WLWB Registry

From: Sarah Baines [sbaines@wlwb.ca]
Sent: Thursday, August 09, 2007 9:46 AM
To: 'Ken Dies'
Cc: registry@wlwb.ca
Subject: FW: Updated telephone numbers for EPP - N1L4-0150, MV2003L4-0014
Attachments: Snare Hydro Emergency Preparedness Plan 2007.doc

Thanks Ken. Please accept this receipt as acknowledgment that the Board received the updated EPP 2007. No further approvals are required.

Regards,
Sarah

From: Ken Dies [mailto:KDies@ntpc.com]
Sent: Thursday, August 09, 2007 8:14 AM
To: Sarah Baines
Subject: RE: Updated telephone numbers for EPP - N1L4-0150, MV2003L4-0014

Sarah,

Please find attached the **Snare Hydro Emergency Preparedness Plan 2007** with updated telephone numbers and agency names.
A printed copy has been sent to Roberta Judas in Wekweeti.

Ken Dies
Manager, System Control & Hydro Planning

From: Sarah Baines [mailto:sbaines@wlwb.ca]
Sent: Wednesday, August 08, 2007 7:39 AM
To: Edward Smith; Ken Dies
Cc: registry@wlwb.ca
Subject: Updated telephone numbers for EPP - N1L4-0150, MV2003L4-0014

Good morning,

On April 3, 2007, the Board informed NTPC that the February 2007 Emergency Preparedness Plan for Snare Hydro and Cascades was approved on the condition that the telephone numbers and agency names were updated (no further approvals are required). The updated plan was to be submitted by June 30, 2007 but it hasn't been received yet. Please fulfill this condition and submit an updated plan by August 31, 2007.

Regards,
Sarah.

NORTHWEST TERRITORIES
POWER
CORPORATION

Snare Hydro

Emergency Preparedness Plan

2007

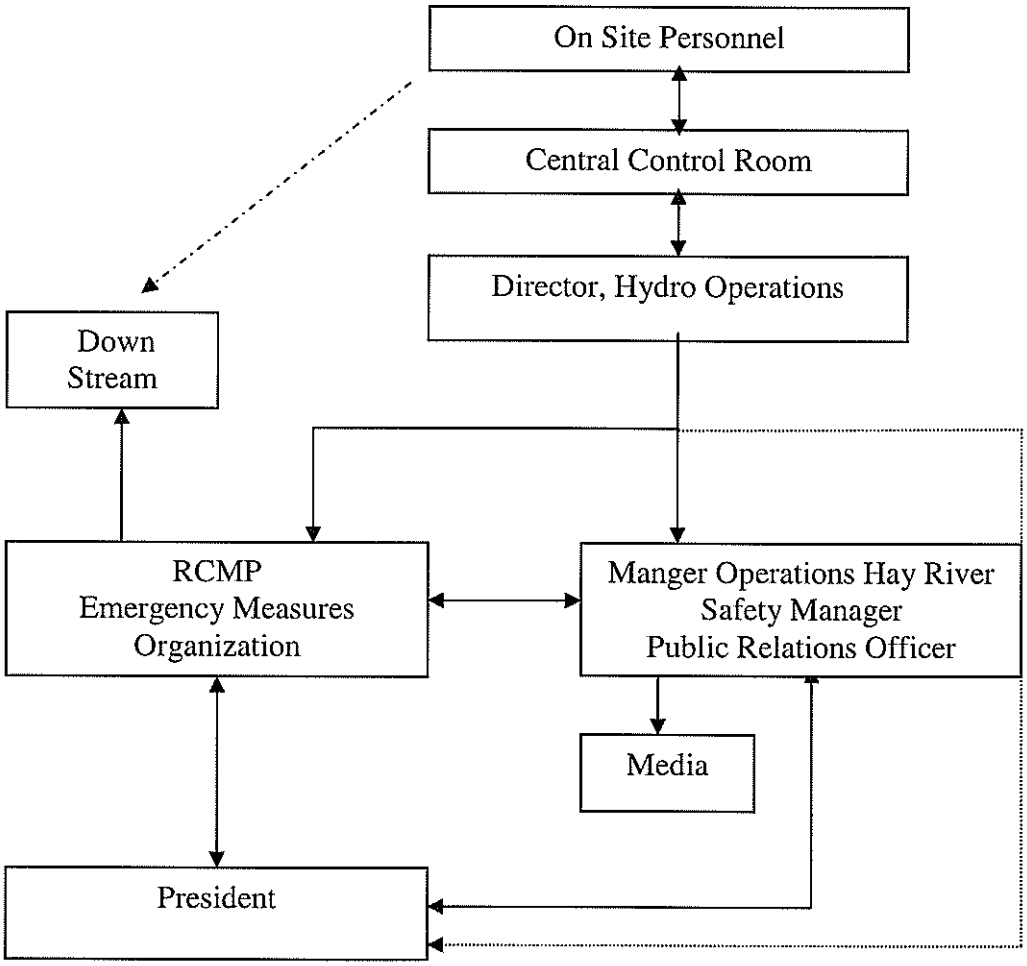
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Snare Emergency Preparedness Plan

1.0 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

Calls that must be made:

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

Manager, System Control & Hydro Planning – Ken Dies	867-669-3327 (O) 867-873-8034 (H) 867-445-6515 (cell)
Plant Manager – Norm McBride	867-669-3326 (O) 867-920-2885 (H) 867-445-6521 (cell)
Hydro Maintenance Manager – Randy Waddell	867-669-3306 (O) 867-873-4322 (H) 867-445-6514 (cell)
Director, Hydro Operations – Randy Patrick	867-669-3301 (O) 867-766 2392 (H) 867-445-6525 (cell)

2. **Regional Director shall report to the following:**

President & CEO – Leon Courneya	867-874-5245 (O) 867-874-2417 (H) 780-719-0612 (cell)
Manager Safety & Envir – Robert Schmidt	867-669-3313 (O) 867-669-0858 (H) 867-444-1207 (cell)

3. **Local Agencies (Yellowknife):**

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

4. **Downstream Water Users:**

RCMP – Behchoko	867-392-1111
Hamlet of Behchoko	867-392-6500
Chief Leon Lafferty - Behchoko	867-392-6412
Tlicho Lands Protection Department	867-392-6406

Other important phone numbers:

GNWT Emergency Measure Organization	867-873-7554
South Mackenzie District Office – INAC	867-669-2720
Environment and Conservation – INAC	867-669-2701
Water Resources Division – INAC	867-669-2716
Environment Canada	867-873-8185
Department of Oceans and Fisheries	867-669-4940

2.0 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 of 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 Operations Director (HOD) and his staff to follow during emergencies at the dam. It describes:

5. Initial actions and observations to be taken;
6. Organizations and persons to be notified;
7. Remedial or deviating actions to be initiated; and
8. 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 OS 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:

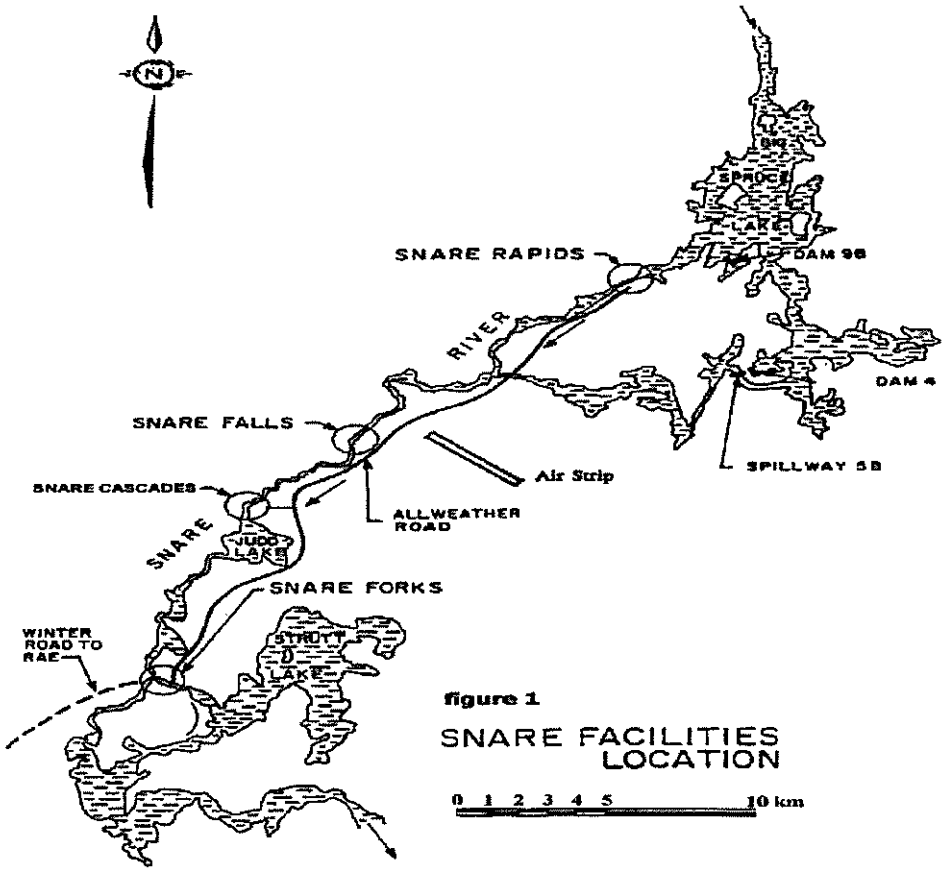
HOD Hydro Operations Director
EPP Emergency Preparedness plan
CC System Control Centre (at Yellowknife)

