Q. Please provide a copy of the following process procedures for Newfoundland Power's hydro facilities:
a. Work Management
b. Maintenance
c. Operations

A. Attachment A to this response provides Newfoundland Power's *Plant Operating Guidelines* for the maintenance and operation of the Company's hydro and thermal facilities.[1]

[1] A detailed description of Newfoundland Power's work management practices for its generating facilities was provided in response to Request for Information PUB-NP-175 of the 2014 investigation into *Supply Issues and Power Outages on the Island Interconnected System*. That response included both maintenance and capital refurbishment programs and practices, and how the generator maintenance programs are managed including the use of maintenance management software.

Plant Operating Guidelines

Bulletin Number: POG100.01
Date Issued: 2002 05 04
Date Revised: 2012 07 27
Date Reviewed: 2018 08 20

Inspection and Maintenance of Power Generating Facilities

Created By: B. Titford
Revised By: B. Hogan
Reviewed By: G. Whitty
Approved By: G. Humby

1.0 Purpose

The purpose of this procedure is to manage preventative maintenance (PM) inspections that are required for all generating facilities owned by Newfoundland Power.

2.0 Scope

This procedure applies to mechanical, civil and electrical systems associated with diesel, gas turbine and hydro generating facilities.

3.0 General

Newfoundland Power's power generating infrastructure is maintained in accordance with a comprehensive PM program. The PM program is developed and executed in an effort to ensure optimal performance and longevity of the power generating facilities.

4.0 Responsibilities

4.1 Director responsible for Generation Operations

- Will ensure that the overall PM program is appropriately resourced and coordinated.

4.2 Manager, Generation

- Will ensure that the PM procedures are completed each year.
- Will ensure fuel usage data is reviewed/analyzed.
- Will ensure that required plant improvement projects are identified.

Inspection and Maintenance of Power Generating Facilities

Created By: B. Titford
Revised By: B. Hogan
Reviewed By: G. Whitty
Approved By: G. Humby

4.3 Supervisor(s), Generation Operations:

- Will ensure that the PM procedures are completed for each generating facility under their responsibility.
- Will ensure the collection of fuel usage data.
- Will ensure that the plants are operating efficiently.

5.0 Procedure

5.1 Complete maintenance program for all generating facilities as provided in the Avantis maintenance system.

5.2 Review aspects of maintenance program to ensure appropriateness.

6.0 References

6.1 Reference Documents

- No documents referenced

6.2 Related Significant Aspects

- 720; 770

6.3 Legal and Other Requirements

- No legal or other requirements

Inspection and Maintenance of Power Generating Facilities

Created By: B. Titford
Revised By: B. Hogan
Reviewed By: G. Whitty
Approved By: G. Humby

7.0 Records

- Asset Management System Records

8.0 Glossary

Abbreviations:

- **PM** – Preventative Maintenance

Diesel Generating Plant - refers to electrical generating plants with a diesel engine as the prime mover.

Gas Turbine Generating Plant - refers to electrical generating plants with a combustion turbine engine as the prime mover.

Hydro Generating Plants - refers to electrical generating plants with a hydro turbine as the prime mover.

Bulletin Number: POG100.02
Date Issued: 1999 08 05
Date Revised: 2012 01 20
Date Reviewed: 2018 08 20

Rose Blanche Plant Fishery Flow Compensation Strategy

Created By: K. Nicholson
Revised By: P. O'Leary
Reviewed By: G. Whitty
Approved By: G. Humby

1.0 Purpose

Manage fishery flow compensation for the Rose Blanche hydro plant development.

2.0 Scope

This procedure applies to all operations or maintenance that could affect the flow of water down stream of the Rose Blanche hydro plant.

3.0 General

The Company is proactive in reducing impacts to fish and fish habitat as a result of operation of the Rose Blanche hydro plant.

4.0 Responsibilities

4.1 Director Responsible for Generation Operations

- Will provide resources in order to ensure that this fishery flow compensation strategy is followed.

5.0 Procedure

5.1 Fishery Flow Compensation Scheme

Rose Blanche hydro plant development has several design features that ensure adequate water flow to maintain fish habitat down stream of the plant. The compensation scheme utilizes two fishery flow compensation valves that can replace the normal flow of water through the plant.

Rose Blanche Plant Fishery Flow Compensation Strategy

Created By: K. Nicholson
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Approved By: G. Humby

The first valve, located at the forebay dam, is a 20" diameter butterfly valve operated by a manual hand wheel actuator and located at the base of the main dam structure. The valve is located within a concrete vault, locked in the closed position with a company issued padlock. A company issued lock key (available only to Newfoundland Power employees) is required to gain access to this valve. This valve is referred to as the Forebay Dam Fishery Flow Compensation Valve. Its purpose is to provide water down stream of the plant in the case of penstock dewatering. This valve is normally in the closed position.

The second valve, located in the powerhouse, is a 16" motor actuated valve. This valve is referred to as the Powerhouse Fishery Flow Compensation Valve. Its purpose is to provide water downstream of the plant when the hydro turbine is not operating and there is water in the penstock. The valve operates automatically in response to the turbine operation. This valve is also used to drain the penstock during the dewatering process.

There is a 16" butterfly valve in series upstream and with the Powerhouse Fishery Flow Compensation Valve, referred to as Fisheries Valve Isolator, to allow the powerhouse compensation valve to be isolated from the system for maintenance. This isolation valve is normally in the open position.

5.2 Flow Compensation Scenarios

The plant has basically 4 flow compensation scenarios:

5.2.1 Water is passing through the turbine to the tail race as a result of running the turbine. In this case, both compensation valves are in the closed position.

5.2.2 The turbine is shut down and water is passing through the open Powerhouse Fishery Flow Compensation Valve to maintain water downstream of the plant. The Forebay Dam Fishery Flow Compensation Valve is in the closed position.

5.2.3 Water flows through the Forebay Dam Fishery Flow Compensation when the turbine and Powerhouse Fishery Flow Compensation Valve are shut.

Bulletin Number: POG100.02
Date Issued: 1999 08 05
Date Revised: 2012 01 20
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5.2.4 During penstock dewatering, the Forebay Dam Fishery Flow Compensation valve is open. When water from this valve reaches the tailrace area of Rose Blanche Brook, penstock dewatering may start. In this case, the Powerhouse Fishery Flow Compensation Valve will also be open until the penstock is drained. The Forebay Dam Fishery Flow Compensation remains open until the penstock is refilled and the turbine is either in operation or the Powerhouse Fishery Flow Compensation Valve or Fisheries Valve Isolator is open.

5.3 Water Passing Through the Turbine

5.3.1 Water passing through the turbine in the normal operation of the plant may vary from maximum load to minimum 25% load. The amount of water passing through the turbine at 25% load will provide minimum water flows. Refer to POG100.03.20 - Rose Blanche Operating Procedures for details.

5.3.2 When the plant is in operation, both fishery flow compensation valves will be in the closed position.

5.4 Powerhouse Fishery Flow Compensation Valve

5.4.1 If the turbine shuts down or is taken off line, the Powerhouse Fishery Flow Compensation Valve will open automatically allowing water to bypass the turbine and enter the tailrace. This assumes that there is available water in the penstock.

5.4.2 In this mode, the Dam Forebay Fishery Flow Compensation Valve is in the closed position.

5.5 Forebay Dam Fishery Flow Compensation Valve.

5.5.1. The Forebay Dam Fishery Flow Compensation Valve provides water down stream of the plant if the penstock is dewatered or both the turbine and the Powerhouse Fishery Flow Compensation Valve are out of service at the same time. It must be manually operated.

Rose Blanche Plant Fishery Flow Compensation Strategy

Created By: K. Nicholson
Revised By: P. O'Leary
Reviewed By: G. Whitty
Approved By: G. Humby

5.5.2 There is a time delay in operation of the Forebay Dam Fishery Flow Compensation Valve and the water reaching the brook down stream of the plant. This is due to the length of the route taken by the water. When in use, the Forebay Dam Fishery Flow Compensation Valve must be in the fully open position. The opening of this valve will allow water to flow down a channel and enter the brook down stream of the plant. It may take up to 4 hours for the water to travel from the dam to the tailrace area of Rose Blanche Brook. The person operating the plant will ensure that the water from the Forebay Dam Fishery Flow Compensation Valve has reached the brook before disrupting other sources of water flow (i.e. penstock dewatering).

5.5.3 Once a flow directly attributable to flow from the Forebay Dam Fishery Flow Compensation Valve has been confirmed in the main river below the Rose Blanche tailrace, the Generation operating staff can then proceed as required with such activities as draining the penstock.

5.6 Penstock Dewatering

5.6.1 Prior to dewatering the penstock, compensation flow has to be established using the Forebay Dam Fishery Flow Compensation Valve as per section 5.5 of this procedure. The penstock can then be drained utilizing the Powerhouse Fishery Flow Compensation Valve located within the powerhouse.

5.6.2 The Generation operating staff shall ensure that during the draining of the penstock, the door to the intake gatehouse is left open to insure that a vacuum pressure condition in the gatehouse is not created which could possibly cause damage to this enclosure.

5.7 Other Notes

5.7.1 Flow Measurement - Minimum design flow required to be released from the system is 1.0 m^3/s, 500m downstream of the tailrace.

Rose Blanche Plant Fishery Flow Compensation Strategy

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Reviewed By: G. Whitty
Approved By: G. Humby

5.7.2 Fishery compensation valves will be inspected and maintained as scheduled in Avantis.

5.7.3 Fisheries Inspection Checklist will be completed as scheduled in Avantis, using Form 742 – Rose Blanche Fisheries Inspection Checklist.

6.0 References

6.1 Reference Documents

- POG100.03.20 – Rose Blanche Operating Procedures

6.2 Related Significant Aspects

- 750

6.3 Legal and Other Requirements

- Environmental Legal Requirements Application - Webster

7.0 Records (refer to local Master Environmental Records List for record location)

- Asset Management System Records
- Rose Blanche Fisheries Inspection Checklist – Form 742

8.0 Glossary

No new terms

Bulletin Number: POG100.03.01
Date Issued: 1999 08 18
Date Revised: 2016 09 13
Date Reviewed: 2018 08 20

Reservoir and Turbine Operating Procedures

Created By: L. Thompson
Revised By: B. Titford
Reviewed By: G. Whitty
Approved By: G. Humby

1.0 Purpose

The purpose of this procedure is to manage Newfoundland Power hydro development systems for the effective and efficient use of the water resource. This will manage environmental impacts and manage communication of information about operational changes to the public.

2.0 Scope

This procedure covers hydro plant hydroelectric facilities owned and operated by Newfoundland Power and is required knowledge of the Generations Operations staff and System Control Centre (SCC) operations staff.

3.0 General

The Company will manage the efficient use of water resources in an effort to displace fossil fuel generation sources.

4.0 Responsibilities

4.1 Director responsible for Generation Operations

- Will ensure that Generation Operations staff and System Control Centre (SCC) staff are trained in the use of this procedure to guide the operation of the hydroelectric facilities.

4.2 Manager, Generation

- Will ensure that requirements of this procedure are completed and reviewed each year.
- Will ensure any changes made in operation procedures shall be added to this procedure as the need arises

Reservoir and Turbine Operating Procedures

Created By: L. Thompson
Revised By: B. Titford
Reviewed By: G. Whitty
Approved By: G. Humby

4.3 Supervisor(s), Generation Operations

- Responsible for ensuring that the staff under his/her supervision is following the Plant Operating Guidelines (POGs).
- Will notify the Manager, Generation and SCC of any changes to the Plant Operating Guidelines (POGs) or any temporary/permanent major changes in operations at a generation facility.

4.4 Generation Operations Staff

- Responsible for following the Plant Operating Procedures (POGs) and for performing all their work activities in an environmentally responsible manner.

4.5 Manager, System Control (SCC) & Electrical Maintenance

- Will ensure that the SCC Operators are following the Plant Operating Guidelines (POGs).

4.6 System Control Centre (SCC) Operator

- Responsible for performing daily operations in accordance with the Plant Operating Guidelines (POGs), determining plant and unit productions and monthly storage report.

5.0 Procedure

5.1 Detailed Operating Procedures

5.1.1 Generating Operations staff, in conjunction with the SCC operators, will determine gate settings based on pending inflows and upcoming system requirements. Where possible, gate setting instructions will be issued prior to generation operations staff leaving to take reservoir elevation readings.

5.1.2 Reservoir elevations, gate openings and spill amount will normally be taken on the last working day of the month by generation operations staff and forwarded to SCC. Reservoir elevations are typically observed using staff gauges installed at various sites. In the absence of staff gauges, hand held measuring tapes may be

Reservoir and Turbine Operating Procedures

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used. The condition of staff gauges and tapes shall be visually checked prior to each use for any obvious indications of damage. Reservoir elevations must be estimated when actual readings are not taken. Supervisor(s), Generation Operations will determine when it is permissible to estimate the elevations.

5.1.3 SCC will normally issue the monthly storage report near the first working day of the month. Delays may be encountered due to unforeseen circumstances.

5.1.4 Generation operations staff are to note any abnormal system conditions and report to Supervisor(s), Generation Operations and SCC as soon as possible. Report as soon as it is corrected.

5.1.5 Daily rainfall shall be recorded by generation operations staff. Rain accumulation shall be measured daily and included with reservoir elevations to SCC.

5.1.6 During the course of significant rainfall events (approximately 25 mm or more during a 24 hour period), generation operations staff may be required to visit dam sites at the discretion of the Supervisor(s), Generation Operation or Manager Generation or Manager Engineering. The requirement for such site visits is based on the following considerations:

- Spill lost out of the system shall be recorded and reported to SCC.
- Significant changes in reservoir elevations may require gate adjustments.
- To check that all storage structures are performing as expected.

5.1.7 Generation operations staff shall report to the SCC when gates are opened/closed for any reason.

5.1.8 Director responsible for Generation Operations will notify and provide information related to public communications about plant operations to the Manager, Public & Government Affairs.

5.1.9 Manager, Generation will decide if changes in plant operation require public communication and notify the Manager, Public & Government Affairs about information to be made public.

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Date Issued: 1999 08 18
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Date Reviewed: 2018 08 20

Reservoir and Turbine Operating Procedures

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Reviewed By: G. Whitty
Approved By: G. Humby

5.2 General Operating Procedure

5.2.1 Gates located at control structures must be left open by a required minimum of one (1) inch to maintain water flow in streams between reservoirs (to preserve fish habitat). If the requirement exists to close the gate completely, then an alternate means of maintaining the equivalent amount of flow should be provided.

5.2.2 Should maintenance on a gate require the stoppage of water flow through that gate, some alternate means of maintaining a water flow on the downstream side of the control structure should be utilized. This might include the use of pumps to pump water to the opposite side of the dam or allow water to flow over spillways, where practical, to provide flow in the downstream channel. This should be done at the discretion of the Manager Generation or Manager Engineering.

5.2.3 Turbines shall generally be operated at their best efficiency operating point unless heavy inflows necessitate operating the turbine at their maximum loading point to draw down the water storage system. Turbines may be operated at less than maximum efficiency point in situations where maintenance work, low inflows or abnormal situations require this.

5.2.4 In situations where a fire hydrant or hose system is connected to a Newfoundland Power penstock, the relevant Fire Department or Town Council shall be notified if maintenance work requires the penstock to be dewatered. Hydro plants with such fire systems are Mobile Plant, Tors Cove Plant and Pierre's Brook Plant (three fire hydrants are run off the penstock at Pierre's Brook Plant).

5.2.5 Newfoundland Power shall perform any operations to control structures such as: opening/closing of gates; removal of stoplogs; or excavation of temporary spill channels to reduce and/or eliminate the effects of flooding caused by natural forces. These operations will always be conducted with the best interests of the environment and local communities in mind.

Reservoir and Turbine Operating Procedures

Created By: L. Thompson
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5.2.6 Flow in tailraces shall be maintained by operating hydro plants regularly to ensure water flow for fish habitat. When plants are out of service for an extended period of time (i.e. one week or greater), flow compensation may be required. See section 5.1 of POG100.12 – Storing and Controlling the Release of Water for further details.

5.2.7 The water storage reservoir and forebay of each of the hydro plants are to be operated within the upper and lower operating elevations as listed in the POG 100.03 Series – Reservoir and Turbine Operating Procedures. Care shall also be taken that the minimum storage elevation listed for the summer season shall also be maintained where possible.

5.2.8 While not always achievable, Newfoundland Power shall endeavour to operate their hydro plants in such a way as to eliminate the spilling of water over spillways. This non-regular or artificial flow may create fish habitat which will not then be continuously maintained.

5.2.9 Operations at hydro plants shall be carried out in a manner to minimize any negative impacts on public use of the water bodies. These public activities might include: fishing; boating; swimming; floatplane use; and tourism related actives.

5.2.10 All unit trips will be investigated on site, by an experienced and qualified employee, prior to any unit being restarted.

5.2.11 All plant specific operating procedures are found in the POG 100.03 Series – Reservoir and Turbine Operating Procedures. These operating instructions are to be followed by both SCC staff and generation operations staff.

5.2.12 Generation operations and maintenance staff will, at all times, avoid and prevent release of deleterious substances into all waterways (i.e. reservoirs, channels, tailraces).

Reservoir and Turbine Operating Procedures

Created By: L. Thompson
Revised By: B. Titford
Reviewed By: G. Whitty
Approved By: G. Humby

5.3 Public Communications

5.3.1 Where appropriate, information stemming from emergency situations shall be communicated to the public through the procedures contained within the Emergency Preparedness and Response Procedure for that particular power plant. The format of communications shall be as determined by the Director responsible for Corporate Communications. For additional detailed procedures relating to communications with external parties see OPR400.05 – Environmental Communications.

5.3.2 Specifics of operational changes shall be determined by the generation operating staff and reviewed in conjunction with operations staff in the field and at the SCC. The communication of this information should be performed in advance of the activity in so much as possible.

5.3.3 The Supervisor(s), Generation Operations shall communicate this information to the Manager Generation for a review of the situation in consultation with the Director responsible for Generation. As a result of this review, a decision will be made as to whether the operational changes contemplated necessitate or require the communication of this information to the public.

5.3.4 The measure of whether the information necessitates communication to the public is whether or not the operational changes may have, or in the future could have, impacts in terms of the environment; public safety of residents; the fire fighting capabilities of area residents; water quality and availability; recreational activities in area affected; and other impacts on public activities.

5.3.5 This information would be communicated to the Manager, Public & Government Affairs who would make a final decision on the presentation of the information and the form of communication required.

Reservoir and Turbine Operating Procedures

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5.3.6 The Manager, Public & Government Affairs may require additional information from the Supervisor(s), Generation Operations in the form of an issue brief such that his/her group can speak about the subject at hand with a reasonable amount of knowledge and background information. It will be the responsibility of the Supervisor(s), Generation Operations to insure that this information gets collected and put together in a timely manner.

5.3.7 Where appropriate, notification shall be made to the respective Town Council when abnormal operating situations are required or when water quality may be affected by the activities known to Newfoundland Power.

5.3.8 Unplanned emergency situations, which may have caused deterioration of water quality, shall be communicated to the respective communities through the Manager, Public & Government Affairs. Refer to OPR400.05 – Environmental Communications for additional information.

6.0 References

6.1 Reference Documents

- OPR400.05 – Environmental Communications
- POG100.03 Series – Reservoir and Turbine Operating Procedures
- POG100.12 – Storing and Controlling the Release of Water
- Emergency Preparedness and Response Procedure

6.2 Related Significant Aspects

- 750; 290; 720; 780

6.3 Legal and Other Requirements

- Environmental Legal Requirements Application - Webster

Reservoir and Turbine Operating Procedures

Created By: L. Thompson
Revised By: B. Titford
Reviewed By: G. Whitty
Approved By: G. Humby

7.0 Records (refer to local Master Environmental Records List for record location)

- Reservoir Elevation Data
- Operating Guidelines
- Rainfall Report (daily)
- Gate Opening Changes

8.0 Glossary

Abbreviations

- **SCADA** – Supervisory Control and Data Aquisition
- **SCC** – System Control Centre

Best Efficiency Point – this is the operating point or wicket gate opening of the hydroelectric turbine which maximized the amount of energy that is produced for each unit of water consumed in the turbine.

