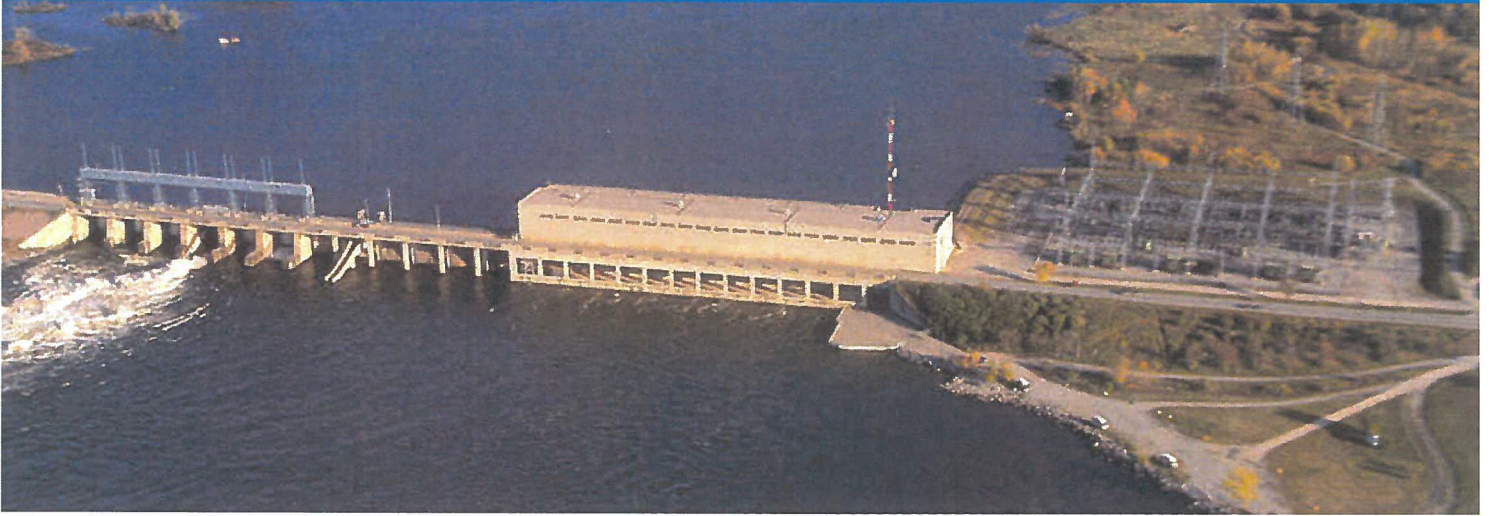


# PINE FALLS GENERATING STATION

Report in Support of a Request for a

## RENEWAL LICENCE

Under The Water Power Act and Regulations



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Manitoba Hydro

No. 38



## **Executive Summary**

The purpose of this document is to demonstrate that Manitoba Hydro has fulfilled all obligations required to obtain a Renewal Licence under The Water Power Act C.C.S.M. c. W60 (The Water Power Act) for the Pine Falls Generating Station (GS). This document provides details on the observances of all the terms and conditions under the 1965 Final Licence and Manitoba Regulation 25/88R pursuant to The Water Power Act (the Regulation). Manitoba Hydro provides this documentation to assist the Minister responsible for The Water Power Act in the decision to issue a Renewal Licence for the Pine Falls GS.

Pine Falls GS will have an installed capacity of 100.59 MW (134,890 horsepower) after Unit 3's re-runnering is completed in 2020. Pine Falls GS is located approximately 120 kilometres northeast of Winnipeg on the Winnipeg River.

Manitoba Hydro has operated the Pine Falls GS under the authority of a Final Water Power Act Licence and under two Short-Term Extension Licences (STELs). Manitoba issued the Final Licence on November 30, 1965 and covered a term of fifty years from January 1, 1952 to December 31, 2001. Manitoba Hydro submitted the application to renew the Final Licence on June 18, 1997. Manitoba Water Resources Branch (now Sustainable Development) responded on September 5, 1997 requesting additional information. From 1997 to 2017 resource constraints and other project licensing priorities were the primary causes for the delay in the renewal of this licence. The current STEL expires on September 30, 2020.

Division 1 of this document provides an overview of the project, its history and operation. Division 2 of this document provides context for the decision to renew the licence for another 50 years. Division 3 of this report demonstrates how Manitoba Hydro has fulfilled terms of the second Short-Term Extension and Final Licence and articles of the Regulation pertaining to a final licensee and which require a statement indicating observance. Division 4 concludes the report highlighting Manitoba Hydro's commitment to the ongoing safe operation of Pine Falls GS and its request for a Renewal Licence under The Water Power Act.

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## Division 1 – Introduction and Background

### Purpose

The purpose of this document is to demonstrate that Manitoba Hydro has fulfilled all obligations required to obtain a Renewal Licence under The Water Power Act C.C.S.M. c. W60 (The Water Power Act) for the Pine Falls Generating Station (GS). The document provides details on the observances of all the terms and conditions under the 1965 Final Licence and Manitoba Regulation 25/88R pursuant to The Water Power Act (the Regulation). Manitoba Hydro is providing this documentation to assist the Minister responsible for The Water Power Act in the decision to issue a Renewal Licence for the Pine Falls GS.

### Report Overview

Division 1 of this document provides background information including an overview of the project, its history and operation, and highlights Manitoba Hydro's commitment to dam safety and the project's significance in the overall system. Division 2 summarizes the key aspects of the Renewal Licence requiring provincial decision and approval. Division 3 demonstrates how Manitoba Hydro has fulfilled terms of the Short-Term Extension and Final Licences and shows compliance with pertinent articles of the Regulation. Manitoba Sustainable Development (MSD) agreed to the selection of pertinent articles of the Regulation. This document references previous names of MSD that include Manitoba Conservation and Water Stewardship as well as Manitoba Water Stewardship. Division 4 concludes the report highlighting Manitoba Hydro's commitment to the ongoing safe operation of Pine Falls GS and its request for a Renewal Licence under The Water Power Act.