3.0 Project Description

3.1 Location of Dams and Downstream Areas

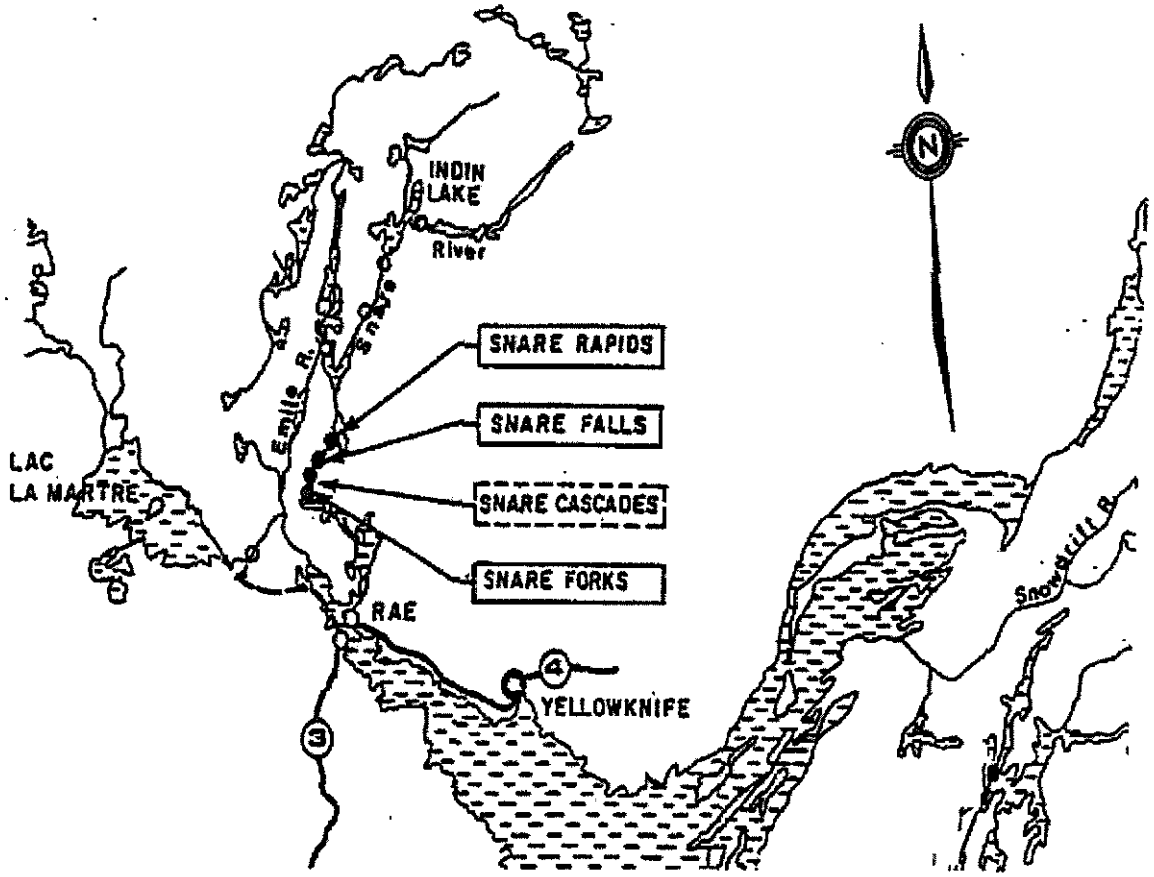
The location of the four Snare River Hydro Facilities is shown on figure 1. The main Snare Rapids dam with power plant and the 5B spillway are the furthest upstream on the Snare River. These components control outflow from the major storage reservoir, a combination of Big Spruce and Kwejinne Lakes called 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: Downstream Communities



A) Snare Rapids

Hazard Classification:	High		
Location and Access:	150 km by air northeast of Yellowknife, NT 115 km by water north of Rae/Edzo, NT		
Latitude:	63031'N	**Longitude:**	1160 00' W
River/Stream:	Snare River	**Nearest City/Town:**	Rae/Edzo, NT
Height:	22 m	**Normal Surface:**	130,203,559 m2
Length:	233 m	**Normal Capacity:**	546,177,502 m3
Dam Type:	rock-fill with impermeable core	**Max Capacity:**	1,944,624,000 m3
Spillway:	8 controlled stoplog weirs	**Spillway Capacity:**	528 m3
Dikes:	(3) #4, #5B, #9B	**Drainage Area:**	14,020 km2
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:	breech freeboard dyke #9		

B) Snare Falls

Hazard Classification:	Low		
Location and Access:	145 km by air northeast of Yellowknife, NT 103 km by water north of Rae/Edzo, NT		
Latitude:	63026'N	**Longitude:**	1160 11' W
River/Stream:	Snare River	**Nearest City/Town:**	Rae/Edzo, NT
Height:	23 m	**Normal Surface:**	5,640,147 m2
Length:	152 m	**Normal Capacity:**	3,384,013 m3
Dam Type:	Rock-fill with impermeable core	**Max Capacity:**	87,306,912 m3
Spillway:	2 controlled underflow gates	**Spillway Capacity:**	442 m3
Dikes:	(2) North, South	**Drainage Area:**	153 km2
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:	breech north saddle dam		

C) Snare Cascade

Hazard Classification: Low
Location and Access: 150 km by air north-east of Yellowknife, NT
100 km by water north of Rae/Edzo, NT
Latitude: 63o 25.3' N **Longitude:** 116o 13.2' W
River/Stream: Snare River **Nearest City/Town:** Rae/Edzo, NT
Height: 7 m **Normal Surface:** 220,000 m2
Length: 162 m **Normal Capacity:** 220,000 m3
Dam Type: rock-fill with impermeable core **Maximum Capacity:** 1,261,834 m3
Spillway: uncontrolled labyrinth weir **Spillway Capacity:** 434 m3
Dikes: none **Drainage Area:** 28 km2
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: breech right abutment

D) Strutt Lake & Snare Forks

Hazard Classification: Low
Location and Access: 140 km by air north-east of Yellowknife, NT
90 km by water north of Rae/Edzo, NT
Latitude: 63o 20' N **Longitude:** 116 o 20' W
River/Stream: Snare River **Nearest City/Town:** Rae/Edzo, NT
Height: 18 m, 10 m **Normal Surface:** 10,900,205 m2
Length: 160 m, 105 m **Normal Capacity:** 6,540,018 m3
Dam Type: rock-fill with impermeable core **Max Capacity:** 77,449,680 m3
Spillway: uncontrolled weir **Spillway Capacity:** 364 m3
Dike: (3) #1, #2, #3 **Drainage Area:** 73 km2
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: breech freeboard dyke #1

4.0 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 System Control & Hydro Planning Manager**. Phone numbers are given in Section "Communications Directory."

(See also Section 3.0 for telephone locations, radio, and back-up systems.)

The System Control & Hydro Planning 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 shown on Fig. 2-1. 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 HOD 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 HOD 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.

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 System Control & Hydro Planning 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 HOD 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.

4.3 Earthquakes

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

In the case of an earthquake alert the System Control & Hydro Planning Manager shall immediately arrange for a general overall inspection of the dam and surrounding slopes.

The System Control & Hydro Planning 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 Vice-President of Operations 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 HOD, 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. Vice-President of Operations and Engineering
   c. Director of Security and Safety
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 on line as long as possible. Ask caller to repeat message. Try to record every word spoken by caller.
2. If caller does not indicate the location of bomb or time of detonation, ask caller 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 HOD, who shall then notify:
   a. RCMP
   b. Vice-President of Operations
   c. Safety Manger, West
6. Evacuate dam site under supervision of the HOD.

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 HOD 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.** Vice-President of Operations
   - **c.** Director of Security and Safety

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 mainstem, 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 mitigative 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 mitigative measures would be implemented. These would include, for example, early draw down of Big Spruce reservoir and the Falls and Forks forebays, heightening of major dams, removal of small very low head side dams, etc. as described subsequently.

4.5.2 Mitigative 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 fairly 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 kilometres 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 20.574 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, first priority would be directed towards saving the Rapids dam with its attendant large volume of stored water.

3. **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.). This is the maximum water level allowed by licence. The top of the dam is at elevation 176.78 m (580 ft.). The top of the right side dam is slightly lower at about elevation 175.3 m (575 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 the low side dam 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 mitigative 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 m3/s at Big Spruce Reservoir was attenuated to a maximum daily outflow of 424 m3/s. A confirming estimate of 434 m3/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 m3/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 m3/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).

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 centre operator by radio. The highest rise in water levels would occur just below each dam. The flood wave would have virtually no major affect 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 System Control & Hydro Planning 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 HOD and the System Control & Hydro Planning Manager.

4.7 Response During Periods of 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 the powerhouse at Snare Forks.

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 tailwater 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 as long as the Falls forebay is kept within licensed limits.

The minimum flow release requirement below the Falls forebay is 5.66 m3/s (200 cfs). 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 kilometre 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 217.8 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 Special Water Licence Exemptions for Scheduled Maintenance

For short periods of time each year, it is necessary to apply to the Water Board for special exemptions 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 apply to the Water Board for special exemption to cease Falls dam releases completely for one eight hour period while debris is cleared from the tailrace with heavy equipment.

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. 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 m3/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. Hence the licensed minimum outflow from the Falls forebay could be sustained. During the few days it would take the 5B spillage to work its way through the several small lakes between the 5B spillway and the Falls forebay, minimum licensed outflows from the Falls forebay could be sustained by withdrawing water from storage. 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.).

In the very unlikely event that Big Spruce reservoir was below this level at the time that the Rapids generator failed, then the constriction in the 5B channel would not allow sufficient spillage from Big Spruce reservoir to satisfy downstream licensed minimum flow releases for more than a few weeks. If this were to happen, then NTPC would immediately remove some of the restrictions. A wintertime operation would involve a drag line. A summertime operation would require blasting and some hand labour.

If the Falls plant generator were to fail, licensed minimum forebay flow releases would be maintained by opening the spillway gates.

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. At that point, there would be sufficient outflow over the uncontrolled Forks spillway to meet the licensed minimum release requirement.

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 System Control & Hydro Planning Manager

   The System Control & Hydro Planning Manager shall:

1. Notify the HOD 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 OS is informed of an accident already reported to the RCMP, he shall report the event to the Vice-President of Operations.

5.0 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: HOD

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

Person responsible for the notification: HOD

5. Provisions for security measures at the dam; and
6. Reporting termination of emergency situation 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 & Hydro Planning Manager whose headquarters are the Yellowknife Area Office and can normally be contacted there. Local staff attends 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 HOD. Where advice or special expertise is required, it is the responsibility of the HOD 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.

6.0 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:

6.1.1 NTPC
6.1.2 RCMP
6.1.3 NWT Emergency Coordinating Committee
6.1.4 Local Municipalities

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

	Office Telephone	Home Telephone
Yellowknife		
Area Office		
Manger, System Control & Hydro Planning Ken Dies	669-3327	873 8034
Plant Manager Norm McBride	669-3326	920-2885
Hydro Maintenance Manager Randy Waddell	669-3306	873-4322
Director, Hydro Operations Randy Patrick	669-3301	766 2392
Yellowknife Control Centre	669-3340	
Snare Staff House	669-4863	
Snare Rapids Powerhouse	669-4860	
Snare Falls Powerhouse	669-4850	
Snare Cascades Powerhouse	669-4880	
Snare Forks Powerhouse	669-4870	
Head Office – Hay River		
President & CEO Leon Courneya	874-5245	874-2417
Director of Engineering Steven Kerr	874-5276	

6.1.2 RCMP

Behchoko	867-392-1111

6.1.3 GNWT Emergency Measure Organization

Yellowknife	873-7554 (24 hours)
FAX	873-8193

6.1.4 Local Municipalities

Behchoko

Hamlet Office	392-6500
Garage	392-6111
Medical emergency	392-6075
Fire	392-2222, 371-2222
RCMP	392-1111

Yellowknife

City Hall	920-5600
RCMP	669-1111
Ambulance	873-2222
Fire	873-2222
Stanton Hospital	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 and radio link. 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 669-3340. Each powerhouse, staff house, and vehicle is equipped with phone access through the microwave system and with repeaters at Snare Rapids Snare Falls and Snare Forks. In addition, the staff house at Snare Rapids and the operator's truck at Snare are equipped with radio telephones to access the Northwest Tel system through their Snare repeater and Rae Edzo repeater. These phones are generally used only if the microwave system is out of service. In addition there is a powerline carrier that can be used as a backup communications system.