Control Structure – refers to dams, dikes, overflow spillways, and other appurtenances that control the natural flow of waterways.

Flow Delay – refers to a time delay which is incurred for water to flow from one water storage reservoir to another reservoir. This delay will vary with the terrain and length of travel required.

Forebay – refers to the storage reservoir from which the water flows through the penstock to the turbines.

Frazil Ice – formed at intake structures during cold weather when high water velocities create vacuum conditions and aid in the creation of ice which blocks trash racks.

Reservoir and Turbine Operating Procedures

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Gate – steel or wooden bulkhead mounted within vertical tracks which may be raised or lowered to allow water to pass through an intake or control structure. Gates are typically raised or lowered using a manually operated threaded stem hoist, or by an electric motor and worm gear combination. In a few instances these gates are operable from the respective power plant (i.e. Amy's Lake Structure at Rattling Brook Plant).

Intake Structure – refers to a dam or dike in which the gate and penstock are installed to supply water to the hydroelectric turbine.

Maximum Load Point – this is the operating point where the maximum amount of electrical capacity is produced. This usually corresponds to the 100% wicket gate opening on the turbine.

Penstock – the pipe or conduit through which the water flows through to reach the hydroelectric turbine. Penstocks may be either of woodstave construction, welded steel construction, and buried fiberglass construction.

SCADA – refers to the Supervisory Control and Data Acquisition system which controls, through telecommunications systems, the power plants and substation equipment across the Newfoundland Power system.

System Control Centre –the facility located on Topsail Road in St. John's where the electrical system is operated remotely using SCADA and telecommunications technology.
Water Level Control System – a microprocessor based system which automatically cycles the hydroelectric turbines on and off based upon the forebay elevation to maximize the amount of energy produced and to minimize the amount of water spilled out of the system.

Watershed – land area which, due to its topography and terrain, will drain rainwater into ponds, lakes or reservoirs. Each hydroelectric development has a watershed associated with it, although several hydroelectric sites may share the same watershed area (i.e. Horsechops and Cape Broyle Plants).

NEWFOUNDLAND POWER
A FORTIS COMPANY

Bulletin Number: POG100.03.02
Date Issued: 1999 08 18
Date Revised: 2011 08 15
Date Reviewed: 2018 08 20

Pierre's Brook Operating Procedures

Created By: L. Thompson
Revised By: B. Hogan
Reviewed By: G. Whitty
Approved By: G. Humby

UNIT LOADING								
	Best Efficiency			Maximum Load			Rough Zone	
Unit	Load (kW)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Load (kW)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Minimum	Maximum
#1	3400	5.09	668	4300	6.54	657.5	1200	2500

FOREBAY OPERATING ELEVATIONS (Ft.)			
	Upper	Lower	Trip Level
Gull Pond (Forebay)	384.0	382.0	375.5

STORAGE ELEVATION LIMITS (Ft.)			
	Upper	Lower (normal)	Lower (summer)
Gull Pond (Forebay)	385.1	370.0	382.7
Big Country Pond	525.6	510.0	-
West Country Pond	474.6	457.0	-

- Lower summer elevation is a minimum that the reservoir will operate at between June 15 and September 15 under normal conditions.
- Gull Pond maximum storage elevation without stoplogs in place is 384.0 feet.

Flow Delay

- Big Country to Gull Pond: 4 hours
- West Country to Gull Pond: 2 hours

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Date Reviewed: 2018 08 20

Pierre's Brook Operating Procedures

Created By: L. Thompson
Revised By: B. Hogan
Reviewed By: G. Whitty
Approved By: G. Humby

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1. Inflows are such that this plant is in operation 75% to 80% of the time.

2. Operate unit at best efficiency unless heavy inflows are predicted or under extremely low inflow conditions.

3. Prior to spring runoff, Gull Pond elevation should be lowered to the minimum.

4. Big Country Pond gate usually kept at 3 to 5 inches in summer and West Country Pond gate kept at 3 inches in the summer.

5. Flow to be maintained to the tailrace and Lower Pond for at least two (2) hours per day for fisheries. If the plant has to be off for more than 24 hours, an alternate method of providing flow should be established.

6. West Country Pond spills out of the system.

7. Fish plant is fed from the penstock. The fish plant management will be notified, where possible, in advance of penstock dewatering such that they can procure alternate water sources or plan shut-down's at the fish plant (24 - 48 hour notice minimum).

8. All gates to be left open a minimum of 1 inch to maintain flow for fisheries. If gate has to be closed, an alternate method of maintaining flow must be established.

9. During cold weather, shut down the plant and let the forebay freeze over to prevent frazil ice formation on the trash racks.

10. Operate plant at full load when storage is above 68% full supply.

Pierre's Brook Operating Procedures

Created By: L. Thompson
Revised By: B. Hogan
Reviewed By: G. Whitty
Approved By: G. Humby

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11. During cold weather conditions it may be necessary to reduce the load at Pierre's Brook to 1000 kW for 5 minutes to avoid surge tank freeze up. Guidelines for the frequency of variation are:

Temperature	**Frequency**
-10 C to –20 C	4 hours
Below –20 C	2 hours

12. Water level readings are observed by field operations staff using the following reference benchmarks:

Reservoir	**Reference**	**Elevation**
Gull Pond (Forebay)	Top of Stoplogs (height of logs = 1.0 feet)	385.1 feet
Big Country Pond	Spillway Sill	525.6 feet
West Country Pond	Top of Stoplogs (height of logs – 2.6 feet)	474.6 feet

NEWFOUNDLAND POWER
A FORTIS COMPANY

Bulletin Number: POG100.03.03
Date Issued: 1999 08 18
Date Revised: 2018 08 20
Date Reviewed: 2018 08 20

Mobile/Morris Operating Procedures

Created By: L. Thompson
Revised By: G. Whitty
Reviewed By: G. Whitty
Approved By: G. Humby

UNIT LOADING								
	Best Efficiency			Maximum Load			Rough Zone	
Unit	Load (kW)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Load (kW)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Minimum	Maximum
Morris	1080	4.61	234.3	1135	5.12	221.7	600	780
Mobile	10,130	10.13	1000	10,400	10.40	1000	2000	4000

Full load at Mobile Plant is limited to 10,400 kW.

FOREBAY OPERATING ELEVATIONS (Ft.)			
	Upper	Lower	Trip Level
Morris Forebay	179.77	178.25	177.25
Mobile Forebay – Dry Season	493.7	493.0	490.5
Mobile Forebay – Wet Season (Mar, Apr) (Oct, Nov, Dec)	493.7	492.5	490.5

STORAGE ELEVATION LIMITS (Ft.)			
	Upper	Lower (normal)	Lower (summer)
Mobile Forebay	494.0	491.0	-
Mobile Big Pond	612.0	590.0	-

- Summer elevation is a minimum that the reservoir will operate at between June 15 and September 15 under normal conditions.
- Mobile forebay maximum storage elevation without stoplogs in place is 492.0 feet.
- Mobile forebay is normally operated with 2.0 foot stoplogs in place (494.0 feet).
- Mobile Big Pond maximum storage elevation without stoplogs in place is 607.5 feet.

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Date Issued: 1999 08 18
Date Revised: 2018 08 20
Date Reviewed: 2018 08 20

Mobile/Morris Operating Procedures

Created By: L. Thompson
Revised By: G. Whitty
Reviewed By: G. Whitty
Approved By: G. Humby

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1. Morris Plant should be operated at best efficiency 24 hours per day. This will allow about 12 to 14 hours operation at Mobile Plant depending upon inflows. Morris Plant should be operated at full load when Mobile Big Pond elevation is above 604.3 feet. If Mobile Plant is out of service, Morris Plant may be shut down as well.

2. Morris canal is prone to a lot of trash during the summer and fall (leaves, grass, etc.). Frazil ice can become a problem when it gets colder. As a result, load may need to be reduced to about 450 kW if trips due to blocked trash racks become common. In addition, the plant will have to be shut down if a cold day is forecasted as the canal can ice over. This will prevent the frazil ice problem.

3. All gates to be left open a minimum of 1 inch to maintain flow for fisheries. If gate has to be closed, an alternate method of maintaining flow must be established.

4. Wet season is generally October through December, and March through April. Use operating elevations as required to maintain approximately 10 to 12 hours operation per day at the Mobile plant.

5. Operate unit every 4 hours to prevent water lines from freezing when temperature falls below –8 degrees Celsius.

6. The penstock at the Mobile Plant supplies water pressure to a fire hose connected inside a red box on the exterior of the Mobile powerhouse. The Witless Bay Fire Department and Town Council of Mobile shall be notified each time the penstock will be dewatered. Sufficient warning shall be given in order that alternate provisions for water may be made.

7. During cold weather conditions it may be necessary to vary the load at Mobile Plant by 4000 kW for 5 minutes to avoid surge tank freeze up. Guidelines for the frequency of variation are:

Temperature	**Frequency**
-10 C to –20 C	4 hours
Below –20 C	2 hours

NEWFOUNDLAND POWER
A FORTIS COMPANY

Bulletin Number: POG100.03.04
Date Issued: 1999 08 18
Date Revised: 2018 08 20
Date Reviewed: 2018 08 20

Rocky Pond/Tors Cove Operating Procedures

Created By: L. Thompson
Revised By: G. Whitty
Reviewed By: G. Whitty
Approved By: G. Humby

UNIT LOADING								
	Best Efficiency			Maximum Load			Rough Zone	
Unit	Load (kW)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Load (kW)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Minimum	Maximum
Rocky Pond	3100	10.57	293.3	3250	11.37	285.8	1200	1500
Tors Cove #1	1930	4.44	434.7	2410	5.88	409.9	800	1300
Tors Cove #2	2100	4.65	451.6	2400	5.71	420.3	800	1300
Tors Cove #3	2330	5.46	426.7	2530	6.14	412.1	800	1300

Full load on Tors Cove with all machines on is 6500 kW.

TORS COVE NORMAL WATER MANAGEMENT ELEVATIONS (Ft.)			
Level (Feet)	G1 Load	G2 Load	G3 Load
Below 283	Shutdown	Shutdown	Shutdown
283 to 283.5	Shutdown	Efficient Loading Waiting to Auto Start	Shutdown
283.5 to 285	Shutdown	Efficient Loading Waiting to Auto Start	Efficient Loading Waiting to Auto Start
285 to 285.5	Shutdown	Efficient Loading	Efficient Loading Waiting to Auto Start
285.5 to 286	Shutdown	Efficient Loading	Efficient Loading
Above 286	Efficient/Peak Loading	Peak Loading	Peak Loading

ROCKY POND NORMAL WATER MANAGEMENT ELEVATIONS (Ft)	
Level (Feet)	G1
Below 399	Shut Down
399 to 401	Efficient Loading Waiting To Auto Start
401 to 401.5	Efficient Loading
Above 401.5	Peak Loading

NEWFOUNDLAND POWER
A FORTIS COMPANY

Bulletin Number: POG100.03.04
Date Issued: 1999 08 18
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Rocky Pond/Tors Cove Operating Procedures

Created By: L. Thompson
Revised By: G. Whitty
Reviewed By: G. Whitty
Approved By: G. Humby

TORS COVE NORMAL WATER MANAGEMENT START AND SHUTDOWN LEVEL (Ft)			
	G1	G2	G3
Auto Shutdown	NA	283.0	283.5
Auto Start	NA	285.0	285.5

ROCKY POND NORMAL WATER MANAGEMENT START AND SHUTDOWN LEVEL (Ft)	
	G1
Auto Shutdown	399.0
Auto Start	401.0

STORAGE ELEVATION LIMITS (Ft.)			
	Upper	Lower (normal)	Lower (summer)
Tors Cove Forebay	286.0	269.0	283.0
Rocky Pond Forebay	401.7	393.0	-
Cape Pond	590.0	577.4	-
Franks Pond	655.6	646.3	-

- Tors Cove forebay is operated within a target range of 283.8 to 284.2 during the summer period (June 15 to September 15) under normal conditions.

Flow Delay

- Franks Pond to Cape Pond: 24 hours
- Cape Pond to Rocky Pond: 24 hours

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Rocky Pond/Tors Cove Operating Procedures

Created By: L. Thompson
Revised By: G. Whitty
Reviewed By: G. Whitty
Approved By: G. Humby

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1. Operate Rocky Pond Plant at best efficiency and Tors Cove Unit #2 at best efficiency when inflows are minimal. As inflows increase, operate Rocky Pond Plant at maximum load, Tors Cove Unit #2 at maximum and Tors Cove Unit #3 at best efficiency or maximum load as required. Tors Cove Unit #1 is not automated and should be operated in times of very high inflows only or if other units are not in service.

2. Maintain forebay elevation limits at Tors Cove by either cycling Unit #2 between best efficiency and maximum load or having Unit #2 at maximum load and cycling Unit #3 on and off at best efficiency.

3. Prior to spring runoff, keep Rocky Pond forebay elevation at 398 feet and Tors Cove Pond forebay elevation at 282 feet.

4. The canal between Cape Pond and Rocky Pond has 7 spillways and they all spill out of the system. A gate opening of 20 inches at the Cape Pond gate will typically keep the canal full without spill. The uncontrolled flow from Butlers Pond causes most of the canal spills. The 2015 improvements allow a higher gate opening and conditions are currently under evaluation.

5. Franks Pond gate should be positioned with a 12-inch height of opening, under normal operating conditions. Franks Pond spills out of the system.

8. A fish plant is fed from the Tors Cove penstock. The fish plant management will be notified, where possible, in advance of penstock dewatering, such that they can procure alternate water sources, or plan shut-downs at the fish plant (if the fish plant is in operation).

7. All gates to be left open a minimum of 1 inch to maintain flow for fisheries. If gate has to be closed, an alternate method of maintaining flow must be established.

Rocky Pond/Tors Cove Operating Procedures

Created By: L. Thompson
Revised By: G. Whitty
Reviewed By: G. Whitty
Approved By: G. Humby

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8. During cold weather conditions it may be necessary to vary the load at Tors Cove by 2000 kW for 5 minutes to avoid surge tank freeze up. Guidelines for the frequency of variation are:

Temperature	**Frequency**
-10 C to –20 C	4 hours
Below –20 C	2 hours

9. Water level readings at Rocky Pond/Tors Cove are observed by field operations staff using the following reference benchmarks:

Reservoir	**Reference**	**Elevation**
Tors Cove Pond	Concrete Spillway Sill	286.0 feet
Rocky Pond	Concrete Spillway Sill	401.7 feet
Cape Pond	Concrete Spillway Sill	590.0 feet
Franks Pond	Timber Spillway Sill	655.6 feet

NEWFOUNDLAND POWER
A FORTIS COMPANY

Bulletin Number: POG100.03.05
Date Issued: 1999 08 18
Date Revised: 2010 05 28
Date Reviewed: 2018 08 20

Horsechops/Cape Broyle Operating Procedures

Created By: L. Thompson
Revised By: T. Hynes/J. Williams
Reviewed By: G. Whitty
Approved By: G. Humby

UNIT LOADING										
	Best Efficiency				Maximum Load				Rough Zone	
Unit	Load (kW)	Gate Limit (%)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Load (kW)	Gate Limit (%)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Min	Max
Horsechops	7520	90	10.05	748.3	8130	100	11.30	719.5	3000	5000
Cape Broyle	5300	76.5	11.46	462.5	6280	100	14.05	447.0	2000	4000

CAPE BROYLE NORMAL WATER MANAGEMENT ELEVATIONS (Ft.)		
Level (Feet)	**Normal Inflow**	**Spring Inflow**
Below 282.0	Unit Will Not Start	Unit Will Not Start
Below 284.0	Shut Down	Shut Down
284.0 to 285.0	Shut Down	Efficient Loading Waiting To Auto Start
285.0 to 285.5	Shut Down	Efficient Loading
285.5 to 286.0	Shut Down	Peak Loading
286.0 to 286.5	Efficient Loading Waiting To Auto Start	Peak Loading
286.5 to 287.0	Efficient Loading	Peak Loading
Above 287.0	Peak Loading	Peak Loading

HORSECHOPS NORMAL WATER MANAGEMENT ELEVATIONS (Ft.)		
Level (Feet)	**Normal Inflow**	**Spring Inflow**
Below 575.0	Unit Will Not Start	Unit Will Not Start
Below 575.5	Shut Down	Shut Down
575.5 to 576.5	Efficient Loading Waiting To Auto Start	Shut Down
576.5 to 577.0	Efficient Loading Waiting To Auto Start	Efficient Loading Waiting To Auto Start
577.0 to 577.5	Efficient Loading	Efficient Loading
Above 577.5	Peak Loading	Peak Loading

NEWFOUNDLAND POWER
A FORTIS COMPANY

Bulletin Number: POG100.03.05
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Date Revised: 2010 05 28
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Horsechops/Cape Broyle Operating Procedures

Created By: L. Thompson
Revised By: T. Hynes/J. Williams
Reviewed By: G. Whitty
Approved By: G. Humby

NORMAL WATER MANAGEMENT START AND SHUTDOWN LEVEL (Ft)				
	Cape Broyle		Horsechops	
	Normal Inflow	Low Inflow	Normal Inflow	Low Inflow
Auto Shutdown	286.0	284.0	575.5	576.5
Auto Start	286.5	285.0	577.0	577.0

STORAGE ELEVATION LIMITS (Ft.)			
	Upper	Lower (normal)	Lower (summer)
Cape Broyle Forebay	288.0	276.0	286.0
Horsechops Forebay	578.5	575.5	-
Mount Carmel Pond	614.7	592.2	-
Blackwoods Pond	729.0	724.5	-
Northwest Pond	729.3	725.5	-

- Summer elevation is a minimum that the reservoir will be operated at between June 15 and September 15 under normal conditions.
- Cape Broyle forebay maximum storage elevation is 284.5 feet.

Flow Delay

- Blackwoods Pond to Mount Carmel Pond: 24 hours
- Mount Carmel Pond to Horsechops forebay 12 hours

Horsechops/Cape Broyle Operating Procedures

Created By: L. Thompson
Revised By: T. Hynes/J. Williams
Reviewed By: G. Whitty
Approved By: G. Humby

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1. Operate Horsechops Plant at best efficiency unless spill will occur. Cape Broyle Plant will have to operate for 20 hours for every 24 hours that Horsechops Plant operates in order to keep the Cape Broyle forebay constant with little inflow to Cape Broyle Pond.

2. Need to keep water flowing from Mount Carmel Pond in winter to prevent the canal from freezing up.

3. Prior to spring runoff, Cape Broyle Pond should be lowered to 284 feet. Placing the unit in “Spring In-Flow” would accomplish this.

4. Both hydro plants tend to experience low water trips when weather turns colder because of frazil ice. Best to shut both plants on a cold day to let the forebay ice over.

5. Northwest Blackwoods Pond does not have an outlet gate structure.

6. Fourth Blackwoods Pond canal stoplog structure is no longer used and is to be left open under normal operating conditions.

7. Northwest Pond, Ragged Hills Pond, Blackwoods Pond, and Fly Pond all spill out of the system. To minimize spill out of the system in the event of major inflows allow the system to spill at Horsechops so the water can be used at Cape Broyle Plant.

8. All gates to be left open a minimum of 1 inch to maintain flow for fisheries. If gate has to be closed, an alternate method of maintaining flow must be established.

