

Hydro-electric Development Questionnaire to Accompany Water License Applications to the Mackenzie Valley Land and Water Board



Mackenzie Valley Land and Water Board
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*Regulating the use of land and waters and
the deposit of waste, and enabling residents to
participate in the management of resources to
provide optimum benefit to the residents of the
settlement areas and of the Mackenzie Valley
and to all Canadians.*

June 2020

Hydro Electric Development questionnaire

The purpose of this questionnaire is to solicit supplemental information from an applicant to support his/her application for a water licence (or renewal). It is anticipated that the completion of this questionnaire will reduce delays arising from the Board having to solicit additional information after an application has already been submitted. This information will also be useful during the pre-screening of your application, which must be undertaken prior to development and approval of a water licence to determine if the project needs to be referred to the Mackenzie Valley Environmental Impact Review Board.

The applicant should complete the questionnaire to the best of his/her ability, recognizing that some questions may not be relevant to the project under consideration. For questions that do not relate to his/her operation, the applicant is requested to indicate "N/A" (Not Applicable).

If any questions arise while completing the questionnaire, the applicant may wish to contact the Mackenzie Valley Land and Water Board at (867) 669-0506.

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PLEASE PRINT OR TYPE YOUR RESPONSES

NOTES:

If space is insufficient for any of the responses on this questionnaire, use the back of the sheet or an attachment.

A number of sections in the questionnaire solicit information on water quality and waste management which must be provided in accordance with specific policies and guidelines: the Board's *Water and Effluent Quality Management Policy*; the Board's *Guidelines for Developing a Waste Management Plan*; and INAC's *Guidelines for Spill Contingency Planning*. The Board's policies and guidelines are accessible at www.mvlwb.com or by calling the Board. INAC's *Guidelines for Spill Contingency Planning* are available at <http://www.ainc-inac.gc.ca/ai/scr/nt/pdf/SCP-EUD-eng.pdf>. Please provide separate plans and/or reports to address these information requirements as part of the completed application package. Reference the relevant title(s) of the plans and/or reports in the body of the questionnaire.

SECTION 1 – GENERAL

Date: **July 3 2020**

1.1 Applicant **Northwest Territories Power Corporation 867.874.5223**
4 Capital Drive, Hay River, NT, X0E 1G2

Property Name: **Bluefish Hydro**

Closest Community: **Yellowknife, NT**

Latitude/Longitude: **62.40N/-114.15W**

1.2 Environmental Contact: **Matthew Miller**
Senior Environmental Licensing Specialist
(867) 874-5314

1.3 Attach two detailed maps identifying the project site in relation to local geographical features. Maps should be drawn at a scale of 1:50, 000.

Map 1 – Showing the location of the Site in relation to neighbouring roads, lands, and waterbodies, including:

- Lake, stream and river locations, including but not limited to the tertiary watershed boundary in which proposed project is found, and location of property boundaries.

Map 2 – Map of the proposed project, this should include:

- Location of powerhouses, dams, water conduits, water impoundments and other works and structures as applicable to the proposed project;
- Area to be flooded, if any, by the proposed project;

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- Access road location to the project site, and;
- Anticipated transmission line route from Site to grid.

SECTION 2 –STREAM FLOW INFORMATION

2.1 Provide the following Stream Flow information:

Maximum Annual Flow (m³/s):

Maximum Annual Flow (highest daily-averaged flow for a given year) typically occurs in July but can occurred throughout a given year. The highest Maximum Annual Flow on record is 185 m³/s on June 30, 1991.

The average of Maximum Annual Flows for the years on record is 58 m³/s.

Minimum Annual Flow (m³/s):

Minimum Annual Flow (lowest daily-averaged flow for a given year) typically occurs in April but can occur throughout a given year. The lowest Minimum Annual Flow on record, excluding records flagged as 'Estimated' by Water Survey of Canada is 1.6 m³/s September 23, 1981.

The average of Minimum Annual Flows for the years on record, excluding 'Estimated' record is 14 m³/s.