### The Water Power Act

Manitoba grants the right to develop water power under the authority of The Water Power Act and the Regulation. The Water Power Act is part of a suite of natural resource allocation acts through which the province allows various entities to develop Crown resources. It is broad in its application in that it provides authority for Manitoba to; allocate provincial water powers and Crown lands required for the development of water power, expropriate private lands, authorize the construction of all undertakings with respect to the water power development, regulate all power and energy produced, and to authorize all incidental matters.

The Water Power Act allows for a licence to take on one of three main types: Interim, Final and Renewal, depending on the stage of development. Manitoba issues an Interim Licence

prior to initiating construction subject to certain terms and conditions. Upon successful completion of the development and satisfaction of the Interim Licence terms and conditions and the Regulation, the licensee is entitled to receive a Final Licence. When granted, a Final Licence will expire in no more than fifty years from the date the project went into service. Between four and six years before expiry, the licensee once again expects to apply for a Renewal Licence.

More information on Water Power Act Licensing is available on the provincial web site at: <https://www.gov.mb.ca/sd/water/water-power/index.html>.

## Licensing Background

Manitoba Hydro operates the Pine Falls GS in accordance with the second Short-Term Extension Licence for the development of water power at the Pine Falls Site on the Winnipeg River.

Manitoba Department of Mines and Natural Resources initiated the Pine Falls GS project and it was the first hydroelectric plant built and owned by the Province of Manitoba (under the Manitoba Hydro-Electric Board (MHEB) Development Act of 1949). The Province began construction shortly after the formation of the MHEB in 1949 and completed it in 1952. From 1949 until 1951, the provincial Department of Mines and Natural Resources conducted MHEB business on an interim basis. Manitoba then appointed the first MHEB members on May 18, 1951.

An Interim Licence was not issued for this development. The Final Licence notes that the Licensee was not issued an Interim Licence but the development was "...constructed in accordance with plans filed with and approved by the Director..."

Manitoba Hydro requested a Final Licence on September 14, 1959. Manitoba issued the Final Licence on November 30, 1965 in accordance with the provisions of The Water Power Act for a term of 50 years from January 1, 1952 to 2002.

Manitoba Hydro submitted the application to renew the Final Licence on June 18, 1997. Manitoba Water Resources Branch (now Sustainable Development) requested additional information on September 5, 1997. On May 14, 2009, Manitoba Hydro provided an update to the Province on licence activities.

Manitoba Hydro requested to extend the term of the Final Licence on February 4, 2010 in accordance with Section 92 of the Water Power Regulation, Manitoba Regulation 25/88R

of The Water Power Act until 2015. Manitoba issued a Short-Term Extension Licence (STEL) on November 3, 2010 that authorized operation for a term of January 1, 2002 to and including September 30, 2015 (retroactive). Manitoba Hydro then requested to extend the Final Licence for a second time on June 26, 2015 for a five year term. Manitoba Conservation and Water Stewardship (now Sustainable Development) issued a second STEL in accordance with Section 92(6) of the Regulation that authorizes operations for a term of October 1, 2015 to and including September 30, 2020 as shown on page 61.

### Licence Area

Manitoba drawing number 21-2-1024 shows the current licence area. The current licence area extends from approximately 0.9 km downstream of the Pine Falls GS to approximately 1.4 km upstream of Silver Falls.

### Project Description

The Pine Falls Generating Station consists of a powerhouse, spillway and dykes with an original nameplate capacity of 85 MW (114,000 horsepower). Three of the six units (Units 4, 5 and 6) are refurbished, so the nameplate increased to 95.26 MW (127,745 horsepower) in 2018, and the fourth unit's re-runnering is currently underway (Unit 3). Pine Falls GS is the most downstream station on the Winnipeg River and it was constructed between 1949 and 1952 following World War II and during the Farm Electrification Program (1945-1953).

The Pine Falls GS is located approximately 120 km northeast of the City of Winnipeg and approximately 13 km upstream of Lake Winnipeg, as shown in the key plan in [Figure 1](#). It is also east of the Town of Powerview-Pine Falls and is located in the RM of Alexander, in Treaty 1 territory and in the homeland of the Metis Nation. [Figure 2](#) is an overall site map that shows the layout of the major project components. [Figure 3](#) shows a photograph of the Pine Falls GS powerhouse, spillway and switchyard.

The Winnipeg River drainage basin is an approximately 150,000 km<sup>2</sup> area that lies mostly in northwestern Ontario but also includes the south east portion of Manitoba and northern Minnesota in the United States. Most of the basin is located within the Canadian Shield and is scattered with many lakes and rivers including the Winnipeg, Bird, Lee, Whitemouth and English Rivers. The basin is mainly forested and rocky.

Although the Winnipeg River system is approximately 765 km in length, running from Lake Superior to Lake Winnipeg, the Winnipeg River is only 260 km long and flows from Lake of the Woods in a north-westerly direction, draining into Lake Winnipeg. Due to the multi-

purpose nature of the Winnipeg River drainage basin, Lake of the Woods Control Board (LWCB) manages flows on the Winnipeg River.

Manitoba Hydro owns and operates six hydraulic generating stations on the Winnipeg River listed below from east to west:

1. Pointe Du Bois Generating Station
2. Slave Falls Generating Station
3. Seven Sisters Generating Station
4. McArthur Falls Generating Station
5. Great Falls Generating Station
6. Pine Falls Generating Station

### Physical Structures

The station components include a six unit powerhouse, a six bay gated spillway, a non-overflow dam, a transition dam and an earth dyke just upstream of the switchyard. The station is located adjacent to Highway 11 and serves as the river crossing for PR 304. In 1953, Manitoba Hydro signed an agreement with the Department of Highways that specifies that the Department of Highways is responsible for the highway bridge, approaches and roadway maintenance. Figures 1 to 4 show general arrangements of concrete and earth structures. Tables 1 and 2 summarize major characteristics of the station and project components.