9. Mount Carmel Pond elevation should be maintained at approximately 600.0 feet.

10. During cold weather conditions it may be necessary to vary the load at Horsechops by 3000 kW for 5 minutes to avoid surge tank freeze up. Guidelines for the frequency of variation are:

Temperature	**Frequency**
-10 C to –20 C	4 hours
Below –20 C	2 hours

Horsechops/Cape Broyle Operating Procedures

Created By: L. Thompson
Revised By: T. Hynes/J. Williams
Reviewed By: G. Whitty
Approved By: G. Humby

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11. The units can be operated below the water management shutdown setpoint, but the control of the unit should be placed in “Load Control” or operated in “Local Manual” at the plant. The unit will shut down and not start when the water level reaches the “Block From Starting Level” (282.0 for Cape Broyle and 575.0 for Horsechops).

NEWFOUNDLAND POWER
A FORTIS COMPANY

Bulletin Number: POG100.03.06
Date Issued: 1999 08 18
Date Revised: 2018 08 20
Date Reviewed: 2018 08 20

Petty Harbour Operating Procedures

Created By: L. Thompson
Revised By: G. Whitty
Reviewed By: G. Whitty
Approved By: G. Humby

UNIT LOADING										
	Best Efficiency				Maximum Load				Rough Zone	
Unit	Load (kW)	Gate Limit (%)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Load (kW)	Gate Limit (%)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Minimum	Maximum
#1	1300		-	-	1450		-	-	None	None
#2	1050	80	2.09	502.4	1350	100	2.93	499.3	None	None
#3	2000	85	3.99	501.2	2505	100	5.12	489.2	1250	1900

NORMAL WATER MANAGEMENT ELEVATIONS (Ft.)				
Level (Feet)	G2 Normal Inflow	G2 Low Inflow	G3 Normal Inflow	G3 Low Inflow
Below 298	Shut Down	Shut Down	Shut Down	Shut Down
298 to 299	Efficient Loading Waiting To Auto Start	Shut Down	Shut Down	Shut Down
299 to 300	Efficient Loading Waiting To Auto Start	Shut Down	Shut Down	Shut Down
300 to 301	Efficient Loading	Peak Loading Waiting To Auto Start	Efficient Loading Waiting To Auto Start	Shut Down
301 to 302	Peak Loading	Peak Loading Waiting To Auto Start	Peak Loading	Peak Loading
Above 302	Peak Loading	Peak Loading	Peak Loading	Peak Loading

NORMAL WATER MANAGEMENT START AND SHUTDOWN LEVEL (Ft)				
	G2 Normal Inflow	G2 Low Inflow	G3 Normal Inflow	G3 Low Inflow
Auto Shutdown	298	300	299	301
Auto Start	300	302	300.5	302.3

Bulletin Number: POG100.03.06
Date Issued: 1999 08 18
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Date Reviewed: 2018 08 20

Petty Harbour Operating Procedures

Created By: L. Thompson
Revised By: G. Whitty
Reviewed By: G. Whitty
Approved By: G. Humby

STORAGE ELEVATION LIMITS (Ft.)			
	Upper	Lower	Summer
Petty Harbour Forebay	303.0	296.0	300.0
Bay Bulls – Big Pond	507.0	483.0	
Cochrane Pond	4.0	0.0	-

- Summer elevation is a minimum that the reservoir will operate at between June 15 and September 15 under normal conditions.
- Petty Harbour forebay SCADA goes to 297.3 feet, but elevation can go as low as 296 feet.

Flow Delay

- Bay Bulls Big Pond to Petty Harbour Forebay: 10 hours

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Petty Harbour Operating Procedures

Created By: L. Thompson
Revised By: G. Whitty
Reviewed By: G. Whitty
Approved By: G. Humby

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1. Depending on inflow, use Unit #3 or Unit #2 at best efficiency. For higher inflows, use Unit #3 at best efficiency and Unit #2 at maximum load. For much higher inflows, use Unit #3 and Unit #2 at maximum load and bring on Unit #1 at best efficiency or maximum load as required. Unit #1 is not automated and shall be placed on line when forebay elevation is above 301.5 feet.

2. Set unit operation to maintain constant forebay elevation under normal conditions.

3. Newfoundland Power is working with the Department of Fisheries and Oceans and the City of St. John's to establish the minimum inflows required for fisheries purposes from Bay Bulls Big Pond gate. At all times, Newfoundland Power will operate the gate at Bay Bulls Big Pond considering this process.

4. Minimum flow determination may result in higher than normal water levels in Bay Bulls Big Pond. Care to be taken by dam operators and supervisors that dam safety and flood reduction is first and foremost.

5. In case of a predicted heavy inflow, drain the forebay as much as possible prior to the start of the rainstorm. Bay Bulls Big Pond should be closed to minimum gate.

6. If Bay Bulls Big Pond gate is to be opened, the opening process should be gradual to prevent downstream flooding (maximum 32 inches).

7. All gates to be left open a minimum of 1 inch to maintain flow for fisheries or whatever minimum is ultimately deemed appropriate by regulatory bodies. If gate has to be closed, an alternate method of maintaining flow must be established.

8. Cochrane Pond spills into Topsail Plant System (Paddy's Pond).

9. Bay Bulls Big Pond is a municipal water supply used by the St. John's Region and gate is to remain open at minimum of 1 inch to maintain flow for fisheries when elevation is below 500 feet. At elevations above 500 feet, Newfoundland Power may consider opening gates for additional generation. In this case the City of St. John's is to be notified.

Petty Harbour Operating Procedures

Created By: L. Thompson
Revised By: G. Whitty
Reviewed By: G. Whitty
Approved By: G. Humby

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10. This System has a large drainage area, and during rainfall, the Petty Harbour forebay rises extremely quickly.

11. If operating at efficient load and the forebay elevation exceeds the upper operating elevation, increase output to full load.

NEWFOUNDLAND POWER
A FORTIS COMPANY

Bulletin Number: POG100.03.07
Date Issued: 1999 08 18
Date Revised: 2013 07 24
Date Reviewed: 2016 09 13

Topsail Operating Procedures

Created By: L. Thompson
Revised By: G. Whitty

Reviewed By: G. Humby
Approved By: G. Humby

UNIT LOADING										
	Best Efficiency				Maximum Load				Rough Zone	
Unit	Load (kW)	Gate Limit (%)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Load (kW)	Gate Limit (%)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Min.	Max.
#1	2230	72	2.97	757.6	2550	80	3.43	743.4	1100	2000

NORMAL WATER MANAGEMENT ELEVATIONS (Ft.) (TOPSAIL POND LEVEL)		
Level (Feet)	G1 Normal Inflow	G1 Low Inflow
Below 6.2	Shut Down	Shut Down
6.2 to 6.8	Efficient Loading	Shut Down
6.8 to 7.2	Efficient Loading	Efficient Loading
Above 7.2	Peak Loading	Peak Loading

NORMAL WATER MANAGEMNT START AND SHUTDOWN LEVEL (Ft) (TOPSAIL POND LEVEL)		
	G1 Normal Inflow	G2 Low Inflow (summer)
Auto Shutdown	6.2	6.4
Auto Start	7.2	7.2

NEWFOUNDLAND POWER
A FORTIS COMPANY

Bulletin Number: POG100.03.07
Date Issued: 1999 08 18
Date Revised: 2013 07 24
Date Reviewed: 2016 09 13

Topsail Operating Procedures

Created By: L. Thompson
Revised By: G. Whitty
Reviewed By: G. Humby
Approved By: G. Humby

STORAGE ELEVATION LIMITS (Ft.)			
	Upper	Lower (normal)	Lower (summer)
Topsail Pond (pond level)	7.3	5.0	6.5
Three Island Pond	5.9	2.0	4.5
Three Arm Pond	5.0	2.0	2.0
Paddy's Pond	7.0	2.5	6.0
Thomas Pond	14.5	6.0	6.0

- Summer elevation is a minimum that the reservoir will be operated at between May 15 and October 15 under normal conditions. If we need to reduce pond level further in summer mode, Superintendent Generation Operations or designate must be contacted to notify home owners in advance.

Flow Delay

- Thomas Pond to Paddy's Pond: 8 hours
- Paddy's Pond to Three Arm Pond: 2 hours
- Three Arm Pond to Three Island Pond: 2 hours

1. Operate Topsail Plant at best efficiency unless risk of spilling.

2. Elevation shown on SCADA is of the Topsail forebay.

3. Usual operation is to fill Three Arm Pond and allow to spill into Three Island Pond. When Three Island Pond fills, run Topsail Plant for a day or two until the Three Island Pond elevation reaches 3 feet. Topsail Plant is then shut until Three Island Pond fills up again.

4. In the event of a predicted rainstorm, the gate at Thomas Pond and Paddy's Pond should be closed to the minimum. Three Island Pond gate should be opened and Topsail Plant operated to get as much water out of the system as possible before the storm.

5. Thomas Pond and Paddy's Pond spill out of the system. Cochrane Pond, from the Petty Harbour system, spills into Paddy's Pond.

Topsail Operating Procedures

Created By: L. Thompson
Revised By: G. Whitty
Reviewed By: G. Humby
Approved By: G. Humby

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6. All gates to be left open a minimum of 1inch to maintain flow for fisheries. If gate has to be closed, an alternate method of maintaining flow must be established.

7. Paddy's Pond elevation should be no lower than 6.0 feet during summer months to accommodate float plane operations. If the elevation falls below 6.0 feet for any reason, contact Ray Hawco with the Avalon Float Plane Association. Contact information:

   Ray Hawco
   29 Sunset Drive
   Goulds, NL
   364-2855

NEWFOUNDLAND POWER
A FORTIS COMPANY

Bulletin Number: POG100.03.08
Date Issued: 1999 08 18
Date Revised: 2018 08 20
Date Reviewed: 2018 08 20

Seal Cove Operating Procedures

Created By: L. Thompson
Revised By: G. Whitty
Reviewed By: G. Whitty
Approved By: G. Humby

UNIT LOADING										
	Best Efficiency				Maximum Load				Rough Zone	
Unit	Load (kW)	Gate Limit (%)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Load (kW)	Gate Limit (%)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Min	Max
#1	980	74	2.42	405	980	74	2.42	405	None	None
#2	2200	85	5.35	411	2450	100	5.68	399	1200	1200

PARTIAL UNIT LOADING				
Unit	Load (kW)	Gate Limit (%)	Flow (m^3/s)	Eff. ($kW/m^3/s$)
#1	240	20	0.9	201
#2	N/A	N/A	N/A	N/A

NORMAL WATERMANAGEMNT START AND SHUTDOWN LEVEL (Ft)		
	G1	G2
Auto Shutdown	6.2	7.0
Auto Start	7.0	8.0

NEWFOUNDLAND POWER
A FORTIS COMPANY

Bulletin Number: POG100.03.08
Date Issued: 1999 08 18
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Date Reviewed: 2018 08 20

Seal Cove Operating Procedures

Created By: L. Thompson
Revised By: G. Whitty
Reviewed By: G. Whitty
Approved By: G. Humby

NORMAL WATER MANAGEMENT ELEVATIONS (Ft.)		
Level (Feet)	G1 Load	G2 Load
Below 6.2	Shut Down	Shut Down
6.2 to 6.7	Partial Loading Waiting To Auto Start	Shut Down
6.7 to 7.0	Efficient Loading Waiting To Auto Start	Shut Down
7.0 to 8.0	Efficient Loading	Efficient Loading Waiting To Auto Start
8.0 to 8.2	Efficient Loading	Efficient Loading
Above 8.2	Peak Loading	Peak Loading

STORAGE ELEVATION LIMITS (Ft.)			
	Upper	Lower	Summer
Seal Cove Forebay	8.3	6.4	-
Fenelons Pond	16.0 (see note 6)	2.0	-
Soldiers Pond	10.3	1.3	-

- Summer elevation is a minimum that the reservoir will operate at between June 15 and September 15 under normal conditions.

Flow Delay

- Fenelons Pond to Seal Cove Forebay 18 hours
- Soldiers Pond to Seal Cove Forebay 18 hours

Bulletin Number: POG100.03.08
Date Issued: 1999 08 18
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Date Reviewed: 2018 08 20

Seal Cove Operating Procedures

Created By: L. Thompson
Revised By: G. Whitty
Reviewed By: G. Whitty
Approved By: G. Humby

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1. Units at Seal Cove Plant are equipped with automatic water level controls. This type of control drops the unit load in proportion to the forebay water level and can be activated remotely.

2. In the event of a predicted rainstorm, the gates at Fenelons Pond and Soldiers Pond should be closed quickly as possible as there is only 3 to 4 hours lead-time to do so. The water level control system should be blocked and the units run at full load to lower the forebay elevation as much as possible prior to the storm.

3. Soldiers Pond spills out of the system.

4. All gates to be left open a minimum of 1 inch to maintain flow for fisheries. If gate has to be closed, an alternate method of maintaining flow must be established.

5. Inform staff at Butterpot Park of any significant changes to Fenelons Pond gate openings, both summer and winter, as it affects the swimming area in summer and cross country skiing in winter. Whenever practical, gate adjustments should be made early in the week in an effort to minimize impacts on weekend park activity.

6. Fenelons Pond spillway sill is at elevation 16.0 feet.

7. Fisheries Flow Compensation Valve operated in 35% open position (~ 0.25 m^3/s) when generating units are not operating as a means of providing minimum flows in the tailrace. If elevation continue to decrease due to extreme low inflows, the valve will be partially closed to the 25% position in an effort to match system inflow conditions. When water levels are below 4.01 feet, the valve shall be required to operate in the manual position.

8. Both hydro units tend to experience cold water trips due to frazil ice. During cold weather units should be started at low loads to avoid trips due to blocked trash racks.

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Seal Cove Operating Procedures

Created By: L. Thompson
Revised By: G. Whitty
Reviewed By: G. Whitty
Approved By: G. Humby

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9. Water level readings at Seal Cove are observed by field operations staff using the following reference benchmarks:

Reservoir	Reference and Elevation
Seal Cove Forebay	Concrete Spillway Sill is equal to 8.4 feet
Fenelons Pond	Reference staff gauge located at outlet structure
Soldiers Pond	Reference staff gauge located at outlet structure

NEWFOUNDLAND POWER
A FORTIS COMPANY

Bulletin Number: POG100.03.09
Date Issued: 1999 08 18
Date Revised: 2013 07 29
Date Reviewed: 2018 08 20

Heart's Content Operating Procedures

Created By: L. Thompson
Revised By: D. Ball
Reviewed By: G. Whitty
Approved By: G. Humby

UNIT LOADING								
	Best Efficiency			Maximum Load			Rough Zone	
Unit	Load (kW)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Load (kW)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Minimum	Maximum
#1	2550	6.79	375.6	2720	7.65	355.6	810	2600

- To be calculated based on index testing.

FOREBAY OPERATING ELEVATIONS (Ft.)					
	May - September			October – April	
	Upper	Lower	Trip Level	Upper	Lower
Hearts Content Forebay	5.8	4.4	3.8	5.8	4.4

STORAGE ELEVATION LIMITS (Ft.)			
	Upper	Lower	Summer
Hearts Content Forebay	6.2	3.8	-
Long Pond	7.7	1.0	-
Seal Cove Pond	7.0	1.0	-

- Summer elevation is a minimum that the reservoir will operate at between June 15 and September 15 under normal conditions.

Bulletin Number: POG100.03.09
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Date Reviewed: 2018 08 20

Heart's Content Operating Procedures

Created By: L. Thompson
Revised By: D. Ball

Reviewed By: G. Whitty
Approved By: G. Humby

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1. Operate Heart's Content Plant at best efficiency unless there is risk of spill.

2. Hearts Content Plant is essentially a run of river plant with very little storage. The unit typically has to be cycled on and off to allow the forebay to refill.

3. If a heavy rainfall is predicted, the gate at Long Pond should be closed to minimum opening and the unit operated at full load to lower the forebay elevation. Keep unit at full load during rainfall.

4. Gate at Long Pond is usually full open, under normal operating conditions.

5. Seal Cove Pond and forebay spill out of system.

6. All gates to be left open a minimum of 1 inch to maintain flow for fisheries. If gate has to be closed, an alternate method of maintaining flow should be established.

7. Water level readings at Hearts Content are observed by field operations staff using the following reference benchmarks:

Reservoir	Reference	Elevation
Hearts Content Forebay	Spillway Sill	6.2 feet
Long Pond	Spillway Sill	7.7 feet
Seal Cove Pond	Spillway Sill	7.0 feet

NEWFOUNDLAND POWER
A FORTIS COMPANY

Bulletin Number: POG100.03.10
Date Issued: 1999 08 18
Date Revised: 2015 05 26
Date Reviewed: 2018 08 20

Pittman's Pond/New Chelsea Operating Procedures

Created By: L. Thompson
Revised By: D. Ball
Reviewed By: G. Whitty
Approved By: G. Humby

UNIT LOADING										
	Best Efficiency				Maximum Load				Rough Zone	
Unit	Load (kW)	Gate Limit (%)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Load (kW)	Gate Limit (%)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Min	Max
Pittman's	610	N/A	3.51	173.8	625	N/A	3.64	171.7	None	None
New Chelsea	3800	85	5.26	646.4	4500	100	5.86	631.4	1500	1800

NORMAL WATERMANAGEMNT START AND SHUTDOWN LEVEL (Ft)	
	NEW CHELSEA
Auto Shutdown	288.5
Auto Start	289.5

NORMAL WATER MANAGEMENT ELEVATIONS (Ft.)	
Level (Feet)	NEW CHELSEA
Below 288.5	Shut Down
288.5 to 289.5	Efficient Loading Waiting To Auto Start
Above 289.6	Peak Loading

STORAGE ELEVATION LIMITS (Ft.)			
	Upper	Lower	Summer
Pittman's Forebay	367.0	353.0	-
New Chelsea Forebay	290.0	285.0	-

- Summer elevation is a minimum that the reservoir will operate at between June 15 and September 15 under normal conditions.

Bulletin Number: POG100.03.10
Date Issued: 1999 08 18
Date Revised: 2015 05 26
Date Reviewed: 2018 08 20

Pittman's Pond/New Chelsea Operating Procedures

Created By: L. Thompson
Revised By: D. Ball
Reviewed By: G. Whitty
Approved By: G. Humby

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1. Operate Pittman's Plant at best efficiency or full load to maintain level for New Chelsea forebay within its operating range.

2. During heavy inflows, keep Pittman's Plant at best efficiency or shut off. Operate New Chelsea Plant at full load only as long a forebay elevation is increasing, then back off to best efficiency.

3. All gates to be left open a minimum of 1inch to maintain flow for fisheries. If gate has to be closed, an alternate method of maintaining flow should be established.

4. Pittman's Pond forebay elevation should be operated no lower than 353.0 feet to ensure adequate submergence over the intake.

5. To compensate for the loss of fish habitat associated with the construction and operation of the Moose Pond Diversion Dyke, compensation and monitoring measures shall be carried out as outlined in the following agreements:

   - "Fish Habitat Compensation Agreement – Moose Pond Diversion Dyke Project", dated August 29, 1997
   - "Agreement to Amend Fish Habitat Compensation Agreement – Moose Pond Diversion Dyke Project", dated October 5, 2001

   It is the responsibility of Director Engineering to ensure that the field investigations and assessments are completed as outlined in the Monitoring Program, and subsequent reports are submitted to Fisheries and Oceans Canada (DFO) in accordance with the conditions of the Agreement.

