NORTHWEST TERRITORIES POWER CORPORATION
Empowering Communities

Health, Safety, & Environment, 4 Capital Drive, Hay River, NT X0E 1G2

June 2023

Mason Mantla
Chair
Wek'èezhìı Land and Water Board
#1-4905 48th St. | Yellowknife, NT | X1A 3S3

Snare Hydroelectric Facility- Type A Water Licence Renewal

The Northwest Territories Power Corporation (NTPC) owns and operates the Snare Hydroelectric Facility located on the Snare River, approximately 145 km northwest of Yellowknife, NT. The facility includes four hydroelectric generating stations that provide power to the North Slave communities of Yellowknife, Behchokǫ̀, Dettah and N'Dilo along with the power generated by the Bluefish Hydroelectric Facility. Back up and supplemental power is provided by the Jackfish Lake Generating Station.

There are currently two Type A Water Licences from the Wek'èezhìi Land and Water Board (WLWB) that regulate the facility for the purposes of storage and diversion of water for hydroelectric purposes:

- N1L4-0150
    - Regulates the operation of the Snare Rapids, Snare Falls and Snare Forks facilities which are all owned and operated by NTPC
    - Issued May 30, 1999
    - Expires May 29, 2024
- W2014L4-0004
    - Regulates the operation of the Snare Cascades facility which is owned by the Dogrib Power Corporation (DPC) and operated and maintained by NTPC
    - Issued September 5, 2014
    - Expires May 29, 2024

Throughout 2022 and early 2023 NTPC has prepared a water licence renewal application to renew N1L4-0150 and W2014L4-0004, to maintain compliance with the Mackenzie Valley Resource Management Act, the Waters Act and other environmental legislation for the operation of the hydro facility.

NTPC and DPC propose to combine the two licences into a single licence that will regulate all four hydroelectric generating stations and associated infrastructure. This approach was determined by NTPC and DPC to be more efficient as it will reduce the costs and simplify

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water licence compliance by combining all reporting and regulatory submissions. NTPC holds all the regulatory legal liability through the agreement between NTPC and DPC so having two separate licences is not legally required. DPC has provided a letter of support for this approach, included in Appendix A.

NTPC holds a site-wide Tłı̨chǫ Quarry Permit and Access Agreement for Snare Hydro with the Tłı̨chǫ Government and a site-wide Type A Land Use Permit (W2021Q0011) with the WLWB for all land use activities at the Snare Hydroelectric Facility.

NTPC considers the application to be exempt from preliminary screening, on the grounds that screening has already been completed, and as no modifications to the Facilities and only very minor changes to operations (i.e., lower water levels at Big Spruce Reservoir and Snare Falls to reflect operational realities) are proposed with this application. Details of previous screenings and previous exemptions to minimum water levels are provided in the Water Licence Application Form.

There are no plans to alter the operating parameters for the Snare Hydroelectric facility so for efficiency for the WLWB and NTPC the requested licence term is 39 years. This term is timed to expire one year after the lease agreement with Dogrib Power for Snare Cascades. This will allow NTPC and DPC to adjust the next water licence with the updated terms of the new lease agreement. DPC is also in support of this term length as presented in the letter of support in Appendix A. If any large operational changes occur during this period that are outside the scope of the current licence a water licence amendment will be triggered which will capture the changes moving forward after approval by the Board.

The Snare Hydroelectric Water Licence application package includes the following documents:

1. Snare Hydro- Water Licence Application Form
2. Snare Hydro- Type A Water Licence Renewal- Figures and Lands
3. Snare Hydro – Draft Type A Water Licence Conditions
4. Snare Hydro- Water Licence- Engagement Plan
5. Snare Hydro- Water Licence - Engagement Log
6. Snare Hydro- Water Licence- Operations, Maintenance and Surveillance Manual
7. Snare Hydro- Spill Contingency Plan
8. Snare Hydro- Waste Management Plan
9. Snare Hydro-Water Licence- Conceptual Closure and Reclamation Plan

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10. Snare Hydro- Emergency Preparedness Plan
11. Snare Hydro- Public Safety and Awareness Plan
12. Snare Hydro- Environmental Studies Summary and Screening-Level Environmental Assessment
13. Snare Hydro Dam Safety Overview
14. NTPC Dam Safety Program
15. NTPC Dam Seepage Monitoring Program

Conformity tables for the Spill Contingency, Waste Management, Emergency and Preparedness and Closure and Reclamation Plan are included in Appendix B.

The full application package has been uploaded as an FTP submission on the Online Review System for the WLWB. If you have any questions regarding this application or if there is any further information we can provide, please contact me at mmiller@ntpc.com. We very much appreciate the support and collaboration of the WLWB throughout the process to date to look forward to working with the WLWB team during the next steps in the water licence application process.

Sincerely,

Matthew Miller, M.Sc., P.Eng.
Senior Environmental Licensing Specialist
Northwest Territories Power Corporation

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Health, Safety, & Environment, 4 Capital Drive, Hay River, NT X0E 1G2

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Appendix A- DPC Letter of Support

TŁĮCHǪ
Dogrib Power Corporation

100 Borden Dr., Unit 25, PO Box 1567, Yellowknife, NT X1A 2P2

Phone 867-766-4909 Fax 867-766-4919

June 17, 2023

Wek'èezhìi Land and Water Board
#1 – 4905 48th St.
Yellowknife, NT
X0E 1W0

Re: NTPC Application for a Combined Water Licence (W2014L4-0001) at Snare Cascades

To Whom It May Concern:

Northwest Territories Power Corporation (NTPC) has approached Dogrib Power Corporation (DPC) in requesting a letter of support for NTPC's application for a single water licence for the entire Snare Hydro Facility (SHF) during the renewal process.

Since DPC has ownership of the Snare Cascades Facility, a discussion has occurred between NTPC, DPC and the Tłįchǫ Government to ensure there are no issues with such an application. Since NTPC is the operator for the facility and takes responsibility the water licence, the application is agreeable to DPC.

I am confirming that DPC has no issue with NTPC applying for a single water license for the Snare Hydro Facility. Nor does DPC have an issue with NTPC requesting a 39-year term for the requested license.

If there are any issues or questions regarding this letter of support, please contact me.

Sincerely,

Mark Brajer, MBA, P. Eng, ICD.D
Chief Executive Officer
Tłįchǫ Investment Corporation

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Appendix B- Conformance Tables

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Spill Contingency Plan Conformity Table

Showing conformity for the Spill Contingency Plan Version 6.0 with the WLWB Reasons for Decision for Spill Contingency Plan Version 5.0, Licence N1L4-0150, dated 18 May 2023.

SCP Revision	Revised Section(s)	Description of Revision
1	5.6.1	Clarified that water collected during spill cleanup will be managed as a hazardous waste.
2	N/A	• This version contains no references to Tłı̨chǫ Government, or Department of Culture and Lands Protection. Table 5 updated to refer to Behchokǫ̀. • Changed method of submitting Spill Reports from fax to email and phone. • Estimate of camp water use is no longer included in this document, as it is not relevant to a Spill Contingency Plan.
	1.1	• Updated to clarify that a permit was issued in 2021 to consolidate former permits.
	1.2	• Spelling of Protection corrected.
	Table 5	• Reference to Emergency Management Organization corrected.

Waste Management Plan Conformity Table

Showing Conformity of the Waste Management Plan Version 5.0 with the WLWB Reasons for Decision for Waste Management Plan Version 4.0, Licence N1L4-0150, dated 18 May 2023.

WMP Revision	Revised Section(s)	Description of Revision
1	1.12.6.2	Updated to include reference to the GNWT Quarry Sampling and Testing Guidance for the Identification of Acid Rock Drainage and Metal Leaching Potential.
2	Appendix C	Incinerator Operation Manual added, specific to the make and model used.
3	1.5.2	Added reference to the GNWT Guideline for Hazardous Waste Management (2017) and Guidelines for the Planning, Design, Operations and Maintenance of Modified Solid Waste Sites in the NWT (2003).
4	-	Rather than update the Glossary to reflect GNWT comments, it was removed as it is not a requirement of the Guidelines for Developing a Waste Management Plan.
5	Various	• This version contains no references to Tłı̨chǫ Government, Behchokǫ̀, Department of Culture and Lands Protection. • This version contains no references to the GNWT Department of Environment and Climate Change. Citations to documents prepared by the Department of Environment and Natural Resources remain as such. • Estimate of camp water use and the number of possible temporary camp locations is no longer included in this document, as it is not relevant to a Waste Management Plan. • The term 'Life Cycle Management' no longer occurs in this document, as the document focusses on waste streams rather than the delivery and on-site handling stages.
	1.1	• Updated to clarify that a permit was issued in 2021 to consolidate former permits.
	Appendix B	• Waste Management Standard Operating Procedure updated to reflect that organics should not be burnt.

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Health, Safety, & Environment, 4 Capital Drive, Hay River, NT X0E 1G2

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Emergency Preparedness Plan Conformity Table

Showing Conformity of the Emergency Preparedness Plan Version 9.0 with the WLWB Reasons for Decision for Emergency Preparedness Plan Version 8.0, Licence N1L4-0150, dated 18 May 2023.

EPP Revision	Revised Section(s)	Description of Revision
1	1.2, 4.5 and 4.9	• Revised to update contact and reference information for Tłı̨chǫ Government and Behchokǫ̀.
	1.2	• Updated to include the NWT Spill Report Line. • Corrected reference the GNWT Emergency Measure Organization.
	4.5.2,	• Corrected to remove the reference to elevation 175.56 being the water licence limit.
	4.9.2	• Updated to clarify that the water licence elevation is 217.9 metres.
	4.9.3	• Updated to remove the statement '…to apply to the Water Board for special exemption to cease Falls dam releases...'
	4.9.5	• Updated to clarify that Licence N1L4-0150 does not regulate releases or outflows.

Operations, Maintenance and Surveillance Manual Conformity Table

Showing Conformity of the Operations, Maintenance and Surveillance Manual Version 3.0 with the 18 May 2023 WLWB Reasons for Decision on the OMSM Version 2.0, water licence W2014L4-0001.

OMSM Revision	Revised Section(s)	Description of Revision
1	2.6	• Added information on normal operations with information regarding operating duties and authorities, identification of downstream users, staffing and time requirements and stakeholder communication protocols, for alignment with Section 3.4.3 of the Dam Safety Association Guideline, as per WLWB Comment #6
	2.7	• Added information on flood operations with information on flood operating procedures for alignment with Section 3.4.3 of the Dam Safety Association Guidelines, as per WLWB Comment #7
	2.8	• Added information regarding emergency operations, including loss of flow control equipment, sceniarios that would activate the emergency plan, and authority of operating staff, for alignment with Section 3.4.3 of the Dam Safety Association Guidelines, as per WLWB Comment #8
	4.1.1	• Revised to cite the monthly dam inspection forms that would detect cracks in concrete, in response to WLWB Comment#9
	4.4	• Updated text in response to WLWB comment 11 regarding current instrumentation on Snare dams and error in NTPC ORS response
2	Appendix B	• Conformity table added to show conformity with the Canadian Dam Association Guidelines recommendations for contents of an Operations Maintenance and Surveillance Manual (Table 3-1 of the Guidelines), as per WLWB Revision #2
3	4.3.1	• Updated with reference to WLWB approval for 7 year dam inspection cycle, as per WLWB Comment#10 and Revision #3
4	Figures 6-10 and 6-11	• Tables of example inflows from Bigspruce Reservoir replaced with charts showing low, normal and high inflows from Bigspruce Reservoir
5	1.1.2.5	• Corrected licence number for Snare Cascades, as per the WLWB Comment #1
	1.1.3	• Added dam classification from 2018 Dam Safety Review, as per WLWB Comment #2

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	1.1.3.1	• Updated seismic hazard values, as per WLWB Comment #3
	2.2.4.9	• Drawing number added, as per WLWB Comment #4
	5.1	• GNWT Emergency Management Organization phone number included, as per GNWT-ENR Comment #1
	2.8.3	• GNWT Emergency Management Organization phone number included, as per GNWT-ENR Comment #1

Closure and Reclamation Plan Conformity Table

Showing Conformity of the Closure and Reclamation Plan Version 2.0 with Schedule 3 of the draft Licence conditions submitted with this application.

Item	Condition	Section CRP
1.	The Closure and Reclamation Plan referred to in Part I, Condition 1 of this Licence shall include, but not be limited to the following information:	
	a. A plain language summary of the Plan;	ii
	b. A description of the overall goals for Closure and Reclamation of the Project, including expected future land use;	1.3
	c. A description of the Closure and Reclamation planning team;	To be provided in a final CRP
	d. A description of engagement related to Closure and Reclamation planning, including a summary of completed and planned engagement, and links to the Engagement Plan referred to in Part B, Condition 19 for the Project;	1.5
	e. A list of any other regulatory authorizations required for Closure and Reclamation of the Project;	1.6
	f. A description of the pre-existing and current Project environment, including, but not limited to: i. climatic conditions; ii. physical conditions; iii. chemical conditions; iv. biological conditions; v. any physical or chemical assessments of soil, water, and permafrost; and vi. traditional uses.	2.0
	g. A description of the Project, including, but not limited to: i. site history; ii. Project development; iii. current status of the Project; iv. maps delineating all disturbed areas, borrow material locations, site facilities, hydrological features, and elevation contours; and v. photographs.	3.0
	h. A description of each Project component, including, but not limited to: i. Power generation facilities; ii. Dams; iii. Spillways; iv. Roads and airstrips; v. Accommodation buildings and other buildings; vi. areas affected by spills or Unauthorized Discharges; and vii. other areas affected by Project activities.	3.2 to 3.7
	i. A description of any planned Progressive Reclamation;	4.0

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	j.A plan for Temporary Closure, including, but not limited to the following information: i.Temporary Closure goals and objectives; ii.a description of activities and methods; iii.a description of monitoring, maintenance, and reporting; iv.contingencies; and v.an implementation schedule.	5.0
	k.An implementation schedule that includes Progressive Reclamation and final Closure and Reclamation activities	5.5

NORTHWEST TERRITORIES POWER CORPORATION

Empowering Communities

SNARE HYDRO

Emergency Preparedness Plan

2023

Revision History Table

WLWB Version #	Date Received by WLWB	NTPC Revision #	Revised Sections	Description of Revision	Prepared by	Issue Date
1.0	9-Mar-00	-	-	-	-	-
2.0	10-Feb-06	-	-	-	-	-
	16-Feb-07	-	-	-	-	-
	25-Apr-07	-	-	Updated agency names and phone numbers	-	-
	9-Aug-07	-	-	Updated telephone numbers and agency names	-	-
3.0	19-Nov-13	1	1.2, 11	Contact information update and addition of Snare Dyke Breach Report	NTPC	Nov-13
3.1	12-Feb-14	1	1 and 4	Updates based on points 3-6 from January 17, 2014 directive from WLWB	David Dewar	12-Feb-14
		1	8.0, 6.1	Added external agencies to distribution list and added AANDC and DFO to contacts	David Dewar	Feb-14
		2	1.2, 7.0, 8.0, Document History, 4.9	Updates per WLWB Board Directive January 17, 2014	David Dewar	Feb-14
	18-Jan-16	2	1 and 7	Updates based on *Snare Hydroelectric System Dam Break and Flood Study Report (2015)*	Colin Steed	18-Jan-16
7.0	18-Jul-16	3	1, 4 and 7	Ensure all updates from previous versions are present, all points from January 17, 2014 directive from WLWB are completed and addition of Forest Fire section	Matthew Miller	18-Jul-16
		4	1	Updated Environment Canada contact number	Matthew Miller	27-Jul-16