6.3 Road Communications

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.

   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.

2. **Helicopters**

   There are numerous possible helicopter landing areas at each dam.

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 gas generator located in the Emergency Response facility located near Snare Rapids helipad.

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 - John Deer tracked Hi Hoe – back hoe
1 - Champion D-760 Grader c/w V-plow, wing-plow
1 - Pelomix 1 yd batch cement mixer
2 - 16 foot aluminum boats with 25 hp outboard motors
2 - 14 foot aluminum boats with 15 hp outboard motors

6.7 Off-site Equipment and List of Contractors

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

	Office Telephone Numbers
Hamlet of Bohchoko	392-6500
Garage	392-6111
City of Yellowknife	920-5600
Works Garage & City Stores	873-2671
RTL Robinson Trucking Ltd.	873-6271
Two Way Enterprises	873-5322
First Air	669-6600
Air Tindi	669-8200
Great Slave Helicopters	873-2081
Arctic Sunwest	873-4464

7.0 Inundation Maps

In the event of a complete dam breach, the areas of inundation have been determined for each dam site. This area was determined by finding the area covered if all of the water in the reservoir of the dam was immediately displaced into the inundation area. This method neglects the time taken for the water to reach the inundation area and neglects the outflow from the inundation area. Using this method, the inundation areas calculated were slightly larger than the worst case scenario possible. This is considered to be a high factor of safety for this study.

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. Slemon Rapids has been modeled as a constriction point and outflow has been neglected.

1. **Snare Rapids**

   The Snare Rapids dam has the largest reservoir of the dams on the Snare River. A total breach of the Snare Rapids Dam would cause a breach of all the subsequent dams on the Snare River: the Falls, the Cascades, and the Forks. The area of inundation in the event of a complete breach is shown on figure 1 as Snare Rapids Failure. The water in this area would reach an elevation of approximately 176 m (580 ft) within 40 hours after the breech of Snare Rapids dam as shown in figure 1.

2. **Snare Falls**

   A complete failure of the Snare Falls dam would cause subsequent failure of the Snare Cascades and Snare Forks dam. The area of inundation in the event of a breach is shown as Snare Falls Failure on figure 1.

3. **Snare Cascades**

   A failure of Snare Cascades would not cause a subsequent failure of the Snare Forks dam. The water from the Snare Cascades reservoir would be contained in the Snare Forks forebay (Judd Lake) and would not cause a significant change in the surface area of the Forks forebay. Judd Lake would remain as shown on figure 1.

4. **Snare Forks**

   A complete failure of Snare Forks would cause an insignificant change to the area of Strutt Lake and the Snare River. It would remain the original size shown on figure 1 .

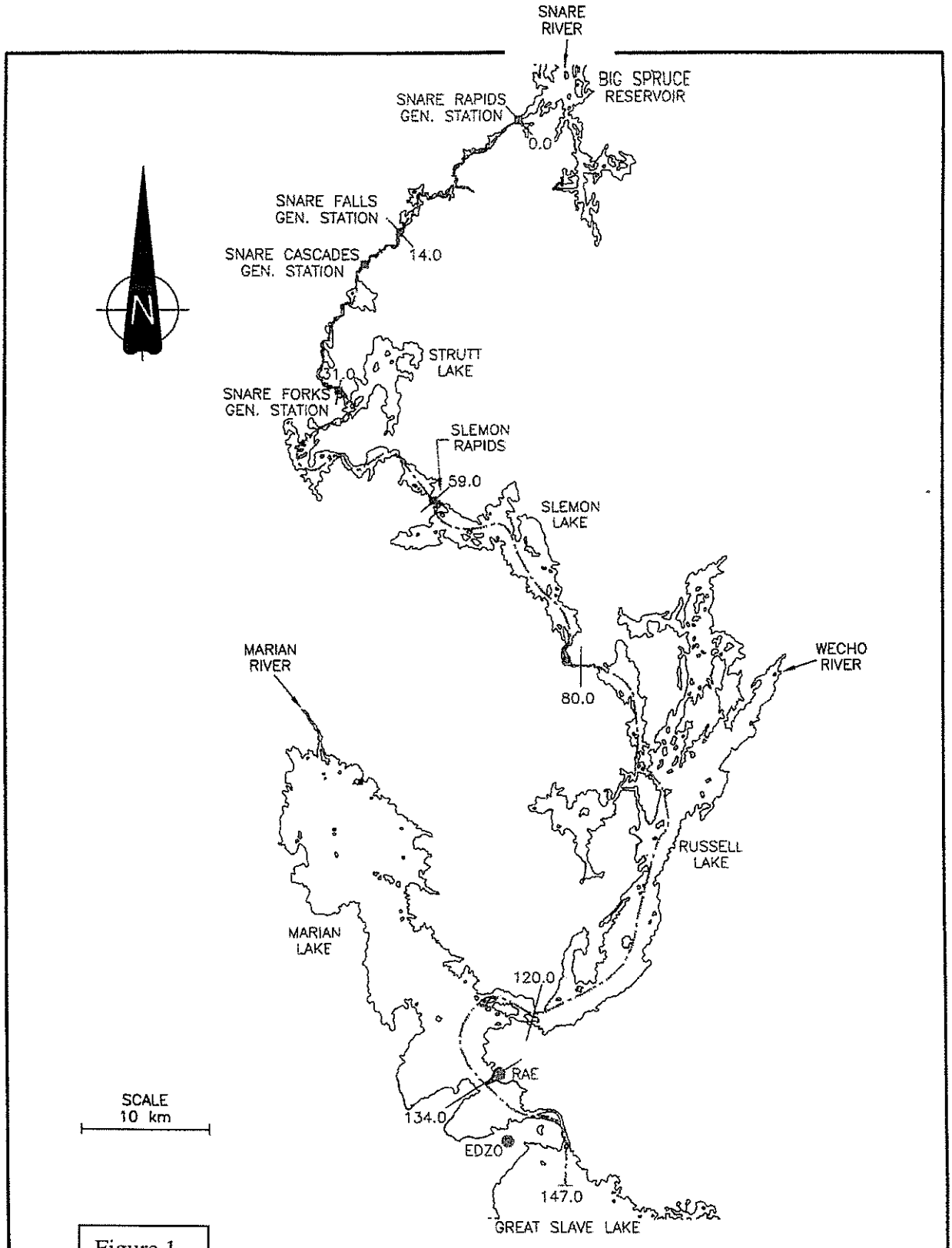
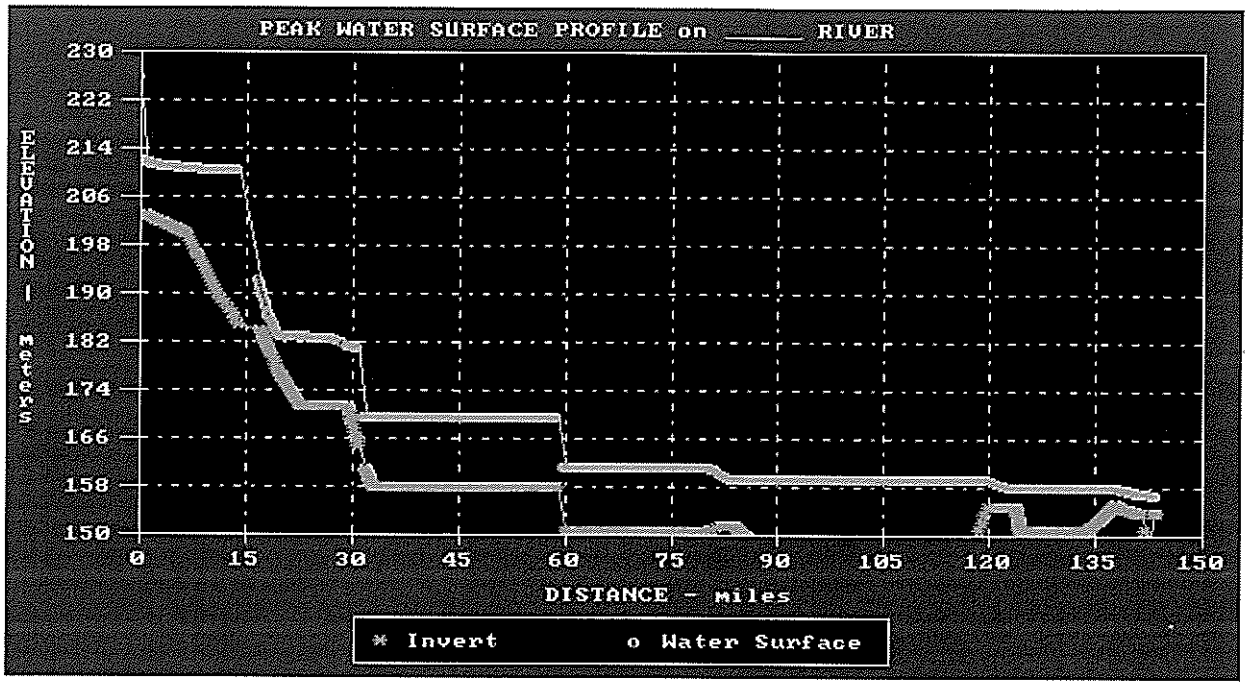


Figure 1 Features of Snare Hydro Complex and Downstream Waterways.