NEWFOUNDLAND POWER
A FORTIS COMPANY

Bulletin Number: POG100.03.11
Date Issued: 1999 08 18
Date Revised: 2007 08 09
Date Reviewed: 2018 08 20

Victoria Operating Procedures

Created By: L. Thompson
Revised By: J. Curran
Reviewed By: G. Whitty
Approved By: G. Humby

UNIT LOADING								
	Best Efficiency			Maximum Load			Rough Zone	
Unit	Load (kW)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Load (kW)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Minimum	Maximum
#1	420			550			None	None

FOREBAY OPERATING ELEVATIONS (Ft.)			
	Upper	Lower	Trip Level
Blue Hill Pond	3.87	2.87	2.5

STORAGE ELEVATION LIMITS (Ft.)			
	Upper	Lower (normal)	Lower (winter)
Rocky Pond	21.8	9.0	11.0

- Summer elevation is a minimum that the reservoir will operate at between June 15 and September 15 under normal conditions.
- Blue Hill Pond maximum storage elevation without stoplogs in place is 4.0 feet.

Bulletin Number: POG100.03.11
Date Issued: 1999 08 18
Date Revised: 2007 08 09
Date Reviewed: 2018 08 20

Victoria Operating Procedures

Created By: L. Thompson
Revised By: J. Curran
Reviewed By: G. Whitty
Approved By: G. Humby

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1. Victoria Plant is equipped with water level control which cycles the unit between just below best efficiency and full load depending upon the forebay elevation.

2. Rocky Pond is the only storage in the system. The outlet gate is adjusted to maintain flow to the forebay.

3. Rocky Pond is used by the town of Victoria as the municipal water supply so a minimum elevation of 9.0 feet must be maintained in normal conditions to provide 3.0 feet of water over the water supply intake. Furthermore, a minimum elevation of 11.0 feet is maintained during winter months (i.e. December 1 to March 31) due to the effects of ice cover in the reservoir.

4. Rocky Pond gate to be left open a minimum of 1inch to maintain flow for fisheries. If gate has to be closed, an alternate method of maintain flow should be established.

5. Water level readings at Victoria are observed by field operations staff using the following reference benchmarks:

Reservoir	Reference	Elevation
Blue Hill Pond	Concrete Spillway Sill	4.0 feet
Rocky Pond	Concrete Spillway Sill	21.8 feet

NEWFOUNDLAND POWER
A FORTIS COMPANY

Bulletin Number: POG100.03.12
Date Issued: 1999 08 18
Date Revised: 2009 06 19
Date Reviewed: 2018 08 20

Fall Pond Operating Procedures

Created By: L. Thompson
Revised By: J. Williams
Reviewed By: G. Whitty
Approved By: G. Humby

UNIT LOADING								
	Best Efficiency			Maximum Load			Rough Zone	
Unit	Load (kW)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Load (kW)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Minimum	Maximum
#1	320	2.9	110.3	350	3.35	104.5	None	None

FOREBAY OPERATING ELEVATIONS (Ft.)			
	Upper	Lower	Trip Level
Fall Pond Forebay	8.0	4.0	3.0

STORAGE ELEVATION LIMITS (Ft.)			
	Upper (normal)	Upper (winter)	Lower
Fall Pond Forebay	8.0	5.0 (see note 3)	4.0

- Forebay maximum storage elevation without stoplogs in place is 8.0 feet.

Bulletin Number: POG100.03.12
Date Issued: 1999 08 18
Date Revised: 2009 06 19
Date Reviewed: 2018 08 20

Fall Pond Operating Procedures

Created By: L. Thompson
Revised By: J. Williams
Reviewed By: G. Whitty
Approved By: G. Humby

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1. Fall Pond Plant is a run of the river plant and operates under water level load control.

2. Fall Pond forebay has the capacity to hold a substantial amount of water compared to plant capacity and should be brought to its minimum level prior to spring runoff. There are no control structures on this system.

3. Fall Pond forebay should be operated with a maximum storage elevation of 5.0 feet during periods of significant winter ice loading conditions.

4. Water level readings at Fall Pond Forebay are observed by field operations staff using a reference elevation of 8.0 feet (44.96m geodetic) at the top of the concrete spillway sill.

NEWFOUNDLAND POWER
A FORTIS COMPANY

Bulletin Number: POG100.03.13
Date Issued: 1999 08 18
Date Revised: 2018 08 20
Date Reviewed: 2018 08 20

West Brook Operating Procedures

Created By: L. Thompson
Revised By: G. Whitty
Reviewed By: G. Whitty
Approved By: G. Humby

UNIT LOADING								
	Best Efficiency			Maximum Load			Rough Zone	
Unit	Load (kW)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Load (kW)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Minimum	Maximum
#1	545	1.48	368.2	720	1.92	354.2	None	None

FOREBAY OPERATING ELEVATIONS (Ft.)			
	Upper	Lower	Trip Level
West Brook Forebay	9.0	6.5	6.2

STORAGE ELEVATION LIMITS (Ft.)			
	Upper	Lower	Summer
West Brook Forebay	9.0	6.0	-

- Maximum storage elevation without stoplogs in place is 8.0 feet
- West Brook Plant is normally operated with 1.0 foot stoplogs in place (elevation 9.0 feet).

Bulletin Number: POG100.03.13
Date Issued: 1999 08 18
Date Revised: 2018 08 20
Date Reviewed: 2018 08 20

West Brook Operating Procedures

Created By: L. Thompson
Revised By: G. Whitty
Reviewed By: G. Whitty
Approved By: G. Humby

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1. West Brook Plant is a run of the river plant and operates under water level load control.

2. Water supply for the town of St. Lawrence is taken from the canal feeding the West Brook Plant.

3. Water level readings at West Brook forebay are observed by field operations staff using a reference elevation of 9.0 feet (102.56m geodetic) at the top of the forebay stoplogs.

4. During summer operation between June 15 to September 15, plant is to be operated at maximum load of 140 Kw to avoid attraction of salmon into tailrace. Operations staff to monitor plant regularly to check for trapped salmon in tailrace.

NEWFOUNDLAND POWER
A FORTIS COMPANY

Bulletin Number: POG100.03.14
Date Issued: 1999 08 18
Date Revised: 2007 08 08
Date Reviewed: 2018 08 20

Lawn Operating Procedures

Created By: L. Thompson
Revised By: J. Curran
Reviewed By: G. Whitty
Approved By: G. Humby

UNIT LOADING								
	Best Efficiency			Maximum Load			Rough Zone	
Unit	Load (kW)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Load (kW)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Minimum	Maximum
#1	600	3.54	169.5	600	3.54	169.5	250	400

FOREBAY OPERATING ELEVATIONS (Ft.)			
	Upper	Lower	Trip Level
Lawn Forebay	25.0	18.0	15.0

STORAGE ELEVATION LIMITS (Ft.)			
	Upper	Lower	Summer
Lawn Forebay	25.0	18.0	-

Bulletin Number: POG100.03.14
Date Issued: 1999 08 18
Date Revised: 2007 08 08
Date Reviewed: 2018 08 20

Lawn Operating Procedures

Created By: L. Thompson
Revised By: J. Curran
Reviewed By: G. Whitty
Approved By: G. Humby

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1. Lawn Plant is a run of the river plant and operates under water level load control.

2. Lawn forebay is relatively small and there are no control structures on this system.

3. Water level readings at Lawn forebay are observed by field operations staff using a reference elevation of 25.0 feet (59.43m geodetic) at the top of the concrete spillway sill.

NEWFOUNDLAND POWER
A FORTIS COMPANY

Bulletin Number: POG100.03.15
Date Issued: 1999 08 18
Date Revised: 2015 06 25
Date Reviewed: 2018 08 20

Lockston Operating Procedures

Created By: L. Thompson
Revised By: D. Ball
Reviewed By: G. Whitty
Approved By: G. Humby

UNIT LOADING										
	Best Efficiency				Maximum Load				Rough Zone	
Unit	Load (kW) 1500	Gate Limit (%)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Load (kW)	Gate Limit (%)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Minimum	Maximum
#1	1500	85	2.2	664	1750	100	2.7	644	None	None
#2	1500	N/A	2.5	616	1800	N/A	3.0	577	None	None

FOREBAY OPERATING ELEVATIONS (Ft.)			
	Upper	Lower	Trip Level
Ratting Pond	16.0	15.0	8.5

STORAGE ELEVATION LIMITS (Ft.)			
	Upper	Lower	Summer
Trinity Pond	14.4	2.0	-

NORMAL WATER MANAGEMENT ELEVATIONS (Ft.)		
Level (Feet)	**G1**	**G2 (see below)**
Below 14.0	Unit will not start	Unit will not start
Below 14.2	Shut down	Unit will not start
14.2 to 14.7	Shut down	Shut down
14.7 to 15.1	Efficient loading waiting to auto start	Shut down
15.1 to 15.8	Efficient loading waiting to auto start	Shut down
15.8 to 15.9	Efficient loading	Shut down
15.9 to 16.0	Peak loading	Shut down
Above 16.0	Peak loading	See Below

Bulletin Number: POG100.03.15
Date Issued: 1999 08 18
Date Revised: 2015 06 25
Date Reviewed: 2018 08 20

Lockston Operating Procedures

Created By: L. Thompson
Revised By: D. Ball
Reviewed By: G. Whitty
Approved By: G. Humby

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1. Unit #1 should be cycled on and off at best efficiency to maximize water use and should only operate at full load in the event of predicted spill. Main control should be via operating gates.

2. Unit #2 should only operate in the following conditions:
   - Elevation of forebay exceeds spill elevation of 16.0 feet
   - Elevation of Trinity Pond exceeds 14.4 feet

3. Plant has a large storage reservoir and seldom spills. The control gate at Rattling Pond which feeds the canal is usually full open. The water flow to Lockston Plant is controlled using the outlet gate at Trinity Pond.

4. The gate at Trinity Pond is typically kept open 8 to10 inches in the winter.

5. All gates to be left open a minimum of 1 inch to maintain flow for fisheries. If gate has to be closed, an alternate method of maintaining flow should be established.

6. The maximum allowable storage elevation in Trinity Pond is 14.4 feet (28 inches below dam crest). Operating at this limit will ensure adequate design flood discharge capacity is maintained.

7. The Fisheries Flow Compensation Valve shall be normally operated in 55% open position (approximately 0.14 m^3/s) when the generating units are not operating as a means of providing flow in the tailrace. If, due to extreme low inflows, the forebay level drops below elevation 13.0 feet, the valve should be partially closed to the 10% position in an effort to match system inflow conditions.

8. Water level readings at Lockston are observed by field operations staff using the following reference benchmarks:

Reservoir	Reference	Elevation
Rattling Pond	Concrete Spillway Sill	16.0 feet
Trinity Pond	Top of Concrete Dam	16.75 feet (201”)

NEWFOUNDLAND POWER
A FORTIS COMPANY

Bulletin Number: POG100.03.16
Date Issued: 1999 08 18
Date Revised: 2010 06 16
Date Reviewed: 2018 80 20

Port Union Operating Procedures

Created By: L. Thompson
Revised By: D. Ball
Reviewed By: G. Whitty
Approved By: G. Humby

UNIT LOADING								
	Best Efficiency			Maximum Load			Rough Zone	
Unit	Load (kW)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Load (kW)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Minimum	Maximum
#1	260	1.45	179.3	260	1.45	179.3	None	None
#2	340	1.93	176.2	340	1.93	176.2	None	None

FOREBAY OPERATING ELEVATIONS (Ft.)			
	Upper	Lower	Trip Level
Second Storage Pond	8.0	7.5	3.0

STORAGE ELEVATION LIMITS (Ft.)			
	Upper	Lower (normal)	Lower (summer)
Whirl Pond	7.8	2.8	-
Long Pond	12.0	1.0	See note 4

- Summer elevation is a minimum that the reservoir will operate at between June 15 and September 15 under normal conditions.

Bulletin Number: POG100.03.16
Date Issued: 1999 08 18
Date Revised: 2010 06 16
Date Reviewed: 2018 80 20

Port Union Operating Procedures

Created By: L. Thompson
Revised By: D. Ball
Reviewed By: G. Whitty
Approved By: G. Humby

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1. Operate Unit #1 and Unit #2 at maximum load to avoid spill. Cycle Units on and off to maintain forebay limits.

2. The system is essentially a run of the river plant and water has to be used as it becomes available.

3. Whirl Pond is a water supply for the town of Port Union and a minimum coverage of 3 feet is required at the intake.

4. Long Pond minimum elevation to be kept above 4.5 feet at critical low inflow periods of the year (i.e. mid to late summer and possibly mid-winter). When elevation reaches the minimum level during these critical periods, hydro plant operations should be halted, and storage is to be reserved for towns water supply only.

5. All gates to be left open a minimum of 1 inch to maintain flow for fisheries. If gate has to be closed, an alternate method of maintaining flow should be established.

6. Fish screens must be installed at Whirl Pond commencing immediately on ice out and must not be removed until August 31.

7. Water level readings at Port Union are observed by field operations staff using the following reference benchmarks:

Reservoir	Reference	Elevation
Port Union Forebay	Timber Spillway Sill	8.0 feet
Whirl Pond	Concrete Spillway Sill	7.8 feet
Long Pond	Concrete Spillway Sill	12.0 feet
Wells Pond	Top of Dam	8.5 feet

Port Union Operating Procedures

Created By: L. Thompson
Revised By: D. Ball

Reviewed By: G. Whitty
Approved By: G. Humby

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8. The fishway at Whirl Pond spillway must be kept open and clear with no obstructions to flow or fish passage.

9. Gate structure at Halfway Pond has been removed so water moves unrestricted from this reservoir. Gate structure at Wells Pond has been removed and replaced with a culvert.

NEWFOUNDLAND POWER
A FORTIS COMPANY

Bulletin Number: POG100.03.17
Date Issued: 1999 08 18
Date Revised: 2013 07 26
Date Reviewed: 2018 08 20

Rattling Brook Operating Procedures

Created By: L. Thompson
Revised By: D. Ball
Reviewed By: G. Whitty
Approved By: G. Humby

Table A

UNIT LOADING								
	Best Efficiency			Maximum Load			Rough Zone	
Unit	Load (kW)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Load (kW)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Minimum	Maximum
#1 Alone	7100	9.1	780	7940	10.5	756	None	None
#2 Alone	6680	8.4	795	8110	10.8	751	None	None
#1 with Both Units Operating	6900	9.2	750	7290	10.7	681	None	None
#2 with Both Units Operating	6500	8.6	756	7390	10.5	704	None	None

Table B

FOREBAY OPERATING ELEVATIONS (Ft.)			
	Upper	Lower	Trip Level
Forebay	335	335	325

Table C

STORAGE ELEVATION LIMITS (Ft.)			
	Upper	Lower	Summer
Forebay	335.3	325.0	
Rattling – Amy's	377.0	349.0	-
Frozen Ocean	602.0	595.5	-

Flow Delay

- Frozen Ocean to Amy's 12.0 hours
- Amy's to Forebay 0.5 hours

NEWFOUNDLAND POWER
A FORTIS COMPANY

Bulletin Number: POG100.03.17
Date Issued: 1999 08 18
Date Revised: 2013 07 26
Date Reviewed: 2018 08 20

Rattling Brook Operating Procedures

Created By: L. Thompson
Revised By: D. Ball
Reviewed By: G. Whitty
Approved By: G. Humby

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1. Per Department of Fisheries and Oceans (DFO) "Fish Passage Flow Requirements for Newfoundland Power Hydroelectric Facilities at Rattling Brook, NL" (effective May 1, 2013).

   a) To protect fish downstream of the Rattling Brook facility and to provide upstream passage for Atlantic Salmon flows shall be provided as follows:

Table 1: Minimum Tailrace Flows			
Water Temperature	**Rate of Flow Reduction**	**Minimum Flow**	**Approximate MW* Loading (either unit)**
≥ 8ºC	Not greater than 2m^3/s/hr	3 m^3/s	2.5 MW
< 8ºC	Not greater than 2m^3/s/hr	4 m^3/s	3.0 MW
* The MW loading above corresponds to the minimum flow requirement by DFO. Running either unit at this loading is not ideal for the mechanical integrity of the turbine and should be avoided if at all possible. If it is absolutely necessary to run at this rate, confirmation must be obtained from the Superintendent, Generation Operations or designate.			

   b) Provide downstream passage for Atlantic Salmon smolts and kelts.
      i. Flows shall be provided, maintained and monitored between May 1 and June 30 of each year.
      ii. A minimum flow of 1.5 m^3/s shall be maintained from the top 1 to 1.5 meters of the water column from Amy's Lake to Goulding's Reservoir.
      iii. During the operating period, the Amy's Lake Reservoir shall be maintained about 111.5 meters (365.7 feet) to provide adequate flows to operate the bypass structure.
      iv. Conduit fences shall be installed prior to May 1 to direct fish to the Goulding's Spillway Bypass Pipe and may be removed after June 30.
      v. A minimum flow of 0.75 m^3/s shall be released via the Goulding's Spillway Bypass Pipe between May 1 and June 30 each year to provide safe fish passage into Rattling Brook.

Rattling Brook Operating Procedures

Created By: L. Thompson
Revised By: D. Ball
Reviewed By: G. Whitty
Approved By: G. Humby

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c) Unplanned Flow Reduction (unplanned flow reduction below the minimum prescribed above).

i. The outlet gate at Amy's will be operated by the PLC to allow the water to rise in the forebay as quickly as possible.

ii. The Plant Operator will confirm this is happening as soon as possible. If this has not occurred the Plant Operator will manually initiate this process.

iii. Once there is a spill level of approximately 5 inches at the forebay, Amy's gate opening should be reduced to maintain 5 inches of spill.

iv. The spill level is to be maintained until the Plant is returned to service and minimum flows are able to be supported from the Plant. Estimated time for minimum flows to reach the tailrace once the Plant shuts down is 4 to 8 hours.

d) Planned Flow Reduction (scheduled flow reduction below the minimum prescribed above as a result of capital or maintenance work).

i. Before the units are taken offline, the outlet gate at Amy's will be operated to allow the water to rise in the forebay and result in spill of 5 inches.

ii. Once there is a spill level of 5 inches, Amy's gate opening should be reduced to maintain the level of spill. The spill level is to be maintained until the Plant is returned to service and minimum flows are able to be supported from the Plant alone.

iii. Table 2: Unit Loading and Resulting Flows

Table 2: Unit Loading and Resulting Flows* For Either Unit Operating Alone		
Gate Position (%)	**MW**	**Flow (m^3/s)**
30	2.7	4.2
40	4.2	5.7
50	5.4	7.2
60	6.3	8.1
65	6.7	8.6
70	7.0	9.0
75	7.3	9.4
80	7.5	9.8

Rattling Brook Operating Procedures

Created By: L. Thompson
Revised By: D. Ball
Reviewed By: G. Whitty
Approved By: G. Humby

85	7.8	10.2
90	7.9	10.5
95	8.1	10.8
* Table above approximates flow based on power output or gate position of either unit operating alone. The data is rounded for simplicity in presentation and should be used for guidance only – not for an exact measure of flows. Flows are approximate and should be taken to be ± 0.5 m^3/s.		

e) In the event that periodic maintenance, operational requirements or emergency or unforeseen circumstances at the Rattling Brook facilities interfere with the ability of Newfoundland Power to adhere to the conditions specified, Newfoundland Power is to notify the DFO Fisheries Protection Triage & Planning Unit by telephone at 709-772-4140 or by email to FPP-NL@dfo-mpo.gc.ca at the earliest opportunity.

2. When inflows are minimal, units may be operated in "low efficiency" gate position. This is approximately 55-60% for either unit. Various modes of operation of the units are incorporated into the water management scheme.

3. The water available in this system will be used as efficiently as possible. All water management will be done in consultation with the Plant Maintenance Supervisor for the Area and the Manager, Generation to ensure there is always an adequate supply to maintain minimum flows in the tailrace as per DFO requirements.

   a) Prior to spring runoff, Amy's and Frozen Ocean water levels *may* be reduced to capture as much run off as possible.
   b) Winter normal inflows will be evaluated at year end in conjunction with yearend storage levels to ensure there is adequate water for at least minimum flows through the winter period.
   c) Summer normal inflows will be evaluated in conjunction with spring storage levels to ensure there is adequate water for at minimum flows through the summer.

