03	21.68	17.98	17.62	21.71	21.99
2022-07-20	20.33	20.97	17.79	17.44	21.12	21.39
2022-07-21	20.04	20.68	18.49	18.19	20.56	20.84
2022-07-22	20.45	21.11	18.34	18.04	21.14	21.41
2022-07-23	20.22	20.86	18.54	18.24	20.85	21.12
2022-07-24	20.09	20.73	19.59	19.02	20.57	20.83
2022-07-25	19.72	20.37	19.24	18.94	20.18	20.46
2022-07-26	19.66	20.30	19.10	18.81	20.31	20.58
2022-07-27	19.54	20.18	19.10	18.81	20.22	20.49
2022-07-28	19.46	20.09	18.90	18.60	19.92	20.19
2022-07-29	19.37	20.01	19.82	18.61	19.87	20.14
2022-07-30	19.37	20.01	18.83	18.53	19.81	20.08
2022-07-31	18.94	19.57	18.45	18.16	19.44	19.71
2022-08-01	18.82	19.45	18.26	17.97	9.72	9.86
2022-08-02	18.70	19.33	18.35	18.05	9.61	9.75
2022-08-03	18.44	19.07	18.14	17.85	9.53	9.66
2022-08-04	18.72	19.35	18.47	18.18	9.55	9.69
2022-08-05	18.50	19.13	18.00	17.70	9.53	9.67
2022-08-06	18.24	18.87	18.00	17.71	10.25	9.52
2022-08-07	18.22	18.85	18.17	17.87	9.35	9.48
2022-08-08	18.28	18.91	20.44	17.69	9.42	9.56
2022-08-09	18.59	19.21	20.45	17.62	9.62	9.75
2022-08-10	18.66	19.29	20.49	18.17	9.57	9.70
2022-08-11	18.33	18.96	24.44	18.06	9.39	9.52
2022-08-12	19.76	18.94	24.74	17.85	9.46	9.60
2022-08-13	18.33	18.94	18.09	17.80	9.52	9.66
2022-08-14	18.43	19.05	18.23	17.93	9.68	9.82
2022-08-15	19.01	19.63	20.34	18.04	10.02	10.16



Date	CAT Plant Discharge (°C)	CAT Plant Intake (°C)	EMD Plant Discharge (°C)	EMD Plant Intake (°C)	K Plant Discharge (°C)	K Plant Intake Temp. (°C)
2022-08-16	19.41	20.03	20.98	18.36	10.06	10.19
2022-08-17	19.85	20.33	20.49	18.36	10.49	10.63
2022-08-18	20.06	20.12	20.92	18.75	10.49	10.63
2022-08-19	20.03	20.06	21.31	18.87	10.40	10.54
2022-08-20	20.06	20.05	20.36	19.16	10.34	10.47
2022-08-21	19.72	19.70	19.93	19.02	10.18	10.31
2022-08-22	19.34	19.30	20.75	18.82	9.95	10.08
2022-08-23	18.49	18.44	20.06	18.25	13.16	12.73
2022-08-24	20.44	17.68	17.94	17.63	18.09	17.74
2022-08-25	17.70	17.64	19.66	17.60	18.18	18.75
2022-08-26	18.08	18.06	19.66	17.80	18.39	19.01
2022-08-27	18.08	18.06	18.12	17.82	18.42	17.93
2022-08-28	17.86	17.83	18.63	17.64	18.22	16.06
2022-08-29	17.44	17.38	18.32	17.34	17.75	16.06
2022-08-30	17.10	17.03	18.64	16.99	17.97	15.60
2022-08-31	17.07	17.43	19.12	17.05	17.24	16.01
2022-09-01	16.88	17.49	16.97	16.67	17.03	17.57
2022-09-02	18.02	17.08	16.60	16.30	16.73	17.28
2022-09-03	16.35	16.97	16.57	16.26	16.80	17.37
2022-09-04	16.44	17.05	16.62	16.32	16.66	17.21
2022-09-05	16.26	16.86	16.57	16.27	16.41	16.94
2022-09-06	15.45	16.04	15.37	15.31	15.55	16.07
2022-09-07	14.69	15.28	14.51	14.50	14.80	15.32
2022-09-08	13.93	14.51	13.85	13.78	13.47	14.53
2022-09-09	13.36	13.91	13.84	13.27	13.42	13.96
2022-09-10	14.20	13.87	14.50	13.19	13.39	13.92
2022-09-11	13.41	13.24	15.32	12.66	13.32	13.29
2022-09-12	12.59	13.13	15.64	12.42	12.64	13.16
2022-09-13	12.41	12.94	14.95	12.23	12.65	13.19
2022-09-14	12.46	12.99	15.01	12.23	12.73	13.27
2022-09-15	12.48	12.99	15.04	12.24	12.65	13.19
2022-09-16	12.84	13.37	15.04	12.52	12.93	13.49
2022-09-17	12.84	13.37	14.28	12.41	12.85	13.37