Table 1: Pine Falls GS Major Characteristics

Construction Period	1949 to 1952
Nameplate Capacity (2018) (2019)	95.26 MW (127,745 hp) 100.59 MW (134,890 hp)
Average Annual Generation (Reported in the Annual Water and Flows Report)	606 million kW-h (2018) 607 million kW-h (2017)
Waterfall Drop (head)	11.3 m
Maximum Operating Forebay Elevation	229.21 m (752.0 ft)



Table 2: Pine Falls GS Component Characteristics

Powerhouse	Number of Units	6
	Length	151.2 m
	Deck Elevation	230.4 m
	Discharge Capability (at full gate)	951 m <sup>3</sup> /s
	Generating Capacity (2018)	
	Unit 1	14.17 MW
	Unit 2	14.17 MW
Unit 3 (2018/20 re-runnering)	14.17 MW *	
Unit 4	19.50 MW **	
Unit 5	16.63 MW ***	
Unit 6	16.63 MW ***	
		Total=95.26 MW
Spillway	Number of Bays	6 bays
	Length	95.5 m
	Deck Elevation	230.4 m
	Discharge Capability (at maximum operating forebay elevation)	3,822 m <sup>3</sup> /s
North Transition Concrete Dam	Length	123.0 m
	Design Crest Elevation	230.4 m
Non-Overflow Concrete Dam	Length	80.5 m
	Design Crest Elevation	230.4 m
Embankment Dam (Switchyard Dyke)	Length	900.0 m
	Design Crest Elevation	231.0 m

\* Manitoba Hydro is currently refurbishing Unit 3 (started in November 2018) to increase capacity

\*\* Manitoba Hydro refurbished Unit 4 from 2016 to 2018 with increased unit output.

\*\*\* Manitoba Hydro refurbished Units 5 and 6 in 1990 and 1991 with increased unit output.

A partially decommissioned log chute also exists between the spillway and powerhouse. The Pine Falls paper mill (closed in 2009) used the log chute when it was first constructed but they eventually found it more efficient to run logs through the spillway. Running logs through Pine Falls GS became sporadic and ceased altogether by 1968 (memo dated March 8, 1990 as noted on page 69 in [Appendix D](#)).

### Project Upgrades

The initial capacity of each of the six units was 14.17 MW (19,000 horsepower). Manitoba Hydro refurbished Units 5 and 6 between 1990 and 1991 with increased unit capacity to 16.63 MW (22,300 horsepower).

Manitoba Hydro took Unit 4 out of service for re-running and rewinding work along with other associated upgrades from November 2016 to March 2018 that increased capacity to 19.50 MW (26,145 horsepower). Manitoba Hydro is currently refurbishing Unit 3 (started in November 2018) which will also have an increased capacity of 19.50 MW. The 2018 total nameplate capacity of the Pine Falls GS was 95.26 MW (127,745 horsepower) prior to starting Unit 3's re-running. Pine Falls GS will have an installed capacity of 100.59 MW in 2020. [Appendix C](#) shows the 2008 to 2018 maintenance and construction record summary information on page 63.

### Operational Description

Manitoba Hydro currently operates the Pine Falls GS under a second Short-Term Extension Licence (STEL) issued on October 1, 2015 in accordance with the provisions of The Water Power Act. The STEL is in effect until September 30, 2020. The operating terms of the STEL are identical to those of the Final Licence issued on November 30, 1965.

Manitoba Hydro's System Control Centre remotely operates the Pine Falls GS from Winnipeg. Maintenance and emergency staff are stationed at the Winnipeg River Operations Centre located adjacent to the Great Falls Generating Station. Manitoba Hydro operates the generating station in a run-of-river mode with a forebay (upstream) having an area of about 9 square kilometers. Flow releases in Ontario and local watershed runoff affect Winnipeg River inflows.

The flow on the Winnipeg River as it enters Manitoba is regulated in Ontario upstream of Manitoba Hydro's generating stations. The Lake of the Woods Control Board (LWCB) is a Canadian board which manages the water levels of Lake of the Woods and Lac Seul, and the flows in the Winnipeg River and English River downstream of these lakes to their junction. The LWCB consists of four members: one representing Federal interests, two representing Ontario and one representing Manitoba. Manitoba Hydro represents its views as a stakeholder in meetings with the LWCB to provide input into LWCB's regulation strategy based on current and projected water conditions in Manitoba.

The Pine Falls forebay operating range experienced since construction varies from the licence limit of 229.21 m (752.0 feet) to 228.75 m (750.5 feet) as shown in [Figure 5](#).

## Historic Power Generation

The original turbines were rated at 14.17 MW (19,000 horsepower) at a design head of 11.3 m (37.0 feet), a total of 85.01 MW (114,000 horsepower) for six units. This became the basis for the licensed capacity in Term 2 of the Final Licence.

[Figure 6](#) shows the monthly power generation and Pine Fall's powerhouse capacity from the issuance of the Final Licence to the end of 2018. As shown, prior to the first refurbishment, Pine Falls GS regularly generated power near 85.01 MW (114,000 horsepower). Manitoba Hydro regularly generated power near 89.48 MW (120,000 horsepower) since the early 1990's refurbishments. The primary factors responsible the gap between the capacity limit and actual generation include the Ontario tie line transmission limit, the reduced head due to higher than normal inflows and/or higher Lake Winnipeg levels, maintenance and re-runners.

As of 2018, Manitoba Hydro has rehabilitated three out of six available generating units. Based on 2018 rated conditions, the new installed capacity is 95.26 MW (127,745 horsepower). [Figures 7 to 12](#) on pages 44 to 46 show the current nameplates of each of the units.

Manitoba Hydro's objective is to plan for the secure and economic operation of Manitoba Hydro's system of reservoirs and generating stations while considering the effects on stakeholders and the environment. Manitoba Hydro optimizes energy generation across the overall system through the development and implementation of modern technology and computer programs. A computer-based control system installed in 1984 in the System Control Centre in Winnipeg enables operators to monitor Manitoba Hydro's generating stations, transmission lines and exports. The computer systems are able to automatically adjust electricity generation to correspond with customers' needs. The Market Optimized Short Term (MOST) computer model enables operators to make optimal decisions based on real time inputs.