4. Operate both Units at full load only when necessary to avoid spill or manage available water. This is the most inefficient setting for the Units.

Rattling Brook Operating Procedures

Created By: L. Thompson
Revised By: D. Ball

Reviewed By: G. Whitty
Approved By: G. Humby

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5. Maintain constant head at Rattling Forebay by adjusting the gate at Amy's.

6. All upstream gates to be left open a minimum of 1 inch to maintain minimum flow. If any gate has to be closed, an alternate method of maintaining flow must be established.

7. During cold weather conditions it may be necessary to vary the load at Rattling Brook by 4 MW for 5 minutes to avoid surge tank freeze up. Guidelines for the frequency of variation are:

Temperature	Frequency
-10 C to -20 C	4 hours
Below -20 C	2 hours

8. Ensure that the transportation of Adult Salmon and the migration of smolt and salmon downstream is managed in accordance with the requirement of Fisheries and Oceans Canada (DFO).

Related Significant Aspects

- 850; 860

NEWFOUNDLAND POWER
A FORTIS COMPANY

Bulletin Number: POG100.03.18
Date Issued: 1999 08 18
Date Revised: 2012 07 26
Date Reviewed: 2018 08 20

Sandy Brook Operating Procedures

Created By: L. Thompson
Revised By: B. Hogan
Reviewed By: G. Whitty
Approved By: G. Humby

UNIT LOADING								
	Best Efficiency			Maximum Load			Rough Zone	
Unit	Load (kW)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Load (kW)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Minimum	Maximum
#1	5700	-	-	6400	-	-	2000	5500

FOREBAY OPERATING ELEVATIONS (Ft.)					
	Jan – Feb; June – Nov			Dec; March - May	
	Upper	Lower	Trip Level	Upper	Lower
Sandy Brook Forebay	415	413.5	408.5	413.0	411.5

STORAGE ELEVATION LIMITS (Ft.)			
	Upper	Lower	Summer
Sandy Brook Forebay	416.0	410.0	-
Sandy Lake	11.8	0.0	-
West Lake	7.0	0.0	-

Flow Delay

- Sandy Lake to Sandy Brook Forebay 18 hours
- West Lake to Sandy Brook Forebay 2 hours

Bulletin Number: POG100.03.18
Date Issued: 1999 08 18
Date Revised: 2012 07 26
Date Reviewed: 2018 08 20

Sandy Brook Operating Procedures

Created By: L. Thompson
Revised By: B. Hogan

Reviewed By: G. Whitty
Approved By: G. Humby

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1. Operate Sandy Brook Plant at best efficiency unless heavy inflow expected or happening.

2. The plant has a large drainage area and is prone to spilling during heavy inflows. Reservoirs should be brought to their minimum level prior to spring runoff (March). At that time the plant should be cycled on and off at best efficiency to keep the forebay within limits. In advance of rainstorms, bring forebay down as low as possible by operating at best efficiency or full load as necessary

3. Typically Sandy Lake should be kept at a maximum of 3 feet from mid-September to the end of October in anticipation of fall precipitation.

4. All gates to be left open a minimum of 1 inch to maintain flow for fisheries. If gate has to be closed, an alternate method of maintaining flow should be established.

5. Inform Nalcor Energy – Exploits Generation Department when Unit is put on and taken off line. Contact Peter Robbins at (709) 489-5306.

6. During cold weather conditions it may be necessary to vary the load at Sandy Brook by 3000 kW for 5 minutes to avoid surge tank freeze up. Guidelines for the frequency of variation are:

Temperature	**Frequency**
-10 C to –20 C	4 hours
Below –20 C	2 hours

NEWFOUNDLAND POWER
A FORTIS COMPANY

Bulletin Number: POG100.03.19
Date Issued: 1999 08 18
Date Revised: 2013 07 26
Date Reviewed: 2018 08 20

Lookout Brook Operating Procedures

Created By: L. Thompson
Revised By: T. Hynes
Reviewed By: G. Whitty
Approved By: G. Humby

UNIT LOADING										
		Best Efficiency			Maximum Load				Rough Zone	
Unit	Load (kW)	Gate Limit (%)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Load (kW)	Gate Limit (%)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Min	Max
#3	2500	85.0	-	-	2950	100	2.25	1311.1	None	None
#4	2500	86.0	1.79	1396.6	3200	100	2.36	1356	None	None

NORMAL WATER MANAGEMENT ELEVATIONS (Ft.)				
	Lookout Brook March-May Inflow		**Lookout Brook June-February Inflow**	
Level (Feet)	**G3**	**G4**	**G3**	**G4**
Below 551.0	Unit Will Not Start	Unit Will Not Start	Unit Will Not Start	Unit Will Not Start
Below 551.6	Shut Down	Shut Down	Shut Down	Shut Down
551.6 to 551.7	Efficient Loading Waiting To Auto Start	Shut Down	Shut Down	Shut Down
551.7 to 552.2	Efficient Loading Waiting To Auto Start	Efficient Loading Waiting To Auto Start	Shut Down	Shut Down
552.2 to 552.3	Efficient Loading Waiting To Auto Start	Efficient Loading Waiting To Auto Start	Shut Down	Efficient Loading Waiting To Auto Start
552.3 to 552.4	Efficient Loading Waiting To Auto Start	Efficient Loading Waiting To Auto Start	Efficient Loading Waiting To Auto Start	Efficient Loading Waiting To Auto Start
552.4 to 552.5	Efficient Loading Waiting To Auto Start	Efficient Loading	Efficient Loading Waiting To Auto Start	Efficient Loading Waiting To Auto Start
552.5 to 552.7	Efficient Loading	Efficient Loading	Efficient Loading Waiting To Auto Start	Efficient Loading Waiting To Auto Start
552.7 to 552.8	Peak Loading	Efficient Loading	Efficient Loading Waiting To Auto Start	Efficient Loading Waiting To Auto Start
552.8 to 553.2	Peak Loading	Peak Loading	Efficient Loading Waiting To Auto Start	Efficient Loading Waiting To Auto Start
553.2 to 553.3	Peak Loading	Peak Loading	Efficient Loading Waiting To Auto Start	Efficient Loading
553.3 to 553.4	Peak Loading	Peak Loading	Efficient Loading	Efficient Loading
553.4 to 553.5	Peak Loading	Peak Loading	Efficient Loading	Peak Loading
Above 553.5	Peak Loading	Peak Loading	Peak Loading	Peak Loading

NEWFOUNDLAND POWER
A FORTIS COMPANY

Bulletin Number: POG100.03.19
Date Issued: 1999 08 18
Date Revised: 2013 07 26
Date Reviewed: 2018 08 20

Lookout Brook Operating Procedures

Created By: L. Thompson
Revised By: T. Hynes
Reviewed By: G. Whitty
Approved By: G. Humby

NORMAL WATERMANAGEMNT START AND SHUTDOWN LEVEL (Ft)				
	G3 March-May Inflow	G3 June-February Inflow	G4 March-May Inflow	G4 June-February Inflow
Auto Shutdown	551.6	552.3	551.7	552.2
Auto Start	552.5	553.3	552.4	553.2

STORAGE ELEVATION LIMITS (Ft.)			
	Upper	Lower (normal)	Lower (summer)
Lookout Brook Forebay	554.0	552.2	551.5
Joe Dennis Pond	12.2	2.4	-
Cross Pond	10.0	1.8	-

- Summer elevation is a minimum that the reservoir will operate at between June 15 and September 15 under normal conditions.
- Lookout Brook forebay SCADA goes only to 551.1 feet elevation. Do not operate units below 551.5 feet.

Flow Delay

- Cross Pond to Joe Dennis 48 hours
- Joe Dennis to Lookout Brook Forebay 18 hours

Bulletin Number: POG100.03.19
Date Issued: 1999 08 18
Date Revised: 2013 07 26
Date Reviewed: 2018 08 20

Lookout Brook Operating Procedures

Created By: L. Thompson
Revised By: T. Hynes
Reviewed By: G. Whitty
Approved By: G. Humby

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1. During minimum inflow, operate Unit #4 at best efficiency. For higher inflows, bring Unit #3 on at best efficiency and cycle on and off to maintain forebay limits.

2. For higher inflows, keep Unit #3 at best efficiency and bring Unit #4 to full load. If required to keep ahead of inflow, operate both units at full load. Total output with both machines on will be about 5800 kW due to the additional head loss in the penstock

3. Spring runoff may begin in June and continue through mid-July so the watersheds should be near minimums by this time. The runoff can be heavy. Inflows in the fall may be heavy as well so the storage levels should be maintained on the lower range going into late September/ early October.

4. Cross Pond gate to be opened to 12 inches and left at this setting year round (under normal operating conditions). Changes to the opening will be done in consultation with the Supervisor, Generation Operations.

5. Cross Pond spills out of the system.

6. All gates to be left open a minimum of 1 inch to maintain flow for fisheries. If gate has to be closed, an alternate method of maintaining flow should be established.

NEWFOUNDLAND POWER
A FORTIS COMPANY

Bulletin Number: POG100.03.20
Date Issued: 1999 08 18
Date Revised: 2012 07 26 **Date Reviewed**: 2018 08 20

Rose Blanche Operating Procedures

Created By: L. Thompson
Revised By: B. Hogan
Reviewed By: G. Whitty
Approved By: G. Humby

UNIT LOADING								
	Best Efficiency			Maximum Load			Rough Zone	
Unit	Load (kW)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Load (kW)	Flow (m^3/s)	Eff. ($kW/m^3/s$)	Minimum	Maximum
#1 Alone	2584	2.72	950.0	3034	3.00	1011.3	None	None
#2 Alone	2636	2.72	969.1	3019	3.00	1006.3	None	None
#1 with #2	2755	2.72	1012.9	2884	3.04	948.7	None	None
#2 with #1	2755	2.72	1012.9	2884	3.04	948.7	None	None

FOREBAY OPERATING ELEVATIONS (M)			
	Upper	Lower	Trip Level
Rose Blanche Forebay	162.6	157.0	157.0

STORAGE ELEVATION LIMITS (M)		
	Upper	Lower
Rose Blanche Forebay	162.6	157.0

Flow Delay

- Rose Blanche Forebay to Tailrace via Spillway 4 hours

NEWFOUNDLAND POWER
A FORTIS COMPANY

Bulletin Number: POG100.03.20
Date Issued: 1999 08 18
Date Revised: 2012 07 26 **Date Reviewed**: 2018 08 20

Rose Blanche Operating Procedures

Created By: L. Thompson
Revised By: B. Hogan
Reviewed By: G. Whitty
Approved By: G. Humby

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1. When inflows are minimal, operate either Unit #1 or Unit #2 at best efficiency. Water management scheme calls for the operation of both units simultaneously when water elevation reaches 160.0 m.

2. Prior to spring runoff, Rose Blanche Forebay should be brought to minimum elevation.

3. Prior to the penstock dewatering, the fisheries valve at the main dam must be fully opened a minimum of 4 hours in advance.

4. Department of Fisheries and Oceans Agreement requires that a minimum flow of 1.0 m^3/s is maintained in the Rose Blanche River at all times. Once both units shutdown, the 16 inch fisheries valve is required to open to provide 1.0 m^3/s.

5. The Rose Blanche River downstream of the powerhouse supplies a holding pond for the Town of Rose Blanche and Town of Harbour Le Cou water supply.

6. Prior to a forecasted heavy rainfall event, Rose Blanche Forebay should be brought to minimum elevations, in an effort to reduce eventual spill. This may require operating both units at maximum load. This operation will over-ride the Water Management Scheme, and will be carried out at the discretion of the Supervisor, Generation Operations.

7. For detailed procedures regarding the operation of the fisheries compensation valve see POG100.02 – Operation and Maintenance for Rose Blanche Brook Plant Fisheries Compensation Valve and Penstock Dewatering.

8. The Water Management Scheme is normally switched from "summer mode" to "winter mode" in late November or December, at the discretion of the Superintendent, Generation Operations. The "winter mode" is designed to limit the fluctuation in the forebay elevations and minimize the ice cover disturbances, as well as preserving an emergency supply.

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Rose Blanche Operating Procedures

Created By: L. Thompson
Revised By: B. Hogan
Reviewed By: G. Whitty
Approved By: G. Humby

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9. Water level readings at Rose Blanche Forebay are observed by field operations staff using the SCADA reading. Should an actual field measurement be required for any reason, staff use a reference elevation of 162.6 meters which represents the top of the Concrete Spillway Sill.

10. The fishway structures downstream of Rose Blanche Plant must be kept open and clear with no obstructions to flow or fish passage.

Bulletin Number:POG100.04
Date Issued:2004 10 18
Date Revised: 2012 01 20
Date Reviewed: 2018 08 20

Thermal Generation Operating Procedures

Created By: B. Titford
Revised By: B. Hogan
Reviewed By: G. Whitty
Approved By: G. Humby

1.0 Purpose

The purpose of this procedure is to manage Newfoundland Power Thermal Generating Systems for the effective and efficient use of the fossil fuel resource to minimize environmental impacts.

2.0 Scope

This procedure applies to all thermal generating facilities operated by Newfoundland Power.

3.0 General

The Company will manage the efficient use of fossil fuel resources in an effort to reduce environmental impacts.

4.0 Responsibilities

4.1 Director, Responsible for Generation Operations

- Will ensure that appropriate resources are trained and available to meet the requirements of this procedure.

4.2 Manager, Generation

- Will ensure that requirements of this procedure are completed and reviewed each year.
- Will ensure any changes made in operation procedures shall be added to this procedure as the need arises.

Thermal Generation Operating Procedures

Created By: B. Titford
Revised By: B. Hogan
Reviewed By: G. Whitty
Approved By: G. Humby

4.3 Supervisor(s) Generation Operations

- Will ensure that the Thermal Generation Operating Procedures are completed for each thermal generating facility under their responsibility.
- Will notify the Manager, Generation of any changes to the procedure or temporary/permanent major changes in operations at the generation facility.

5.0 Procedure

5.1 Detailed Operating Procedures

5.1.1 Plant staff are to note any abnormal generator and/or fuel storage system conditions and report to the Supervisor for review. The supervisor will identify abnormal conditions for follow-up and arrange for repair or maintenance to be scheduled in the Avantis System.

5.1.2 Regular generator maintenance and start-up checks will be completed as scheduled in Avantis.

5.1.3 Fuel storage systems with the main fuel supply line to the generator located at the bottom of the storage tank will have the main valve placed in the closed position when plant is not in operation.

5.1.4 Fuel storage systems with the main fuel supply line to the generator located at the top of the storage tank will be fitted with an anti-siphon valve with the main valve left in the open position when the plant is not in operation.

5.1.5 Fuel storage systems will be inspected and reconciled regularly as scheduled in Avantis and detailed in OPR200.09 – Petroleum Storage.

5.1.6 Fuel usage and production data will be provided to SCC and included with the Monthly Energy Report.

Thermal Generation Operating Procedures

Created By: B. Titford
Revised By: B. Hogan
Reviewed By: G. Whitty
Approved By: G. Humby

5.2 General Operating Procedure

5.2.1 Generators shall generally be operated to match project requirements. Generators may be operated at less than best efficiency point in situations where load demands, maintenance work or abnormal situations require this.

5.2.2 Thermal generation plants will only be operated for planned outages, maintenance procedures, emergency back-up and upon request from Newfoundland Hydro.

5.2.3 Emergency situations and information related to the emergency shall be managed according to the Emergency Preparedness and Response Procedure for that particular power plant. The format of communications shall be as determined by the Manager, Public & Government Affairs. For additional detailed procedures relating to communications with external parties see OPR400.05 – Environmental Communications.

6.0 References

6.1 Reference Documents

- OPR200.09 – Petroleum Storage
- OPR400.05 – Environmental Communications
- Emergency Preparedness and Response Procedure

6.2 Related Significant Aspects

- 420

6.3 Legal and Other Requirements

- No legal or other requirements

Thermal Generation Operating Procedures

Created By: B. Titford
Revised By: B. Hogan
Reviewed By: G. Whitty
Approved By: G. Humby

7.0 Records

- No records

8.0 Glossary

- **SCC** – System Control Center

Abbreviations

Best Efficiency Point – This is the operating point which maximizes the amount of energy that is produced for each unit of fuel consumed by the turbine.

Bulletin Number: POG100.05
Date Issued: 1999 08 18
Date Revised: 2007 08 08
Date Reviewed: 2018 08 20

Maintenance of Fluid Measuring Systems

Created By: L. Thompson
Revised By: J. Curran
Reviewed By: G. Whitty
Approved By: G. Humby

1.0 Purpose

This procedure outlines the maintenance and calibration requirements for fluid measuring systems associated with Newfoundland Power's generating facilities.

2.0 Scope

These guidelines refer to devices that measure level, volume, flow and pressure associated with various liquids

3.0 General

Newfoundland Power on a regular basis will monitor its fluid measuring systems to ensure they are functioning properly.

4.0 Responsibilities

4.1 Supervisor, Generation Maintenance

- Will work with Supervisor, Generation Operations in order to insure that the required maintenance is completed.

4.2 Supervisor(s) Generation Operations

- Will ensure that any required maintenance on fluid measuring systems is completed for each of their plants.

Maintenance of Fluid Measuring Systems

Created By: L. Thompson
Revised By: J. Curran
Reviewed By: G. Whitty
Approved By: G. Humby

5.0 Procedure

5.1 Asset Management System
All maintenance will be scheduled and tracked through the Generation Asset Management System. This system is comprised of the electronic system Avantis.

5.2 Dipstick System
Dipstick will be inspected prior to each use. Any defects will result in the stick being repaired or replaced.

Dipsticks will not be calibrated.

5.3 Bubbler Level/Volume Measuring Systems
Maintenance will be carried out as per the Generation Asset Management System. Any defects will result in the device being repaired or replaced.

Bubbler level/volume measuring systems will be calibrated every five years.

5.4 Electric Level/Volume Monitoring System
Maintenance will be carried out as per the Generation Asset Management System. Any defects will result in the devices being repaired or replaced.

Electric level/volume monitoring systems will be calibrated every five years.

5.5 Float Volume Measuring System
Maintenance will be carried out as per the Generation Asset Management System. Any defects will result in the device being repaired or replaced.

Float volume measuring systems will be calibrated every five years.

Maintenance of Fluid Measuring Systems

Created By: L. Thompson
Revised By: J. Curran
Reviewed By: G. Whitty
Approved By: G. Humby

5.6 Interstitial, Overfill and Leak Detection Systems.
Maintenance will be carried out as per the Generation Asset Management System. Any defects will result in the device being repaired or replaced.

Interstitial, overfill and leak detection systems will be calibrated every five years.

5.7 Fuel Flow Meters
Maintenance will be carried out as per the Generation Asset Management System. Any defects will result in the device being repaired or replaced.

Fuel flow meters will be calibrated every five years.

5.8 Thermometers
Thermometers will be inspected before each use. Any defects will result in the device being replaced.

Thermometers will not be calibrated.

5.9 Fish Valves
Maintenance will be carried out as per the Generation Asset Management System. Any defects will result in the device being repaired or replaced.

Fish Valves will be calibrated every ten years.

6.0 References

6.1 Reference Documents

- No reference documents

Maintenance of Fluid Measuring Systems

Created By: L. Thompson
Revised By: J. Curran
Reviewed By: G. Whitty
Approved By: G. Humby

6.2 Related Significant Aspects

- No related significant aspects

6.3 Legal and Other Requirements

- No legal and other requirements

7.0 Records

- Asset Management System Records

8.0 Glossary

- No new terms referenced

Bulletin Number: POG100.07
Date Issued: 1999 07 15
Date Revised: 2012 01 20
Date Reviewed: 2018 08 20

Maintenance of Dams, Gates and Penstocks

Created By: K. Nicholson
Revised By: P. O'Leary
Reviewed By: G. Whitty
Approved By: G. Humby

1.0 Purpose

To identify existing or potential issues, related to the condition of dams/gates/penstocks that may negatively impact the environment and conduct immediate improvements.