8.0	12-Apr-22	5	6.2	Updated Telecommunication Information	Bryan Brazeau	13-Oct-16
		6	3.2, 4.8	Updated Dam Class, seepage areas.	Jamie Tennant	15-Mar-21
		7	All	Updated contact info, communication flowchart.	Travis Perkins	18-Mar-21
	26-Sept-22	8	Appendix C	Updates to Document History Table. Addition of Appendix C to include Conformance Table	Patrick Smith	26-Sept-22
	20-Oct-22	8.1	4.1.3, Appendix C	Updates to Document History Table. Removed reference to Figure 2-1 in Section 4.1.3, and corrected section references in Conformance Table C-1	Patrick Smith	20-Oct-22
		8.2	1.2, 4.11, 6.1, Appendix A	Updated contact info, added table in Appendix A to document future EPP testing, revisions to Surveillance / Public Facilities sections, minor formatting/editing.	Jamie Tennant	7-Mar-23
		8.3	1.2, 4.5, 4.9	Revised to address comments from public review by Wek'èezhìı Land and Water Board.	Jamie Tennant	2-May-23
9.0	July 2023	8.4	4.9.5	Revised to address comments from public review by Wek'èezhìı Land and Water Board. Version submitted with Water Licence application	WSP	7 July 2023
			Throughout	Updated references from GNWT-ENR to GNWT ECCC Updated contact information	WSP	7 July 2023

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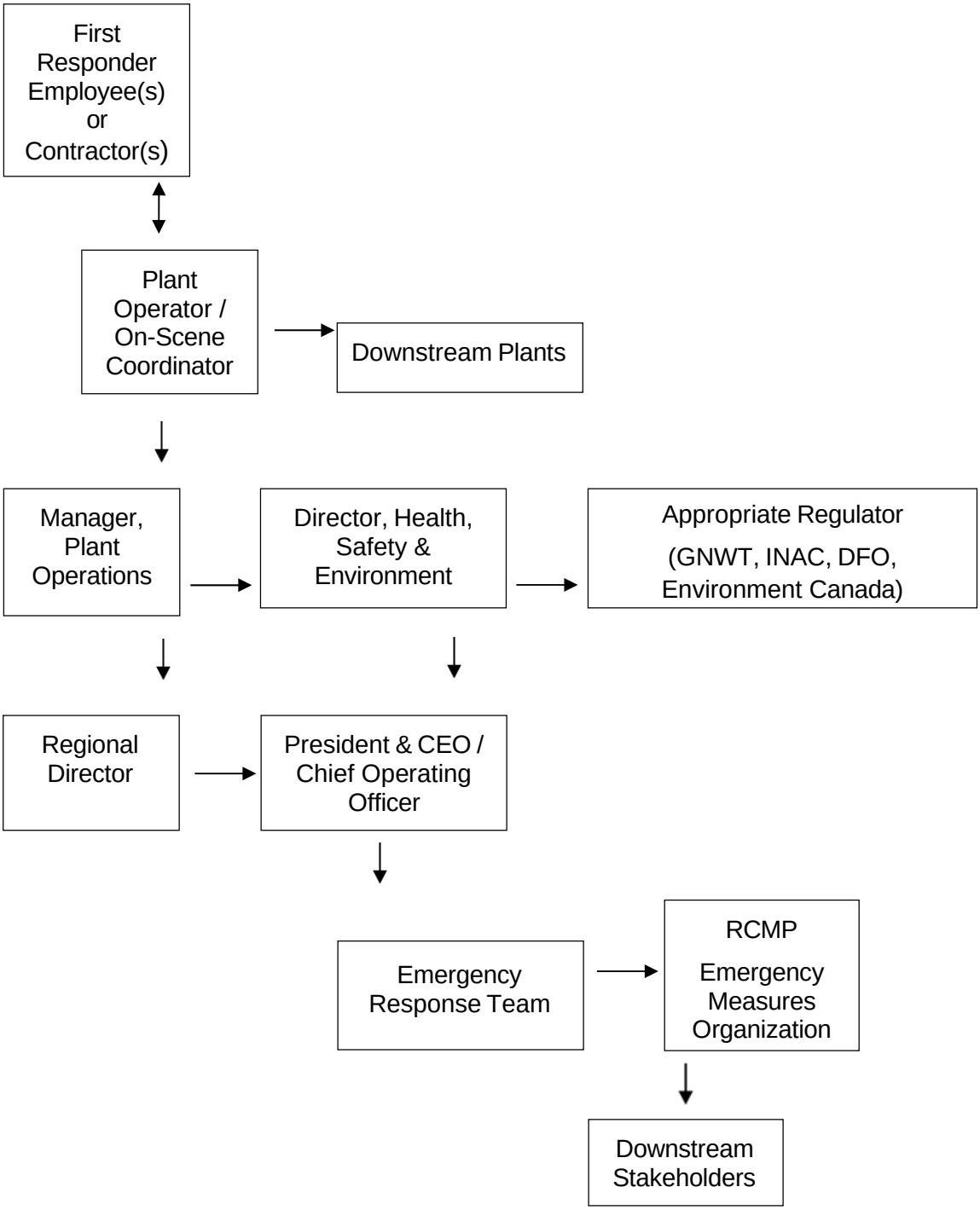
LIST OF APPENDICES

1 EMERGENCY NOTIFICATION

1.1 EMERGENCY NOTIFICATION FLOWCHART ORGANIZATIONAL COMMUNICATION PLAN



If any individual cannot contact the next person on the list that position should be skipped and immediately go to the next position.

1.2 EMERGENCY NOTIFICATION INFORMATION

1.2.1 Calls That Must Be Made

1) On Site Personnel / Control Center Operator shall report to:

Manager, System Control – Eileen Hendry	867-669-3301 (w) 867-444-1170 (cell)
Manager, Plant Operations – Anthony Spink	867-669-3312 (w) 867-222-2312(cell)
Manager, Mechanical Services – Sergio Catlyn	867-669-6881 (w) 867-445-3389 (cell)
Director, Hydro Operations – Dean Hendrickson	867-669-3313 (w) 867-445-3811 (cell)

2) Regional Director shall report to the following:

President & CEO – Cory Strang	867-874-5217 (w) 867-875-8850 (cell)
Director, Health, Safety, and Environment – Dave Dewar	867-874-5268 (w) 867-875-0037 (cell)
Chief Operating Officer - Belinda Whitford	867-669-3303 (w) 867-875-8920 (cell)

3) Local Agencies (Yellowknife):

Emergency Contact	9-1-1
Fire Department/Ambulance	867-873-2222
Hospital	867-669-4111
RCMP	867-669-1111
City Hall	867-920-5600
Public Works	867-920-5670
Public Works (After Hours Emergency)	867-920-5699
NWT 24hr Spill Report Line	867-920-8130

4) Downstream Water Users:

RCMP – Behchokǫ̀	867-392-1111
Behchokǫ̀	867-392-6500
Chief Clifford Daniels – Behchokǫ̀	867-392-6385
Behchokǫ̀ Community Government	867-392-6561
Department of Culture & Lands Protection, Tłı̨chǫ Government	866-540-7668

Other important phone numbers:

GNWT Emergency Management Organization	867.920.2303
GNWT Department of Environment and Climate Change (ECC) North Slave Region Duty Officer	867.920.6115
GNWT ECC Water Division	867.873.7184
Environment and Climate Change Canada	867.669.4729
Department of Oceans and Fisheries	867.669.4729

1.3 EMERGENCY PREPAREDNESS PLAN DISTRIBUTION LIST

Once approved by the board hard copies of this emergency preparedness plan will be printed out and available at:

- Snare Rapids Plant
- Snare Falls Plant
- Snare Cascades Plant
- Snare Forks Plant
- Snare Airstrip
- Snare Operators Camp
- Operations Control Room in Yellowknife

A copy of the plan will also be available on NTPC Intranet system which is available to all employees.

A copy of the plan will also be forwarded internally to all Operations and Health, safety, and Environment staff.

Externally this plan will be forwarded to:

- Behchokǫ̀
- Department of Culture & Lands Protection, Tłı̨chǫ Government
- GNWT ECC North Slave Region

2 STATEMENT OF PURPOSE

2.1 PURPOSE

This Emergency Preparedness Plan (EPP) has been prepared to assist NTPC personnel, the Territorial Emergency Coordinating Committee, the RCMP, and other responsible local and regional officials in responding swiftly and effectively to emergencies at the four Snare River Dams. It facilitates efficient mobilization of NTPC manpower and equipment to deal with any developing emergency condition. It allows the non-NTPC emergency officials to establish timely warning procedures for the protection and security of property downstream.

This document is the Emergency Preparedness Plan for all the NTPC hydro facilities - Snare Rapids, Snare Falls, and Snare Forks. Snare Cascades, although under a separate water license held by the Dogrib Power Corporation, is included due to location and for completeness. Rather than producing nearly identical EPPs for each dam, the differences in EPP for each dam are clearly noted where necessary in sections 3.1 (Dam Locations) and 7.0 (Inundation mapping).

Inclusion in the EPP of procedures dealing with the safety of the dam itself does not in any way reflect upon the integrity of the dam.

2.2 SCOPE

The EPP sets out initial instructions for the Hydro Region Director (HRD) and his staff to follow during emergencies at the dam. It describes:

- Initial actions and observations to be taken;
- Organizations and persons to be notified;
- Remedial or deviating actions to be initiated; and
- Resources available.

The procedures are designed to prevent or minimize loss of life and/or damage of property resulting from an emergency at a dam. In case of an emergency affecting the safety of the dam, procedures for initiating warning of downstream users are specified, consisting essentially of notification of local emergency agencies. Detailed public warning procedures are the responsibility of the RCMP and local and territorial emergency programs, agencies, and authorities.

Emergencies not specifically identified in the EPP shall be handled by the HRD and his staff using procedures appropriate to the degree of threat to life and property posed by the emergency, based on the procedures outlined in the Plan for emergencies of similar severity.

2.3 ABBREVIATIONS

The following abbreviations are used throughout this document:

HRD Hydro Region Director

EPP Emergency Preparedness Plan

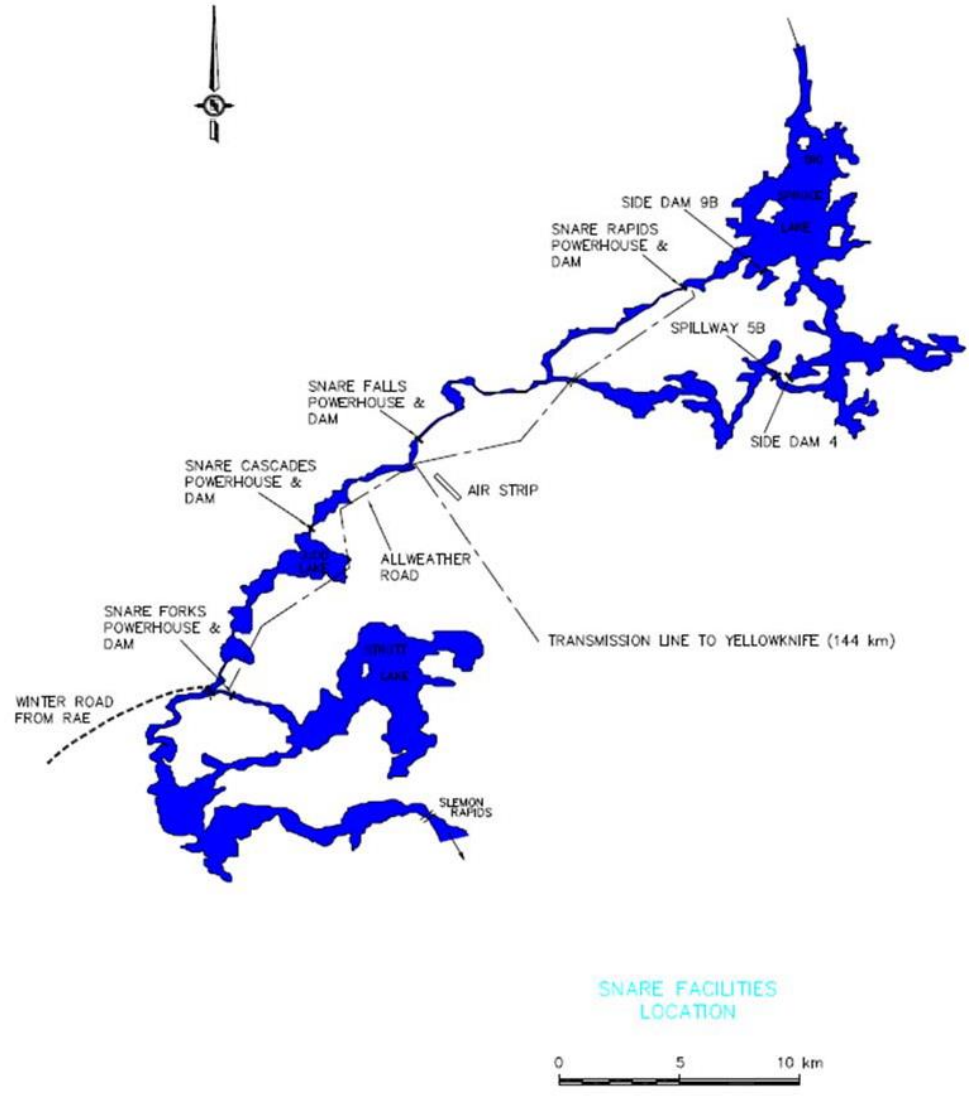
CC System Control Centre (at Yellowknife)

3 PROJECT DESCRIPTION

3.1 LOCATION OF DAMS AND DOWNSTREAM AREAS

The location of the four Snare River Hydro Facilities is shown on figure 1. The main Snare Rapids dam with power plant and the 5B spillway are the furthest upstream on the Snare River. These components control outflow from the major storage reservoir, a combination of Big Spruce and Kwejinne Lakes called Big Spruce Reservoir. Next in line downstream is the Snare Falls dam with associated power plant and spillway. The Snare Falls forebay, although very small in storage capacity, backs up water to the toe of the Snare Rapids plant. Closely downstream to Snare Falls is the Snare Cascades plant and spillway. Furthest downstream is the Snare Forks dam with associated spillway, power plant, and small forebay.