Figure 2

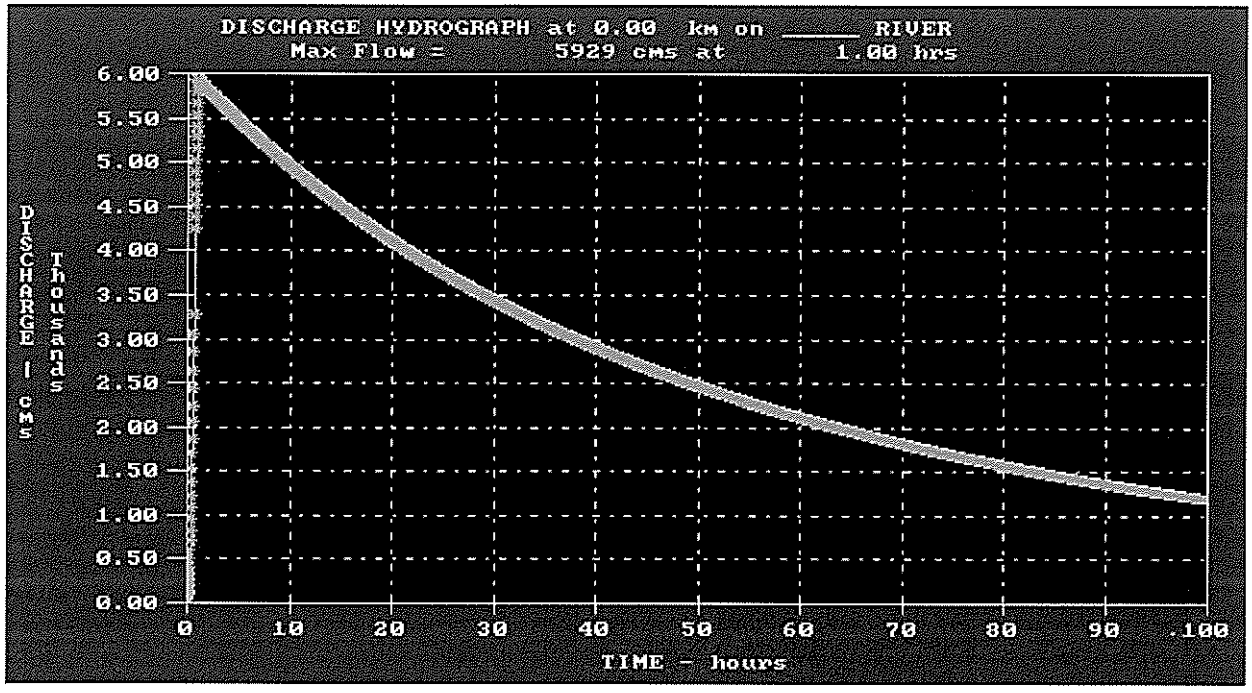


Sunny Day Dam Failure, Peak W.L. Profile – Snare Rapids to Great Slave Lake

Locations:

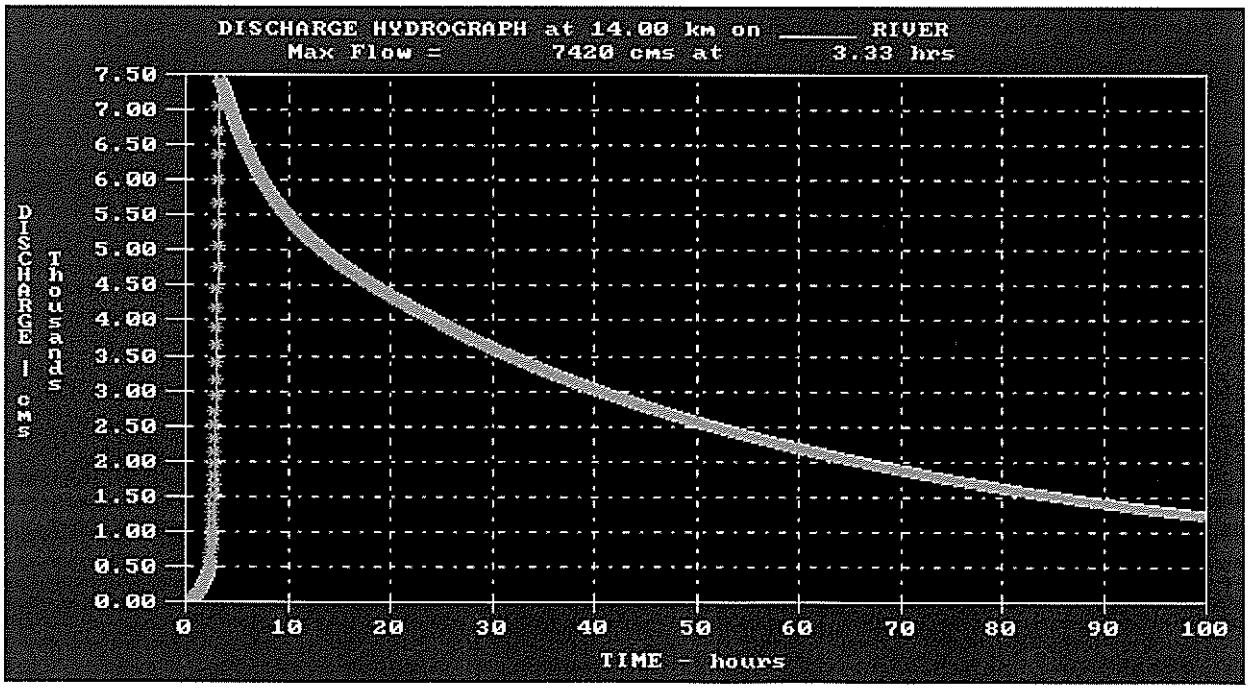
km 0.0	Snare Rapids G.S
km 14.0	Snare Falls G.S.
km 31.0	Snare Forks G.S.
km 59.0	Slemon Rapids (outlet Strutt Lake)
km 80.0	Outlet – Slemon Lake
km 120.0	Outlet – Russell Lake
km 134.0	Rae
km 136.0	Edzo
km 142.5	Highway Bridge
km 144.0	Great Slave Lake

Figure 3



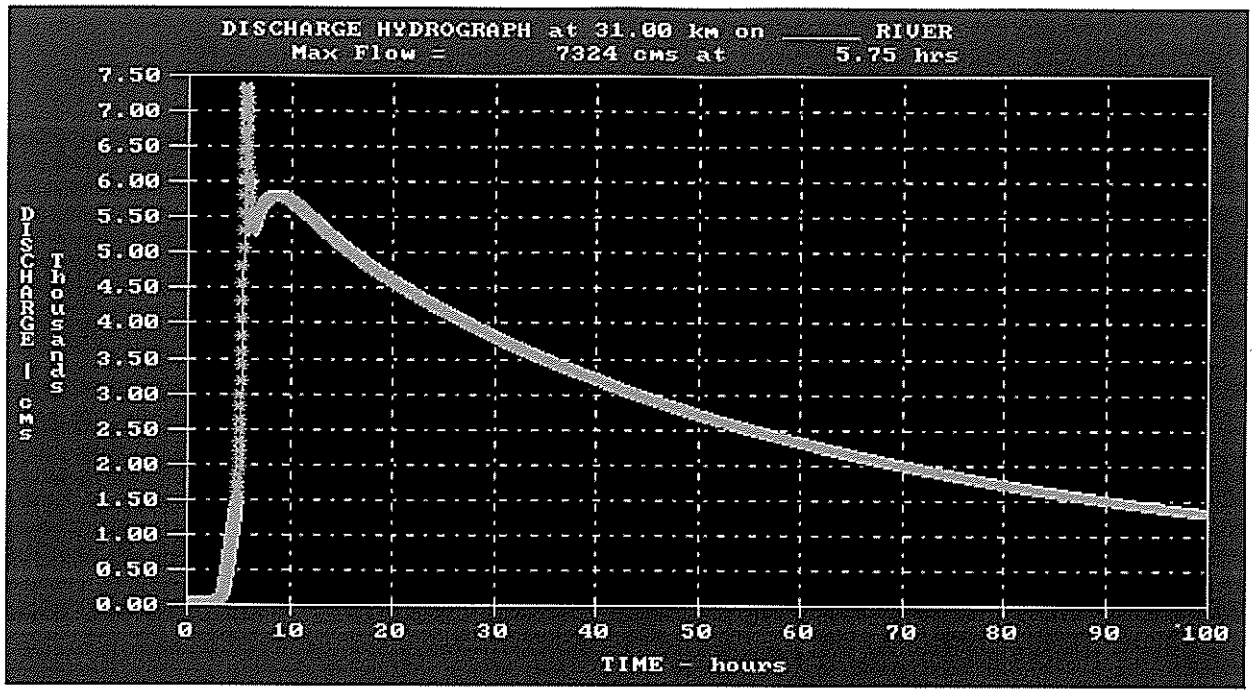
Sunny Day Dam Failure – Outflow Hydrograph, Snare Rapids G.S.

Figure 4



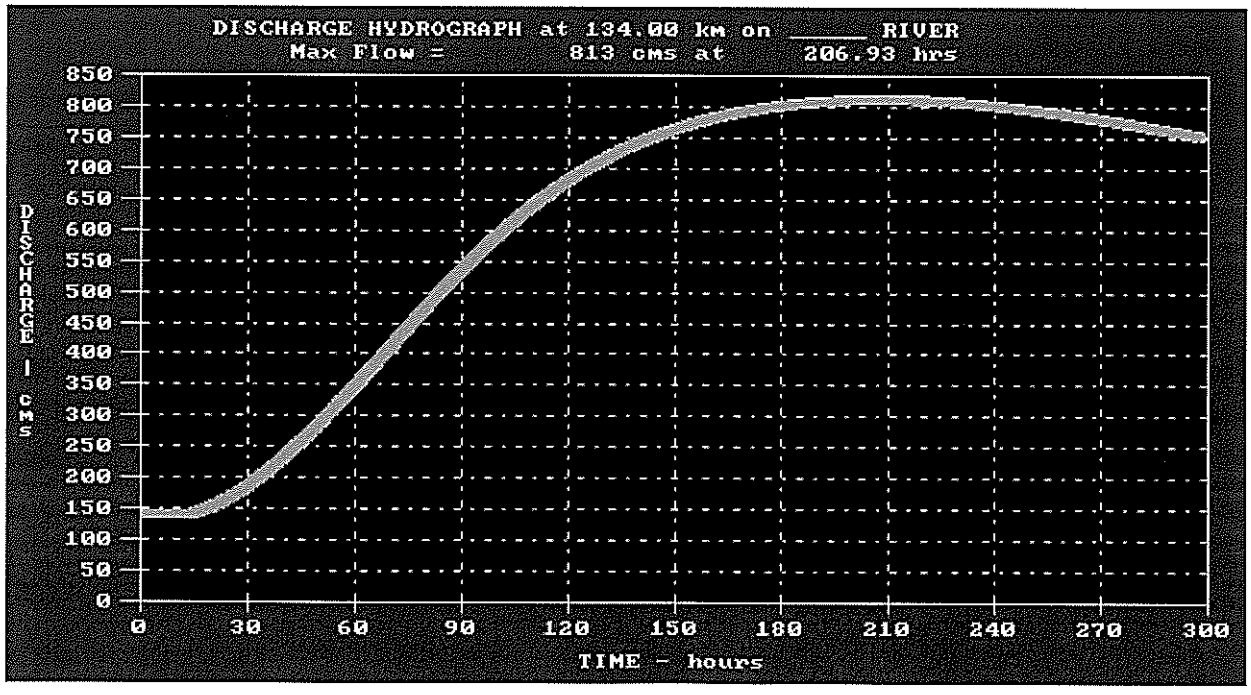
Sunny Day Dam Failure – Outflow Hydrograph Snare Forks G.S.