2.0 Scope

This procedure provides guidelines for the inspection and other preventive maintenance activities relating to all dam structures (both storage structures and gate structures) and penstocks owned and operated by the Company.

3.0 General

Regularly scheduled preventative maintenance (PM) activities ensure that dam structures (both storage structures and gates structures) and penstocks are functioning as intended. The PM program includes inspection activities, operational assessments, and normal maintenance required to maintain structures in an appropriate operating condition. A properly maintained system will reduce the potential for loss of water control and flooding that may cause disruption/ creation of fish habitat, erosion, and inefficient use of the water resource.

4.0 Responsibilities

4.1 Director Responsible for Generation Operations

- Will ensure that the overall PM program is appropriately resourced and coordinated.

Maintenance of Dams, Gates and Penstocks

Created By: K. Nicholson
Revised By: P. O'Leary
Reviewed By: G. Whitty
Approved By: G. Humby

4.2 Manager, Generation

- In conjunction with the Manager responsible for Civil Engineering, shall deploy resources as required to complete repairs and improvements in a timely and cost effective manner.

4.3 Supervisor(s), Generation Operations

- Will ensure structures are inspected and make decisions, in conjunction with the Superintendent, Generation Operations, regarding repairs or improvements to structures that have a potential to adversely affect the environment.

5.0 Procedure

5.1 Dam structures (storage structures and gates) will be operated in accordance with the POG100.03 Series – Reservoir and Turbine Operating Procedures.

5.2 Power plant staff to conduct a site visit and inspection of each dam structure (storage structures and gate structures) and penstock on a frequency as scheduled in Avantis.

5.3 Power plant staff conduct PM activities to ensure structures are maintained in an appropriate operating condition.

- Maintenance to penstock bands and staves will minimize the potential for flooding caused by an uncontrolled release/blowout.
- Maintenance to forebay sluice gates will minimize leaks, and thus prevent the inadvertent creation of unsustainable fish habitat.
- Maintenance to gated spillway structures will ensure that adequate flood discharge capacity is maintained. This will reduce the risk of dam overtopping and subsequent downstream siltation.

Maintenance of Dams, Gates and Penstocks

Created By: K. Nicholson
Revised By: P. O'Leary
Reviewed By: G. Whitty
Approved By: G. Humby

5.4 Supervisor(s) Generation Operations to identify and coordinate appropriate repairs or improvements relating to issues identified during the inspections that have the potential to negatively impact the environment.

6.0 References

6.1 Reference Documents

- POG100.03 Series – Reservoir and Turbine Operating Procedures

6.2 Related Significant Aspects

- 270; 720

6.3 Legal and Other Requirements

- Environmental Legal Requirements Application - Webster

7.0 Records

- No records

8.0 Glossary

Abbreviations

- **PM** - Preventive Maintenance

Bulletin Number: POG100.08
Date Issued: 2002 03 26
Date Revised: 2012 01 20
Date Reviewed: 2018 08 20

Hydroelectric Projects in Water Supply Areas

Created By: B. Titford
Revised By: P. O'Leary
Reviewed By: G. Whitty
Approved By: G. Humby

1.0 Purpose

Minimize the impact on the quality and quantity of water supplies of the operation, maintenance and construction activities associated with Newfoundland Power hydroelectric developments.

2.0 Scope

This procedure applies to all Company owned hydroelectric developments located within watersheds that are also used to supply a source of water to external agencies/organizations (i.e. municipalities, fish plants, fire departments), as listed in Appendix A.

3.0 General

Several of Newfoundland Power's hydroelectric developments are operated in watersheds which also provide a source of water to other users. In such cases, the Company is committed to full cooperation with all stakeholders.

4.0 Responsibilities

4.1 Supervisor(s) Generation Operations

- Will ensure that public communications procedures are initiated through Corporate Communications at any time it is anticipated that water supply systems of others may be impacted by Newfoundland Power's plant operations.

4.2 Newfoundland Power employees, and Contractors acting on behalf of the Company, shall adhere to this procedure.

Bulletin Number: POG100.08
Date Issued: 2002 03 26
Date Revised: 2012 01 20
Date Reviewed: 2018 08 20

Hydroelectric Projects in Water Supply Areas

Created By: B. Titford
Revised By: P. O'Leary
Reviewed By: G. Whitty
Approved By: G. Humby

5.0 Procedure

5.1 The use and disposal of chemically treated poles and timbers shall comply with Sections 5.5 and 5.9 respectively of OPR200.03 – Chemically Treated Poles and Timbers.

5.2 Water levels in reservoirs that act as water supplies, as listed in Section 2.0 of this procedure, are maintained in accordance with the operating elevations established on the Plant Data Sheets in the POG100.03 Series – Reservoir and Turbine Operating Procedures. In particular, Forebay Operating and Storage Elevations provide lower limits of operation to minimize impact on water quality and quantity standards.

5.3 Changes in normal plant operating conditions which may have adverse impacts on water supply quality and availability require Public Communication as outlined in the POG100.03 Series – Reservoir and Turbine Operating Procedures.

5.4 Notification shall be made to the affected water user when activities outside normal operating conditions are required or when quality may be affected by activities of others that may be known to Newfoundland Power.

5.5 Unplanned emergency situations, which may have caused deterioration of water quality, shall be communicated to the respective communities and/or water users through the Manager, Public & Government Affairs.

6.0 References

6.1 Reference Documents

- POG100.03 Series – Reservoir and Turbine Operating Procedures
- OPR200.03 – Chemically Treated Poles and Timbers

Bulletin Number: POG100.08
Date Issued: 2002 03 26
Date Revised: 2012 01 20
Date Reviewed: 2018 08 20

Hydroelectric Projects in Water Supply Areas

Created By: B. Titford
Revised By: P. O'Leary
Reviewed By: G. Whitty
Approved By: G. Humby

6.2 Related Significant Aspects

- 810

6.3 Legal and Other Requirements

- Environmental Legal Requirements Application - Webster

7.0 Records

- No records

8.0 Glossary

- No new terms referenced

Appendix A
POG100.08

Reservoir	**Municipality**
Bay Bulls Big Pond	City of St. John's
Rose Blanche River (Fish Plant Dam)	Towns of Rose Blanche and Harbour LeCou
Fall Pond Forebay	Town of Little St. Lawrence
Victoria Forebay	Town of Victoria
West Brook Canal	Town of St. Lawrence
Whirl Pond	Town of Port Union
Southern Cove Pond (HCT Forebay)	Town of Heart's Content
Cape Broyle Forebay	Half Dozen Local Residents
Cochrane Pond	Country Ribbon Inc. (poultry farm)

Penstock/Plant	**Fish Plant Operator**
Pierres Brook	Shawmutt Fisheries
Tors Cove	Tors Cove Fisheries Ltd.

Penstock/Plant	**Fire Fighting Provider**
Mobile	Town of Witless Bay
Pierres Brook	

Bulletin Number: POG100.09
Date Issued: 2003 04 07
Date Revised: 2013 07 24
Date Reviewed: 2018 08 20

Vegetation Management Around Generating Facilities

Created By: T. Poole
Revised By: D. Ball
Reviewed By: G. Humby
Approved By: G. Humby

1.0 Purpose

To manage vegetation management activities around generating facilities.

2.0 Scope

This procedure applies to all vegetation management activities carried out at generating facilities.

3.0 General

Newfoundland Power will manage its vegetation management activities around generating facilities according to the requirements listed in this procedure including obtaining all regulatory approvals.

4.0 Responsibilities

4.1 Manager, Engineering or Manager, Generation

- Will ensure all regulatory approvals are obtained prior to the start of work.

4.2 The Manager, Generation has overall responsibility for the Generation Vegetation Management Program at Newfoundland Power.

4.2 Supervisor(s) Generation Operations

- Will ensure proper work methods are used and permits requirements are fulfilled.

Bulletin Number: POG100.09
Date Issued: 2003 04 07
Date Revised: 2013 07 24
Date Reviewed: 2018 08 20

Vegetation Management Around Generating Facilities

Created By: T. Poole
Revised By: D. Ball
Reviewed By: G. Humby
Approved By: G. Humby

5.0 Description of Activity

5.1 Work Method

5.1.1 Acceptable forms of mechanical methods include chain saws and brush saws, lawn mowers, axes, picks, shovels, etc.. Equipment, such as backhoes, may be used provided approval is received from the regulatory bodies.

5.1.2 Fertilizer or insecticide will not be used on lawns.

5.1.3 For herbicide application, refer to OPR200.05 – Vegetation Management.

5.2 Regulatory Approvals

5.2.1 The approvals required will depend on the type of generation facility.

5.2.2 Cutting of brush or trees will require a permit from the Department Natural Resources (DNR).

5.2.3 Cutting of brush or trees within 15 meters of water will require Fisheries and Oceans, Canada (DFO) and Department of Environment and Conservation (DOEC) approval.

5.2.4 Any cutting of vegetation within 30 meters of a salmon river will require approval of DFO.

5.2.5 Activities within 200 meters of a salmon river may require a submission to the Environmental Assessment Branch of DOEC.

5.2.6 Any fording activities will follow the requirements of OPR200.07 – Fording of Water Bodies.

Vegetation Management Around Generating Facilities

Created By: T. Poole
Revised By: D. Ball
Reviewed By: G. Humby
Approved By: G. Humby

5.2.7 Any access on ATV will follow the requirement in OPR200.06 – All-Terrain Vehicles (ATV).

5.2.8 If activities are inside the Avalon Wilderness Reserve, prior approval must be obtained as per OPR200.19 – Operating Inside the Avalon Wilderness Reserve.

5.2.9 If brush is to be burned on site a Burning Permit is required from DNR.

5.2.10 Application of herbicides will require approval from the Department of Environment and Conservation.

5.3 Management of Cut Vegetation

5.3.1 Cut vegetation may be either chipped, piled or burned depending on the location, time of year and permit restrictions.

5.3.2 No cut vegetation shall enter a water body or obstruct water flows

5.3.3 All merchantable timber must be salvaged.

5.3.4 Burning brush will require a Burning Permit during forest fire season. See OPR200.23 – Forest Fires Prevention.

5.3.5 Cut vegetation may be burned at dam sites, if, at the discretion of the Manager, Generation, chipping and piling is impractical due to the site location.

5.3.6 Refer to OPR200.38 - Migratory Birds for brush clearing activities related to migratory birds and their nests and eggs between May 1 – July 31 of each year.

Vegetation Management Around Generating Facilities

Created By: T. Poole
Revised By: D. Ball
Reviewed By: G. Humby
Approved By: G. Humby

6.0 References

6.1 Reference Documents

- OPR200.06 – All-Terrain Vehicles (ATV)
- OPR200.07 – Fording of Water Bodies
- OPR200.19 – Operating Inside the Avalon Wilderness Reserve
- OPR200.23 – Forest Fires Prevention
- OPR200.05 – Vegetation Management
- OPR200.38 - Migratory Birds

6.2 Related Significant Aspects

- No related significant aspects

6.3 Legal and Other Requirements

- Environmental Legal Requirements Application - Webster

7.0 Records (refer to local Master Environmental Records List for record location)

- Approval from Department Natural Resources
- Approval from Fisheries and Oceans, Canada
- Approval from Department of Environment and Conservation
- Release from Environmental Assessment

8.0 Glossary

- DFO – Fisheries and Oceans, Canada
- DNR – Department of Natural Resources
- DOEC – Department of Environment and Conservation
- EA – Environmental Assessment

Bulletin Number: POG100.10
Date Issued: 2006 03 08
Date Revised: 2013 06 07
Date Reviewed: 2018 08 20

Regulatory Approval for Routine Maintenance At Hydro Facilities

Created By: T. Cormier
Revised By: B. Ryan
Reviewed By: G. Whitty
Approved By: G. Humby

1.0 Purpose

Provide guidance for all Generation Operating staff regarding the use of a blanket approval from the provincial Department of Environment and Conservation (DOEC) and the federal department of Fisheries and Oceans (DFO) relating to routine maintenance activities conducted at hydro facilities owned and operated by Newfoundland Power.

2.0 Scope

This procedure applies to all Newfoundland Power routine maintenance and other related activities consisting of site improvements, dam maintenance and engineering / geotechnical investigations completed in order to maintain safe reliable operating conditions. This procedure applies within the 15 meter wide environmental buffer surrounding water bodies at various hydroelectric facilities.

3.0 General

Routine maintenance activities are required to maintain equipment and other assets in a safe reliable operating condition. Maintenance activities at the hydro facilities (i.e. dams, penstocks, intakes) are somewhat small-scale in nature, and are typically short duration (a few days or less). As a result, these activities may be considered relatively non-intrusive, with minimal risk to the environment. Obtaining a blanket approval for these routine maintenance activities provides Newfoundland Power with an opportunity to carry out low risk activities and avoid obtaining DOEC and DFO approvals for each separate work occurrence. Activities outside the scope of the DOEC's Blanket Approval ALT5052 and DFO's Blanket Approval will require additional approvals.

Regulatory Approval for Routine Maintenance At Hydro Facilities

Created By: T. Cormier
Revised By: B. Ryan
Reviewed By: G. Whitty
Approved By: G. Humby

4.0 Responsibilities

4.1 Manager, Engineering and / or Manager, Generation

- Will ensure that prior to the start of the maintenance work the appropriate documentation is completed and submitted to DOEC and DFO.

4.2 Supervisor(s) Generation Operations

- Prior to the commencement of maintenance work covered under Permit To Alter A Body of Water - ALT5052, the Supervisor(s) Generation Operations are responsible to submit the Notification of Maintenance Activities at NP Hydroelectric Facilities (Form 797) to DOEC a minimum of two (2) working days prior to the start of the work. A review of the DFO Blanket Request for Project Review (which is attached to the DFO Blanket Approval) shall also be carried out to see if the work falls within the scope of the DFO Blanket Approval. If so, the terms and conditions of the DFO Blanket Approval must be followed while performing the work. If the work is outside the scope of the DFO Blanket Approval, one should check the DFO web site to see if there is an Operational Statement that would apply and if so a Notification Form must be submitted to DFO ten (10) working days prior to starting work. In cases where neither the DFO Blanket Approval nor the Operational Statement can be used, one must submit a Request for Project Review for the specific project.

5.0 Procedure

5.1 Generation staff are responsible to conduct routine maintenance activities within each development as required and to maintain safe reliable operating conditions. Maintenance activities include, but are not limited to, the following:

5.1 Site Improvement

- Maintenance of access roads
- Drainage improvements
- Bridge repair (small scale)
- Safety improvements

Regulatory Approval for Routine Maintenance At Hydro Facilities

Created By: T. Cormier
Revised By: B. Ryan
Reviewed By: G. Whitty
Approved By: G. Humby

5.1.2 Routine Dam Maintenance

- Clearing trashracks / culverts
- Stoplog repairs
- Timber crib ballast repairs
- Penstock plugging
- Isolated area of riprap repair
- Re-grading slopes
- Repairs to appurtenant structures (i.e. gatehouse, outlet gate, spillway concrete)

5.1.3 Engineering / Geotechnical Investigations

- Concrete coring
- Test pits
- Soil sampling

Notes:

1. Drainage improvements will be limited to maintenance related to existing channels, culverts, bridges, etc.

2. Re-grading of slopes to the original grade will be covered under the blanket approval; however, if the slopes are changed this would require a separate permit. Please refer to OPR200.21 – Application for Regulatory Approvals for regulatory approvals required for such an activity.

5.2 For each activity carried out under the authority of the DOEC Permit ALT5052, the Supervisor(s) Generation Operations is responsible to complete and submit a Notification of Maintenance Activities at NP Hydroelectric Facilities (Form 797) to DOEC by e-mail to clydemclean@gov.nl.ca or fax (709) 729-0320 at least two (2) working days prior to the start of work. The form will identify specific details relating to the nature of the work on a case-by-case basis and will be submitted for separate work occurrences. In addition, the Supervisor(s) Generation Operations is responsible to send a copy of the form to the Generation Records Officer on Kenmount Road for filing.

Regulatory Approval for Routine Maintenance At Hydro Facilities

Created By: T. Cormier
Revised By: B. Ryan
Reviewed By: G. Whitty
Approved By: G. Humby

5.3 The DOEC Permit To Alter A Body of Water – ALT5052 will apply to repairs and / or improvements to existing structures only. Approval for new structures on significant streams will continue to be submitted as stand-alone applications to DOEC.

5.4 Environmental Approvals for large scale capital projects or other projects which may be otherwise be considered more environmentally sensitive will not be covered under the DOEC Permit ALT5052. Please refer to OPR200.21 – Application for Regulatory Approval for regulatory approvals required for such projects.

5.5 Activities within a Protected Public Water Supply Area (PPWSA) will not be covered under the DOEC Permit ALT5052. Refer to POG100.08 – Hydroelectric Projects in Water Supply Areas and OPR200.21 – Application for Regulatory Approval for regulatory approvals required for such projects. The DOEC Permit ALT5052 is valid for a five (5) year period and will expire in January 2015.

5.6 The DFO Blanket Request for Project Review (which is attached to the DFO Blanket Approval) covers a wide range of work as described in the terms and conditions of the DFO Blanket Approval. If the work is outside the scope of the DFO Blanket Approval one should check the web site to see if there is an Operational Statement that would apply and if so a Notification Form must be submitted to DFO ten (10) working days prior to starting work. In cases where neither the DFO Blanket Approval nor an Operational Statement can be used, one must submit a Request for Project Review for the specific project.

6.0 References

6.1 Reference Documents

- OPR200.21 – Application for Regulatory Approval
- POG100.08 – Hydroelectric Projects in Water Supply Areas
- DOEC Permit To Alter A Body of Water – ALT5052
- DFO Blanket Approval

Regulatory Approval for Routine Maintenance At Hydro Facilities

Created By: T. Cormier
Revised By: B. Ryan
Reviewed By: G. Whitty
Approved By: G. Humby

6.2 Related Significant Aspects

- No related significant aspects

6.3 Legal and Other Requirements

- Environmental Legal Requirements Application – Webster

7.0 Records (refer to local Master Environmental Records List for record location)

- Notification of Maintenance Activities at NP Hydroelectric Facilities – Form 797

8.0 Glossary

Abbreviations
DFO – Department of Fisheries and Oceans
DOEC – Department of Environment and Conservation
PPWSA – Protected Public Water Supply Area

Bulletin Number: POG100.11
Date Issued: 2004 04 02
Date Revised: 2012 08 03
Date Reviewed: 2018 08 20

Management of Greenhill Fuel Recirculation System

Created By: M. Churchill
Revised By: P. O'Leary
Reviewed By: G. Whitty
Approved By: G. Humby

1.0 Purpose

The purpose of this procedure is to manage the Greenhill Fuel Recirculation System.

2.0 Scope

This procedure is applicable to the Greenhill Fuel Recirculation System.

3.0 General

Newfoundland Power will manage the Greenhill Fuel Recirculation System in accordance with this procedure.

4.0 Responsibilities

4.1 Supervisor(s) Generation Operations

- Shall be responsible for the periodic review of the Greenhill Fuel Recirculation System.

5.0 Procedure

5.1 Normal Operations

Power Plant staff will ensure that the following steps are taken if the turbine is not running:

- Ensure AC MCC fuel pump is in AUTO by viewing MCC panel
- Ensure 96FLK3 valve is opened by viewing indications on panel view screen. 96LK1 and 96FLK2 should already be open.
- Ensure alarm and shutdown set points are set correctly. At present, this valve is 1 US Gallons Per Minute (GPM). This value is viewable and settable on panel view set points screen three.