## Existing Project Significance in Manitoba Hydro System

Currently, Pine Falls Generating Station provides 2% of the generating capacity in the Manitoba Hydro system, with the Winnipeg River stations providing 11% of the total capacity in the Manitoba Hydro system (In 1977, the Winnipeg River Stations supplied approximately 36% of the total Manitoba load). Even though the Pine Falls Generating Station is relatively small, the Winnipeg River generating stations make efficient use of the water resource as the water travels from the Ontario border to Lake Winnipeg.

The natural falls and the river's relative proximity to Winnipeg made the Winnipeg River an excellent prospect for early hydroelectric development. As the electricity demand increased

for industrial, agricultural and domestic needs, seven generating stations were built on the Winnipeg River between 1902 and 1955.

“Only through the construction of the Pine Falls Generating Station was the Province of Manitoba able to avoid a dangerous situation with respect to power supplies.” (Page 8, The Manitoba Hydro-Electric Board, First Annual Report, 1952)

Manitoba Hydro completed the Farm Electrification program in 1954 and with the construction of Winnipeg River plants, electricity became more available and affordable to people across the province. By that time, Manitoba had the distinction of being western Canada’s most electrified province (75% of all farms in Manitoba had electrical service).

Manitoba Hydro has upgraded Pine Falls through recent re-runners and it can efficiently continue to generate electricity for decades to come. Pine Falls GS is financially viable as it results in a positive rate of return in a hydro system that is known for some of the lowest energy rates in Canada.

Finally, Pine Falls GS is an integral part of an overall hydro system which generates renewable energy as it helps to reduce carbon emissions. By doing so, it helps to support the Manitoba Clean Energy Strategy which focuses on protecting the environment while promoting a prosperous and environmentally conscious economy.

### Dam Safety Summary

Manitoba Hydro’s Dam Safety Program is based on the Canadian Dam Association Guidelines (CDA, 2007) and operates in accordance with two key CDA principles:

#### Principle 1a

*The public and the environment shall be protected from the effects of dam failure, as well as release of any or all retained fluids behind a dam, such that the risks are kept as low as reasonably practicable.*

#### Principle 2d

*Documented surveillance procedures shall be followed to provide early identification and to allow for timely mitigation of conditions that might affect dam safety.*

Manitoba Hydro’s program objectives aim to detect changes in the condition of dams and to initiate timely remedial measures when necessary. The program includes visual inspections, instrument data analysis, engineering analysis, testing, evaluations, and reporting. Manitoba Hydro maintains inspection guidelines for surveillance of concrete and embankment dams based on the dam classification, condition and professional judgment.

Both concrete and embankment dams continue to be inspected at regular intervals for any anomalies or deficiencies. Routine inspections by Manitoba Hydro staff are performed monthly for the embankment dams (switchyard dyke) and every 2 months for the concrete structures, including the spillway. Specialists from Manitoba Hydro's Generation Asset Management Division perform additional inspections of all dams annually.

Dam Safety Reviews (DSR) of generating stations and water control structures are undertaken on an intermittent schedule. This type of review is a systematic evaluation of dam safety through a comprehensive performance assessment of the structures and review of original design, construction, operation and maintenance records to ensure that the generating station meets current industry standards. The CDA Guidelines are the applicable standard. Qualified external consulting engineering firms carry out DSRs and typically include a site inspection of the station, dams, and spillway gates, including mechanical and electrical aspects of gate operation. A comprehensive DSR report includes observed deficiencies and recommendations for follow-up.

SNC-Lavalin performed a DSR at Pine Falls in 2004. Manitoba Hydro has tentatively scheduled the next external Pine Falls DSR for 2020. Manitoba Hydro's DSR frequency is approximately every fifteen years.

Manitoba Hydro maintains Dam Safety Emergency Plans for generating stations where lives are at risk or if implementation of emergency procedures can reduce the potential consequences of a dam failure. These plans are consistent with the CDA's Dam Safety Guidelines and bulletins and are issued to local authorities and emergency response agencies to assist in responding to an emergency situation. The Pine Falls GS Emergency Plan contains detailed information regarding the verification, and classification of the emergency, and contains communication notification and reporting procedures.

Manitoba Hydro updates notification charts in the emergency plans annually to reflect ongoing personnel and content change. Major revisions to the plans are currently underway and will include updated dam breach mapping and a new format that aligns with the latest CDA emergency management guidance.

## Annual Reporting

Since 2007, Manitoba Hydro has submitted the Annual Water Levels and Flows report to the Province. The report contains information on data collection, verification and reporting related to Water Power Act licences, as well as a summary of deviations from licence conditions during the year. Manitoba Hydro and Manitoba Sustainable Development (MSD)



use the information in this report as a framework for discussions regarding future system operation and monitoring licence compliance.

MSD publishes the Annual Water Level Reports on its website at

[https://www.gov.mb.ca/sd/about/articles-and-publications/index.html?wg=water\\_power\\_licensing](https://www.gov.mb.ca/sd/about/articles-and-publications/index.html?wg=water_power_licensing).

The Pine Falls Licence Implementation Guide (LIG) defines the methodology for evaluating, notification of, and reporting non-compliance with respect to critical water levels. Manitoba Hydro prepared this guide to document a common understanding with the regulator of compliance with the water regime terms of the Pine Falls Water Power Act Licence. MSD has approved this document and publishes it on its website at

<https://www.gov.mb.ca/sd/water/water-power/pine-falls-generating-station/index.html>.

[Appendix E](#) includes a copy of the implementation guide.

## Community Involvement

One of Manitoba Hydro's foundational principles is respectful engagement with communities and stakeholders affected by its system and operations with a priority to respect and support Indigenous peoples in all aspects of its business. In addition to having a business unit dedicated to Indigenous Relations, Manitoba Hydro has a section within the Hydraulic Operations Department tasked with community and stakeholder engagement.