Figure 5



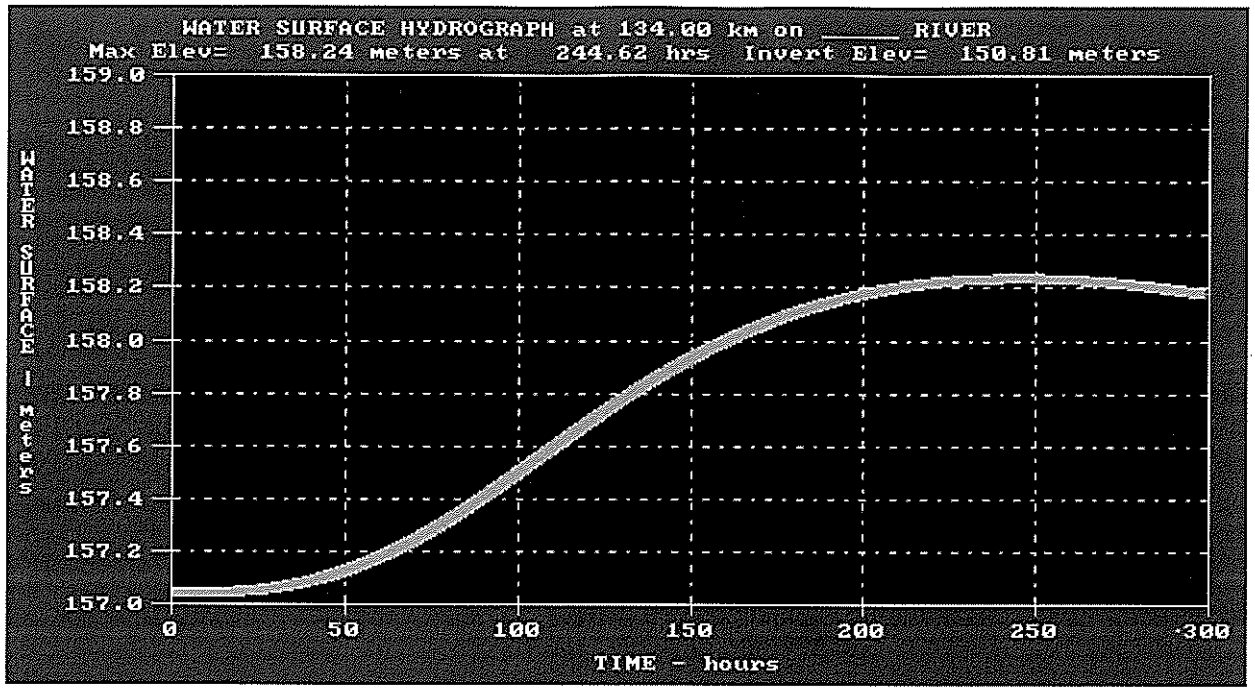
Sunny Day Dam Failure, Outflow Hydrograph, Snare Forks G.S.

Figure 6



Sunny Day Dam Failure Flow Hydrograph at Rae

Figure 7



Sunny Day Dam Failure. W.L. Hydrograph at Rae

Figure 8

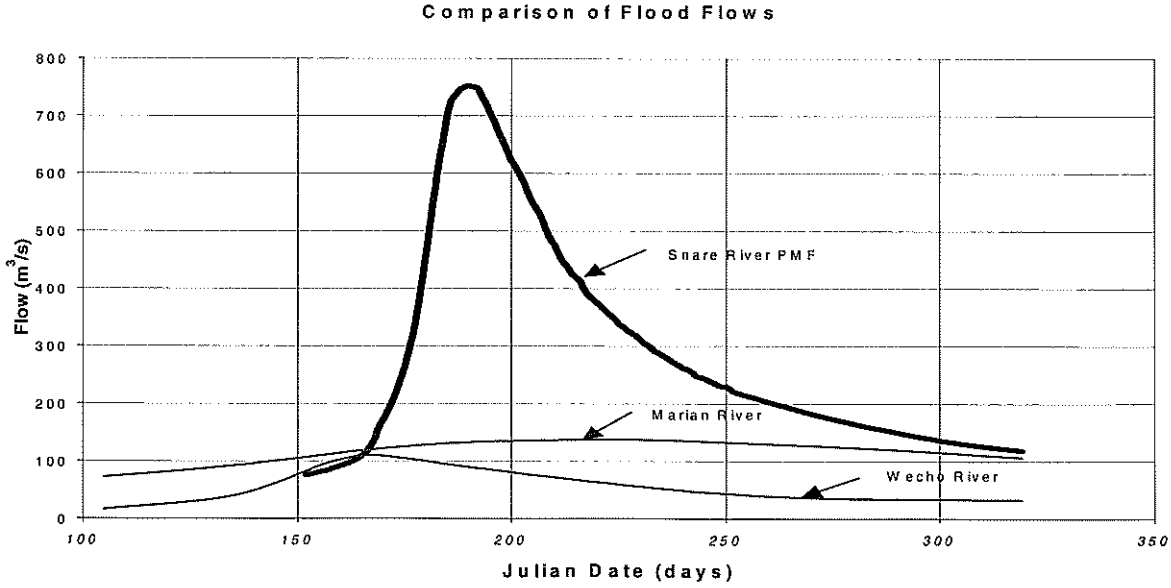
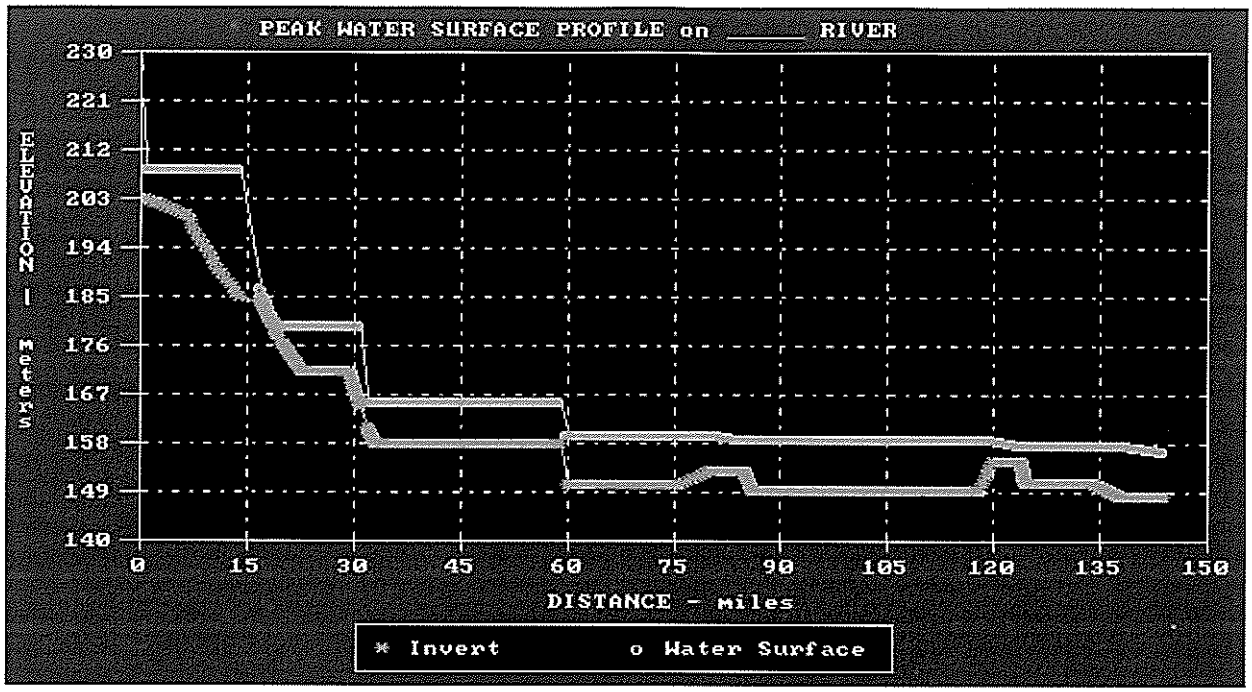