Figure 1: Snare River Hydro Facilities



Outflows from the Forks forebay immediately enter a small lake (Strutt Lake) and then pass into Slemon Lake. Outflows from here enter Russell Lake (which is essentially part of Marian Lake) within 5 km. The closest permanently inhabited communities of Rae and Edzo are located on the south-east comer of Marian Lake. Marian Lake, joined to the North Arm of Great Slave Lake by the Frank Channel, can be considered part of this huge body of water

Figure 2: Snare River Hydro Facilities

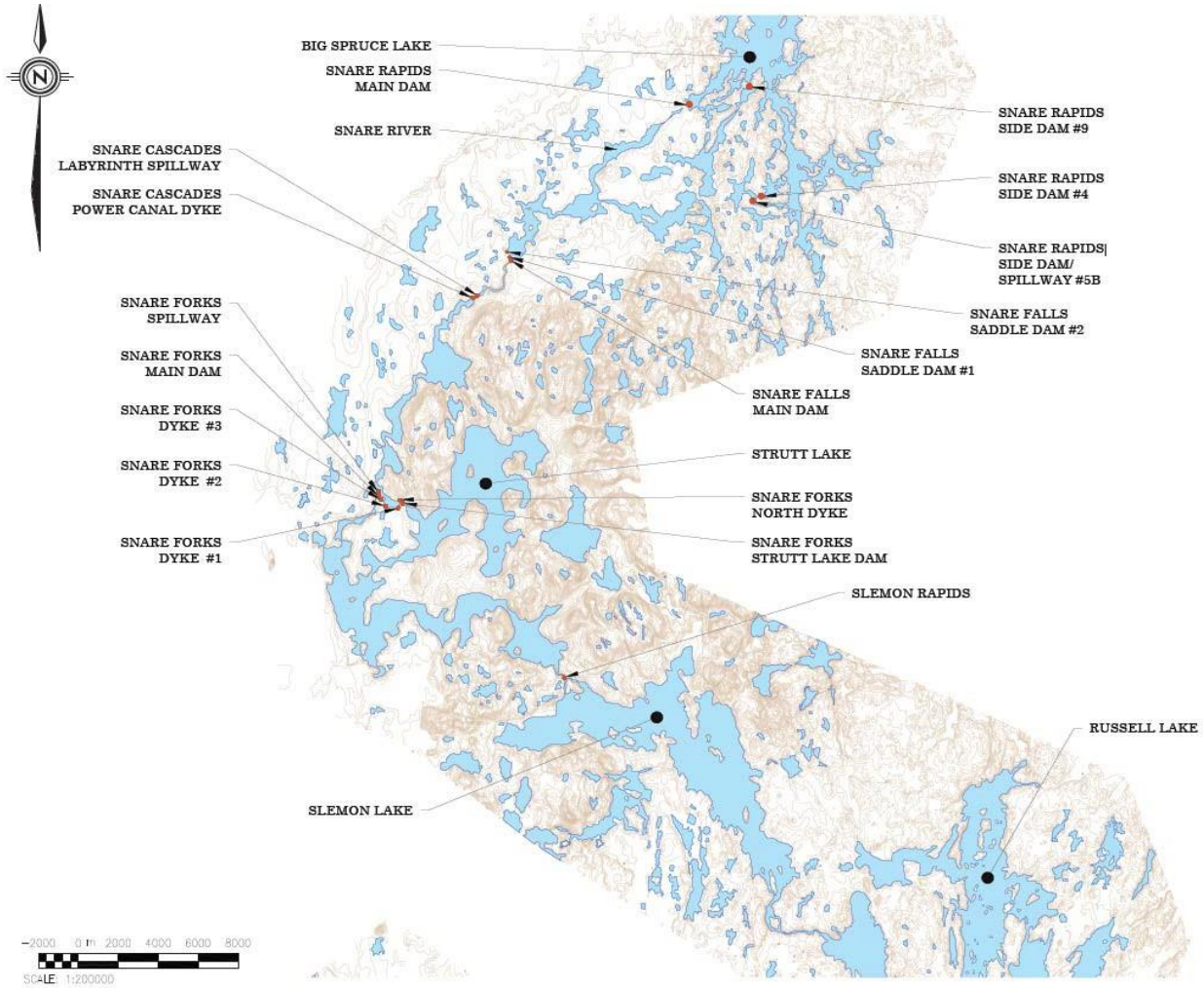
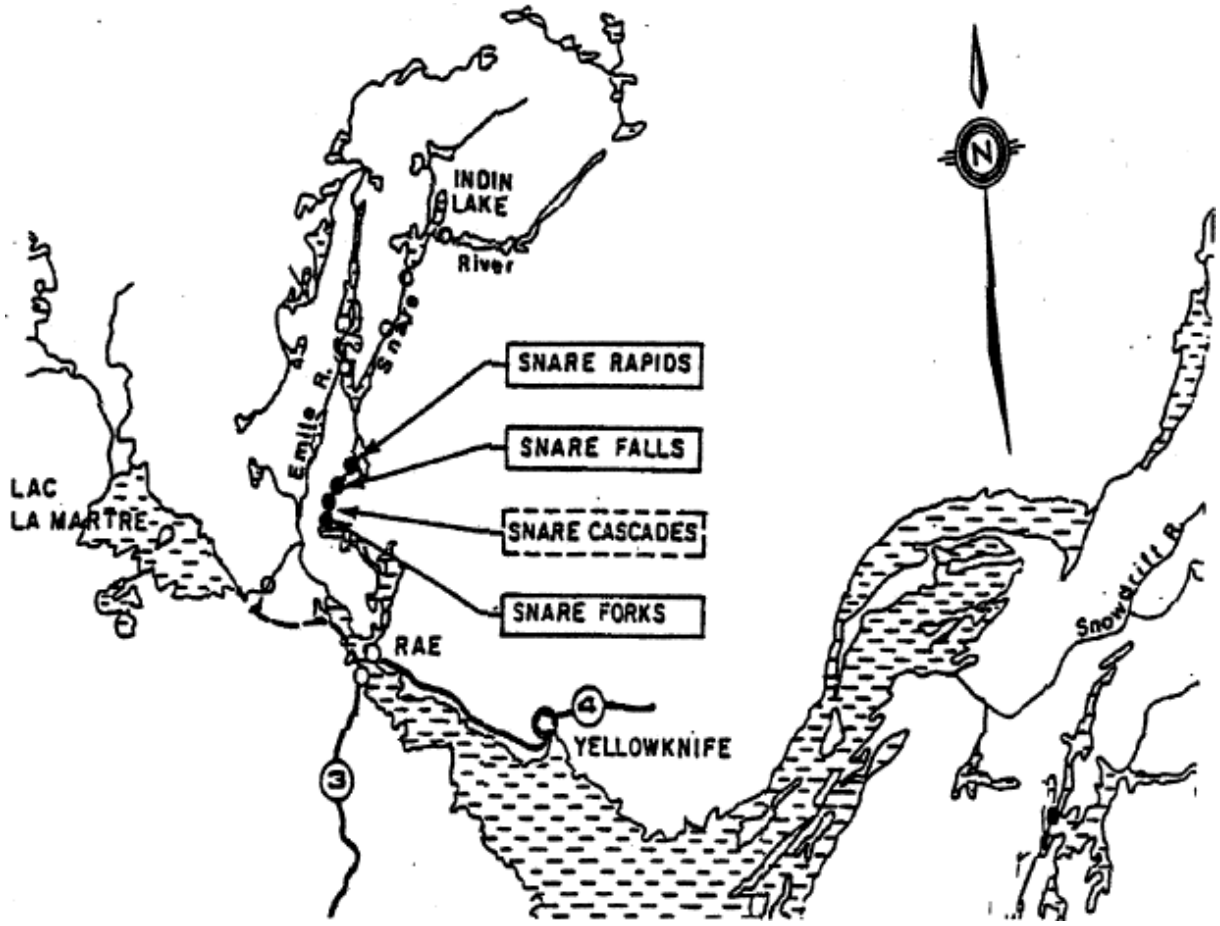


Figure 3: Downstream Communities



3.2 DESCRIPTION OF DAMS AND DOWNSTREAM AREAS

A) Snare Rapids

Hazard Classification: High

Location and Access: 150 km by air northeast of Yellowknife, NT
115 km by water north of Behchokǫ̀, NT

Latitude: 63 º 31'N **Longitude:** 116 º 00' W

River/Stream: Snare River **Nearest City/Town:** Behchokǫ̀, NT

Height: 22 m **Normal Surface:** 130,203,559 m^2

Length: 233 m **Normal Capacity:** 546,177,502 m^3
Dam Type: rock-fill with impermeable core **Max Capacity:** 1,944,624,000 m^3
Spillway: 8 controlled stop log weirs **Spillway Capacity:** 528 m^3

Dikes: (3) #4, #5B, #9B **Drainage Area:** 14,020 km^2

Outlet other than spillway: Powerhouse Unit # 1, Unit #2, draw #8 at high levels

Purpose/Operation of Dam: Hydroelectric **Instrumentation**: core temperature

Significant upstream dams: None

Significant downstream dams: Snare Falls, Snare Cascades, Snare Forks

Overview of Inundation Area: Snare River downstream to Marion Lake

Method of emergency drawdown: breach freeboard dyke #9

B) Snare Falls

Hazard Classification: Significant

Location and Access: 145 km by air northeast of Yellowknife, NT 103 km by water north of Behchokǫ̀, NT

Latitude: 63 º 26'N **Longitude:** 116 º 11' W

River/Stream: Snare River **Nearest City/Town:** Behchokǫ̀, NT

Height: 23 m **Normal Surface:** 5,640,147 m^2

Length: 152 m **Normal Capacity:** 3,384,013 m^3

Dam Type: Rock-fill with impermeable core **Max Capacity:** 87,306,912 m^3

Spillway: 2 controlled underflow gates **Spillway Capacity:** 442 m^3

Dikes: (2) North, South **Drainage Area:** 153 km^2

Outlet other than spillway: Powerhouse Unit # 1, uncontrolled weir

Purpose/Operation of Dam: Hydroelectric **Instrumentation**: none

Significant upstream dams: Snare Rapids

Significant downstream dams: Snare Cascades, Snare Forks

Overview of Inundation Area: Judd Lake, Strutt Lake

Method of emergency drawdown: breach north saddle dam

C) Snare Cascades

Hazard Classification: Significant

Location and Access: 150 km by air north-east of Yellowknife, NT 100 km by water north of Behchokǫ̀, NT

Latitude: 63º 25.3' N **Longitude:** 116 º 13.2' W

River/Stream: Snare River **Nearest City/Town:** Behchokǫ̀, NT

Height: 7 m **Normal Surface:** 220,000 m^2

Length: 162 m **Maximum Capacity:** 1,261,834 m^3

Spillway: uncontrolled labyrinth weir **Spillway Capacity:** 434 m^3

Dikes: none **Drainage Area:** 28 km^2

Outlet other than spillway: Powerhouse Unit #1

Purpose/Operation of Dam: Hydroelectric **Instrumentation**: none

Significant upstream dams: Snare Rapids, Snare Falls

Significant downstream dams: Snare Forks

Overview of Inundation Area: Judd Lake

Method of emergency drawdown: breach right abutment

D) Strutt Lake & Snare Forks

Hazard Classification: Significant

Location and Access: 140 km by air north-east of Yellowknife, NT 90 km by water north of Behchokǫ̀, NT

Latitude: 63 º 20' N **Longitude:** 116 º 20' W

River/Stream: Snare River **Nearest City/Town:** Behchokǫ̀, NT

Height: 18 m, 10 m **Normal Surface:** 10,900,205 m^2

Length: 160 m, 105 m **Normal Capacity:** 6,540,018 m^3

Dam Type: rock-fill with impermeable core **Max Capacity:** 77,449,680 m^3

Spillway: uncontrolled weir **Spillway Capacity:** 364 m^3

Dike: (3) #1, #2, #3 **Drainage Area:** 73 km^2

Outlet other than spillway: Powerhouse Unit #1, Unit #2

Purpose/Operation of Dam: Hydroelectric **Instrumentation:** none

Significant upstream dams: Snare Rapids, Snare Falls, Snare Cascades

Significant downstream dams: None

Overview of Inundation Area: Strutt Lake

Method of emergency drawdown: breach freeboard dyke #1

4 EMERGENCY DETECTION, EVALUATION AND CLASSIFICATION

4.1 POTENTIAL DAM BREACH

4.1.1 Definitions

There are two classifications of Potential Dam Breach:

i. Dam Advisory Condition

A Dam Advisory Condition is a situation where an unusual problem or situation has occurred, but a failure of the dam is not imminent. Examples of a Dam Advisory Condition are:

- Instrumentation readings reach pre-determined numerical limits;
- Any undocumented or unusual spring;
- Any sign of piping;
- Any sign of slumping;
- Any sinkhole;
- Any unusual crack;
- Any unusual wet spot or boggy area;
- Any seismic event regardless of how slight;
- Any obstruction in the spillway;
- Evidence of damage due to vandalism at any structure(s);
- Bomb threat;
- A civil disorder near the reservoir structure(s); and
- Any aircraft accident near the reservoir structure.

ii. Dam Warning Condition

A Dam Warning Condition is any developing or occurring event or circumstance which is or may adversely affect the integrity of the dam but is considered controllable. The Dam Warning Condition has the potential of evolving into a Dam Emergency or Dam Breach condition. Examples of a Dam Warning Condition are:

- Water level of the reservoir is at an unsafe level and is rising threatening to overtop the dam; and
- Any developing erosion, settlement or upheaval occurring on the downstream slope or at the toe of the dam and is considered to be controllable.

4.1.2 Hazard

A potential dam breach may require the controlled release of unusually large flows causing downstream flooding and/or requiring action at downstream dams and reservoirs.

4.1.3 Response

Any observer who learns or suspects for good reason that potential breach condition exists in the dam shall immediately **report the situation to the On-Call Manager**. Phone numbers are given in Section "Communications Directory."

(See also Section 3.0 for telephone locations, radio, and back-up systems.) The On-Call Manager shall:

1. Ascertain and verify details of failure threat;
   - **a.** Description of sloughs, subsidence, movement, cracking, seepage, drainage, disturbances, etc.
   - **b.** Location and extent
   - **c.** Likelihood of deterioration
   - **d.** Effects on adjoining structures
   - **e.** Reservoir and tail water elevations (if available)
   - **f.** Prevailing weather conditions
   - **g.** Other facts believed to be pertinent

2. Initiate notifications procedures as outlined shown in Section 1.1. Make certain all officials understand the nature of a potential breach condition and the possibility of eventual dam breach;

3. Evaluate threat;

4. Determine and implement the immediate actions which must be taken to reduce or eliminate risk of a breach;

5. Take action to minimize potential for downstream flooding; and

6. If the situation deteriorates markedly and a breach occurs or becomes imminent, implement "Dam Breach" procedures set out in Section 4.2.

4.1.4 Notifications

1. Immediate notifications shall be made as shown in Section 1-1. The HRD plays a larger role in initial notifications in the case of potential breach compared with an actual breach because he is the key coordinator in the evaluation of breach potential, possible remedial measures, impact reduction, etc.

2. If any individual or agency responsible for making further notifications cannot be reached, it shall be the responsibility of the initiating caller to make the next stage of notifications himself.

3. The HRD may specify additional people or agencies that should be notified and initiate actions which may reduce the downstream flooding hazard. Refer to Communications Directory in Section 6.0 for a full list of phone numbers.

4. Yellowknife System Control Centre shall be kept fully informed of any change affecting reported condition of the emergency.

4.1.5 Media Contacts

Formal media contacts with NTPC related specifically to a potential dam breach shall be handled in conjunction with NTPC's Public Relations Officer. NTPC's public relations officer is Pam Coulter who can be reached at (867) 874-5202.

4.2 DAM BREACH

4.2.1 Definition

There are two kinds of Dam Breach situations:

i. Dam Emergency Condition

A Dam Emergency Condition is defined as one or more of the following situations:

- Water has overtopped or will overtop any dam or dike.
- Any uncontrollable erosion, settlement, or upheaval occurring on the downstream slope or at the toe of the dam.
- Any uncontrollable leakage through any dam structure.

ii. Dam Breach Condition

A Dam Breach Condition is defined as:

- A dislocation or failure of any structure which allows for an expanding, uncontrollable discharge of water through the spillway, dam or dykes indicating a breach is occurring.

4.2.2 Downstream Hazard

Any building, road, bridge, powerhouse, dam, or settlement which could possibly be reached by flooding.

4.2.3 Response Checklist

1. Observe and report breach (see below)
2. Verify breach report
3. Notify people shown Section 1.1 to start warnings
4. Take action to stem or alleviate flooding downstream

4.2.4 Observations

Any observer who learns or suspects for good reason that a breach has formed in one of the dams shall immediately **report the situation to the On-Call Manager.** If the System Control & Hydro Planning Manager is not available, the observer shall contact the alternate person. Phone numbers are given in Section 1-2 and in Section 6.0 "Communications Directory." (See also Section 3.0 for telephone locations and radio information.) In clear concise language the observer shall relate:

1. Name and position
2. Identification of the breached dam
3. Location of breach
4. Magnitude (size of cracks, gaps, erosion rate)
5. Rate of enlargement
6. Rate of uncontrolled flow
7. Rate of increase in flow
8. Time of commencement of breach

The observer must estimate the above to the best of his ability as measures taken by others will depend on the information supplied.