Manitoba Hydro's Waterway Community Engagement Section strives to be inclusive with everyone having an interest in waterways affected by Manitoba Hydro. The staff in this section identified and reached out to over 20 municipalities, Indigenous communities and non-government organizations along the Winnipeg River, including those in the vicinity of the Pine Falls Generating Station. Manitoba Hydro staff has had discussions with individuals, groups and communities that have raised concerns or interest in learning about Manitoba Hydro's operations. Manitoba Hydro engages with Indigenous communities with an interest in Winnipeg River operations, including the Pine Falls Generating Station, on an ongoing basis.

A recent project at Pine Falls GS involved re-running of turbine Units 3 and 4. Manitoba Hydro announced this upgrade to local First Nations, the Manitoba Metis Federation, communities and potentially interested groups through the distribution of a letter, fact sheet and poster advertising the Public Information Meeting. In May 2016, Manitoba Hydro placed an ad for the Public Information Meeting in the Lac du Bonnet Clipper. Manitoba Hydro put up posters advertising the event at various locations in the Town of Powerview - Pine Falls. Manitoba Hydro held the information meeting in the Powerview -

Pine Falls community on May 25, 2016, and no public concerns were raised regarding the potential effects of the project. Also, in April 2016, Manitoba Hydro posted information about the upgrade on our corporate website.

([https://www.hydro.mb.ca/projects/system\\_renewal/generating\\_stations.shtml](https://www.hydro.mb.ca/projects/system_renewal/generating_stations.shtml)).

### Coordinated Aquatic Monitoring Program

Manitoba Hydro and the Province of Manitoba jointly manage the Coordinated Aquatic Monitoring Program (CAMP) through a partnership. This long-term program studies and monitors the health of water bodies affected by Manitoba Hydro's generating system. The geographic scale of CAMP makes it the largest holistic ecosystem-based aquatic monitoring program in Manitoba. The purpose of CAMP is to strengthen the understanding of the effects of hydroelectric activity on the aquatic ecosystem and support more informed decision making when it comes to water management.

CAMP has established an annual monitoring site at Lac du Bonnet. Monitoring at this site has helped characterize the fish species composition, water quality, and other aquatic ecosystem conditions along the Winnipeg River.

CAMP samples the Pine Falls forebay on a three-year rotational basis. The forebay is located immediately upstream of the Town of Powerview-Pine Falls, and is fished recreationally. Manitoba Sustainable Development has monitored water quality in the Pine Falls forebay since 2001.

CAMP information is located on the website [www.campmb.com](http://www.campmb.com).

The provincial website has additional information on water quality at <https://www.gov.mb.ca/sd/water/lakes-beaches-rivers/index.html>.

### Environment Act Licensing

The intent of Environment Act Licensing is to develop and maintain an environmental protection and management system in Manitoba which will ensure that the environment is protected and maintained in such a manner as to sustain a high quality of life, including social and economic development, recreation and leisure for present and future generations. The Environment Act has been in effect in Manitoba since March 31, 1988. Manitoba Hydro is not required to obtain Environment Act licences for any of its legacy projects including Pine Falls GS as these projects predate the legislation. In the event that Pine Falls GS would undergo major changes to the existing project configuration, Manitoba Hydro would be required to seek an Environmental Act Licence. The Pointe Du Bois

spillway is a recent example of Manitoba Hydro requiring an Environmental Impact Statement (EIS) for new works on the Winnipeg River.

The provincial website has more information on Environment Act Licensing.

[https://www.gov.mb.ca/sd/permits\\_licenses\\_approvals/eal/index.html](https://www.gov.mb.ca/sd/permits_licenses_approvals/eal/index.html).

## Integrated Watershed Management Plan

The Integrated Watershed Management Plan (IWMP) process is a cooperative effort by watershed residents, government and other stakeholders to create a long term plan for the governance of land, water and related resources on a watershed basis. Manitoba Hydro plans to participate when the Province begins an IWMP process that covers the Winnipeg River watershed. More information on the IWMP process, and existing planning and progress reports are available at <https://www.gov.mb.ca/sd/water/watershed/iwmp/index.html>.

## Erosion

Manitoba Hydro previously determined that its hydraulic operations impact water levels, shoreline erosion, and bank stability at locations along the Winnipeg River and its tributaries within the Water Power Act licence areas located downstream and in the forebays of the Seven Sisters, McArthur Falls, Great Falls and Pine Falls Generating Stations. In an effort to mitigate these adverse impacts, Manitoba Hydro acquired property (water storage land) and developed project severance lines during initial licensing of these generating stations. The purpose of water storage land (WSL) was to allow storage of water and for erosion activity and bank instabilities to occur without impacting private property. However, over time it was recognized that continuing erosion and bank instabilities would extend beyond the WSL at some locations.

In 1997 the Winnipeg River Bank Protection Program (WRBPP) was created by Manitoba Hydro to address potential impacts of its operations on private property within the Water Power Act licence areas. Where there is a risk of erosion and/or riverbank movements extending beyond WSL and impacting private property, Manitoba Hydro may purchase additional WSL or perform riverbank remedial works on a priority basis in exchange for the acquisition of additional Water Storage Land from the landowner. The additional Water Storage Land would be added to the landowner's Shore Lands Use Permit for their continued use and enjoyment. The priority of works to be performed is determined by Manitoba Hydro's WRBPP Engineer with regard for the proximity of erosion and/or bank movements relative to the location of the property boundary with particular emphasis on the location of habitable structures. Manitoba Hydro also monitors the overall condition of WSL, prioritizes potential remedial works/purchases, and interacts with the public and local government to promote proper development/usage of WSL.

## Public Safety

In 2009 Manitoba Hydro introduced a Waterway Public Safety Management Program Project. Pine Falls GS was the pilot for site specific Public Waterway Safety Plan. Implementation of the safety plan at Pine Falls GS started in 2013 and is ongoing.