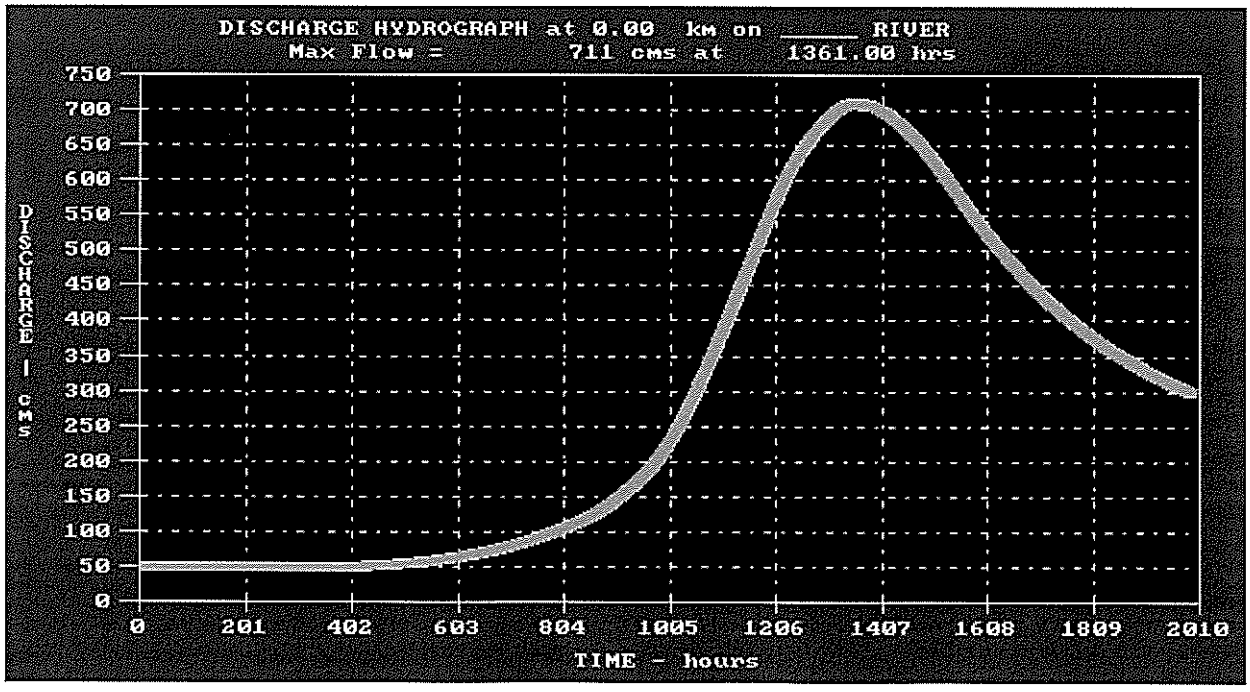
Figure 9



Probable Maximum Flood – Peak W.L. Profile

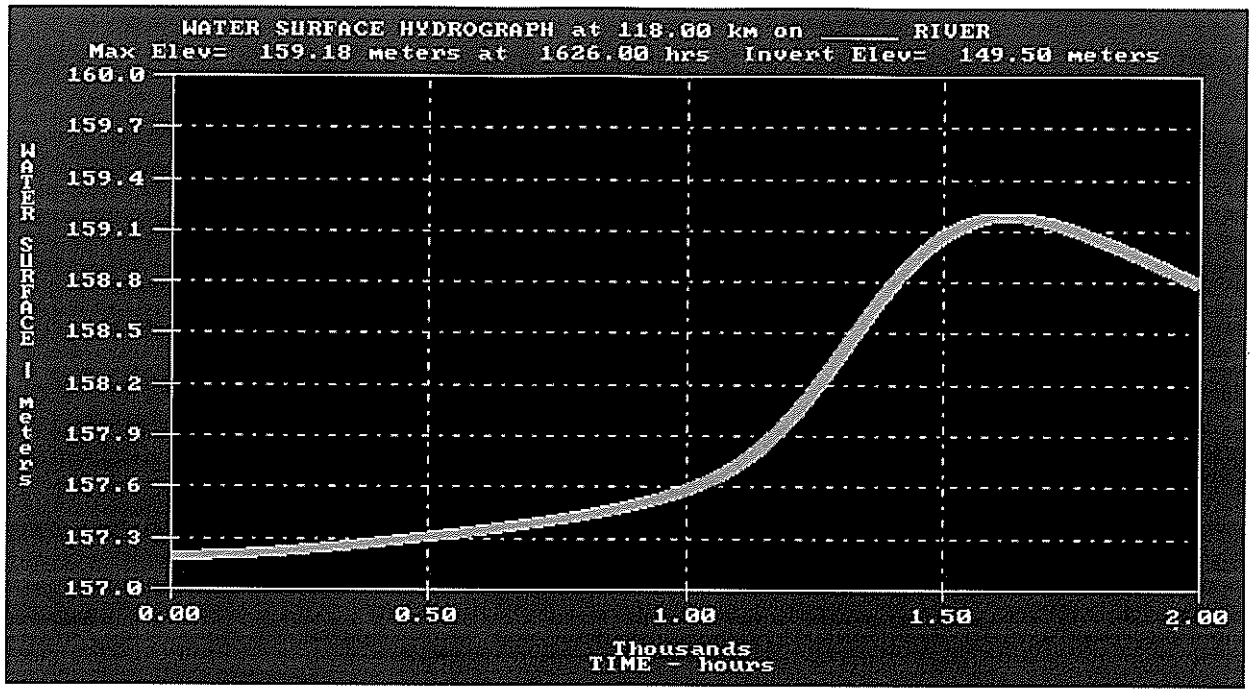
For Locations, see Figure 1

Figure 10



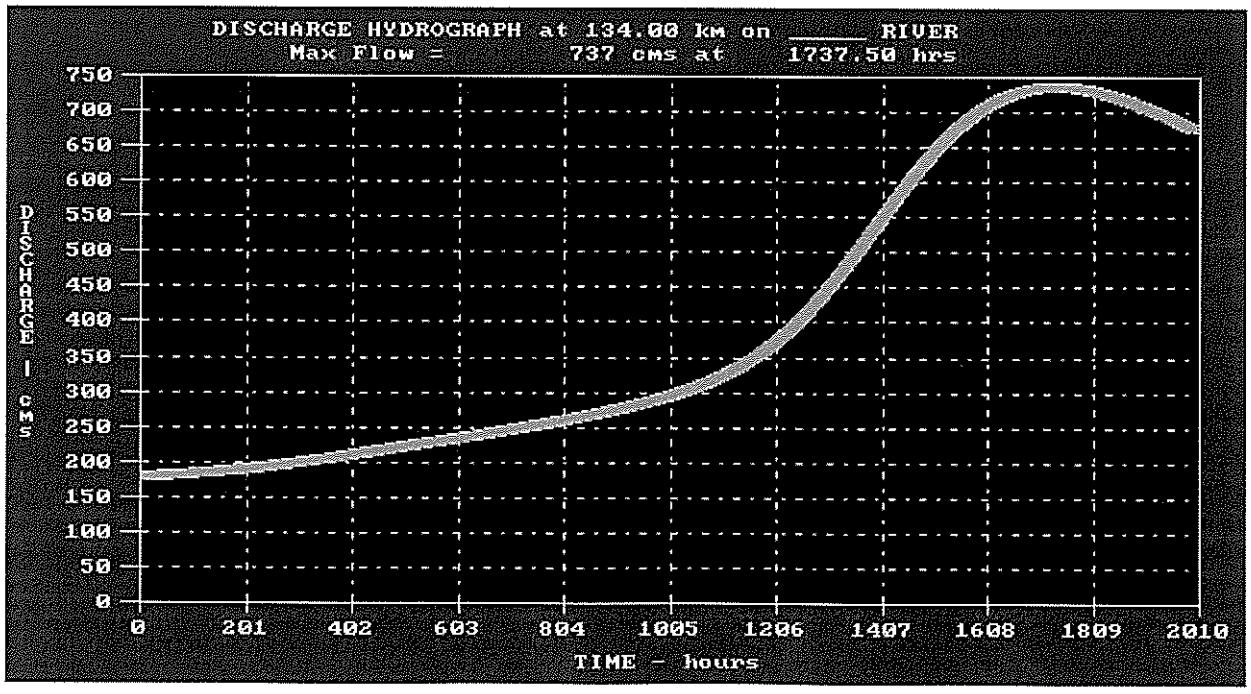
PMF Outflow Hydrograph at Snare Rapids G.S