Mean Annual Flow (m³/s):

Mean Annual Flow is the mean of daily-averaged flows for a given year. The average of Mean Annual Flow for all complete years on record is 29 m³/s.

Source of Stream Flow information (gauge number):

Yellowknife River at the Inlet to Prosperous Lake (07SB003)

Length of Published Stream Flow Record:

63 years with complete record (1942-1970, 1972-1975, 1978-1981, 1989-2000, 2002-2010, 2013-2017)

8 years with partial record (1939-1941, 1976-1977, 1988, 2001, 2011)

Estimate the peak instantaneous 100, 20 and 2 year flood:

Return Period (years)	Peak Instantaneous Discharge (m ³ /s)
2	57
20	128
100	167

Provide methodology for calculation. If more space is required, please attach a separate sheet.

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The source of all the above stream flow information was published publicly available data from Water Survey of Canada gauge station 07SB003. As the station is directly downstream of the generating facility, hydrometric data for the Yellowknife River at Inlet to Prosperous Lake station (07SB003) operated by Environment Canada is the most applicable for the project site.

The maximum annual stream flow was determined by selecting the greatest of all the maximum annual daily stream flows over the period of record published at the time of the application. Similarly, the minimum annual stream flow was determined by selecting the least of all the minimum annual daily stream flows over the available period of record, after screening out values that are flagged as estimated by Water Survey of Canada. The mean annual stream flow was calculated by taking the average of all the mean annual stream flows for years with no gaps in published data.

The peak instantaneous floods were estimated by performing a frequency analysis using a purpose-developed statistics calculator developed in Microsoft Excel. At the time of the application, the Yellowknife River at Inlet to Prosperous Lake station had 69 years of maximum daily stream flow records (highest daily-averaged stream flow for year), 28 years of maximum instantaneous stream flow records (highest stream flow recorded any instant in time for year) and 28 years where both maximum daily stream flow and maximum instantaneous stream flow were recorded. To fill gaps in available peak stream flow data, stream flow records in the form of maximum daily stream flow were converted to instantaneous peak stream flow by the averaged ratio of maximum instantaneous to daily maximum flow ratio of 1.11 (n=28). The mean values of the peak instantaneous floods were calculated using a Weibull distribution which provided the best fit to the data.

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SECTION 3 – POWER PRODUCTION

3.1 Type of Project – Please check appropriate boxes:

*a) Peaking	*b) Intermediate ✓	*c) Run-of-River	*d) Pumped Storage
*e) Attended ✓	*f) Unattended	*g) Interconnected ✓	*h) Embedded Energy

*a) Peaking: Inflows can be stored and then released at peak energy demands

*b) Intermediate: Run of River facility with peaking capabilities

*c) Run-of-River: Little or no upstream storage capacity

*d) Pumped Storage: Water pumped to storage reservoir, usually during off-peak periods

*e) Attended: Individual on site to operate

*f) Unattended: Remotely accessed (e.g. operated by a computer)

** Energy production expected in an average year of flow

*g) Interconnected: Requires connection to the grid

*h) Embedded Energy: Local distribution - energy for off-grid use

3.2 Describe Type of Operation Strategy, including river and reservoir management:
(if any)

See Bluefish Hydro Water Management and Reservoir Operating Plan – December 2018

3.3 Capacity:

(a) Estimate Project Site Capacity G1 = 4.0 MW G2 = 3.5 MW	(b) Estimate Average Annual Production* _____ GWH	(c) Firm Capacity 7.5 MW according to the generator capacity ratings. However due to the penstock limitations the maximum output is limited to 6MW total combined output
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3.4 Head:

(a) Natural Head _____(m)	(b) Proposed Developable Head 33.3 (m) (2008)
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3.5 Drainage Area

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(a) Drainage Area	(b) Area to be flooded
11,655 km ²	

3.6 Conceptual Design Flow Rate 55 m/s³

SECTION 4 – ENVIRONMENTAL MONITORING PROGRAM

4.1 Has any baseline data been collected for the main waterbodies in the area prior to development?

Yes. See the Environmental Impact Summary for the Bluefish Hydroelectric Facility, provided with this application.

