

Jackfish Lake 2021 Groundwater Monitoring Program Plan

April 28, 2021

Introduction:

On September 22, 2004 a diesel spill occurred at the Northwest Territories Power Corporation Jackfish Power Plant site in Yellowknife, NT. Remediation activities removed impacted material as much as possible, but as this is an active site, complete remediation was deemed inaccessible.

In October of 2004, a recovery well was established to remove any impacts in the groundwater. Throughout the continued monitoring and water treatment, a complete network of monitoring wells were installed throughout site and along the lake shore in order to ensure there was no migration of impacted groundwater. The recovery well was in operation until 2016, and monitoring of BTEX F1-F4 has continued until 2020.

Additional Water Licensing Requirements:

Stipulations in the water license (MV2019L1-0001) which was issued in 2019 dictate that a larger sampling set be collected for monitoring well JF01-06 in June and September each as outlined below. The results of this analysis will need to be submitted for the Jackfish Lake Annual Water License Report which is submitted before March 31 annually.

Table 1. 2021 Jackfish Lake Water Monitoring Sampling Schedule (June and September)

Well ID	Analysis							
	Field Parameters	BTEX F1-F4	Total Suspended Solids	Routine	Metals	Mercury	Oil and Grease	Dissolved Oxygen
PW1	X	X						
PW2	X	X						
PW3	X	X						
JF01-01	X	X						
JF01-02	X	X						
JF01-03	X	X						
JF01-04	X	X						
JF01-05	X	X						
JF01-06	X	X	X	X	X	X	X	X
MW1	X	X						
MW2	X	X						

MW3	X	X						
MW4	X	X						
MW5	X	X						
MW6	X	X						
MW7	X	X						
MW9	X	X						
MW10	X	X						

**Note: Some wells may be dry*

Table 2. 2021 Jackfish Lake JF01-06 Sampling Set (June and September)

Test	Container	Preservative
Routine: pH, EC, major ions, temperature	250 mL Plastic	None
Total Suspended Solids	250 mL Plastic	None
Oil and Grease	2x100 mL Amber Glass bottle	(1:1) HCL
BTEX F1-F4	2x40mL Glass Vials + 2x100mL Amber Glass Vial	Sodium Bisulfate (precharged)
Metals	80 mL HDPE	Nitric Acid (red)
Mercury	40 mL Glass Vial	Hydrochloric Acid
Dissolved Oxygen	250 mL Amber Glass Bottle	None

**Note: if JF01-06 is dry, select sampling location along lakeshore with adequate water*

Sampling and Reporting Requirements:

NTPC will follow industry best practices for the collection of the water samples, including but not limited to: purging 3-10x the well volume or up to 19L consistent with shallow groundwater monitoring wells prior to sampling, collecting field and trip blanks, wearing appropriate PPE, and handling samples using appropriate methods. Detailed field notes will be collected in order to ensure reporting consistency with the *2020 Standards for Reporting Water Quality Information in the NWT* (Appendix A).

Appendix A

Standards for Reporting Water Quality Information in the NWT



Standards for Reporting Water Quality Information in the NWT

December 2020

1.0 INTRODUCTION

In the Northwest Territories (NWT), project proponents are typically required to collect and report water quality monitoring information under the conditions of water licences. However, guidance concerning the specific information that should be presented when reporting has not been established. As a result, the specifics of water quality information posted to the Public Registries of the Land and Water Boards of the Mackenzie Valley (the Boards) may vary by proponent. This has resulted in challenges when attempting to combine information collected by different proponents, such as when trying to use this information to conduct regional assessments of water quality.

In recognition of these challenges, Environment and Natural Resources (ENR), Government of the Northwest Territories, initiated a project in 2016 to develop guidance for the reporting of water quality data. The goal of this project was to address the inconsistencies in water quality information submitted to the Boards and provide clear expectations to project proponents.

This project culminated in the development of these standards, which were subject to public review by government, industry and regulatory reviewers. These standards reflect reviewers' input and are intended to provide the Boards with consistency in water quality monitoring information submitted to them.

These standards will be applied by the following Boards:

- Mackenzie Valley Land and Water Board
- Gwich'in Land and Water Board
- Sahtu Land and Water Board
- Wek'èezhii Land and Water Board

1.1 The Need for Comparable Water Quality Data

Information on the water quality of lakes and rivers in the NWT is collected on a regular basis by industry, communities, academics and government researchers. This information represents a large source of potential knowledge that could inform decision makers about trends and natural variation in water quality.

The first step in being able to use this information to tell a story about the state and trend of water quality conditions in the NWT is to ensure that key aspects of how the data were collected and analyzed are reported. This information is known as metadata.