Figure 11



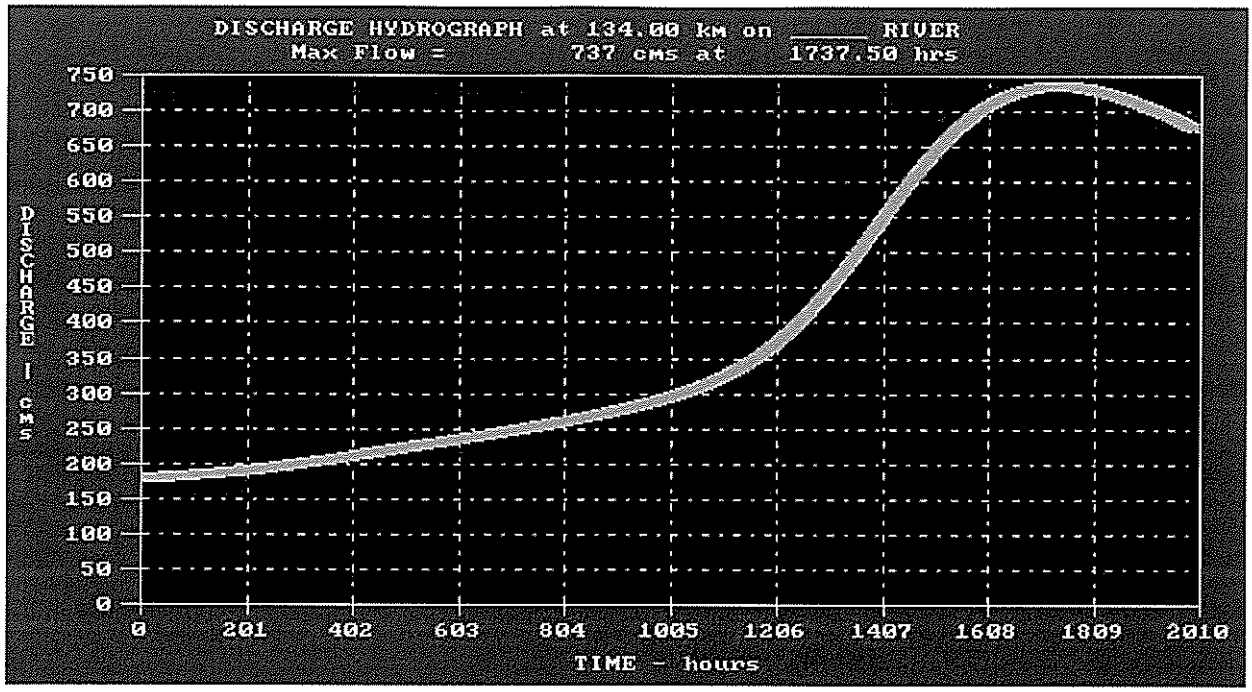
PMF Flood Levels at Russell Lake

Figure 12



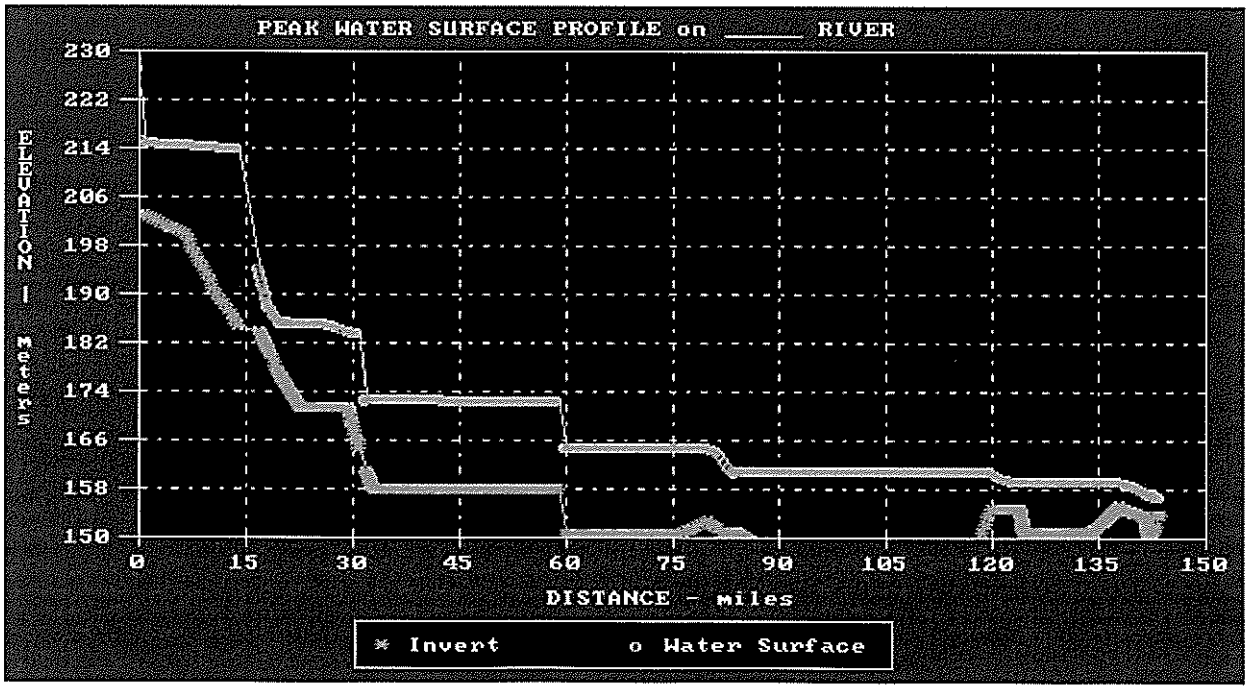
PMF Flood Levels at Rae

Figure 13



PMF Flows at Rae

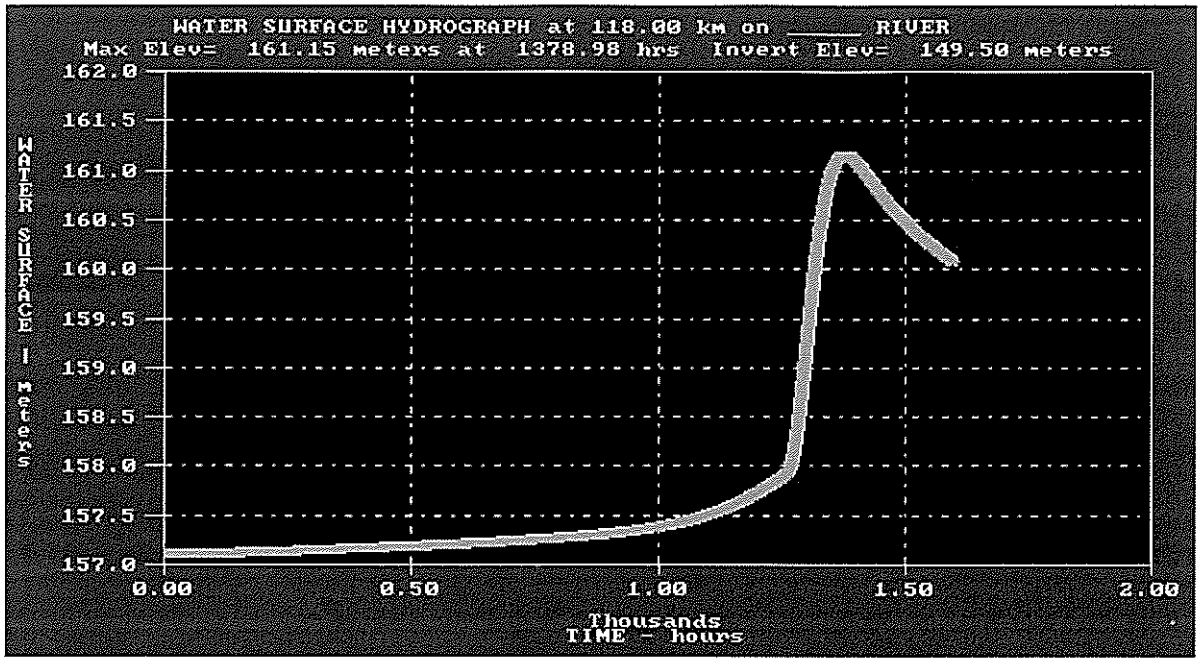
Figure 14



Dam Failure with PMF. Profile of peak W.L.S.

For Locations, see Figure 1

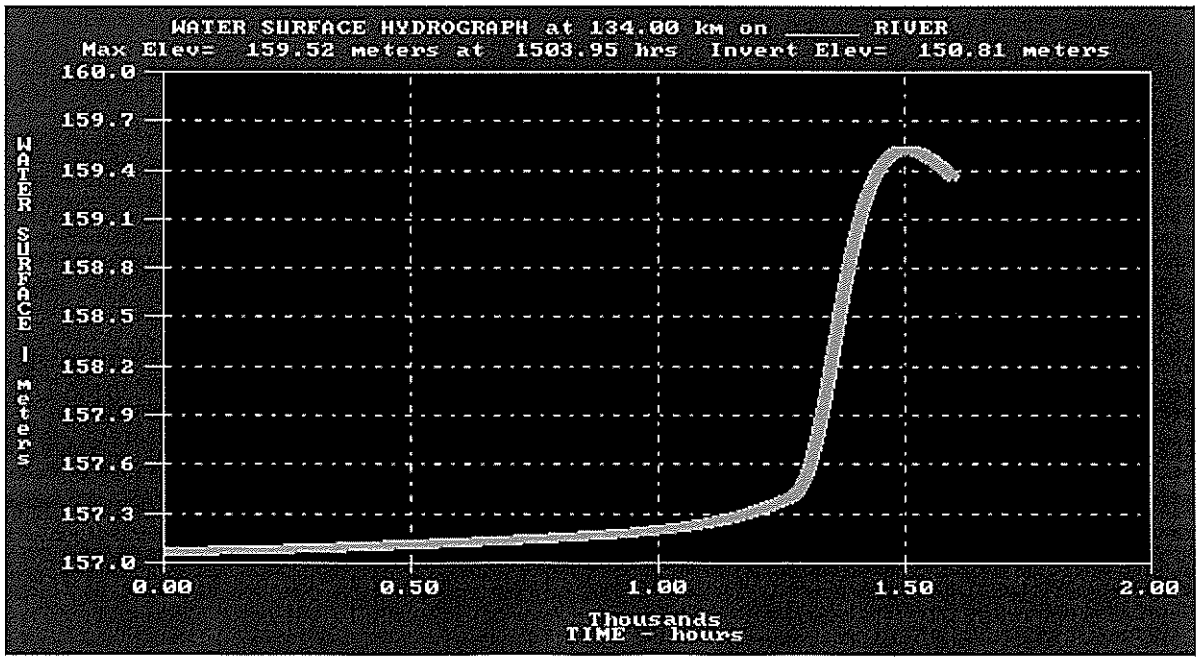
Figure 15



Dam Failures with PMF Water Levels, Russell Lake

Note: Failure of Snare Rapids Main Dam occurred at 1254 hours.

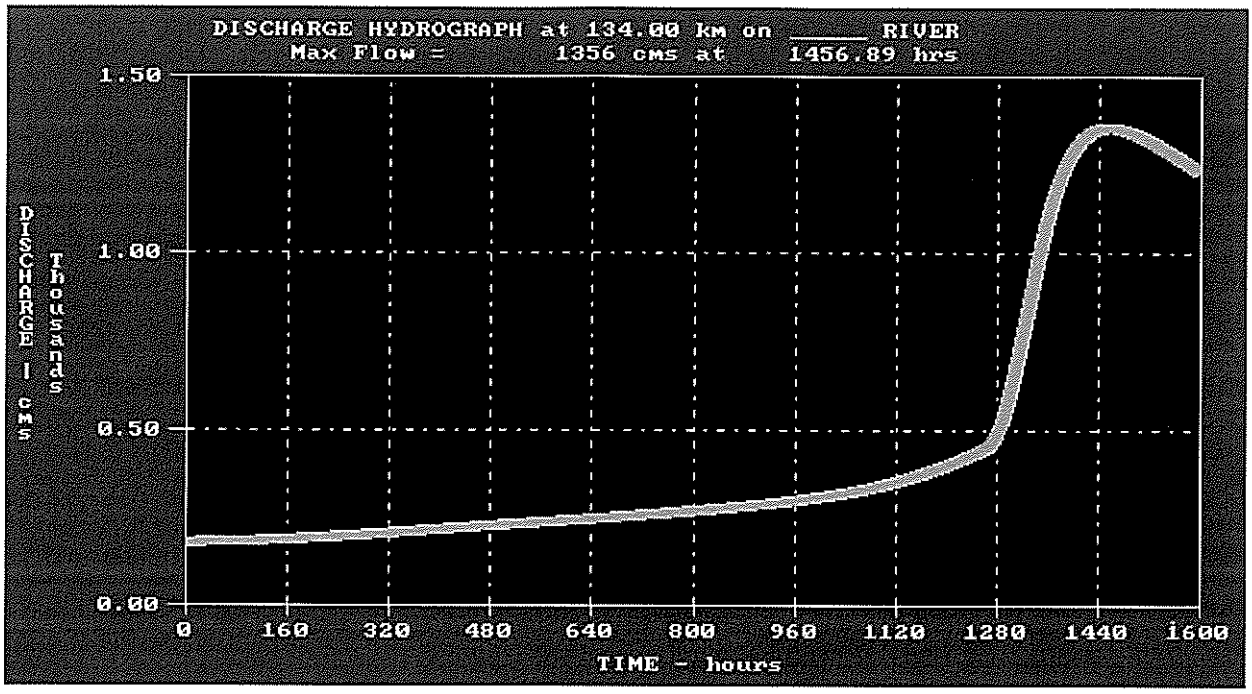
Figure 16



Dam Failure with PMF Water Levels near Rae

Note: Failure of Snare Rapids Main Dam occurred at 1254 hours.

Figure 17

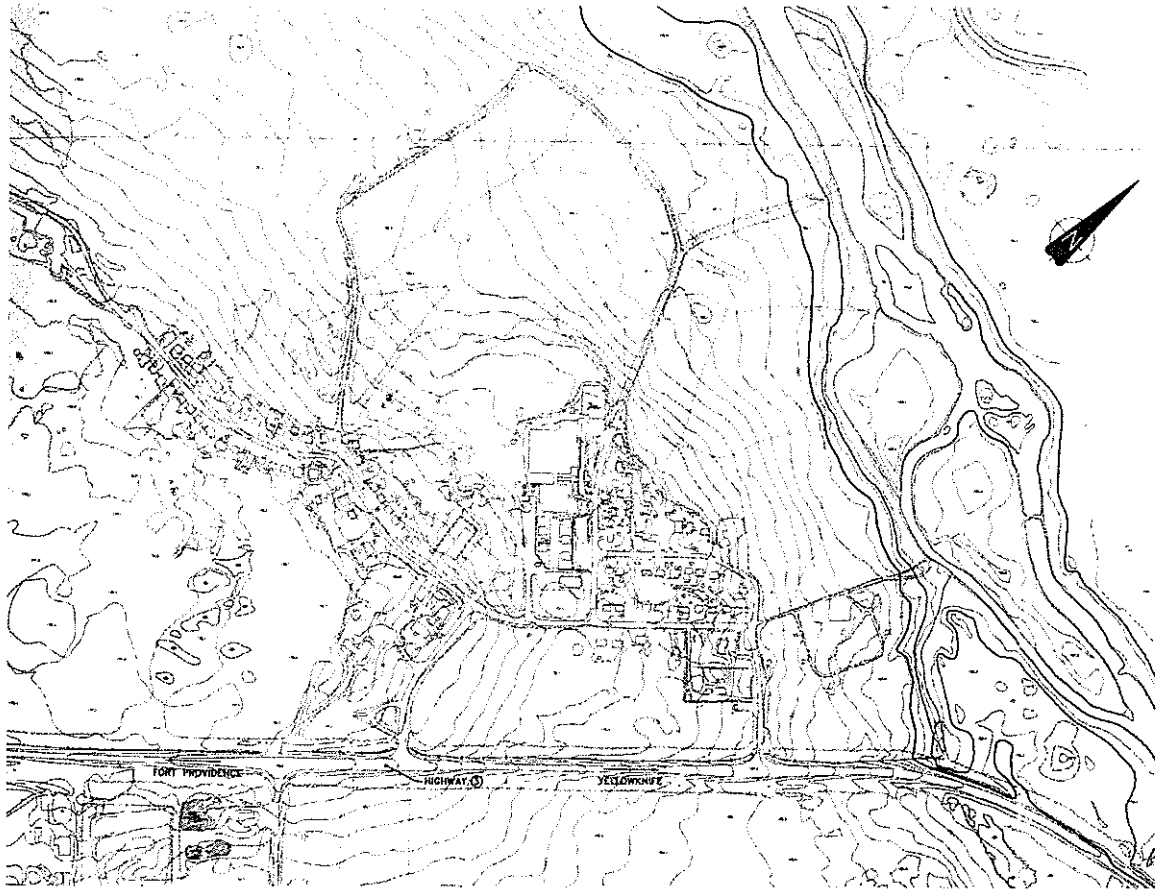


Dam Failure with PMF Flows near Rae

Note: Failure of Snare Rapids Main Dam occurred at 1254 hours.