Manitoba Hydro installed a safety boat boom upstream in 2015 and installs it annually in the spring and removes it in the fall.

The Pine Falls fishing area has been fenced off and warning signage was posted in 2016. Manitoba Hydro erected the fence due to a safety concern regarding excessive numbers of anglers crowding the rail in front of the Dangerous Waterway Zone. Manitoba Hydro also installed large “Danger Keep Away” signs in 2017. Manitoba Hydro places reminders regarding the federal prohibition of fishing within 23 metres of a dam in multiple public areas and in publications. The public can review the safety information around our facilities on the website [https://www.hydro.mb.ca/safety/around\\_our\\_facilities.shtml](https://www.hydro.mb.ca/safety/around_our_facilities.shtml).

## Division 2 – Renewal Licence Request

### Renewal Licence Term

Manitoba Hydro is committed to the safe and productive long term operation of the Pine Falls GS and requests a 50 year term for this Renewal Licence. Section 45(1) of the Regulation limits the term of a Final Licence to no more than 50 years from the completion of the initial development. It is up to the Minister to determine the duration of the Renewal Licence term.

### Renewal Licensed Capacity

Manitoba Hydro requests that the Renewal Licence reflect the future nameplate capacity of 100.59 MW (134,890 horsepower). The current installed nameplate capacity is 95.26 MW (127,745 horsepower) plus the future additional nameplate capacity of 5.33 MW (7,145 horsepower) of Unit 3 (re-runnering is currently underway from November 2018 to January 2020).

Term 2 of the Final Licence provides for an installed capacity of 19,000 horsepower (14.17 MW) for each of the six units for a total of 114,000 horsepower (85.01 MW). However refurbishment of Units 5 and 6 in the early 1990's resulted in an increased generation capacity to 120,600 horsepower (89.93 MW) as shown in Table 2 on page 5. On March 8, 1990 Manitoba Hydro submitted a memo to the province detailing a proposed capacity expansion scheme. The province responded on May 8, 1990 confirming receipt of the capacity increase request and indicated that an anticipated Amended Final Licence would reflect a change in undertaking (the new capacity). The province in the end did not execute an Amended Pine Falls WPA Final Licence. [Appendix D](#) shows copies of the 1990s letters of request and authorization on pages 66 and 72.

Subsequently on September 8, 2016 Manitoba Hydro submitted a memo to the province detailing a proposed capacity expansion for Units 3 and 4. A copy of the 2016 letter is shown in [Appendix D](#) on page 79.

### Renewal Licence Area

The proposed licence area is similar in size to the existing licence area except for the inclusion of land to Whitemud Falls so that the Pine Falls Severance Line abuts with the current Great Falls Severance Line.

The Water Power Act allocates Crown lands required in connection with the development of water power. A Renewal Licence implies a renewal of the decision to allocate Crown lands for another set term of time as defined by the Minister and specified by the Renewal Licence. A new severance line drawing that reflects all approved changes to the licence area as defined by a severance line, showing the inclusion of land up to Whitemud Falls, will be



submitted separately from this report under Manitoba Hydro drawing file 1-00107-PE-07310-0001 and Manitoba file number WPL-1-00107-PE-07310-0001. Manitoba Hydro plans to acquire additional lands over time to extend a continuous Renewal Licence area to Whitemud Falls.

The Renewal Licence area is a combination of lands required for the project and impacted by the project. Manitoba Hydro is basing the Renewal Licence area on the existing licence area as defined by the Final Licence and Short Term Extension Licence. It includes lands required for project structures, site access, and present and future maintenance activities. It also includes all lands impacted by project operations including;

- lands which could be unsafe to the public,
- lands which experience a modified water regime due to project operations, and
- lands which could prove to be geotechnically unstable as a result of project operations.

MSD must review and agree to the proposed Renewal Licence area as part of the Renewal Licence process.

The Water Power Act Regulations require that the severance line that delineates a licence area is legally definable. Therefore the severance line must be based on legal survey plans on record in the provincial land titles system or on the Dominion Government Survey System, or on a combination of both. Manitoba Hydro obtained and reviewed the most recent property assessment information (2015) available from the Crown Lands and Property Agency (CLPA) (now the Real Estate Services Division (RESD)) to evaluate the availability of legal information surrounding the lands required for the project. The nearest available legal survey information was chosen to define the Renewal Licence severance line. Where legal survey plans do not exist, the severance line was defined by the nearest legal subdivision line of the Dominion Government Survey System. The resulting severance line is therefore a combination of legal surveys obtained from Land Titles Office and the section grid defined by the Dominion Government Survey System and is entirely legally definable.

RESD is a Provincial agency that handles property sales, leases and permits, appraisals and land acquisition services for Provincial land. The RESD will contact Manitoba Hydro for comment on any development proposed for provincial land within the Pine Falls severance line area.

The proposed licence area for the Renewal Licence is based on the licence area defined in the Final Licence and up to date information derived from:

- computer based hydraulic and geotechnical reviews,
- 2015 property assessment information available from the Crown Lands and Property Agency (CLPA) (now the Real Estate Services Division)
- a site visit to view existing project components and to interview site staff regarding present and future land use, and
- topographic imagery (LiDAR 2009).

## Division 3 – Compliance with Final Licence and Regulations

This division of the report provides detailed supporting information to demonstrate the fulfillment of the requirements of the Final Licence, the Short Term Extension Licence (STEL) and Manitoba Regulation 25/88R pursuant to The Water Power Act (the Regulation). Manitoba issued the Final Licence in 1965 and it may contain references that are obsolete.

### Observance of Final Licence Terms

1. The Licensee may divert and use continuously for the development of power at the said Pine Falls site all water of the Winnipeg River which may be flowing at the said site from time to time during this term of this Final Licence, subject, however, to the provisions of Section 72 of the Regulations.