4.2.5 Verification

Before notifying others, the System Control & Hydro Planning Manager shall be satisfied that the failure report is genuine. Verification may include:

1. Recognition of caller;
2. Caller's demonstrated knowledge of NTPC procedures, personnel, systems, etc.;

3. Corroborative evidence from instrumentation, current environmental conditions (e.g., weather, earthquake); and/or
4. Contacting another member of staff at or near the dam site for confirmation (but only if there is serious doubt about the veracity of the report.

   Remember, time may be of the essence).

4.2.6 Notification

1. Immediate notifications shall be made as shown on the chart in Section 1.1. The notifications are arranged to maximize the time available to allow site personnel to devote their time to remedial operations and actions to lessen flooding.
2. If any individual or agency responsible for making further notifications cannot be reached, it shall be the responsibility of the initiating caller to make the next stage of notifications himself.
3. Yellowknife System Control Centre shall be kept fully informed of any change affecting the reported condition of the emergency.
4. Staff residing at the Snare Rapids staff house may be aware of temporary hunting or fishing camps in the area. If an evacuation is planned and the camps are accessible by vehicle or boat, notification will be made. The Snare Falls spillway is equipped with a klaxon horn, which is sounded when the spill gates are opened. If camps are not easily accessible, the RCMP will be notified.

4.2.7 Media Contacts

In general, emergency announcements through the local media will be the responsibility of RCMP and/or local officials. The HRD may contact the local communications media as necessary to assist with any emergency announcements or to obtain information. However, formal contact by NTPC staff with the media should be handled in conjunction with the Public Relations Officer. Prior consultation between Territorial and NTPC Public Relations Officer is encouraged in dealing with media inquiries.

NTPC's public relations officer is Pam Coulter who can be reached at (867) 874-5202.

4.3 EARTHQUAKES

An earthquake alert exists if an earthquake is felt in the Snare area.

In the case of an earthquake alert the On-Call Manager shall immediately arrange for a general overall inspection of the dam and surrounding slopes.

The On-Call Manager shall proceed as follows:

1. **Severe Damage** - If a dam is damaged to the extent that there is a rapidly increasing or large uncontrolled flow passing downstream, implement "dam breach" procedure set out in Section 4.2.

2. **Significant Damage** - If damage has occurred which has not caused a breach but which poses an immediate threat to the safety of the dam (e.g. significant increases in drain flow, new seepage or boils, cracking or slumping of dam embankment or major cracks in concrete control structure), implement "Potential Dam Breach" set out in Section 4.1.
3. **Minor Damage** - If damage has occurred which does not present an immediate threat to the safety of the dam (e.g. small cracks or displacements, small increases in drain flow, small rock or earth slides), the following shall be implemented by the System Control & Hydro Planning Manager:
    - **a.** Conduct a thorough re inspection of both faces of dams and crests for cracking, slumping, offset or seepage.
    - **b.** Conduct a detailed inspection of areas in vicinity of abutments for possible landslides, displacements, or seepage.
    - **c.** Inspect all drainage systems and note any changes in established drainage patterns and whether drainage flow is clear or cloudy.
    - **d.** Inspect powerhouse, power intakes and spillways to determine any damage.
    - **e.** Observe reservoir slopes and downstream areas visible from dam crest for landslides or ground ruptures.
    - **f.** Immediately upon discovery of any damage or upon completion of each detailed investigation, a report shall be made orally to the OS.
    - **g.** Some damage to structures may not be readily apparent during the inspection immediately following an earthquake. Inspection and close monitoring of the facilities should be continued for at least 48 hours. A secondary inspection shall then be made 2 weeks to a month after the initial inspection.

4. **No damage** - If no damage is evident, the OS shall notify the Senior Civil Engineer who will decide whether a thorough inspection such as outlined in Item 3 above, should be made, having regard to the intensity of the earthquake.

4.4 SABOTAGE, BOMB THREAT, RIOT

4.4.1 Sabotage

If there are indications that an act of sabotage has been committed at the dam, local staff shall notify the HRD, who shall:

1. Ensure safety of members of public and NTPC employees at or near dam. This may include evacuation of the dam site.
2. Determine (if possible) whether saboteur is still at the dam site and assess sabotage potential and situation.
3. Notify:
    - **a.** RCMP
    - **b.** Director of Operations and Engineering
    - **c.** Manager Safety & Environment

4. If the saboteur has left, check the area for evidence that might aid in apprehending him/her.

4.4.2 Bomb Threat

If a telephone bomb threat is received, the person receiving the call should:

1. Keep the caller online as long as possible. Ask caller to repeat message. Try to record every word spoken by caller.
2. If caller doesn't indicate location of bomb or time of detonation, ask for this information.
3. Listen closely to voice: sex, voice quality, accent, or speech impediment.
4. Pay particular attention to background noises such as motors running or music that could give a clue to location from which the call is made.
5. Notify the HRD, who shall then notify:
    - **a.** RCMP
    - **b.** Director of Operations and Engineering
    - **c.** Manager Safety & Environment
6. Evacuate dam site under supervision of the HRD.

If a search is conducted for a bomb, use of radios during the search should be avoided; radio signals could cause premature detonation of a blasting cap. If during the search a suspicious package or object is found, **DO NOT TOUCH**. It should be left for trained personnel to remove or disarm.

4.4.3 Riot

If there is a riot or demonstration at the dam, the HRD shall:

1. Ensure safety of members of public and NTPC employees at or near dam. This may include evacuation of the dam site.
2. Lock all gates and doors.
3. Notify:
    - **a.** RCMP
    - **b.** Director of Operations and Engineering
    - ***c.*** Manager Safety & Environment

4.5 FLOODS

4.5.1 Early Warning

The area draining into Big Spruce reservoir contains a very high proportion of lakes. These act to hold back and slow down snowmelt and rainfall runoff before it reaches the Snare River and its main tributaries. Once reaching a major channel, numerous lakes hold runoff back still further. These include Winter Lake, Round Rock Lake, Snare Lake, and Indin Lake on the mainstream, and Ghost Lake on the Ghost River.

Consequently, it takes close to two months after a major storm event or after the start of snowmelt before the ensuing reservoir inflows reach a peak. If the forecasted peak inflow is very high, then a two-month early warning period is available to organize a wide range of mitigating measures. Initially this would involve planning and organizing.

An even more accurate inflow forecast can be made about 4 weeks before the peak when complete flow information from the indicator basin on the Indin River is available from satellite. If, at this point, the forecast remains extremely high, the previously organized mitigating measures would be implemented. These would include, for example, early draw down of Big Spruce reservoir and the Falls and Forks fore bays, heightening of major dams, removal of small very low head side dams, etc. as described subsequently.

4.5.2 Mitigating Measures

1. **Big Spruce Reservoir** - Large amounts of water are stored in Big Spruce reservoir. The normal range of licensed water levels varies from 217.93 m (715.0 ft.) to 222.29 m (729.3 ft.). The impermeable core of the dam was constructed at elevation 222.50 m (730.0 ft.) and in 2002 the core was raised to an elevation of 223.0 m (731.66). Consequently, the maximum licensed operating level of the Snare Rapids dam, (valid only during periods of high flow) which is 222.50 m (730.0 ft.) is now 1.66 m below the top of the core.

Material above the core, a compacted mixture of large gravel, silt and clay is also impermeable.

The Snare Rapids dam and powerhouse would be severely damaged, and a gap would develop if reservoir levels exceeded the top of the dam at 224.03 m (735.0 ft.).

To prevent this from happening during flood periods, water is spilled from Big Spruce Reservoir through the 5B spillway, located about five kilometers away from the Snare Rapids dam. This two-man operation is accomplished by selectively withdrawing stop logs (12", 18" and 24" high), with a traveling, powered crane, from each of the eight 6.1 m (20 ft.) wide bays.

Stop logs can be removed to elevation 216.41 m (710 ft.) in bays #3, and #4, and to elevation 219.76 m (721 ft.) in the other six bays. Stop log removal time is dependent upon several factors. Complete removal of all stop logs requires about 5 hours of time. To minimize the sudden rise in downstream water levels, spillage would begin well before the peak is reached.

If inflows were to exceed the spill capacity with the Rapids generator also passing maximum amounts of water, then a nearby borrow pit of till and heavy equipment on site could be used to raise the top of the dam by 0.3 to 0.6 meters and to repair small weaknesses that may develop. Gaps could also be dug by 4 men crews into several small side dams (i.e. #9B). Subsequently washouts would safely expand these gaps and thus the spill rate but would not deepen more than approximately 2 to 3 meters.

2. **Snare Falls Forebay** - Only small amounts of water are stored in the Falls forebay. Water levels are normally maintained between 202.08 m (663.0 ft.) and 202.39 m (664.0 ft.).

The Snare Falls dam and powerhouse would be severely damaged if forebay water levels exceed the top of the dam at elevation 205.74 m (675.0 ft.). The impervious core of the dam rises to elevation 204.83 m (672.0 ft.). To prevent a dam break from happening, water is spilled through two 5.79 m (19 ft.) wide motorized undershot gates that open from 195.38 m (641.0 ft.) to 202.39 m (664.0 ft.).

Small amounts of water also spill uncontrollably over a small 12.2 m (40 ft.) wide weir whenever water levels exceed 202.39 m (664.0 ft.). With both gates fully open, and with the forebay topped up, maximum Falls outflows would match maximum spill capacity from Big Spruce reservoir. If it were necessary to spill through gaps in the Big Spruce side dams, then (time permitting) gaps should be placed in the two right bank side dams near the Falls dam to increase spillage at the Falls too. This could easily be accomplished with heavy equipment. However, priority would be directed towards saving the Rapids dam with its attendant large volume of stored water.

3. **Snare Cascades Forebay** – Very small amounts of water are stored in the Cascades forebay and it is essentially run of river. The Cascades power canal dyke and powerhouse would be severely damaged if forebay water levels exceed the top of the dam elevation 185.00m (607.0ft). Breaching the right abutment of the Cascades with a small crew similar to the procedure for side dam 9B would provide additional spill in an emergency and may limit damage to the dam and powerhouse though priority would be directed to saving the Rapids dam with its attendant large volume of stored water.

4. **Snare Forks Forebay** - Only small amounts of water are backed up behind the Forks dam. Water levels normally range between 173.43 m (569 ft.) and 173.74 m (570 ft.).

NTPC drawings show the top of the core of the dam at elevation 175.56 m (576 ft.). The top of the dam is at elevation 176.78 m (580 ft.). The top of Dyke #1 is slightly lower at about elevation 175.7 m (576.4 ft.).

The Snare Forks plant would be severely damaged if the adjacent dam were breached. This is normally prevented by uncontrolled spillage over the concrete weir at elevation 173.74 m (570 ft.). However, if the forebay inflows were to become higher than combined spillway plus plant flows, water levels would rise until Forks Dyke 1 failed. At that point outflow rates would increase substantially. This additional spill would be located far enough away from the power plant that it would not be damaged.

Even greater additional spill protection would, in fact, be provided because heavy equipment would be used to initiate wider areas of washout. This measure would have a lower priority, however, than mitigating measures to ensure the integrity of the Snare Rapids dam and the Snare Falls dam.

4.5.3 Downstream Flooding Hazards

1. Historical Peak Flows

No serious downstream flood damage has been reported in the over fifty-year history of Snare hydroelectric development.

2. Spillway Design Discharge

In 1998 Dillon Consulting Limited determined that the 1:1000 AEP flood equal to 458 m^3/s at Big Spruce Reservoir was attenuated to a maximum daily outflow of 424 m^3/s. A confirming estimate of 434 m^3/s for the 1:1000 AEP flood was determined by KGS Group in 1999. According to KGS Group at the normal operating level of elevation 222.29 m (729.3 ft), the total spillway capacity is approximately 475 m^3/s, which is greater than the 1:1000 year flood. This capacity includes a head loss of approximately one-foot in the approach channel between the main body of the lake and the spillway control structure. In the 2000 Dam Safety Review carried out be AGRA Monenco the maximum daily outflow was calculated at 457 m^3/s, 20% larger than estimated by earlier investigators, but is still within the original dam design parameters, as the maximum flood level 222.41 (729.72) is lower than the design core elevation 223.0 (731.66). As per the DSR (2011) completed by Meco has defined IDF for structures in the Snare system as a peak of 386m^3/s, 560m^3/s, 763m^3/s for Low, significant and High consequence structures, respectively.

3. Dam Breach due to Earthquake

All three Snare hydroelectric dams are gravity dams of moderate head (maximum 21 m). Consequently, they are very resistant to earthquake damage. If either the Snare Falls or Snare Forks dams were to be breached, very little downstream damage would occur because the small volumes of water that would be released would be dissipated quickly by the first two lakes encountered downstream - Strutt Lake and Slemon Lake. In the extremely unlikely event that the Snare Rapids dam was to be breached by a very strong earthquake, then both downstream dams would be taken out too, either by the flood of water from the upstream breach, or by the earthquake itself.

The force of the earthquake would forewarn NTPC personnel at or in the vicinity of the Snare Rapids staff house. They would have time to move immediately to adjacent high ground while the breach develops and widens, and then to notify the control center operator by radio. The highest rise in water levels would occur just below each dam. The flood wave would have virtually no major effect upon Russell Lake or Marian Lake because they are essentially part of Great Slave Lake.

4.6 FAILURE OF SPILLWAY OPERATING EQUIPMENT DURING AN EMERGENCY

If a spillway gate at the Falls, or the stop log hoist at the 5B spillway fails to operate, the field crew shall:

1. Determine the possible cause of failure and effects on reservoir operations.
2. and, if gate failure could endanger one of the dams, determine what immediate assistance is required to remedy the problem including:
    - **a.** replacement parts.
    - **b.** manpower, and
    - **c.** repair equipment

3. Determine temporary replacement or operating procedures.
4. Contact the On-Call Manager report conditions.

   In the event of conditions not predicted or not covered by operating instructions, request directions on how to proceed.
5. If dam security is threatened, notify the HRD and the On-Call Manager.

4.7 RESPONSE DURING DARKNESS AND ADVERSE WEATHER

The normal period of high flows and potential high precipitation events occurs in the summer months when the Snare structures are subject to a predominance of daylight. If, however, a response was needed during a period when darkness was a hindrance, artificial illumination equipment is available at the Emergency Response Facility. This building is located near the Snare Rapids helipad and contains a portable generator, halogen lights, flashlights, and propane lanterns.

Also contained in the Emergency Response Facility are torches, heaters, tarps, and rope to aid in response during adverse weather.

4.8 SPRING, SEEPAGE, OR INCREASED DRAINAGE

Periodic measurement of seepage is taken by operating staff at:

1. Left abutment drainage sump at Snare Rapids.
2. 5B Spillway Side Dam; and
3. Downstream of Snare Forks Dykes 1 & 2.

If new springs or seepage are observed or existing ones increase abnormally, the observer shall report the following to the System Control & Hydro Planning Manager:

1. Location of springs or seeps, including identification of structure or embankment and a description of affected area;
2. Size;
3. Estimated discharge or change of discharge;
4. Nature of flow - clear or cloudy;
5. Type of flow - wet spot, slow seepage, boil, or piping; and
6. Reservoir and tail water elevations.