Management of Greenhill Fuel Recirculation System

Created By: M. Churchill
Revised By: P. O'Leary
Reviewed By: G. Whitty
Approved By: G. Humby

5.2 Maintenance

- Supervisor(s) Generation Operations will ensure that the Annual Greenhill Fuel Recirculation System Annual maintenance is completed as a simulation to detect of a leak greater than 4 US GPM:
- Two Maintenance Persons are required to perform this step.
- Notify System Control Centre (SCC) prior to performing this maintenance procedure
- Maintenance Person #1 will press the manual recir option on the panelview screen (if system not automatically recirculating). At the same time, Maintenance Person #2 will be located in the fuel-forwarding shed near the normally closed recirculation bypass valve.
- Maintenance Person #1 will then view the liquid fuel screen on the PC HMI and visually monitor the fuel flow out reading while Maintenance Person #2 very slowly opens the closed recirculation bypass valve. Maintenance Person #1 should notice an increase in the amount of fuel leaking (simulated) from 0 US GPM to 4 US GPM. When the amount increases past 4 US GPM the Fuel Recirculation System will shut down and all valves will close.
- Maintenance Person #1 and SCC will see an alarm/shutdown indicating that a fuel leak has been detected.
- When the operation has been verified, Maintenance Person #2 should return the recirculation bypass valve to its normal position (closed).
- This procedure should be performed as per Avantis.
- Refer to OPR200.09 – Petroleum Storage, Section 10.11 for information on fuel shut-off valves.

6.0 References

6.1 Reference Documents

- OPR200.09 – Petroleum Storage

6.2 Related Significant Aspects

- 420

Management of Greenhill Fuel Recirculation System

Created By: M. Churchill
Revised By: P. O'Leary
Reviewed By: G. Whitty
Approved By: G. Humby

6.3 Legal and Other Requirements

- Environmental Legal Requirements Application - Webster

7.0 Records

- Avantis

8.0 Glossary

Abbreviations

- **GPM** – Gallons Per Minute
- **SCC** – System Control Centre

Bulletin Number: POG100.12
Date Issued: 2002 04 05
Date Revised: 2013 07 24
Date Reviewed: 2018 08 20

Storing and Controlling the Release of Water

Created By: B. Titford
Revised By: D. Ball
Reviewed By: G. Whitty
Approved By: G. Humby

1.0 Purpose

Minimize potentially adverse impacts on fish and fish habitat while storing and releasing water.

2.0 Scope

This procedure applies to all water storage systems within Company owned hydroelectric developments.

3.0 General

Water flows shall be managed in all waterbody channels that are utilized as part of the normal operation of hydroelectric watersheds to minimize potential adverse effects on fish and fish habitat. These channels primarily include tailrace channels, rivers which interconnect storage reservoirs and forebays, and discharge channels which release water from the system through sluice gates.

4.0 Responsibilities

4.1 Manager, Generation

- In conjunction with Manager, Engineering will provide resources to monitor and inspect water levels in reservoirs and waterways on a regular basis in accordance with POG100.07 – Maintenance of Dams, Gates and Penstocks.

Bulletin Number: POG100.12
Date Issued: 2002 04 05
Date Revised: 2013 07 24
Date Reviewed: 2018 08 20

Storing and Controlling the Release of Water

Created By: B. Titford
Revised By: D. Ball
Reviewed By: G. Whitty
Approved By: G. Humby

5.0 Procedure

5.1 Tailrace Channels

5.1.1 Normally, hydro plant operating practices do not result in dewatering of tailrace channels. At many coastal powerhouse sites, tailrace water levels are controlled by tidewater, not plant discharges. As such, tailrace dewatering is not a problem, and flow compensation is not required during shutdown periods. Similarly, in cases where inland powerhouses discharge directly into a downstream waterbody with backwater effects, tailrace channels are naturally maintained.

5.1.2 Provision for minimum flows in tailrace channels is of primary concern at inland powerhouse sites, which do not discharge directly into downstream waterbodies with backwater effects. These sites include; PBK, TOP, SCV, VIC, WBK, LOK, SBK, LBK, RBH. Of these nine sites, three plants (SCV, LOK, RBH) are equipped with flow compensation valves that are operated to maintain tailrace flows during periods of plant shutdowns. At all the seven remaining sites, flow diversion arrangements may be required to provide flow compensation during extended plant shutdown periods (i.e. one week or greater), depending on natural seasonal inflow and/or local drainage conditions.

5.1.3 Monitoring and control of water levels at Rose Blanche Brook tailrace shall be conducted as outlined in POG100.02 – Rose Blanche Brook Plant Fisheries Flow Compensation Strategy.

5.1.4 Provisions for minimum flows in tailrace channels at PBK, SCV and LOK are outlined in:

- POG100.03.02 – Pierre's Brook Operating Procedures
- POG100.03.08 - Seal Cove Operating Procedures
- POG100.03.15 – Lockston Operating Procedures

Bulletin Number: POG100.12
Date Issued: 2002 04 05
Date Revised: 2013 07 24
Date Reviewed: 2018 08 20

Storing and Controlling the Release of Water

Created By: B. Titford
Revised By: D. Ball
Reviewed By: G. Whitty
Approved By: G. Humby

5.2 Rivers Downstream of Storage Reservoirs

5.2.1 All Submerged Control Gates in storage dams (used to control the flow of water to downstream reservoirs) are operated to provide a continuous flow of water to downstream rivers. Under normal conditions, outlet gates shall not be operated in a 100% closed position where the potential for partial or complete river dewatering exists. Refer to POG100.03 Series – Reservoir and Turbine Operating Procedures for more site-specific guidelines regarding gate openings.

5.2.2 Rivers and other waterways which are utilized as flow distribution channels between reservoirs and forebays, shall not be subjected to adverse low flow conditions as the direct result of hydropower generation interests. Flow releases from storage reservoirs should, as a minimum, be sufficient to mirror existing natural low flow river conditions during extended dry seasons.

5.3 Operation of Gates

5.3.1 All gates in storage dams and forebays shall be operated under controlled conditions. Gate adjustments shall be carried out in such a way to avoid abrupt/sudden changes in flow conditions in downstream channels. A sudden increase in downstream flow conditions may result in excessive erosion of channel substrate and/or shoreline vegetation. Alternatively, an abrupt decrease in channel discharge may result in the sudden formation of barriers within the river. To avoid both of these potentially adverse conditions, gate adjustments shall be gradual and moderate. River conditions shall be observed prior to, during, and following gate adjustment operations.

5.4 Reservoir Storage Levels

5.4.1 Water level elevations in reservoirs are maintained in accordance with the POG100.03 Series – Reservoir and Turbine Operating Procedures.

5.4.2 In some cases, water levels in storage reservoirs may fluctuate considerably on a seasonal basis. Extreme low storage levels may result in shoreline exposure and the potential creation of barriers. These barriers may result in the entrapment of

Storing and Controlling the Release of Water

Created By: B. Titford
Revised By: D. Ball
Reviewed By: G. Whitty
Approved By: G. Humby

fish in small isolated pools. Power Plant staff attempt to maintain reservoir levels are maintained within acceptable operating ranges as tabulated in the POG100.03 Series – Reservoir and Turbine Operating Procedures. In cases where reservoir levels drop below the operating range due to extreme low inflow conditions, control gates at storage dams should only be operated for the purpose of maintaining fish habitat in downstream areas.

5.5 Diversion Dams

5.5.1 Diversion dams act as a permanent alteration of flow direction within a watershed. Unlike storage dams, which normally release flows through submerged control gates, diversion dams do not have provisions for flow release. Therefore, the natural/historical flow within waterways immediately downstream of diversion dams is permanently changed.

5.5.2 The construction of new diversion dams will require, as a minimum, prior submission to Fisheries and Oceans, Canada (DFO) of a Request for Project Review pursuant to section 35(2) of the Fisheries Act.

5.5.3 The construction of a new dam may, at the discretion of DFO, require provision for fish passage pursuant to Section 20(1) of the Fisheries Act. In such cases, provisions for free passage must be provided both "during construction" and long-term "in service" operations.

6.0 References

6.1 Reference Documents

- POG100.02 – Rose Blanche Brook Plant Fisheries Flow Compensation Strategy
- POG100.03 Series – Reservoir and Turbine Operating Procedures
- POG100.03.02 – Pierre's Brook Operating Procedures

Storing and Controlling the Release of Water

Created By: B. Titford
Revised By: D. Ball
Reviewed By: G. Whitty
Approved By: G. Humby

- POG100.03.08 - Seal Cove Operating Procedures
- POG100.03.15 – Lockston Operating Procedures
- POG100.07 - Maintenance of Dams, Gates and Penstocks

6.2 Related Significant Aspects

- 270; 720; 750; 770; 780

6.3 Legal and Other Requirements

- Environmental Legal Requirements Application – Webster

7.0 Records (refer to local Master Environmental Records List for record location)

- DFO Approval

8.0 Glossary

Abbreviations
DFO – Fisheries and Oceans, Canada
LBK – Lookout Brook
LOK – Lockston
PBK – Pierre's Brook
RBH – Rose Blanche Brook
SBK – Sandy Brook
SCV – Seal Cove
TOP – Topsail
VIC – Victoria
WBK – West Brook

Bulletin Number: POG100.14
Date Issued: 2002 04 05
Date Revised: 2013 07 25
Date Reviewed: 2018 08 20

Leached Preservatives Used on Penstocks and Other Wood Structures

Created By: B. Titford
Revised By: D. Ball
Reviewed By: G. Whitty
Approved By: G. Humby

1.0 Purpose

To reduce soil and water contamination caused by leaching of contaminants from treated wooden structures.

2.0 Scope

This procedure applies to all treated wooden structures associated with Company owned hydroelectric developments, primarily penstocks and spillway stoplogs.

3.0 General

We must manage our use of wood preservatives and treatments to minimize environmental impact. As well, it is important that soil contaminants are either removed or controlled to prevent environmental damage to surrounding areas and waterways.

4.0 Responsibilities

4.1 Manager, Engineering and Manager Generation

- Will ensure that employees and Contractors, conducting work on behalf of the Company, comply with this procedure.

4.2 Supervisor(s) Generation Operations

- Will ensure penstock leaks are repaired as part of regular plant maintenance.

Bulletin Number: POG100.14
Date Issued: 2002 04 05
Date Revised: 2013 07 25
Date Reviewed: 2018 08 20

Leached Preservatives Used on Penstocks and Other Wood Structures

Created By: B. Titford
Revised By: D. Ball
Reviewed By: G. Whitty
Approved By: G. Humby

5.0 Procedure

5.1 Appropriate Use of Preservatives

5.1.1 Petroleum grease is not to be used as a lubricant for mechanical fittings on penstocks. A non-toxic, biodegradable synthetic grease (Mobilgrease EAL 102, or alternate) shall be used for lubricating mechanical fittings.

5.1.2 Creosote treated wood staves, in existing inventory only, will be used for penstock maintenance. No new creosote treated wood material will be purchased. See OPR200.03 – Chemically Treated Poles and Timbers for further information.

5.1.3 Wood treated with CCA is not to be used within 15m of a waterway unless regulatory approval has been received.

5.1.4 Field treating of timbers and decking is to be done in dry conditions only and shall not contact water until completely dry.

5.2 Penstock Right-of-Way Drainage

5.2.1 New penstock installations will ensure appropriate surface drainage systems are provided. Such drainage systems will facilitate surface water flow away from the penstock right-of-way.

5.2.2 Plant staff shall inspect and correct problems identified with surface drainage. See POG100.07 – Maintenance of Dams, Gates and Penstocks for further information.

Leached Preservatives Used on Penstocks and Other Wood Structures

Created By: B. Titford
Revised By: D. Ball
Reviewed By: G. Whitty
Approved By: G. Humby

5.2.3 Penstock right-of-way drainage systems are required to minimize the extent of uncontrolled dispersal of surface runoff. This control may be achieved through the use of transverse cross drains/ditching which direct surface water away from the right-of-way, as well as longitudinal collection drains which flow parallel to the penstock. Longitudinal collection drains are normally located at an offset of one to two metres from the outside of the penstock.

5.3 Soil Remediation

5.3.1 When existing treated wooden penstocks are replaced, the underlying soil will be tested for contamination. If tests indicate contaminants in the soil exceed regulation limits, the soil will be remediated in accordance with applicable regulations. This may, subsequently, result in soil removal and/or risk management of contaminated soil. See OPR200.36 – Environmental Management of Company Property for further details.

6.0 References

6.1 Reference Documents

- POG100.07 – Maintenance of Dams, Gates and Penstocks
- OPR200.03 – Chemically Treated Poles and Timbers
- OPR200.36 – Environmental Management of Company Property

6.2 Related Significant Aspects

- 720;

Leached Preservatives Used on Penstocks and Other Wood Structures

Created By: B. Titford
Revised By: D. Ball
Reviewed By: G. Whitty
Approved By: G. Humby

6.3 Legal and Other Requirements

- Environmental Legal Requirements Application - Webster

7.0 Records

- No records

8.0 Glossary

Abbreviations

- CCA - Chromated Copper Arsenate

Bulletin Number: POG100.15
Date Issued: 1999 06 28
Date Revised: 2012 01 20
Date Reviewed: 2018 08 20

Machine Maintenance / Boom Deployment

Created By: L. Thompson
Revised By: P. O'Leary
Reviewed By: G. Whitty
Approved By: G. Humby

1.0 Purpose

This document defines the process that is used to reduce the impact of an accidental release of petroleum products in the event of a spill at a hydro generating facility during prolonged maintenance periods or when the work type contains a spill risk.

2.0 Scope

This procedure applies to all hydro generating plants operated by the Company.

3.0 General

The Company takes proactive steps to reduce the impact of petroleum releases from its hydro plants.

4.0 Responsibilities

4.1 Supervisor(s) Generation Operations

- Will ensure the requirements of this procedure are followed.

5.0 Procedures

5.1 When all units at a hydro plant are shut down for prolonged maintenance related to equipment, building structure or associated operating systems, a containment boom shall be installed in the tailrace. As well, if the work is such that there is a risk of spill but the work is not prolonged (i.e., an oil change), the boom shall also be deployed.

Bulletin Number: POG100.15
Date Issued: 1999 06 28
Date Revised: 2012 01 20
Date Reviewed: 2018 08 20

Machine Maintenance / Boom Deployment

Created By: L. Thompson
Revised By: P. O'Leary
Reviewed By: G. Whitty
Approved By: G. Humby

5.2 During maintenance at a multi unit hydro plant, if at least one unit remains in operation a containment boom will not be installed, however, oil absorbent materials shall be placed in the turbine drain pit to absorb any petroleum spillage and prevent oil from leaving the plant.

6.0 References

6.1 Reference Documents

- No documents reference

6.2 Related Significant Aspects

- 810

6.3 Legal and Other Requirements

- Environmental Legal Requirements Application - Webster

7.0 Records

- No records

8.0 Glossary

- No new terms referenced

Bulletin Number: POG100.16
Date Issued: 2002 04 19
Date Revised: 2010 07 22
Date Reviewed: 2018 08 20

Management of Waste from Generating Facilities

Created By: T. Poole
Revised By: J. Williams
Reviewed By: G. Whitty
Approved By: G. Humby

1.0 Purpose

The purpose of this procedure is to manage waste products originating from generating plants.

2.0 Scope

This procedure is applicable to all waste generated from both hydro and fossil fuel powered generating facilities.

3.0 General

Newfoundland Power will manage waste material originating from its generation facilities in accordance with this procedure.

4.0 Responsibilities

4.1 Supervisor(s) Generation Operations

- Will ensure proper management of waste generated from the generating facilities under their responsibility.

5.0 Procedure

5.1 Storage of Liquid Waste

5.1.1 Supervisor(s) Generation Operations will ensure that all liquid petroleum waste (e.g. lube oil), and cleaning solvent liquid waste (e.g. varsol) shall be collected and stored in separate liquid tight drums (either plastic or steel) and to ensure waste streams are not mixed.

Management of Waste from Generating Facilities

Created By: T. Poole
Revised By: J. Williams
Reviewed By: G. Whitty
Approved By: G. Humby

5.1.2 The number of drums of petroleum waste oil and solvent waste on site should be kept to a minimum. Weather conditions or work process may require that more drums be on site until the work has been completed or weather conditions permit movement off site.

5.1.3 There is no limit on the number of drums of waste oil that may be stored on site; however, one must ensure all waste is disposed of on a regular basis.

5.1.4 Drums containing liquid petroleum or liquid solvent shall be filled to a maximum of 80% of capacity.

5.1.5 Drums containing liquid waste or liquid varsol located in all generating and hydro plants will be stored in secondary containment.

5.2 Storage Rags/Absorbent Material Containing Flammable/Combustible/Non-Combustible Products

Supervisor(s) Generation Operations will ensure that all flammable solid waste (e.g. rags/absorbent material containing gasoline) and all combustible/non-combustible solid waste (e.g. rags containing varsol, diesel, lube oil) are collected and stored in a separate fire proof, leak proof container. This could be steel drums that are covered. All containers must be placed on a non-combustible floor, such as concrete.

5.3 Labeling

All waste receptacles used for the storage of petroleum waste will be clearly labeled as per OPR200.20 – Identification and Management of Storage Drums.

5.4 Disposal of Waste

5.4.1 Supervisor(s) Generation Operations will ensure that all waste in sections 5.1, and 5.2 is disposed of through the licensed waste disposal contractor retained under contract by the Company. See OPR200.04 – Waste Disposal for further information.

Management of Waste from Generating Facilities

Created By: T. Poole
Revised By: J. Williams
Reviewed By: G. Whitty
Approved By: G. Humby

5.4.2 Supervisor(s) Generation Operations will ensure all waste is disposed of on a regular basis.

5.5 Transportation

5.5.1 All dangerous goods must be transported in accordance with the Transportation of Dangerous Goods (TDG) Regulations. This can be done by employees who have TDG training or by the Company's licensed waste disposal contractors. All movement of TDG regulated products must have the proper documentation and labeling.

5.5.2 In the different situations above, the TDG requirements are only applicable to waste in sections 5.3 of this procedure that contain a flammable product such as gasoline. Rags/absorbent material containing combustible products such as varsol/diesel and liquid varsol are exempt from the TDG Regulations if these wastes are moved in a small means of containment (i.e. a means of containment with cargo capacity less than 450 litres) such as a drum which is properly closed and secured to the vehicle.

5.5.3 Arrangements may be made to have the licensed waste disposal contractor come to each location for pick up or arrangements can be made to have employees, who are trained in TDG, to take the waste to central locations for pick up by the licensed waste disposal contractor. In all cases where the movement requires the shipment to be conducted in accordance with TDG, the person must have a valid TDG certificate and all labels and documentation must be in place.

6.0 References

6.1 Reference Documents

- OPR200.04 – Waste Disposal
- OPR200.20 – Identification and Management of Storage Drums

Management of Waste from Generating Facilities

Created By: T. Poole
Revised By: J. Williams
Reviewed By: G. Whitty
Approved By: G. Humby

6.2 Related Significant Aspects

- No related significant aspect

6.3 Legal and Other Requirements

- Environmental Legal Requirements Application - Webster

7.0 Records (refer to local Master Environmental Records List for location of record)

- TDG Shipping Documents

8.0 Glossary

Abbreviations:

- **TDG** – Transportation of Dangerous Goods

Bulletin Number: POG100.17
Date Issued: 1999 08 18
Date Revised: 2012 01 20
Date Reviewed: 2018 08 20

Monitoring and Reporting of Fish Activity Procedure

Created By: J. Meaney
Revised By: P. O'Leary
Reviewed By: G. Whitty
Approved By: G. Humby

1.0 Purpose

The purpose of this procedure is to provide guidance relating to the reporting of operational impacts on fish and fish habitat.