These standards are linked with other initiatives that are currently being undertaken to standardize northern water quality monitoring, such as the development of guidance regarding Aquatic Effects Monitoring Programs and Baseline Water Quality by ENR and the Boards.

2.0 REPORTING STANDARDS

These reporting standards have been developed based on existing metadata standards for the Mackenzie DataStream¹ and the Polar Data Catalogue², as well as guidance provided by ENR scientists and comments from government, industry and regulators.

The standards are split into two parts. The first part deals with the required metadata for the dataset— in other words, general information on the dataset as a whole. This information should be provided in a manner that avoids the risk of the metadata and dataset being separated. For example, the required metadata could be provided in the first tab of the dataset spreadsheet (see Appendix A for an example).

The second part of these standards identifies the minimum information required for each water quality sample collected. This information is required to assess the comparability and suitability of water quality datasets to address supplementary research and monitoring questions.

A specific format is not being prescribed when reporting water quality information, as long as all required information is present. However, it is imperative that all data should be presented in an accessible file type (i.e. csv or xls). Appendix A provides an example of how the information may be formatted in a spreadsheet and can be used by proponents if desired.

¹ www.mackenziedatastream.ca

² www.polardata.ca

Part 1: Required metadata for each dataset

To be provided with the dataset, ideally in the first tab of the dataset spreadsheet

Required metadata	Notes
Program Name	Provide the name of the monitoring program through which data was collected.
Program Description	Provide a short (1-3 sentences) description of the monitoring program, including the date of initiation, program purpose and location.
Keywords	Provide several keywords for the monitoring program, such as the location of the program and/or the type of activity.
Citation	Indicate how you would like the data to be cited if it is used by others. <i>Example format: Organization Name (Publication Year). Dataset Title. (Type of resource, i.e. "dataset").</i>
Contact information (Name, phone number, email)	Provide contact information that people can use to get in contact if they have questions about using or understanding the data.
Data Collection Organization	Provide the name of the organization and/or other parties responsible for collecting the data (community, Indigenous organization, proponent, government agency, academia).
Data Collection Information	Provide a summary of how data were collected, such as sampling methods, equipment, calibration, QA/QC protocols. <i>Example: A YSI probe (EXO2 Multiparameter Sonde) is used to collect data on physio-chemical parameters at all sampling locations (n=28). To assess additional chemical parameters, a 1-litre grab sample of water is collected from locations in each of two key wetland macro-habitats (open water, emergent vegetation). A small subsample is transferred immediately to a scintillation vial for isotope ($\delta^{18}O$ and δ^2H) analyses, with the remainder reserved for analyses of nutrients, major ions, and trace metals. Monitoring activities follow the Healthy Waters Quality Assurance (QA) Project Plan.¹</i>
Data Disclaimer	Provide any data disclaimer statements regarding the use of the dataset.

¹ Example taken from Mackenzie DataStream guidelines

Part 2: Reporting requirements for each sample

Sampling Reporting Requirements	Notes
Sample ID / Unique identifier	A code which identifies the sample that was collected. No other sample should share this code.
Sample Location	Site name (if used)
Geographic coordinates	Provided in decimal degrees (dd.dddddd)
Geodetic datum	Provided in NAD83
Sample date	Provided in YYYY-MM-DD format
Sample method	Select from: grab sample, composite sample, or depth integrated.
Sample matrix	Select from: river, groundwater, lake water, pond water, mine water, seepage water, treated water, snow, sediment, suspended sediment, leachate, blank water, or other. If other, explain in Comments.
Sample type	Select from: discrete, replicate, field blank, travel blank, equipment blank, field spike, lab blank, filter blank, split sample, or unspecified.
Sample depth	Provided in meters.
Lab used	Laboratory that undertook analysis
Lab analysis date	Provided in YYYY-MM-DD format.
Lab analytical method	
Comments <i>(Optional)</i>	Note anything unusual about the location or the sampling procedure (e.g. hit bottom with sampler and disturbed sediments).
Parameter names	
Detection limit	For each parameter tested
Units	For each parameter tested

APPENDIX A: Example of Water Quality Sample Metadata Template

Part 1 - Dataset Metadata Sample Template	
Program Name	
Program Description	
Keywords	
Citation	
Contact information	
Data Collection Organization	
Data Collection Information	
Data Disclaimer	

Part 2 - Dataset Sample Template (to be used in a spreadsheet)			
Sample ID			
Sample Location			
Latitude			
Longitude			
Geodetic Datum			
Sample Date			
Sampling Method			
Matrix			
Sample Type			
Sample Depth (m)			
Parameter Name			
Detection Limit			
Units			
Lab Used			
Lab Analysis Date			
Lab Analytical Method			
Comments			

**Add rows and columns as needed*