The HOD shall decide what immediate emergency measures are necessary.

4.9 DROUGHTS

4.9.1 Aquatic Habitat and Downstream Licensed Minimum Water Release Requirements

There are no minimum flow requirements from Big Spruce reservoir because water will always be backed up to the base of the Rapids dam by the Snare Falls dam if the Falls forebay is kept within licensed limits.

The minimum flow release requirement below the Falls forebay is 5.66 m3/s (200 cfs) with a condition that allows zero flow for up to 24 hours for maintenance operations This is required to maintain flows and water depth in the short section of river channel between the Falls dam and the upstream end of the Forks forebay. Because of the series of small rapids in this section of river channel, a series of pools would maintain fish in the event of a short duration cessation of inflows.

The minimum flow release requirement from the Forks forebay is a 0.0 m3/s (0.0 cfs). The constriction at the outlet of Strutt Lake backs up water to the Forks dam so that even a complete cessation of flow for extended periods would not eliminate fish habitat between the Forks dam and the outlet of Strutt Lake. Also, outflow from water stored in Strutt Lake would continue for many days should a complete halt to Forks dam outflows ever occur. At any rate, only a short 1-kilometer section of channel between Strutt and Slemon Lake would be affected. Slemon Lake is so large that it would buffer any downstream effects for a month or more.

4.9.2 Licensed Minimum Water Level Requirements

The level of Big Spruce reservoir must be kept above 217.9 meters (715.0 ft.) according to its water licence unless a written request is filed with the Water Board and a letter of approval received. The Falls forebay must be kept above 201.8 meters (662.0 ft.) according to its water licence unless a written request is filed with the Water Board and a letter of approval received. The Forks forebay must be kept above 173.1 meters (568.0 ft.) according to its water licence unless a written request is filed with the Water Board and a letter of approval received.

4.9.3 Scheduled Maintenance

For short periods of time each year, it is necessary to draw down the Falls forebay to about 201.2 meters (660.0 ft.) so that the tailrace of Rapids plant can be dewatered for scheduled inspections and repairs.

After periods of high spillage from the Falls dam, rock debris accumulates in the tailrace channel below the spillway. This raises tailrace levels and consequently reduces the output of the Falls generator. It is therefore necessary approximately every five years on average to cease Falls dam releases completely for one eight-hour period while debris is cleared from the tailrace with heavy equipment. Prior to an amendment

in 2003 there was a minimum flow requirement for Snare Falls which required a special exemption for cessation, this is no longer required.

4.9.4 Operational Strategies for Drought Conditions

a. Maintaining High Generation Efficiencies with Low Average Plant Flows

During the worst historical drought conditions, Big Spruce reservoir net inflows averaged

26.0 m3/s (in 1980/81) and only 24.6 m3/s the following year. If such a drought were to recur, then there would be a very large shortfall in hydroelectric generation. As happened during the last drought, this would be foreseen in the springtime because of snow survey information and satellite information on early Indin River snowmelt runoff. Consequently, heavy base-load diesel generation would start in June. If this action were not taken, it might not be possible to make up the hydro-generation shortfall for the following 12 months with the existing diesel generation capacity.

In conjunction with the lighter summer loads, the heavy base load diesel generation would result in small amounts of summertime hydro generation. To maintain reasonably high generation efficiencies, with such low amounts of water usage (15 to 16 m3/s) in the summer, it would be necessary, as in the early 1980's, to shut individual hydro units off for periods of up to half the day each day. Then, whenever each unit was on, it could be operated much closer to optimal. Such reduced summertime outflows would also raise the average annual elevation of Big Spruce Lake and hence the total amount of generation from the Rapids plants. In addition, it would store more water for wintertime use. This would allow higher generation rates and hence higher generation efficiencies in the wintertime.

And secondly, it would provide more water so that the hydro units could be on at all times or at least 22 hours per day. Hence no intakes would freeze.

Because of its unique design, the Falls unit would be kept on 24 hours a day both summer and winter. Its generation efficiency can be maintained even with low plant flows.

The above mode of operation requires one licence exemption that would have to be approved by the Board. The 5.66 m3/s minimum outflow requirement from the Forks plant would have to be changed to zero for half of each day in the summer, and for about two hours per day in the wintertime. As previously indicated, this will not unduly stress the aquatic environment.

b. Extra Big Spruce Reservoir Drawdown

During the worst historical drought, NTPC asked for special exemption, as provided for in the licence, and received it to draw down Big Spruce reservoir below the licensed minimum level of 217.9 meters (715.0 ft.). As 0.30 meter of stored water saves about 4.3 GWH of diesel generation worth a substantial amount in savings to NTPC customers, NTPC would again request an extended late winter/early spring drawdown at the end of a drought if snow survey data collected at the time indicated that the probability of subsequent full reservoir recharge was high.

4.9.5 Failure of Outflow Components and the Maintenance of Licensed Flows/Elevations

If the Rapids generator were to fail, then about 2.8 m^3/s (100 cfs) of Big Spruce reservoir outflow could be released through the station service generator at Snare Rapids. Within 24 hours, the 5B spillway gates would be opened to provide more water downstream. This would only draw down the Falls forebay about 0.1 meter. As the forebay would initially be the usual 0.5 to 0.6 meter above the licensed minimum level, it would not be drawn down too low.

The above procedure would be satisfactory as long as Big Spruce reservoir is above the minimum licensed level of 217.9 m (715.0 ft.).

If one of the Forks generators were to fail, licensed minimum Forks forebay outflows would be sustained by the second generator. If both were to fail simultaneously, the Forks forebay level would rise 0.1 to 0.2 meter above its usual operating level within one half of a day.

4.10 SEVERE STORMS

Heavy rainfall or snowfall, high winds and/or heavy icing conditions can result in building and equipment damage, major transmission line outages, communications failure, and road washouts.

If severe weather conditions are forecast or experienced, local staff shall:

1. Keep abreast of forecasts and storm developments;
2. Maintain close surveillance of all dam facilities; and

Immediately report any storm damage or personal injury to the On-Call Manager

The On-Call Manager shall:

1. Notify the HRD and the Operations Director of any damage;
2. Take action to restore services and repair damages; and
3. Ensure safety of any members of the public in area.

If the HRD is informed of an accident already reported to the RCMP, he shall report the event to the Hydro Operations Director.

4.11 FOREST FIRE

A forest fire in the area around the Snare facilities could result in damage to the power plants, support buildings, transportation infrastructure and the distribution and transmissions system. It could impact the production and/or transmission of power at Snare and impact transportation to and from site for staff.

In the event a forest fire is discovered in the general vicinity of the Snare Hydro facilities (e.g., within 50 km) the following shall be immediately notified (telephone numbers provided in Section 6.1.1).

- Manager, Plant Operations
- GNWT Fire Operations
- Manager, System Control
- Manager, Transmission & Distribution
- Director, Hydro Operations
- Director, Health Safety and Environment

In these situations, NTPC personnel will take direction from the GNWT Fire Operations Department. NTPC will support the lead agency in any manner possible. Depending on the severity of the fire GNWT will take control of the airspace in which case NTPC will verify all travel to and from site through GNWT. Fire crews may also be deployed on site and NTPC will attempt to assist these crews in any way that is operationally and financially feasible.

During a major forest fire where the lead agency is in charge NTPC staff going to site will be minimized and all non-essential projects will be postponed until the fire is under control.

In forest fire situations unless directed by GNWT, NTPC will keep transmission and distribution system energized for as long as possible. In all situations this will aid GNWT in their actions, communications, and resources. The local power plant will remain operational and manned until GNWT authorizes shutdown.

GNWT makes the recommendation as to whether evacuation of NTPC staff from Snare is required. Evacuation will be coordinated with GNWT.

5 GENERAL RESPONSIBILITIES UNDER THE EPP

5.1 DAM OWNER/ OPERATOR RESPONSIBILITIES

During an emergency condition:

1. Identification of the emergency condition;
2. Notification of the RCMP;

Person responsible for the notification: HRD

3. Implementation and direction of emergency repairs;
4. Update emergency status to the RCMP;

Person responsible for the notification: HRD

5. Provisions for security measures at the dam; and
6. Reporting termination of emergency on-site at the dam.

In non-emergency conditions, owner operator must also provide for:

1. Routine maintenance and operations of the dam;
2. Routine surveillance of the dam; and
3. Annual review, updating and distributing of the EPP.

5.2 OPERATIONS SUPERINTENDENT RESPONSIBILITIES

Responsibility for the day-to-day operation of the Snare Dams rests with the System Control Manager whose headquarters are the Yellowknife Area Office and can normally be contacted there. Local staff attend the dams each day. Normal working hours are 0800 to 1700 hours, Monday to Friday at Yellowknife and seven days a week at Snare Hydro.

During an emergency, decisions regarding operations at the Snare Dams shall be made by the HRD. Where advice or special expertise is required, it is the responsibility of the HRD to obtain guidance from NTPC Engineering, and others such as government agencies or outside consultants.

An organization chart showing the relationships between key NTPC personnel identified in the EPP is shown in Section 1-1.

6 PREPAREDNESS

6.1 EMERGENCY NOTIFICATION DIRECTORY

The Communications Directory contains specific contacts which may be necessary in handling an emergency. Contacts are grouped as follows:

1. NTPC
2. RCMP
3. NWT Emergency Coordinating Committee
4. Local Municipalities and Cities

For **order of notification** required in particular emergencies, refer to Section 1.1.

Long Distance Telephone Calls

1. To dial direct from within NWT (area code 867), but not within municipality, to NWT (area code 867); dial 1 + 867 + number.
2. To dial direct from outside NWT (area code 867) to within NWT (area code 867); dial 1+ 867 + number.
3. To dial direct from NWT (area code 867) to outside of NWT (area code 867); dial 1 + area code + number.

6.1.1 NTPC Contact Information

Position	Office	Telephone Number
Chief Operating Officer	Yellowknife	867.669.3303 (w) 867.875.8920 (cell
Manager, Plant Operations	Yellowknife	867.669.3312 (w) 867.222.2312 (cell)
Manager, System Control	Yellowknife	867-669-3301 (w) 867-441-1170 (cell)
Manager, Mechanical Services	Yellowknife	867-669-6881 (w) 867-445-3389 (cell)
Director, Hydro Region	Yellowknife	867-669-3313 (w) 867-445-3811 (cell)
Yellowknife Control Centre	Yellowknife	867- 669-3370
Snare Staff House	Snare	867.766.6554

Snare Airstrip Garage	Snare	867.766.6558
Snare Rapids Powerhouse	Snare	867.766.6559
Snare Falls Powerhouse	Snare	867. 766.6556
Snare Cascades Powerhouse	Snare	867.766.6553
Snare Forks Powerhouse	Snare	867.766.6552
Snare Radio Channel	Snare	867.669.9827
President & CEO	Hay River	867.874.5217 (w) 867.875.8850 (cell)
Director, Health, Safety & Environment.	Hay River	867.874.5268 (w) 867.875.0037 (cell)

6.1.2 GNWT Emergency Measure Organization Contact Information

Yellowknife 867.873.7538 (24 hours)

6.1.3 Local Municipalities and Cities Contact Information

Location	**Office**	Telephone Number
Behchokǫ	Garage	867.392.6111
	Medical emergency	867.392.6075
	Fire	867.392.2222
	RCMP	867.392.1111
Yellowknife	City Hall	867.920.5600
	RCMP	867.669.1111
	Ambulance	867.873.2222
	Fire	867.873.2222
	Stanton Hospital	867.669.4111

6.2 TELECOMMUNICATION INFORMATION

Telephone and Radio

This Section briefly describes the telephone and radio facilities available at Snare.

Communications to Snare River facilities are via a microwave, satellite, and powerline carrier. Access can be obtained by calling directly the numbers shown in Section 6.1.1 or by phoning the control centre operator in Yellowknife at 867.669.3370.

Radios are installed in each vehicle, plant, at the airstrip and staff house. The radios are set to use the 'Snare' channel. The radio system connects to the NTPC Radio system through the NWTEL microwave link at CN Hill. There is full radio coverage along the highway and winter road from Yellowknife to Snare. If a person does not have an NTPC radio, they can access the Snare radio channel by calling the telephone interconnect at 867.669.9827.

There are VOIP phones installed in all locations in Snare. They primarily use the CN Hill NWTEL microwave link but can be configured by IT to use the Galaxy satellite system if the NWTEL link is unavailable. As a last resort, satellite phones are available. The Snare operator truck is equipped with a satphone, and there's also a phone at the Snare Tie Substation.

6.3 ROAD COMMUNICATIONS

Vehicles may use the NTPC radios system, satphones, or other satellite devices. There is radio coverage all the way from Yellowknife to Snare. There is no cellular coverage on the highway or winter road. Third party vehicles may sign-out a radio from the Jackfish warehouse if required. Five radio kits are available for sign-out.

The only year-round roads in the Snare Area are gravel roads between Snare Rapids, Snare Falls and Snare Forks. The Snare Rapids to Snare Falls Road is 16 km in length. The road from Snare Falls to Snare Forks is 20 km. In the event of a major dam breach at the Snare Rapids, these roads would be flooded at several locations.

During the winter from approximately February 15 to March 15, a winter road is constructed from Rae-Edzo to connect to the local road system at Snare Forks, a distance of 60 km. This section of winter road would not be subject to flooding from a dam breach.

6.4 AIR COMMUNICATIONS

1. **Fixed Wing Aircraft**

A 3000 ft gravel airstrip, designated C-EV9 "Snare River", capable of handling DC3 and Twin Otter aircraft is located adjacent to Snare Falls powerhouse at latitude 63° 26' longitude 116° 11'. It is suitable for landing

aircraft on wheels all year round, during daylight hours. V.F.R. flight rules apply. Navigational aids were installed in the summer of 2000. Landing of float-equipped planes on all the reservoirs is feasible only during daylight hours and in suitable weather conditions. The airstrip could not be affected by a major dam breach. Snare Airstrip frequency is 122.8MHz and can be used to turn on the runway strobe lights.

Landing of ski-equipped planes on all the reservoirs is normally feasible during winter months and during daylight hours and in suitable weather conditions. During the shortest days of the year, there is sufficient daylight for only a few hours of flying each day. It is impossible to land on the reservoirs for a period of one month in the spring and for a similar period in the early winter because of poor ice conditions.

Snare weather and airstrip webcam can be accessed via the internet at this address: http://www.lw-app.com/view/snare-hydro

2. **Helicopters**

There are numerous possible helicopter landing areas at each dam and at the airstrip.

6.5 POWER SOURCES

6.5.1 Water Discharge Control Facilities Power Sources

Normal power for all station operations, including all power intake gates and spillway gates, is supplied by station service from the local powerhouse. In the event of a complete station outage, Snare Rapids has an emergency 120 kW hydro generator and Snare Forks has an emergency 150 kW diesel generator to supply station service. The Snare Forks diesel starts out automatically on loss of station service. Each plant can be fed power from the main 115 KV line. At Snare Falls there are emergency gasoline engines to operate the spillway gates. There is also an emergency gasoline engine on the 5B spillway to operate the stop log hoist.

6.5.2 Communication System Power Sources

All communication system power sources are battery operated, charged by station service. Batteries would last for several hours without recharging.

6.5.3 Backup Power Sources

All Snare River hydro facilities are equipped with backup power supplies in the form of batteries and backup diesel engines. There is also a portable 175kW diesel generator located at the Snare Falls plant near the airstrip.

6.6 AVAILABLE ON-SITE EQUIPMENT AND REPAIR MATERIAL

There are various borrow areas with 1/2 km of each dam where materials could be obtained to repair a breach.