Date	CAT Plant Discharge (°C)	CAT Plant Intake (°C)	EMD Plant Discharge (°C)	EMD Plant Intake (°C)	K Plant Discharge (°C)	K Plant Intake Temp. (°C)
2022-09-18	12.43	12.96	14.40	12.25	12.51	13.04
2022-09-19	12.41	12.94	14.81	12.29	12.43	12.97
2022-09-20	12.32	12.84	14.54	12.19	12.45	12.99
2022-09-21	12.27	12.79	14.48	12.09	12.32	12.85
2022-09-22	12.22	12.74	14.45	12.02	12.25	12.79
2022-09-23	12.34	12.86	14.45	12.25	12.38	12.92
2022-09-24	11.87	12.39	12.92	11.80	11.91	12.42
2022-09-25	11.43	11.94	13.27	11.35	11.47	12.00
2022-09-26	11.13	11.63	13.12	11.02	11.16	11.69
2022-09-27	11.27	11.77	13.41	11.11	11.30	11.85
2022-09-28	12.27	11.75	13.32	11.05	11.27	11.79
2022-09-29	10.82	11.32	13.04	10.72	10.85	11.37
2022-09-30	10.59	11.08	12.39	10.49	10.60	11.14
2022-10-01	10.54	11.03	12.24	10.42	10.63	11.17
2022-10-02	10.45	10.93	12.29	10.36	10.46	10.98
2022-10-03	10.21	10.54	12.20	9.95	10.07	10.59
2022-10-04	9.87	10.24	11.83	9.63	9.74	10.26
2022-10-05	9.29	9.75	11.42	9.15	9.23	9.74
2022-10-06	8.99	9.42	11.04	8.81	8.93	9.44
2022-10-07	8.90	9.34	10.90	8.70	8.90	9.42
2022-10-08	8.75	9.18	10.78	8.56	8.76	9.26
2022-10-09	8.58	9.02	10.26	8.39	8.62	9.13
2022-10-10	8.60	9.03	11.21	8.43	8.58	9.09
2022-10-11	8.30	8.52	13.03	7.97	8.03	8.52
2022-10-12	7.32	7.71	11.70	7.16	7.23	7.72
2022-10-13	6.94	7.37	9.46	6.80	6.90	7.39
2022-10-14	6.57	7.02	6.78	6.43	6.55	7.04
2022-10-15	6.09	6.55	6.31	5.97	6.08	6.57
2022-10-16	5.70	6.15	5.87	5.53	5.67	6.15
2022-10-17	5.36	5.79	7.78	5.15	5.32	5.81
2022-10-18	5.29	5.71	9.13	5.13	5.40	5.77
2022-10-19	5.33	5.76	8.45	5.18	5.29	5.79
2022-10-20	5.33	5.77	8.38	5.17	5.29	5.79

Date	CAT Plant Discharge (°C)	CAT Plant Intake (°C)	EMD Plant Discharge (°C)	EMD Plant Intake (°C)	K Plant Discharge (°C)	K Plant Intake Temp. (°C)
2022-10-21	5.11	5.55	8.18	4.99	5.09	5.59
2022-10-22	4.77	5.20	7.80	4.62	4.74	5.23
2022-10-23	4.38	4.80	7.39	4.22	4.32	4.80
2022-10-24	4.14	4.56	7.18	3.99	4.11	4.59
2022-10-25	3.92	4.30	9.87	3.62	3.71	4.19
2022-10-26	3.33	3.74	6.78	3.20	3.11	3.59
2022-10-27	3.23	3.64	6.77	3.10	3.06	3.55
2022-10-28	2.75	3.16	5.78	2.62	2.54	2.69
2022-10-29	2.67	3.09	5.72	2.46	2.18	2.13
2022-10-30	2.51	2.93	5.46	2.25	2.01	1.97
2022-10-31	2.05	2.47	4.07	1.85	1.46	1.49
2022-11-01	3.21	1.73	6.85	1.36	1.15	1.33
2022-11-02	5.60	1.72	10.79	1.37	1.27	1.77
2022-11-03	3.48	1.87	11.65	1.36	1.25	1.73
2022-11-04	5.12	1.90	11.60	1.39	1.40	1.89
2022-11-05	1.53	1.91	10.37	1.42	1.44	1.92
2022-11-06	2.48	1.97	7.69	1.41	1.44	1.92
2022-11-07	1.54	1.94	3.74	1.39	1.42	1.90
2022-11-08	1.55	1.95	5.09	1.40	1.43	1.92
2022-11-09	1.58	1.97	5.75	1.43	1.46	1.96
2022-11-10	1.62	2.01	8.60	1.46	1.51	2.00
2022-11-11	1.62	2.02	6.67	1.49	1.49	1.98
2022-11-12	1.57	1.99	4.58	1.47	1.46	1.96
2022-11-13	1.60	2.01	6.27	1.48	1.54	2.04
2022-11-14	1.64	2.06	5.37	1.49	1.54	2.04
2022-11-15	1.66	2.07	6.75	1.52	1.55	2.05
2022-11-16	6.00	2.08	5.43	1.53	1.58	2.08
2022-11-17	8.54	2.14	4.07	1.55	1.58	2.08
2022-11-18	7.86	2.14	4.00	1.55	1.60	2.10
2022-11-19	7.88	2.16	4.25	1.57	1.59	2.09
2022-11-20	7.88	2.16	3.94	1.58	1.60	2.10
2022-11-21	8.01	2.20	4.39	1.61	1.61	2.11
2022-11-22	7.94	2.20	4.25	1.62	1.65	2.15