#### Observance

Manitoba Hydro has and continues to exercise its rights granted under this term of the licence. Regulation 72 states: *“Every licence shall be deemed to have been executed on the express condition that the licensee shall (a) divert, use or store the water authorized to be diverted, used, or stored by him in such a manner as not to interfere, in the opinion of the minister, with the maximum advantageous development of the power and other resources of the river or stream upon which the works are located; (b) conform to and comply with any orders in respect of the control or regulation of the flow of the waters of such river or stream as may be made from time to time by the minister or any person authorized by the minister in that behalf; and (c) at no time cause or permit the surface level of the waters of such river or stream or of any storage reservoir operated by the licensee to be raised or lowered beyond the limits which shall be fixed from time to time by the minister or by a person authorized by the minister in that behalf.”*

Manitoba Hydro owns and operates all plants on the Manitoba portion of the Winnipeg River. Manitoba Hydro operates the Pine Falls GS for reliable power generation while considering social and environmental effects. The Minister or another authorized person has issued no specific orders other than those defined by the Final Licence and Short Term Extension Licences. Observance of the maximum operating limit is provided in Term 4 of the Final Licence.

2. The undertaking authorized to be maintained and operated by the Licensee under this Final License shall comprise the following: a concrete dam with sluice gates and non-overflow sections; a powerhouse with six vertical type hydro-electric units of 19,000 horsepower capacity; switching station; transmission lines; roads; and all necessary works, machinery and equipment for the complete development, generation and transmission of electric power available at the said Pine Falls site, all

as shown by plans and descriptions thereof filed in the office of the said Director at Winnipeg, as follows:

<i>Manitoba Water Control and Conservation Branch File Number</i>	<i>Licensee's File Number</i>	<i>Description</i>
21-2-1026	D-429-114 (Rev.2)	<a href="#">General Arrangement of Development Plan, Elevation &amp; Typical Sections</a>
21-2-1025	0107-E-0401 (Rev.0)	General Plan, Pine Falls Power Development
21-2-3001	D-429-145 (Rev.1)	Powerhouse Superstructure Sectional Plan Above El. 756'-10", Units 1 to 4
21-2-3002	D-429-144 (Rev.2)	Powerhouse Superstructure, Sectional Plan Above El. 756'-10" Units No. 5 and 6 and Erection Bay
21-2-3003	D-429-149 (Rev.0)	Powerhouse Substructure Sectional Plan Above El. 721'-0", Units 1 to 4
21-2-3004	D-429-148 (Rev.0)	Powerhouse Substructure, Sectional Plan Above El. 721'-0", Unites No. 5 and 6 and Erection Bay
21-2-3005	D-429-132 (Rev.0)	Powerhouse Typical Cross Section Through Centre Line of Units
21-2-3006	D-429-138 (Rev.1)	Powerhouse Longitudinal Section on Centre Line of Units 1 to 4
21-2-3007	D-429-137 (Rev.0)	Powerhouse Longitudinal Section on Centre Line of Units 5-6 and Erection Bay
21-2-3008	D-429-1001 (Rev.6)	Main Dam, General Arrangement and Concrete Details. Plan, Elevation, Sections and Details
21-2-3009	D-429-134 (Rev.1)	Powerhouse Superstructure Downstream Elevation
21-2-3010	D-429-133 (Rev.0)	Powerhouse Superstructure Upstream Elevation
21-2-3011	D-429-135 (Rev.0)	Powerhouse, North and South Elevation. Elevation and Details

### Observance

Manitoba Hydro constructed the Undertaking as described in the plans listed above.

Unit 1 and 2 remain at 19,000 horsepower. Manitoba Hydro refurbished Units 5 and 6 to 22,300 horsepower in 1990 and 1991 (Memo dated March 8, 1990 – [Appendix D](#)). Manitoba Hydro refurbished Unit 4 to 26,145 horsepower in 2018. Unit 3 is currently being re-runned to increase capacity from 19,000 horsepower to 26,145 horsepower. (Letter dated September 8, 2016 – [Appendix D](#)).

3. Lands of the Province which may be entered upon, used or occupied for the maintenance and operation of the said works shall be the following:
  - (a) Lands of the Province not covered by water required for main diverting works, powerhouses, etc. – All those parts of River Lots Nineteen (19), Twenty (20) and Forty-six (46) in Township Eighteen (18) and Range Ten (10) East of the Principal Meridian in Manitoba not covered by the waters of the Winnipeg River, as shown outlined in green on Record Plan No. 21-2-1027 filed in the office of the said Director at Winnipeg and which is the Licensee's No. 0107-E-0211 (Rev. 1).
  - (b) Lands of the Province covered by water required for main diverting works, powerhouses, etc. – All those parts of Section Twenty-nine (29) in Township Eighteen (18) and Range ten (10) East of the Principal Meridian in Manitoba covered by the waters of the Winnipeg River, as shown outlined in red on the said Record Plan No. 21-2-1027.
  - (c) Lands of the Province required only to be flooded in connection with the storage or pondage of water – All those portions of the following Townships shown outlined in brown on record Plan No. 21-2-1028 filed in the office of the said Director at Winnipeg and which is the Licensee's No. 0107-E-0212 (Rev.0), excepting thereout all those lands heretofore described as required for works: (i) Township Eighteen (18) in Range Ten (10) East of the Principal Meridian in Manitoba. (ii) Townships Seventeen (17) and Eighteen (18) in Range Eleven (11) East of the Principal Meridian in Manitoba.

### Observance

Manitoba Hydro's refinement of the severance line showing the lands required for the project as identified in plans referenced in Term 3 is in progress. This line is legally definable either by Dominion Government Survey System (provincial section grid) or legal survey plans and is being reviewed by MSD. The drawing showing the refined line if approved will form part of the Renewal Licence and is shown on Manitoba drawing WPL-1-00107-PE-07310-0001 (Manitoba Hydro drawing No. 1-00107-PE-07310-0001).



4. The Licensee shall not raise the headwater of its development to an elevation higher than 752.0 above mean sea level, Canadian Geodetic Datum, 1929 Adjustment. A higher elevation may be created only with prior written permission by the Director and in accordance with Section 72 of the Regulations.