The following heavy equipment is located at Snare:

- 2 - Tandem Ford LTS 8000 dump trucks
- 1 - Cat D-6 Bulldozer c/w hydraulic angle blade
- 1 - Cat ITC38 Front end loader c/w bucket, forks, boom, and backhoe
- 1 – Cat 930 Loader
- 1 – John Deere 175kw portable generator
- 1 - John Deer tracked Hi Hoe – backhoe
- 1 - Caterpillar 140H Grader c/w wing-plow
- 1 – Ford F 8000 Water Truck
- 1 – Kenworth W900 tractor trailer
- 1 – Ingersoll- Rand 8kw portable lighting unit
- 1 – Grove RT655 Mobile Crane
- 1 - Pelomix 1 yd batch cement mixer
- 1 - 16 foot aluminum boats with 40 hp outboard motors 2 - 16 foot aluminum boats with 25 hp outboard motors

6.7 OFF-SITE EQUIPMENT AND LIST OF CONTRACTORS

During the period when the winter road is available for travel, there is additional construction equipment available in Behchokǫ and in Yellowknife.

Office	Telephone Numbers
Behchokǫ	867.392.6500
Behchokǫ Garage	867.392.6111
City of Yellowknife	867.920.5600
Yellowknife Works Garage & City Stores	867.873.2671
RTL Robinson Trucking Ltd.	867.873.6271
Two Way Enterprises	867.873.5322
Air Tindi	867.669.8200
Great Slave Helicopters	867.873.2081

7 INUNDATION MAPS

In 2014 Meco was retained by NTPC to compete a flood study of the Snare Hydroelectric Facility to determine the areas of inundation resulting from a dam breach or overtopping and completed the *Snare Hydroelectric System Dam Break and Flood Study Report (2015).* The inundation studies were concentrated in the bodies of water at the outlet of Snare Forks Dam, as this is the only area that would be affected immediately following a dam breach. This area includes Strutt Lake and the section of the Snare River from Snare Forks to Slemon Rapids.

There were two main scenarios that were assessed; a fair-weather failure and a flood induced failure. A fair-weather failure represents the failure of one of the facilities under normal water level and flow conditions. A flood induced failure represents the overtopping and/or failure of one of the facilities under very high-water level and flow conditions.

The flood study assessed the impact of dam failure scenarios to determine the consequences to NTPC of dam failures. Two separate models were used to assess inundation limits; a 1-D HEC- RAS model was used for the reach upstream of Slemon Lake outlet and HEC-HMS level pool routing was used for the reach downstream of Slemon Lake outlet.

A failure of either Rapids Main Dam or 5B will result in overtopping of downstream dams at Falls and Cascades, and likely at Forks. The models do not assume a cascade failure at the downstream structures. Time for the peak flood to reach Slemon Falls will vary from two days to three and a half days. A fair-weather failure of dam 9B will not result in overtopping of downstream dams.

A flood induced failure at Falls reservoir will result in overtopping at Cascades and Forks reservoirs. However, the maximum flow at Slemon Lake outlet is less than 20% that from a failure at Rapids Main dam and the maximum water level more than five (5) meters less. A failure at Forks reservoir will produce similar results to a failure at Falls dam.

Results indicate a fair-weather failure would result in a lake level in Russel Lake of about 4.5 to 4.8 meters above normal, compared with 2.0 to 2.2 meters in Marian Lake. A large portion of the shoreline at Rae will be inundated during a fair-weather failure at Rapids dam.

For a fair-weather failure, the peak flood levels at Marian Lake would be reached about 6.5 days after Russell Lake and 13.5 days after failure of Snare Rapids Main Dam.

Results indicate a flood induced failure would result in a lake level in Russel Lake of about 4.6 meters above normal without a dam failure, with an incremental rise of an additional 1.8 to 2.0 meters if Rapids Main dam was to fail. At Marian Lake, the lake level will rise 3.3 meters during the flood induced failure without a dam failure, with an incremental rise of an additional 0.8 to 0.9 meters if Rapids Main dam was to fail.

For a flood induced failure the peak flood levels at Marian Lake would be reached about 6.5 days after Russell Lake and 13.5 days after failure of Snare Rapids Main Dam.

The following figures present some more results from the flood study of the Snare Hydroelectric Facility. There are four flood contour maps that outline the results of the flood study for Behchoko (Rae and Edzo) and Marian Lake.

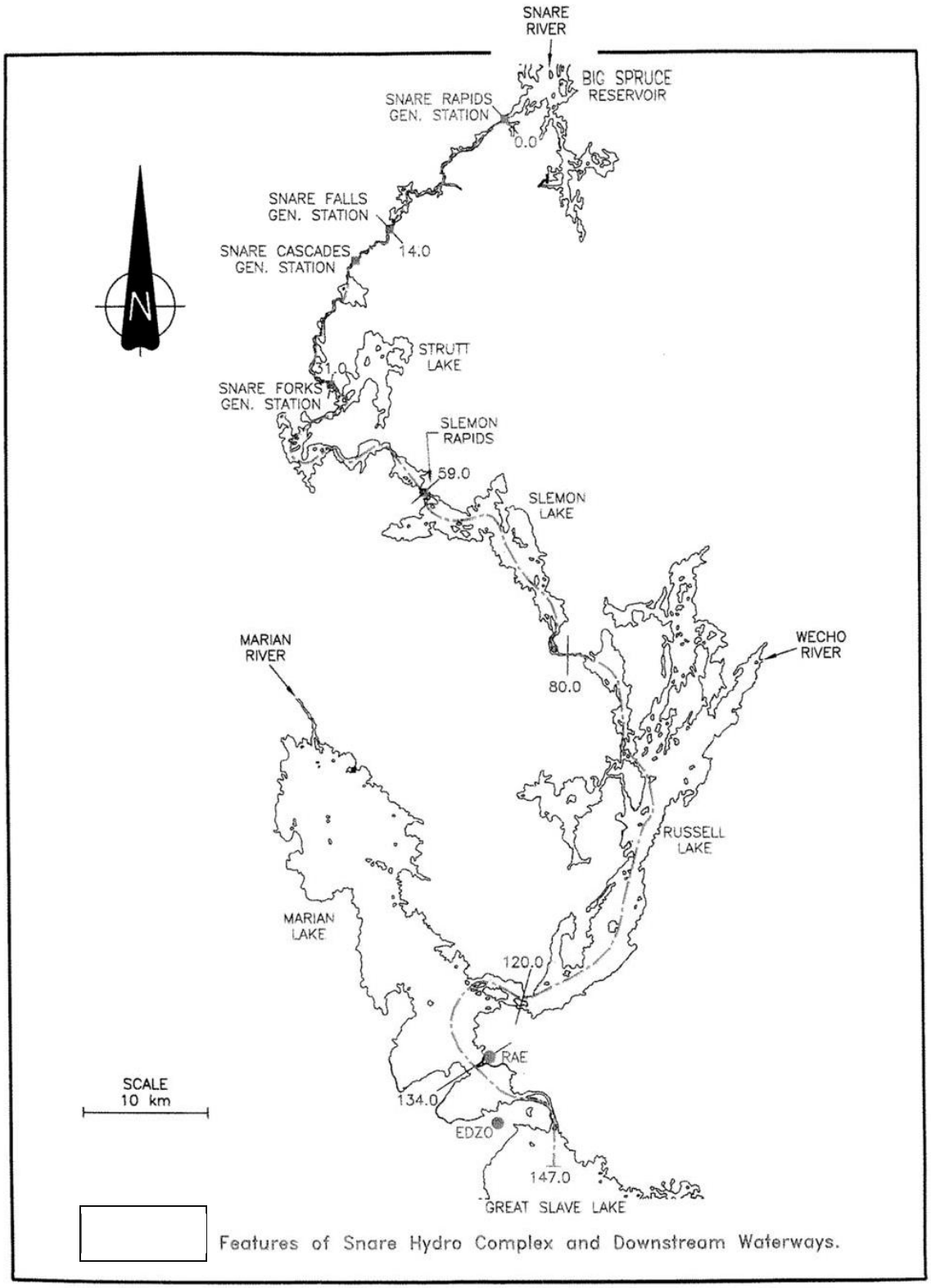
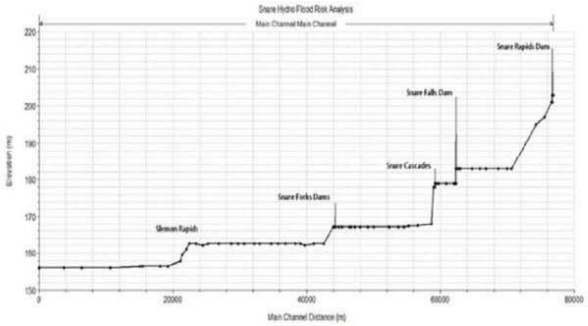
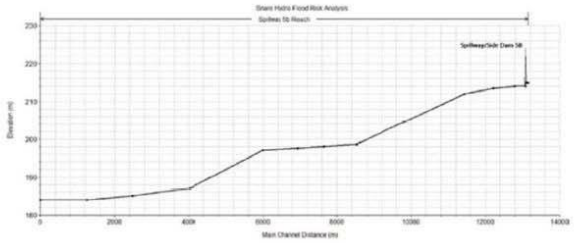


Figure 4: Downstream Waterways

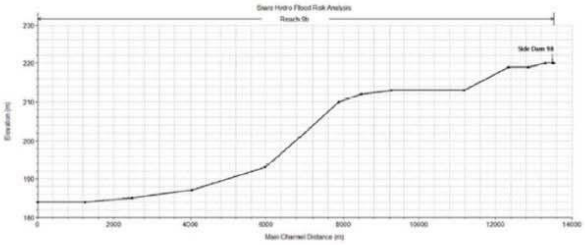
Figure 8: Approximate Bed Profiles



(a) Snare River from Snare Rapids Dam to Slemon Lake Outlet

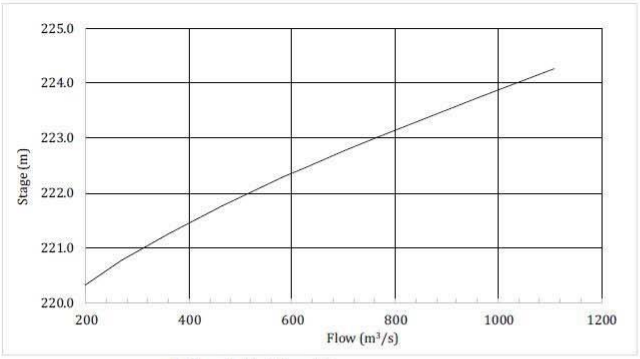


(b) Discharge Channel from Spillway 5B to Snare River above Snare Falls Hydro

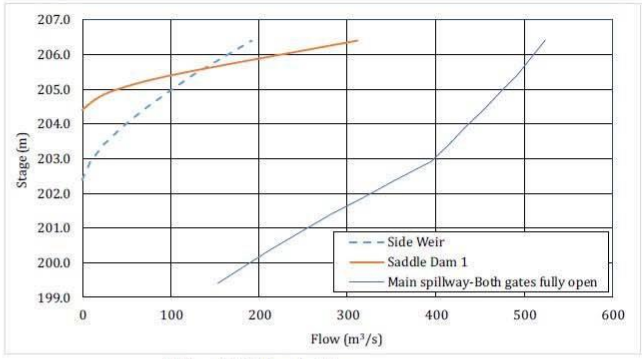


(c) Discharge Channel from Side Dam 9B to Spillway 5B Discharge Channel

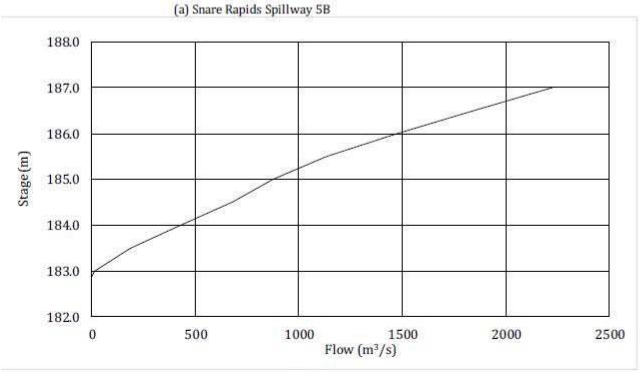
Figure 9: Stage-Discharge Curves at Snare Hydro