Date	CAT Plant Discharge (°C)	CAT Plant Intake (°C)	EMD Plant Discharge (°C)	EMD Plant Intake (°C)	K Plant Discharge (°C)	K Plant Intake Temp. (°C)
2022-11-23	7.98	2.20	5.27	1.64	1.65	2.14
2022-11-24	7.92	2.24	4.30	1.66	1.65	2.15
2022-11-25	7.78	2.25	4.11	1.66	1.68	2.18
2022-11-26	7.91	2.27	3.86	1.69	1.66	2.16
2022-11-27	7.84	2.29	4.23	1.69	1.69	2.18
2022-11-28	7.57	2.27	5.47	1.69	1.69	2.18
2022-11-29	5.22	2.24	8.37	1.70	1.72	2.20
2022-11-30	7.89	2.26	7.65	1.72	1.74	2.21
2022-12-01	8.11	2.32	8.04	1.76	3.48	2.24
2022-12-02	7.39	2.30	8.09	1.81	1.80	2.26
2022-12-03	6.62	2.34	9.10	1.81	1.84	2.33
2022-12-04	1.86	2.32	10.08	1.81	1.87	2.35
2022-12-05	2.25	2.40	12.98	1.90	1.91	2.39
2022-12-06	5.53	2.41	12.69	1.92	1.91	2.38
2022-12-07	7.86	2.48	11.25	1.94	1.97	2.44
2022-12-08	8.17	2.56	11.42	2.01	2.02	2.50
2022-12-09	5.94	2.61	10.07	2.04	2.08	2.56
2022-12-10	7.33	2.58	5.87	2.00	2.02	2.51
2022-12-11	9.89	2.60	6.83	2.02	1.99	2.47
2022-12-12	9.97	2.64	7.88	2.07	2.06	2.54
2022-12-13	10.16	2.62	7.82	2.04	2.02	2.51
2022-12-14	10.32	2.67	6.65	2.07	2.05	2.54
2022-12-15	10.35	2.67	8.20	2.08	2.06	2.55
2022-12-16	10.94	2.68	6.77	2.10	2.10	2.59
2022-12-17	9.94	2.67	8.65	2.12	2.11	2.59
2022-12-18	10.58	2.68	9.20	2.14	2.16	2.64
2022-12-19	13.10	2.73	6.87	2.17	2.15	2.63
2022-12-20	12.52	2.74	6.98	2.17	2.12	2.59
2022-12-21	9.30	2.76	9.13	2.20	2.17	2.64
2022-12-22	10.46	2.81	9.42	2.21	2.21	2.68
2022-12-23	10.99	2.83	10.60	2.26	2.22	2.69
2022-12-24	13.93	2.89	7.69	2.31	2.23	2.70
2022-12-25	8.53	2.86	8.47	2.27	2.20	2.68

Date	CAT Plant Discharge (°C)	CAT Plant Intake (°C)	EMD Plant Discharge (°C)	EMD Plant Intake (°C)	K Plant Discharge (°C)	K Plant Intake Temp. (°C)
2022-12-26	7.48	2.85	8.46	2.27	2.23	2.71
2022-12-27	7.57	2.87	8.63	2.28	2.27	2.75
2022-12-28	7.60	2.88	8.33	2.30	2.30	2.79
2022-12-29	7.50	2.88	6.07	2.28	2.30	2.80
2022-12-30	11.03	2.90	4.61	2.29	2.30	2.79
2022-12-31	14.38	2.90	2.64	2.29	2.29	2.78

# APPENDIX B – GROUNDWATER MONITORING REPORT