2.0 Scope

This procedure covers all Newfoundland Power hydroelectric developments and their respective impacts including: water levels, minimum flows, siltation, entrainment in intakes, turbines and tailraces and any other impacts resulting in regular operation of the facilities.

3.0 General

Newfoundland Power will monitor, on a regular basis, the effects its hydro developments have on fish and fish habitat.

4.0 Responsibilities

4.1 Planner, Generation

- Will review Avantis work orders and work requests provided from field staff. These may relate to fish activity in all developments and if required, the Planner will initiate follow up as required.

4.2 Supervisor(s) Generation Operations

- Will monitor each hydroelectric development with respect to impact on fish resources.
- Will ensure Power Plant staff fulfill their duties as noted in this procedure.

Bulletin Number: POG100.17
Date Issued: 1999 08 18
Date Revised: 2012 01 20
Date Reviewed: 2018 08 20

Monitoring and Reporting of Fish Activity Procedure

Created By: J. Meaney
Revised By: P. O'Leary
Reviewed By: G. Whitty
Approved By: G. Humby

5.0 Procedure

5.1 The Planner, Generation shall be responsible for reviewing Avanatis work orders and work requests provided from field staff. If the work orders/requests relate to fish activity in any development, the Planner will identify system problems based on the reports and initiate OPR400.09 – Non-Conformance Corrective and Preventive Action, where appropriate

5.2 The Supervisor(s) Generation Operations will ensure monitoring is carried out by Power Plant Operators during the course of normal daily rounds.

5.3 The Power Plant staff shall be responsible for visually observing all relevant parameters, as listed below, during the course of both normal daily rounds, as well as scheduled dam safety inspections. Abnormal conditions/observations will be reported.

- Water Levels – Ensure reservoir water levels are maintained within normal operating ranges.
- Minimum Flows - Observe minimum flows in rivers and streams below hydraulic control structures.
- Pollution - Inspect surrounding water bodies for evidence of pollution or any deleterious substances from Newfoundland Power operations.
- Siltation - Check for indications of siltation in water bodies arising from Newfoundland Power operations.
- Turbines - Check for indications of destruction of fish in turbines by examining tailrace area for remains.
- Intake - Check intake for fish entrained against trash racks.
- Screens – Observe condition of fish screens (where applicable).
- Fishways – Check for obstruction to flow or fish passage.
- Channels – Check for obstructions in approach channels and discharge channels.

5.4 Any indication of Harmful Alternation, Disruption or Destruction of Fish Habitat (HADD) or destruction of fish resulting from Newfoundland Power operations should be noted and reported using one of the following reporting mechanisms:

- Avantis work order,
- Avantis work request, or

Monitoring and Reporting of Fish Activity Procedure

Created By: J. Meaney
Revised By: P. O'Leary
Reviewed By: G. Whitty
Approved By: G. Humby

- Recorded in the EMS Incident / System Improvement module of Prevent.

6.0 References

6.1 Reference Documents

- OPR400.09 – Non-Conformance Corrective and Preventive Action
- EMS Incident / System Improvement

6.2 Related Significant Aspects

- 270; 720; 770

6.3 Legal and Other Requirements

- Environmental Legal Requirements Application - Webster

7.0 Records

- EMS Incident / System Improvement module of Prevent

8.0 Glossary

Abbreviations:

- **HADD** – Harmful Alternation, Disruption or Destruction of Fish Habitat

Destruction of Fish - According to Fisheries Act, sec.32, no person shall destroy fish by any other means other than fishing

Bulletin Number: POG100.17
Date Issued: 1999 08 18
Date Revised: 2012 01 20
Date Reviewed: 2018 08 20

Monitoring and Reporting of Fish Activity Procedure

Created By: J. Meaney
Revised By: P. O'Leary
Reviewed By: G. Whitty
Approved By: G. Humby

Fish - According to Fisheries Act, sec. 2, "fish" includes shellfish, crustaceans, marine animals, and the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans and marine animals

Fish Habitat - According to Fisheries Act, sec. 34, "fish habitat" means spawning grounds nursery, rearing food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes

Harmful Alteration - According to Fisheries Act, sec. 35(1), no person shall carry on any work or undertaking that results in the harmful alteration, disruption or destruction (HADD) of fish habitat

Bulletin Number: POG100.18
Date Issued: 1999 07 15
Date Revised 2013 07 26
Date Reviewed: 2018 08 20

Gate Hoist Operating Procedures

Created By: B. Titford
Revised By: D. Ball
Reviewed By: G. Whitty
Approved By: G. Humby

1.0 Purpose

To operate control gates and associated hoist equipment during regular or emergency operations.

2.0 Scope

This procedure shall apply to all control gates.

3.0 General

Control gates are operated for the purpose of controlling the discharge from forebays and reservoirs to down stream channels and/or facilities.

4.0 Responsibilities

4.1 Supervisor(s) Generation Operations

- Will ensure the inspection of structures and make decisions; in conjunction with the Manager Generation and Manager Engineering, regarding repairs or improvements to structures.
- Will ensure changes in gate opening elevations are recorded.

5.0 Procedure

5.1 Manually Operated Gates

5.1.1 One person is required to operate the gate under normal conditions at many locations. However, there may be conditions requiring two persons.

Gate Hoist Operating Procedures

Created By: B. Titford
Revised By: D. Ball
Reviewed By: G. Whitty
Approved By: G. Humby

5.1.2 There are three types of handles for operating the gate:

- Crank handle - A metal handle with a socket at one end that slides onto a horizontally mounted shaft on the lift mechanism.
- Ship's wheel - A round metal wheel (about 600 mm diameter) with a socket at the center and handles equally spaced around the perimeter. The socket slides onto a square shaft mounted horizontally on the lift mechanism.
- Wheel - A round metal wheel (about 1200 mm diameter) with a socket at the center permanently attached to the lifting mechanism. It is either horizontally or vertically mounted.

5.1.3 Turn crank handle clockwise to open the gate, counter clockwise to close the gate.

5.1.4 The gate lift stem is exposed through the top of the lift mechanism and raises/lowers in direct proportion to the gate opening/closing. The gate opening is determined by the distance the top of the lift stem is raised above the gate closed mark.

5.1.5 Winter conditions may freeze the gate or a build-up of debris may hinder the operation of the gate. Do not "force" the gate operating mechanism which may damage the stem or lift mechanism. Take steps to free the gate before continuing to operate the lift mechanism.

5.1.6 Ensure methods used to free the gate during winter conditions are not harmful to the environment. The use of salt is prohibited in all waterways.

5.2 Electrically Operated Gates

5.2.1 Electrically operated gates are located at the forebay intake structures and other locations and are generally not affected by weather conditions. The lift mechanism is often sheltered by a wooden enclosure.

Gate Hoist Operating Procedures

Created By: B. Titford
Revised By: D. Ball
Reviewed By: G. Whitty
Approved By: G. Humby

5.2.2 The control gates at Amy's Lake (RBK System) and Trinity Pond (LOK System) is remotely operated through the plant water management scheme but may also be controlled by the System Control Centre (SCC) or operated locally.

5.2.3 One person is required to operate the gate under normal conditions at many locations. However, there may be conditions requiring two persons.

5.2.4 Engage the electric motor using the push button or pull lever starter mounted in the gatehouse. The gate is equipped with limit switches to automatically disengage the motor when the gate is fully open or closed.

5.2.5 When power is unavailable, install the crank arm or wheel on the lift mechanism and operate manually as outlined in sections 4.1 of this procedure.

5.3 Electrically Operated Spillway Gates

5.3.1 The spillway gate located at the Sandy Brook forebay consists of a series of steel frame concrete panels operated by an electrically powered 5 ton hoist mounted on a horizontal overhead steel track.

5.3.2 Each panel has two steel lifting cables attached which connect to the hoist for removal.

5.3.3 If power is unavailable the panels can be removed using a manually operated five-ton winch available from a local rental agency.

5.3.4 Two persons are required for removal of these panels.

5.4 Recording and Reporting

5.4.1 A record of all changes in gate opening elevations shall be maintained at each hydroelectric development powerhouse.

Gate Hoist Operating Procedures

Created By: B. Titford
Revised By: D. Ball
Reviewed By: G. Whitty
Approved By: G. Humby

5.4.2 Gate openings shall be sent to the SCC on a weekly basis.

6.0 References

6.1 Reference Documents

- No documents referenced

6.2 Related Significant Aspects

- 720; 770; 780; 810

6.3 Legal and Other Requirements

- Environmental Legal Requirements Application - Webster

7.0 Records (refer to local Master Environmental Records List for record location)

- Plant Log Book
- SCC Log

8.0 Glossary

Abbreviation:
SCC – System Control Centre

Bulletin Number: POG100.19
Date Issued: 1999 07 15
Date Revised: 2012 01 20
Date Reviewed: 2018 08 20

Stop Log Removal Procedure

Created By: B. Titford
Revised By: P. O'Leary
Reviewed By: G. Whitty
Approved By: G. Humby

1.0 Purpose

The purpose of this procedure is to manage the stop log removal process.

2.0 Scope

This procedure applies to all structures where stop logs are installed.

3.0 General

Stop logs are used at some spillway structure locations to increase reservoir capacity which reduces water loss from the development. These stop logs may be required to be removed during flood conditions to reduce the water level in the reservoir.

4.0 Responsibilities

4.1 Supervisor(s) Generation Operations

- Will ensure inspection of structures and make decisions in conjunction with the Manager Generation, regarding operations, repairs and improvements to structures.
- Will ensure changes in stop log elevations are recorded.

5.0 Procedure

5.1 Two persons are required for the removal and installation of the stop logs.

5.2 Stop logs equipped with lifting brackets are removed using steel lifting hooks stored at forebay gatehouses or powerhouse storage facilities. The stop logs are lifted vertically

Stop Log Removal Procedure

Created By: B. Titford
Revised By: P. O'Leary
Reviewed By: G. Whitty
Approved By: G. Humby

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while standing on the stop log-retaining platform. A sledgehammer and crow bar may be used to loosen and retrieve the stop logs.

5.3 Stop logs without lifting brackets are released using a crow bar and sledge hammer. Rope can be used to help retrieve the stop logs from the retaining brackets.

5.4 Permanently installed stop logs shall not be removed.

5.5 Personal Protective Equipment must be used during the removal of stop logs.

5.6 Recording and Reporting

5.6.1 A record of all changes in stop log elevations shall be kept at each hydroelectric development powerhouse.

5.6.2 Stop log elevations shall be provided to the System Control Centre (SCC) on a weekly basis.

6.0 References

6.1 Reference Documents

- No reference documents

6.2 Related Significant Aspects

- 720; 770; 780; 810

Stop Log Removal Procedure

Created By: B. Titford
Revised By: P. O'Leary
Reviewed By: G. Whitty
Approved By: G. Humby

6.3 Legal and Other Requirements

- Environmental Legal Requirements Application - Webster

7.0 Records (refer to local Master Environmental Records List for record locations)

- Plant Log Book
- SCC Log

8.0 Glossary

Abbreviation:
SCC – System Control Centre

Bulletin Number: POG100.20
Date Issued: 2002 03 27
Date Revised: 2012 01 20
Date Reviewed: 2018 08 20

Monitoring & Operating Unmanned Hydro Plants

Created By: B. Titford
Revised By: P. O'Leary
Reviewed By: G. Whitty
Approved By: G. Humby

1.0 Purpose

The purpose of this procedure is to mitigate the potential environmental impacts from unmanned hydro plants through prevention and early detection strategies.

2.0 Scope

This procedure applies to all unmanned hydroelectric generating plants owned by Newfoundland Power.

3.0 General

It is important that monitoring systems for hydroelectric generating plant operations are in place and regularly inspected and maintained to reduce potential for environmental impacts from mechanical failure and changes in water levels.

4.0 Responsibilities

4.1 Manager, Generation

- Will ensure resources are available for installation and maintenance of mechanical leak detection/prevention equipment and remote monitoring control equipment.

4.2 Supervisor(s) Generation Operations

- Will ensure plant monitoring equipment is inspected and properly maintained.

Monitoring & Operating Unmanned Hydro Plants

Created By: B. Titford
Revised By: P. O'Leary
Reviewed By: G. Whitty
Approved By: G. Humby

5.0 Procedure

5.1 All existing floor and sump drains leading outside the plant will be plugged.

5.2 Monitoring equipment will initiate plant trips or alarms at the System Control Centre (SCC). The SCC will then contact the Plant staff who will determine if staff should immediately visit the site to investigate the alarm/trip.

5.3 Plant operations staff will make weekly (record on log sheets) and monthly (record in Avantis) plant inspection visits.

5.4 Absorbent material will be placed in floor sump pits and in areas where the possibility of leaks may occur as per POG100.22 – Control of Incidental Release of Petroleum Products.

5.5 Spill pans with soda ash will be placed under battery banks.

5.6 Opened drums and containers of petroleum or hazardous products will be stored in spill containment pans or in self dyked buildings

5.7 Solenoids will be installed on cooling systems.

5.8 Cooling coils will be replaced as required.

6.0 References

6.1 Reference Documents

- POG100.22 – Control of Incidental Release of Petroleum Products

Bulletin Number: POG100.20
Date Issued: 2002 03 27
Date Revised: 2012 01 20
Date Reviewed: 2018 08 20

Monitoring & Operating Unmanned Hydro Plants

Created By: B. Titford
Revised By: P. O'Leary
Reviewed By: G. Whitty
Approved By: G. Humby

6.2 Related Significant Aspects

- 390; 810

6.3 Legal and Other Requirements

- No legal or other requirements

7.0 Records

- No records

8.0 Glossary

Abbreviations:

- **SCC** - System Control Centre

Bulletin Number: POG100.21
Date Issued: 2003 03 28
Date Revised: 2007 08 06
Date Reviewed: 2018 08 20

Management of Greenhill Cooling Transfer System

Created By: B. Ryan
Revised By: J. Curran
Reviewed By: G. Whitty
Approved By: G. Humby

1.0 Purpose

The purpose of this procedure is to manage the Greenhill Cooling Transfer System that is used in the event of a glycol system failure.

2.0 Scope

This procedure is applicable to the Greenhill Cooling Transfer System.

3.0 General

Newfoundland Power will manage the Greenhill Cooling Transfer System in accordance with this procedure.

4.0 Responsibilities

4.1 Supervisor(s) Generation Operations

- Will ensure the day-to-day management of the Greenhill Cooling Transfer System.

5.0 Procedure

5.1 Power Plant staff will ensure that the following steps are taken if the turbine is not running:

(a) Turn off glycol pump.
(b) Close glycol inlet valve - #1 tag.
(c) Close glycol outlet valve - #2 tag.

Management of Greenhill Cooling Transfer System

Created By: B. Ryan
Revised By: J. Curran
Reviewed By: G. Whitty
Approved By: G. Humby

(d) Close glycol bypass valve - #3 tag.
(e) Open vent to drain trapped glycol into holding tank.
(f) Close vent when glycol drained.
(g) Open cold water valve in workshop - #6 tag.
(h) Close valve to outside drain - #7 tag.
(i) Open valve to waste barrel - #8 tag.
(j) Open cold water inlet valve to cooler. #5 tag.
(k) Open cold water outlet valve from cooler. #4 tag.
(l) When water clears open valve to outside drain. #7 tag.
(m) Close valve to waste barrel. #8 tag.

5.2 Supervisor(s) Generation Operations will ensure that the following steps are taken if the turbine is running:
(a) Open cold water valve in workshop. #6 tag.
(b) Close valve to outside drain. #7 tag.
(c) Open valve to waste barrel. #8 tag.
(d) Turn off glycol pump.
(e) Close glycol inlet valve. #1 tag.
(f) Close glycol outlet valve. #2 tag.
(g) Close glycol bypass valve. #3 tag.
(h) Open cold water inlet valve to cooler. #5 tag.
(i) Open cold water valve from cooler. #4 tag.
(j) When water is clear, open valve to outside drain. #7 tag.
(k) Close valve to waste barrel. #8 tag

5.3 Supervisor(s) Generation Operations will ensure that the following steps are taken if the turbine is stopped and cooled down:
(a) Turn off cold water in workshop. #6 tag.
(b) Turn off water inlet valve to cooler. #5 tag.
(c) Turn off water drain valve. #4 tag

Management of Greenhill Cooling Transfer System

Created By: B. Ryan
Revised By: J. Curran
Reviewed By: G. Whitty
Approved By: G. Humby

(d) Open glycol inlet valve. #1 tag.
(e) Open glycol outlet valve. #2 tag.
(f) Open glycol bypass valve. #3 tag.
(g) Turn on glycol pump switch.

Note: If the glycol in the drum is of suitable quality it can be pumped back into the holding tank. If the glycol is not suitable, it shall be disposed of as waste in accordance with Section 5.4 of this procedure.

5.4 Disposal of Glycol Waste

Supervisor(s) Generation Operations will ensure that all glycol waste is disposed of through the licensed waste disposal contractor retained under contract by the Company. See OPR200.04 – Waste Disposal for further information.

Supervisor(s) Generation Operations will ensure all glycol waste is disposed of on a regular basis.

6.0 References

6.1 Reference Documents

- OPR200.04 – Waste Disposal

6.2 Related Significant Aspects

- No related significant aspects

Bulletin Number: POG100.21
Date Issued: 2003 03 28
Date Revised: 2007 08 06
Date Reviewed: 2018 08 20

Management of Greenhill Cooling Transfer System

Created By: B. Ryan
Revised By: J. Curran
Reviewed By: G. Whitty
Approved By: G. Humby

6.3 Legal and Other Requirements

- Environmental Legal Requirements Application – Webster

7.0 Records

- No records

8.0 Glossary

- No new terms referenced

Bulletin Number: POG100.22
Date Issued: 2002 05 13
Date Revised: 2012 01 20
Date Reviewed: 2018 08 20

Control of Incidental Release of Petroleum Products

Created By: T. Troke
Revised By: P. O'Leary
Reviewed By: G. Whitty
Approved By: G. Humby

1.0 Purpose

This document defines procedures to minimize the potential of a release of petroleum products from the Company hydroelectric generating facilities and thereby minimizing the potential of a negative environmental impact.

2.0 Scope

This procedure applies to all hydroelectric plants operated by Newfoundland Power.

3.0 General

Newfoundland Power will manage the risk of releasing petroleum products into the environment in accordance with this procedure.

4.0 Responsibilities

4.1 Manager, Generation

- Will provide sufficient resources to complete the tasks as outlined in this procedure.

4.2 Supervisor(s) Generation Operations

- Will ensure that these procedures are completed.

5.0 Procedures

5.1 Greasing

5.1.1 Auto-lubrication systems for application of grease to wicket gate bushings will be removed from service with all greasing done manually, where possible.

Control of Incidental Release of Petroleum Products

Created By: T. Troke
Revised By: P. O'Leary
Reviewed By: G. Whitty
Approved By: G. Humby

Grease will be applied as required rather than at a set amount at a given interval whether required or not.

5.2 Turbine Sumps

5.2.1 Absorbent pads will be placed in turbine sumps to absorb any petroleum products incidentally deposited there.

5.2.2 As part of the regular plant visit and inspection, turbine sumps will be checked for petroleum products and to ensure that adequate absorbent pads are in place.

5.2.3 Turbine sump pump cut-in and cut-out levels will be adjusted so as to minimize the risk of incidental release of petroleum products into the environment.

5.3 Gate Structures

5.3.1 The impact of operating equipment containing petroleum products directly over waterways will be addressed using the best available technology on a site-by-site basis.

6.0 References

6.1 Reference Documents

- No documents reference

6.2 Related Significant Aspects

- 810

6.3 Legal and Other Requirements

- No legal or other requirements

Control of Incidental Release of Petroleum Products

Created By: T. Troke
Revised By: P. O'Leary
Reviewed By: G. Whitty
Approved By: G. Humby

7.0 Records

- No records

8.0 Glossary

- No new terms referenced