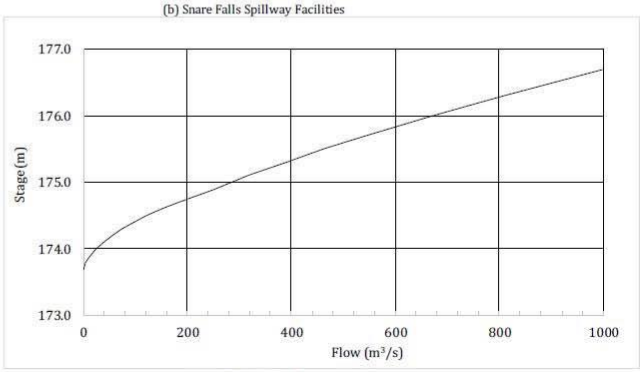
(a) Snare Rapids Spillway 5B



(b) Snare Falls Spillway Facilities



(c) Snare Cascades Spillway



(c) Snare Forks Spillway

Figure 10 : Flood Hydrographs without Dam Break at Slemon Lake Outlet

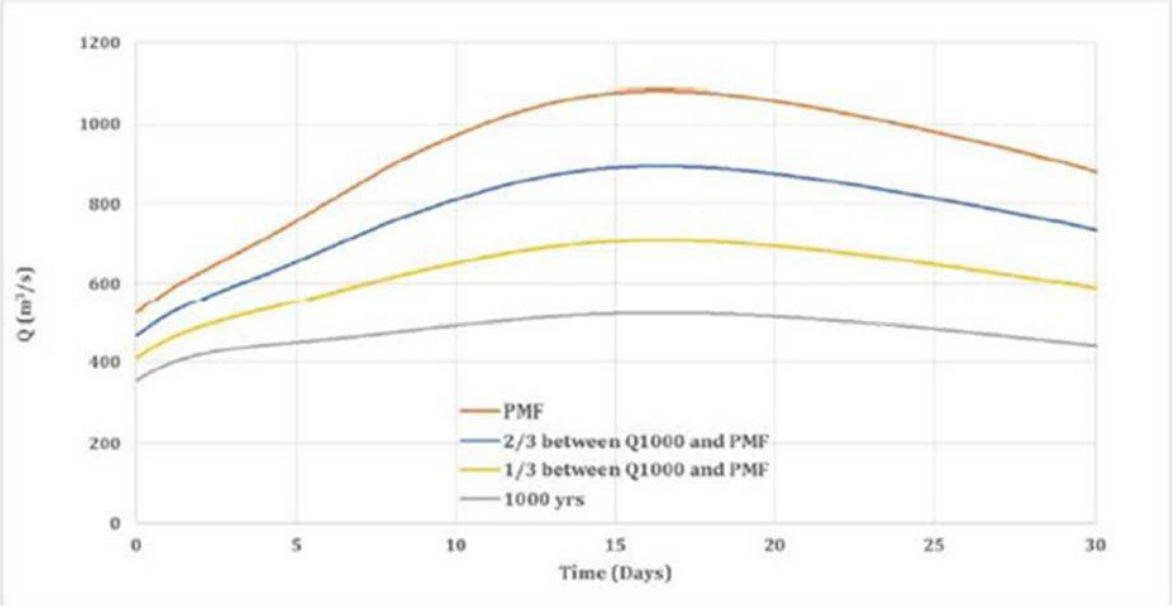
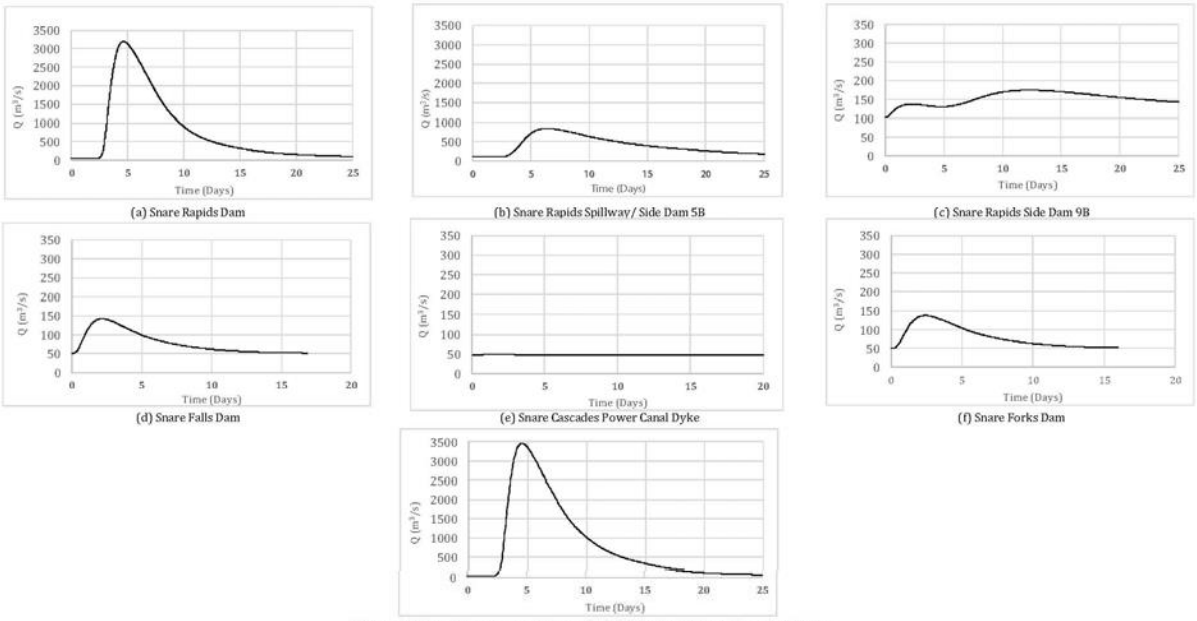
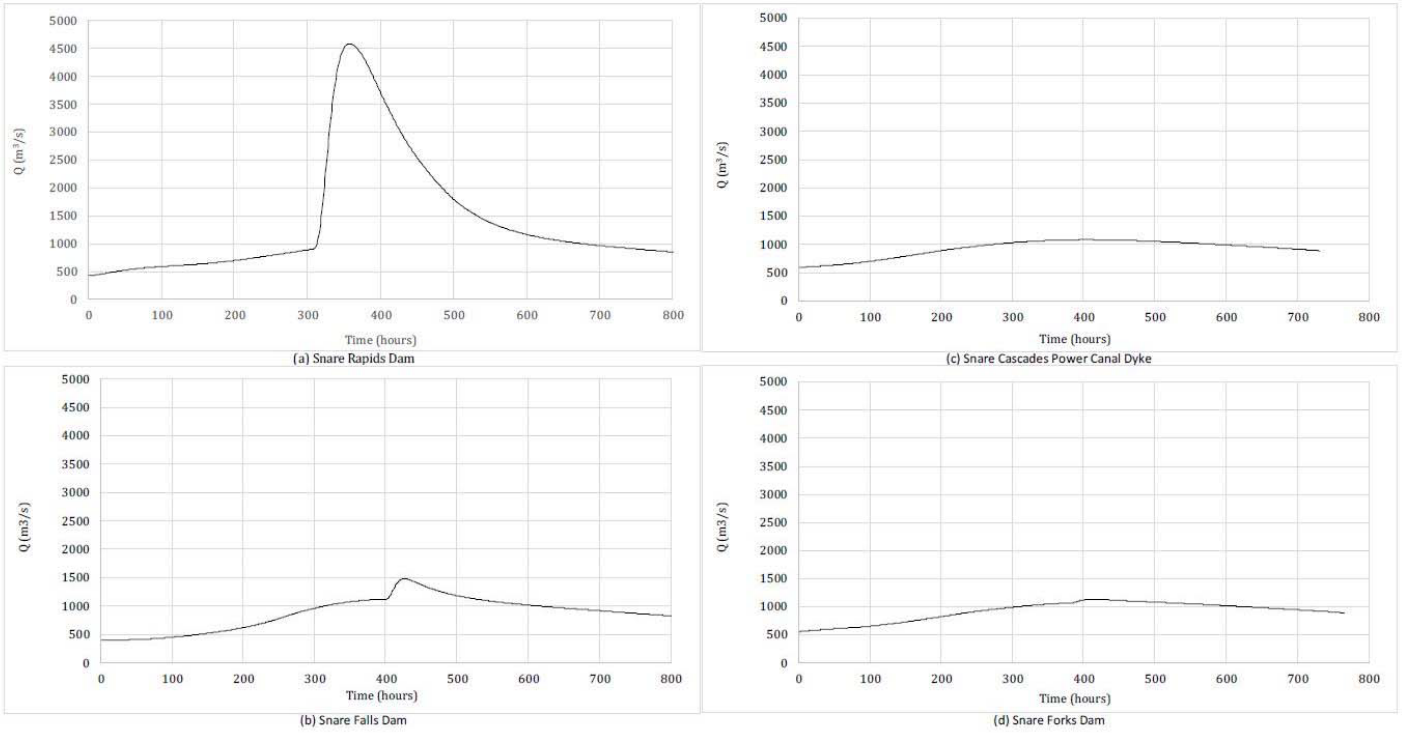


Figure 11: Fair-Weather Failure Hydrographs at Slemon Lake Outlet



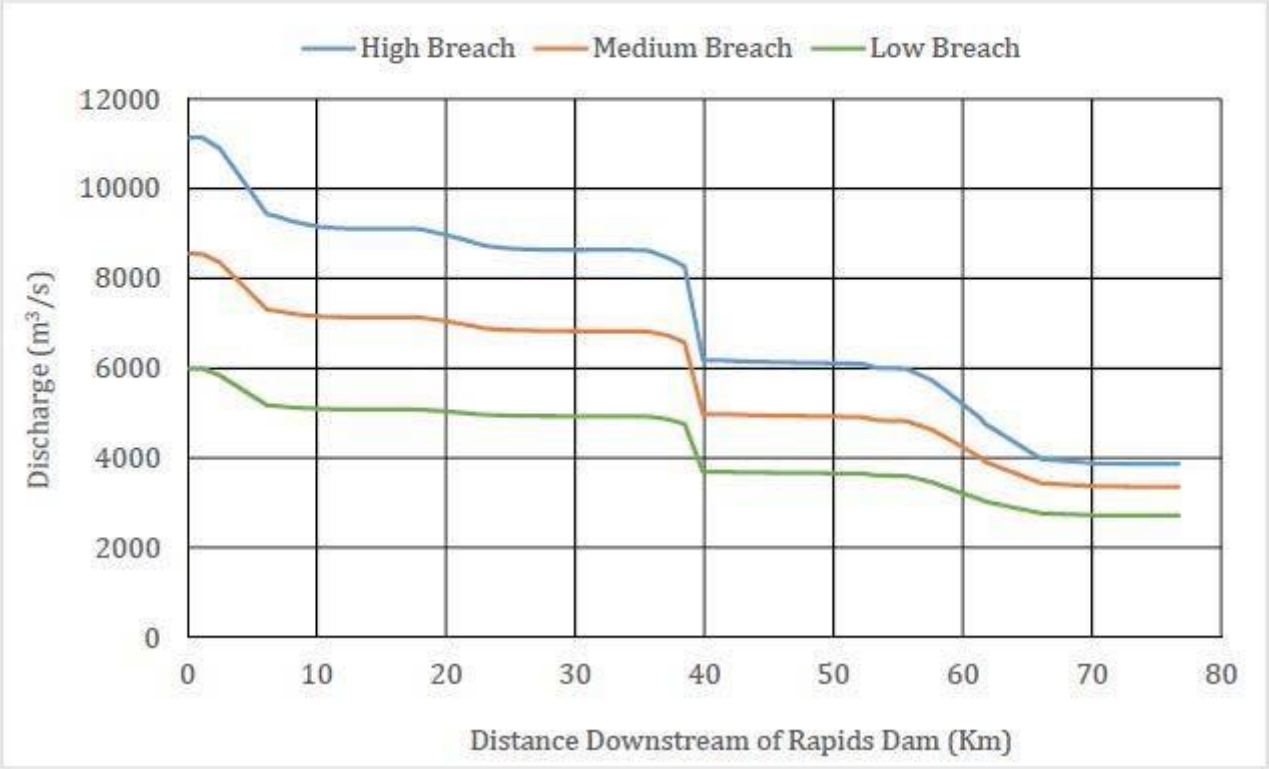
(a) Snare Rapids Dam
(b) Snare Rapids Spillway / Side Dam 5B
(c) Snare Rapids Side Dam 9B
(d) Snare Falls Dam
(e) Snare Cascades Power Canal Dyke
(f) Snare Forks Dam
(g) Cascade Failure of Downstream Triggered by Fair-weather Failure of Snare Rapids Dam

Figure 12: Breach Hydrographs at Slemon Lake Outlet from PMF-Induced Failures at Key Structures



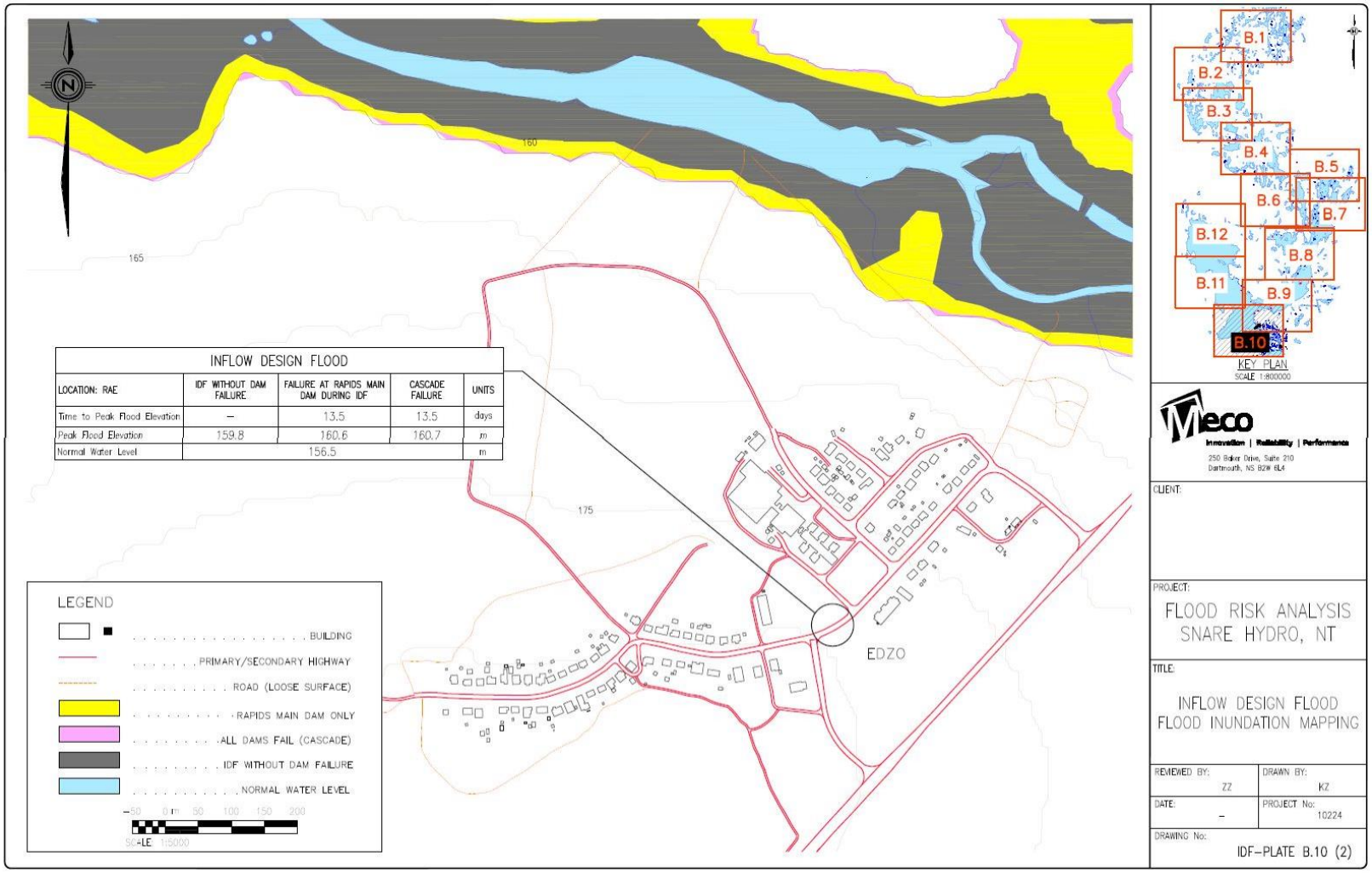
(a) Snare Rapids Dam
(c) Snare Cascades Power Canal Dyke
(b) Snare Falls Dam
(d) Snare Forks Dam

Figure 16 : Profiles of Peak Discharge from Rapids Dam Failure Showing Sensitivity with Breach Width

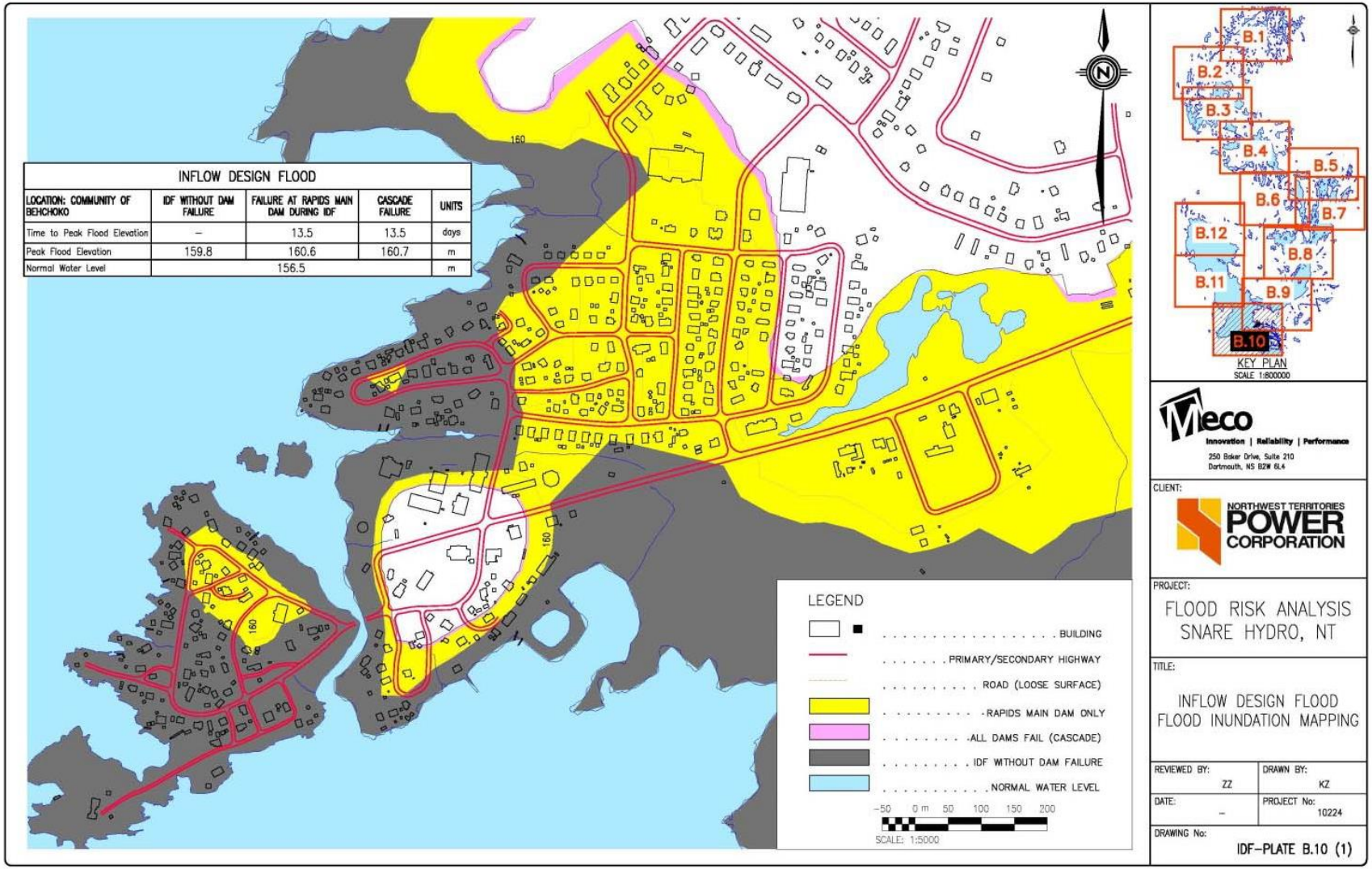


Locations:

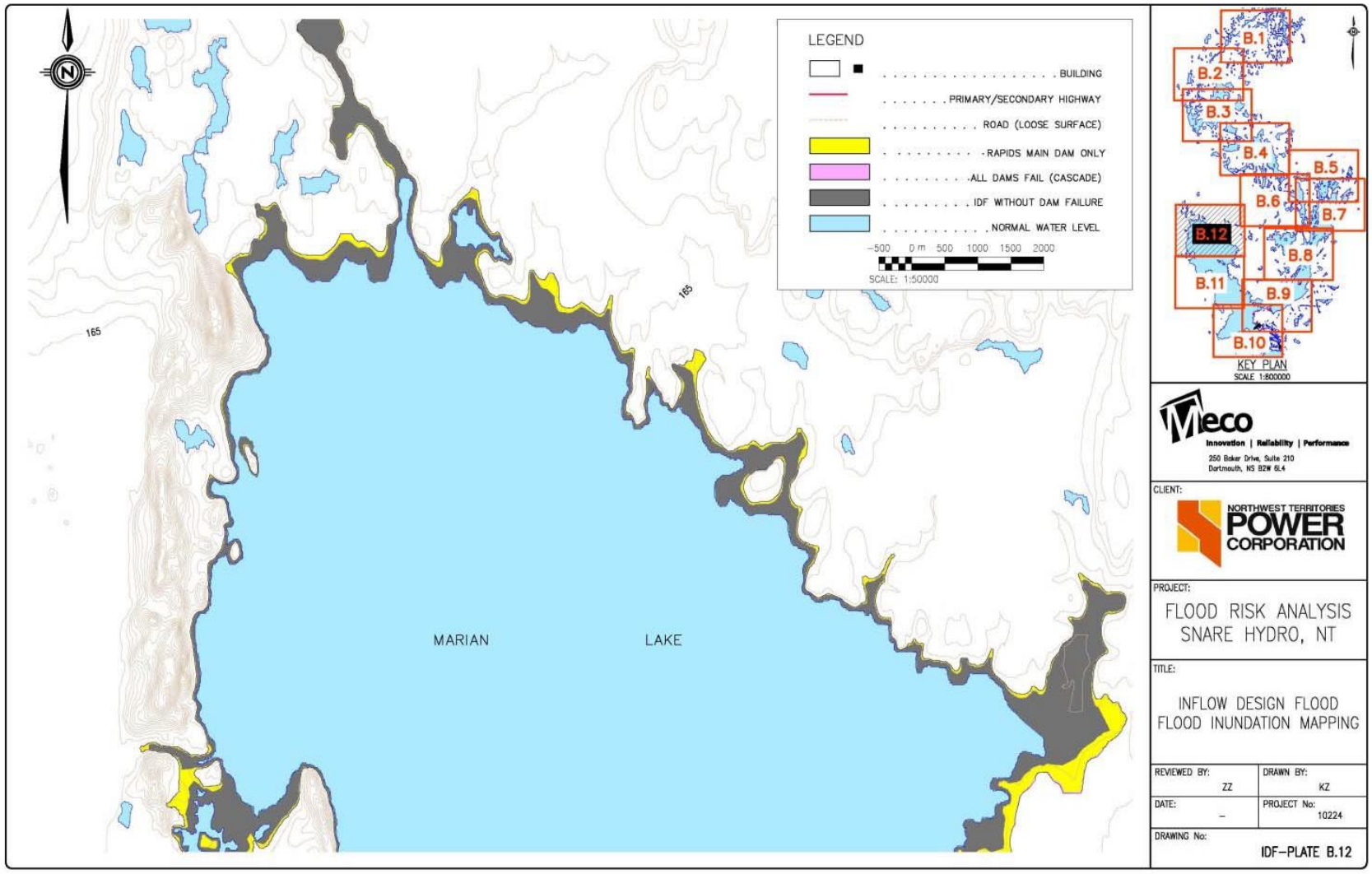
km	0.0	Snare Rapids G.S
km	14.0	Snare Falls G.S.
km	31.0	Snare Forks G.S.
km	59.0	Slemon Rapids (outlet Strutt Lake)
km	80.0	Outlet – Slemon Lake
km	120.0	Outlet – Russell Lake
km	134.0	Rae
km	136.0	Edzo
km	142.5	Highway Bridge
km	144.0	Great Slave Lake



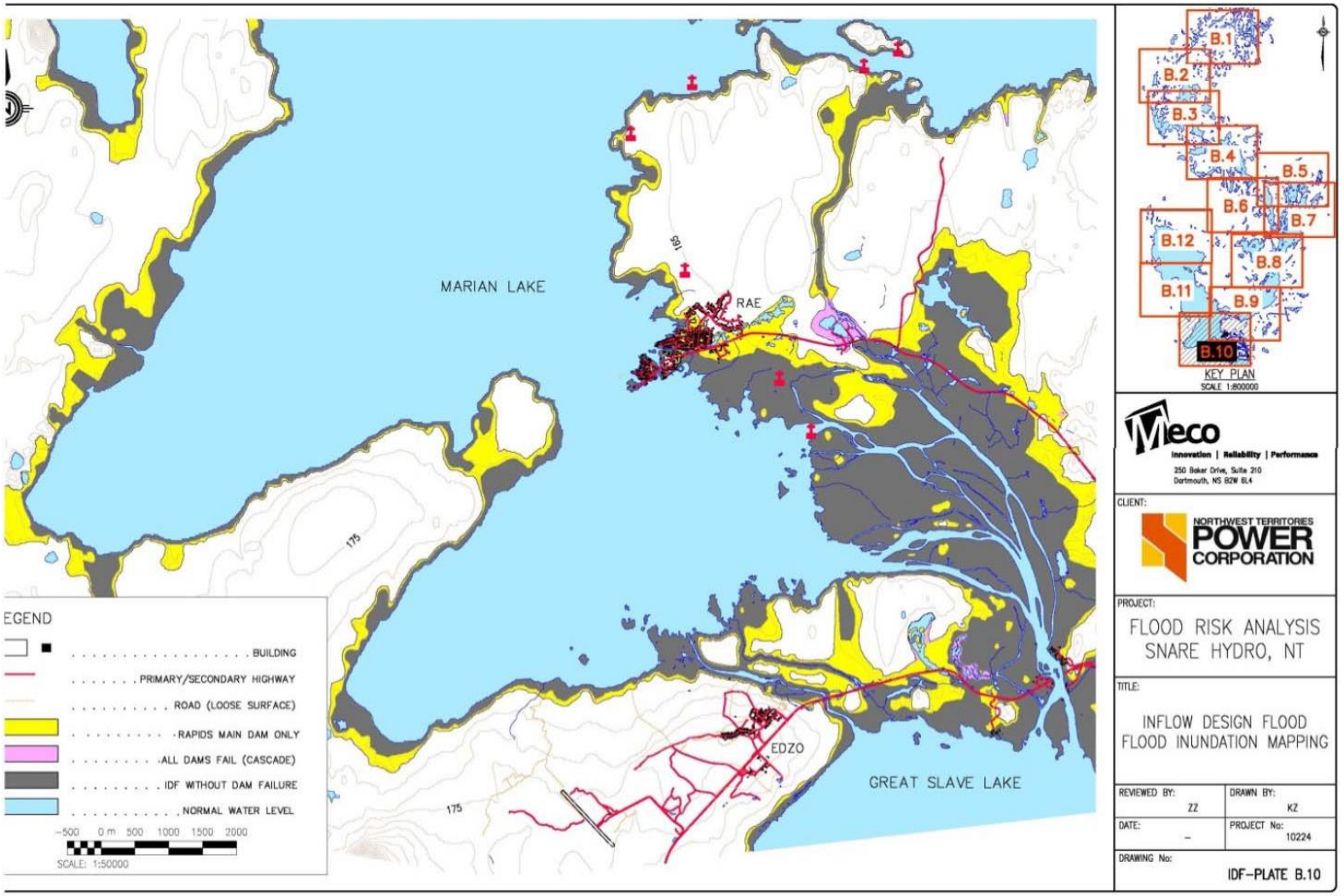
Flood Contour Map 1 – Bechoko (Edzo)



Flood Contour Map 2 – Behchoko (Rae)



Flood Contour Map 3– Marian Lake 1



Flood Contour Map 4 – Marian Lake 2

APPENDICES A:
MAINTENANCE AND TESTING OF THE EPP

The Health, Safety, Environment department shall ensure that local staff maintains familiarity with the continually updated EPP and ERP documents by scheduling periodic reviews, briefings and operational tests as follows:

1. **Twice Per Year** - Phone numbers and responsible officials' names shall be verified, and the appropriate pages of the EPP updated and distributed. (A complete list of all updates to the plan shall be maintained at the front of the EPP.)
2. **Annually** - All affected personnel shall be given a refresher briefing on the EPP. At the option of the System Control & Hydro Planning Manager this may be done separately or as a part of a regularly scheduled safety meeting. A record of all briefing sessions shall be maintained on file by the System Control & Hydro Planning Manager, showing the dates of the sessions, the location where they were held, and the names of the individuals conducting and attending them.
3. **Every 2 years** – All involved personnel should be given a training drill on the EPP. This may consist as a tabletop exercise or an actual test of timely response to spillway operation.

Emergency Plan Testing Register		
Date:	**Description:**	**Participants:**
2018	Emergency Simulation exercise – missed call in from Operator	RCMP Northwestern Airlease NTPC Hydro Operations Staff

APPENDICES B:
LIST OF THIRD-PARTY CONTACTS AND SUPPLIERS

Service	Company	Address	Phone
Generator Rental	Grizzly Power	1400-10 Street, Nisku, AB T9E 8J4	780.955.3305
Generator Rental	Wirtenan Electric	5635 Gateway Boulevard Edmonton, AB T6H 2H3	780.434.8421
Generator Rental	Power Plus Rentals	7003 Girard Road Edmonton, AB T6B 2C4	780.485.0066
Generator Rental	Finning, Hay River	Mitch Thompson, Cust. Serv. Mgr 23 Industrial Drive, Hay River, NT X0E 0R6	867.874.6537
Generator Rental	Finning, Yellowknife	327-8 Old Airport Road, Yellowknife, NT, X1A 3T3	867.766.3578
Electrical Mechanical Services	Atco Power	8750 – 58 Ave., Edmonton, AB T6E 6G6	780.465.3265
Electrical Mechanical Services	Janus Project	105 8712-48 Ave, Edmonton, AB T6E 5L1	780.450.1818
Mechanical Services	South Side Porta Weld Ltd	8110 Davies Road, Edmonton, AB	780.465.4861
Electrical Services	Odesco	5330 89 Street, Edmonton, AB T6E 5G9	780.414.1422
Electrical Services	Orbis	311 3624-119 Street, Edmonton, AB T6J 2X6	780 985 1455
Switchgear Parts and Repairs	Laird Electric	4410 97 Street, Edmonton, AB T6E 5R9	780.450.9636
Switchgear Parts and Repairs	Schneider Electric	12825 1144 Street Bonaventure Industrial Park Edmonton, AB T5L 4N7	780.453.3561
Governors	Henery & Sons	87 Aurora, Pointe Claire, PQ	514.466.2063
Governors	Woodward Alberta Governor Service	5977 103 A Street, Edmonton, AB	780.437.4673

Service	Company	Address	Phone
Engine Suppliers	MAN B&W Diesel Canada Ltd	355 Wyecroft Road Oakville, ON L6K 2H2	905.845.3444
Engine Suppliers	International Energy Systems	570 Ebury PlaceDelta, BC V3M 6M8	604.540.5080
Engine Suppliers	Finning Power System	6735 11 Street NE, Calgary, AB T2E 7H9	403.295.5740
Engine Suppliers	Powell Arctic Ltd	1455 Buffalo Place, Winnipeg, MB R3T 1L8	204.453.4343
Engine Suppliers	Waterous Detroit Diesel - Allison	10025 51 Ave, Edmonton, AB T6E 0A8	780.437.8288
Engine Suppliers	Midwest Power Products	1460 Waverley Street, Winnipeg, MB R3T 0P6	204.452.8244
Engine Suppliers	Cummins Alberta	11731 181 Street, Edmonton, AB T5S 2K5	780.454.9365
Engine Suppliers	Wartsila NSD Canada Inc	164 Akerley Blvd., Dartmouth, NS B3B 1Z5	902.468.1264

APPENDICES C:
WATER LICENCE CONFORMANCE TABLE

Conditions of the Type A Water Licence(s) are summarized in Table C-1 along with sections of the Emergency Preparedness Plan where each condition is addressed.

Table C-1: Water Licence Condition

Water Licence N1L4-0150 Conditions Applying to Emergency Preparedness Plan	**Corresponding Section in Plan**
N1L4-1050 Part E (1): The Licensee shall submit to the Board for approval by December 1, 1999, an Emergency Preparedness Plan in accordance with the Canadian Dam Association's Guidelines.	All
N1L4-1050 Part E (1): In addition to conforming to the Guidelines, the plan shall include, but not be limited to the following:	
a. Evaluation and identification of potential emergencies	Section 4
b. Preventative actions procedures	Section 4 Section 4.5.2
c. Description of the notification procedures	Section 4
d. Notification flowchart	Section 1
e. Description of the communication system	Section 6.2
f. Description of the access to the Power Generation Facilities	Section 3.2
g. Procedures and responses during periods of darkness	Section 4.7
h. Procedures and responses during periods of adverse weather conditions	Section 4.7
i. Description and inventory of equipment sources	Section 6.6
j. Description and inventory of the stockpiles of supplies and materials	Section 6.6
k. Description and inventory of emergency power sources	Section 6.5
l. Inundation maps	Section 7
m. Description of the warning systems	Section 4 Section 4.5
n. Maintenance and testing of the EPP	Appendix A
o. Personnel training	Appendix A