Flood Contours - Rae



Flood Contours – Edzo

8.0 Appendices A – Maintenance and Testing of the EPP

The Safety & Environment Manager shall ensure that local staff maintains familiarity with the continually updated EPP by scheduling period 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. **Annually** – All involved personnel should be given a training drill on the EPP. This may consist as a table top exercise or an actual test of timely response to spillway operation.

9.0 Appendices B – List of Third Party Contacts - Suppliers

Generator Rental

Name	**Power Plus Rentals**
Contact	Dave Lassu
Address	7003 Girard Road Edmonton, AB T6B 2C4
Phone No	780 485 0066
Fax No.	780 485 0041
Cell no	780 721 0971
E-mail Add.	dlassu@telusplanet.net
Max Size Unit	780 KW
Voltage	600

Name	**Grizzly Power**
Contact	Kevin Nelson
Address	1400-10 Street Nisku, AB T9E 8J4
Phone No	780 955 3305
Fax No.	780 955 2260
Cell no	
E-mail Add.	generators@grizzlypower.com
Max Size Unit	
Voltage	

Name	**Wirtenan Electric**
Contact	
Address	5635 Gateway Boulevard Edmonton, AB T6H 2H3
Phone No	780 434 8421
Fax No.	780 437 2658
Cell no	
E-mail Add.	wesco@wirtenan.com
Max Size Unit	Transformer, Elect. Equipment
Voltage	Temporary Power Distribution

Name	**Finning – Hay River**
Contact	Mitch Thompson, Cust. Serv. Mgr
Address	23 Industrial Drive Hay River, NT X0E 0R6
Phone No	867 874 6537
Fax No.	867 874 6570
Cell no	867 874 1104
E-mail Add.	mathompson@finning.ca
Finning 24 Hr	**line – 1 888 346 6464**

Name	**Finning – Yellowknife**
Contact	Patrick Kirychuk
Address	327-8 Old Airport Road Yellowknife, NT X1A 3T3
Satellite Ph:	403 982 0933
Phone No	867 766 3578
Fax No.	867 873 6867
Cell no	867 444 3195
E-mail Add.	
General Line,	**Parts and Service Sales**

Name	**Finning – Yellowknife**
Contact	Ron Drewry
Address	327-8 Old Airport Road Yellowknife, NT X1A 3T3
Phone No	867 920 7481
Fax No.	
Cell no	867 444 4500
E-mail Add.	
Manager NWT	

Contractors

Name	**Nuclear Electric**
Contact	Ron Danyluk
Address	Box 57006, 2020 Sherwood Drive Sherwood Park, AB T8A 5L7
Phone No	780 448 1903
Fax No.	780 448 1905
Cell no	
E-mail Add.	
	Electrical Services

Name	**Adco Power**
Contact	Bill Slater
Address	8750 – 58 Ave Edmonton, AB T6E 6G6
Phone No	780 465 3265
Fax No.	780 466 8086
Cell no	780 910 9410
E-mail Add.	slater@adcopower.com
	Electrical Mechanical Services

Name	**Janus Project**
Contact	Laurie Denys
Address	#105 8712-48 Ave Edmonton, AB T6E 5L1
Phone No	780 450 1818
Fax No.	780 465 1116
Cell no	
E-mail Add.	ldenys@janusprojects.com
	Electrical Mechanical Services

Name	**South Side Porta Weld Ltd**
Contact	Danny Kernychny
Address	8110 Davies Road Edmonton, AB T6E 4N2
Phone No	780 465 4861
Fax No.	780 440 6967
Cell no	780 499 8469
E-mail Add.	
	Mechanical Services

Name	**Odesco**
Contact	Alec
Address	5330 89 Street Edmonton, AB T6E 5G9
Phone No	780 414 1422
Fax No.	780 448 3684
Cell no	
E-mail Add.	
	Electrical Services

Name	**Lapka Electric**
Contact	Joe Lapka
Address	835 Dusseault Crt Yellowknife, NT
Phone No	867 873 5631
Fax No.	867 873 8446
Cell no	867 444 4013
E-mail Add.	lapkael@ssimicro.com
	Electrical Services

Name	**Orbis**
Contact	Amin Kassam
Address	311 3624-119 Street Edmonton, AB T6J 2X6
Phone No	780 985 1455
Fax No.	780 988 0191
Cell no	780 913 8585
E-mail Add.	amin@orbisengineering.net
	Electrical Services

Switchgear Parts and Repairs

Name	**Laird Electric**
Contact	Kevin Pydde
Address	4410 97 Street Edmonton, AB T6E 5R9
	TOLL FREE: 888 450 9636
Phone No	780 450 9636
Fax No.	780 463 3035
Cell no	780 914 7417
E-mail Add.	Kevin.pydde@insulationholdings.com
	Electrical Services

Name	**Schneider Electric**
Contact	
Address	12825 1144 Street Bonaventure Industrial Park Edmonton, AB T5L 4N7
Phone No	780 453 3561
Fax No.	780 451 5085
Cell no	
E-mail Add.	
	Electrical Services

Governors

Name	**Henery & Sons**
Contact	
Address	87 Aurora Pointe Claire, PQ
Phone No	514 466 2063
Fax No.	514 466 3275
Cell no	
E-mail Add.	
	Electrical Services

Name	**Woodward – Alberta Governor Service**
Contact	Jack Hauck
Address	5977 103 A Street Edmonton, AB
Phone No	780 437 4673
Fax No.	780 434 2339
Cell no	
E-mail Add.	
	after hours: 467 8109 or 922 4504
	Electrical Services

Engine Suppliers

	MAN B&W
Engine Make	Ruston, Paxman, Mirrlees, MAN
Rating	500 to 6,480 kW
RPM	1,200 to 550 RPM
Name	**MAN B&W Diesel Canada Ltd.**
Contact	John Hawkes
Address	355 Wyecroft Road Oakville, ON L6K 2H2
Phone No	905 845 3444
Fax No.	905 842 7892
Cell no	
E-mail Add.	jhawkes@manbw.ca

Engine Make	
Rating	500 to 6,480 kW
RPM	1,200 to 550 RPM
Name	**International Energy Systems**
Contact	Doug Cullen
Address	570 Ebury Place Delta, BC V3M 6M8
Phone No	604 540 5080
Fax No.	604 540 5090
Cell no	
E-mail Add.	ies@iesl.com

Engine Make	**Caterpillar**
Rating	227 to 4,400 kW
RPM	1,800 to 900 RPM
Name	**Finning Power System**
Contact	Gary Warneboldt
Address	6735 11 Street NE Calgary, AB T2E 7H9
Phone No	403 295 5740
Fax No.	403 295 5725
Cell no	
E-mail Add.	gwarneboldt@finning.ca

Engine Make	**Caterpillar**
Rating	227 to 4,400 kW
RPM	1,800 to 900 RPM
Name	**Powell Arctic Ltd**
Contact	Chris Moskal
Address	1455 Buffalo Place Winnipeg, MB R3T 1L8
Phone No	204 453 4343
Fax No.	204 478 3379
Cell no	
E-mail Add.	moskal@powell.ca

Engine Make	**Detroit Diesel MTU**
Rating	270 to 4,400 kW
RPM	1,800 to 1,200 RPM
Name	**Waterous Detroit Diesel - Allison**
Contact	Jerry Neddow, Nick Kwasnycia
Address	10025 51 Ave Edmonton, AB T6E 0A8
Phone No	780 437 8288, 780 437 8274
Fax No.	780 437 5864
Cell no	780 915 5762
E-mail Add.	jneddow@wdda.com

Engine Make	**Detroit Diesel, EMD**
Rating	780 to 3,600 kW
RPM	1,200 to 900 RPM
Name	**Midwest Power Products**
Contact	David Jones
Address	1460 Waverley Street Winnipeg, MB R3T 0P6
Phone No	204 452 8244
Fax No.	204 452 2153
Cell no	204 228 9735
E-mail Add.	djones@midwestdda.com

Engine Make	**Cummins**
Rating	36 to 1,860 kW
RPM	1,800 RPM only
Name	**Cummins Alberta**
Contact	Gary Potter
Address	11731 181 Street
	Edmonton, AB T5S 2K5
Phone No	780 454 9365 Ext. 233
Fax No.	780 452 9887
Cell no	780 940 1768
E-mail Add.	gary.a.potter@cummins.com

Engine Make	**Wartsila**
Rating	690 to 11,850 kW
RPM	1,800 to 720 RPM
Name	**Wartsila NSD Canada Inc.**
Contact	Gordon Murrin
Address	164 Akerley Blvd.
	Dartmouth, NS B3B 1Z5
Phone No	902 468 1264, 800 468 1264
Fax No.	902 468 1265
Cell no	
E-mail Add.	

Voltage Regs	
Rating	
RPM	
Name	**Innovelec**
Contact	W. M.. (Bill Cackett)
Address	3 Rhatigan Road East
	Edmonton, AB T6R 1M9
Phone No	780 430 6155
Fax No.	780 430 6155
Cell no	780 905 8748
E-mail Add.	bcackett@shaw.ca

Outside Agencies
A copy of the EPP will be sent to all agencies involved in the emergency procedures as listed in Section 6.1.

NTPC will revise and update the EPP as necessary and arrange for distribution of the revisions to all outside agencies. A record of review by outside agencies shall be maintained on file by the OS.

Surveillance
Routine inspections shall be made once per year by NTPC personnel, usually in the fall. A Water Resource Officer from INAC generally accompanies NTPC personnel on the inspection each year. A formal geotechnical inspection of the structures is performed at 5 year intervals.

Public Facilities
There are no public facilities at the sites.