4.2 If “Yes”, include all data gathered on the physical, biotic and chemical characteristics at each sampling location. Identify sampling locations on a map.

Reports are available on the public registry for MV2005L4-0008, and other reports described in the Environmental Impact Summary.

4.3 Provide an inventory of hazardous materials on the property and storage locations. (attach separate map)

See the Hazardous Materials Management Plan and Waste Management Plan provided with this application.

4.4 Attach the present or proposed contingency plan which describes course of action, mitigative measures and equipment available for use in the event of system failures and spills of hazardous materials.

See attached Spill Contingency Plan and Emergency Preparedness Plan.

4.5 If applicable, provide a brief overview of the conceptual abandonment and restoration plan for the site.

See Conceptual Abandonment and Restoration Plan attached.

SECTION 5 – PRESCREENING

In addition to providing sufficient technical and related information for licensing to proceed, applicants must provide adequate descriptive information to ensure that an initial pre-screening decision can be made prior to a project proceeding for regulatory approvals.

Your application and other project details, such as this questionnaire, will be sent out for review to First Nations, local aboriginal groups, communities, and territorial and federal government agencies. Their comments (e.g., regarding the significance of project impacts) are considered before a decision is made to allow the project to proceed.

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- 5.1 Has this project ever undergone an initial environmental review, including previous owners?

See the Environmental Screening Report provided with this application.

By whom/when:

Indian and Northern Affairs Canada, NWT Region, conducted an environmental screening (pursuant to Section 5 of the Canadian Environmental Assessment Act) of the Bluefish hydro plant on 30 August 1995.

Further, the Project is exempt from preliminary screening under section 157.1 of the MVRMA (see previous decision at <http://registry.mvlwb.ca/Documents/MV2005L4-0008/MV2005L4-0008-%20Staff%20Report%20-%20PS%20Exemption%20under%20s157.1-Sept05.pdf>)

- 5.2 Has any baseline data collection and evaluation been undertaken with respect to the various biophysical components of the environment potentially affected by the project (e.g., wildlife, soils, air quality), in addition to water related information requested in this questionnaire?

Yes. See the Environmental Screening Report provided with this application.

- 5.3 Has any meteorological data been collected at or near the site? (e.g., precipitation, evaporation, snow, wind)

Yes

- 5.4 If "Yes", please include data and attach copies of reports or cite titles, authors and dates.

The Yellowknife Hydro weather station is operated by Canada at Bluefish Hydro. Station ID 2204200. Data is available at

https://climate.weather.gc.ca/historical_data/search_historic_data_e.html

- 5.5 If "No", are such studies being planned? Briefly describe the proposals.

- 5.6 Has authorization been obtained or sought from the Department of Fisheries and Oceans for proposed project activities?

Yes. Fisheries Act Authorization 09-HCAA-CA-00079-2 was issued for construction and operation of the new dam at Bluefish Hydro.

- 5.7 Has a socio-economic impact assessment or evaluation of this project been undertaken? (This would include a review of any public concerns, land, water and cultural uses of the area, compensation, local employment opportunities, etc.)

No

- 5.9 If "Yes", please describe the proposal briefly.

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5.14 If "No", are such studies being planned? Briefly describe the proposals.

Engagement with the Yellowknives Dene First Nation and other local land users are on-going, as described in the Engagement Plan.

5.16 Has authorization been obtained or sought from the Department of Fisheries and Oceans for dewatering or using any waterbodies for containment of waste?

Not applicable

5.17 Please attach an outline briefly describing any options or alternatives considered or rejected for the various mine components outlined in this questionnaire (e.g., mill site, water supply sources, locations for ore and waste piles).

Not applicable.

SECTION 6 – LIST OF ATTACHMENTS

Other documents submitted with this application are listed in the water licence application cover letter.

Prepared by: **Matthew Miller**

Title: **Senior Environmental Licensing Specialist**

Completion Date: **July 3 2020**