#### Observance

The [Pine Falls GS Licence Implementation Guide](#) (LIG) for Water Levels defines the criteria for compliance with this licence term. The guide shows the location of the water level monitoring station, outlines methodology used to determine water level compliance, and describes reporting procedures that Manitoba Hydro follows. Manitoba Hydro reports compliance with the Pine Falls Water Power Act Licence against the hourly forebay water level measured at the Pine Falls Generating Station. Manitoba Sustainable Development approved the Pine Falls LIG on December 29, 2017. The letter of approval and LIG are shown in [Appendix E](#) on pages 83 to 98.

In 2005 a compliance monitoring program was implemented which required Manitoba Hydro to report compliance to Manitoba on an annual basis. Manitoba Hydro submitted the first Annual Water Level and Flow Report to the province in 2007. Using the criteria of any single hourly water level exceeding an elevation of 752 ft., annual compliance from 2007 to 2018 has ranged from 99.92% to 100% with an average annual compliance of 99.98% of the time (Table 3). Manitoba Sustainable Development (MSD) publishes all Annual Water Level and Flow Reports on its website at:

[https://www.gov.mb.ca/sd/about/articles-and-publications/index.html?wg=water\\_power\\_licensing](https://www.gov.mb.ca/sd/about/articles-and-publications/index.html?wg=water_power_licensing)

**Table 3 Annual water level compliance reported in Annual Water Levels and Flows Report**

Year	Hourly Forebay Water Level Readings in a Year	Number of Times Reading Above Licence Limit	Percentage of Readings Below Licence Limit	Number of Reportable Events*
2018	8760	2	99.98	0
2017	8760	0	100.0	0
2016	8783	1	99.99	0
2015	8760	1	99.99	0
2014	8760	0	100.0	0
2013	8760	1	99.99	0
2012	8784	0	100.0	0
2011	8760	7	99.92	0
2010	8760	5	99.94	0
2009	8760	1	99.99	0
2008	8784	5	99.94	0
2007	8760	2	99.98	0

\*Reportable events were defined as those exceeding the Equipment Error Tolerance (EET) level of 0.1 ft and requiring provincial notification and explanation of events leading to the exceedance.

Throughout the project's operation Manitoba Hydro submitted hydraulic and energy generation data to the province in raw form for review and evaluation. The format and frequency of the data changed over time from daily to hourly time step, with submission frequency increasing from an annual to a monthly basis.

Table 4 summarizes water level compliance on a daily basis and shows the relative improvement in compliance by decade since the Final Licence came into effect. A chart of daily water levels for the same period is provided in [Figure 5](#) on page 43. As shown, water level compliance improved in the 1980's and continued to exceed 99% for nearly three decades.

**Table 4 Historic Daily Average Water Level Compliance by Decade**

Time Period	Days Exceeding Limit	Total Days	% Compliant
2010-2018	0	3287	100.0%
2000-2009	1	3653	99.9%
1990-1999	3	3652	99.9%
1980-1989	46	3653	98.7%
1967-1979	1223	4536	73.0%

Manitoba Hydro implemented a compliance monitoring program that contributed to improving performance as well as increasing operator experience/training. Also, modern water level measurements and instrumentation has significantly increased information

accuracy and speed. A computer-based control system installed in 1984 in the System Control Centre in Winnipeg enabled operators to monitor generating stations remotely. These programs and technologies have led to improvement of forebay water level compliance.

5. The Licensee shall acquire by purchase, lease, or otherwise, all privately-owned lands required for water storage or flooding purposes along the Winnipeg River above the development and shall be liable for damage occurring to other lands caused by the raising of the headwater at its development above elevations from time to time authorized.

#### Observance

Manitoba Hydro has acquired all lands required for water storage or flooding purposes within the severance line limits that were previously privately-owned to allow for erosion activity and bank instabilities to occur without impacting private property or structures.

Manitoba Hydro created the Winnipeg River Bank Protection Program (WRBPP) in 1997 to address potential impacts of its operations on private property within the Water Power Act licence area as described on page 13.

6. In accordance with Section 45 of the Regulations, the term of this Final License shall be Fifty (50) years from and after the First day of January, A.D. 1952, and the said term shall thereafter be subject to renewal or extension in accordance with the provisions of the laws and Regulations relating thereto and then in force.

#### Observance

This provision requires no observance statement by the licensee.

7. On the second day of January in each and every year during the term of this Final License, the Licensee shall pay an annual rental in advance of three hundred dollars (\$300.00) for the use and occupation of lands of the Province described in Article 3 hereof.

#### Observance

Manitoba Hydro paid land rental on a fiscal year basis (before April 1 of each year) during the term of the Final Licence (June 1966 to December 1981). This was a result of invoicing being done on a fiscal year basis and an assumption of a 60-day grace period as defined by article 48(3.5)(b) regarding water rentals. In an October 30, 1991 letter, the Director advised Manitoba Hydro that land rentals would be from that time onward invoiced

in November for payment on the first normal working day of the following January. Manitoba Hydro has complied with this requirement. Manitoba adjusted land rental rates over time to reflect more up to date land values along the Winnipeg River with changes coming in effect in 1996 and 2011. Manitoba Hydro has made payments in accordance with rates dictated by the Regulation of the day. The Deputy Minister of Natural Resources notified Manitoba Hydro on November 4, 1996 of a change in billing practice from a calendar year to a fiscal year basis beginning with the 1997-1998 fiscal year. Since then land rentals were payable on April 1. Copies of the 1991 and 1996 letters are shown in [Appendix D](#) on pages 73 and 75 respectively.

8. The Licensee shall also pay an annual rental during the term of this Final Licence for the use of water for the development of power, determined in accordance with the principles set out in Section 48 of the Regulations and payable at the times and in the manner therein provided, and at the following rates:
  - (a) The rentals in the first twenty years of the term of this Licence shall be the greater of:
    - (i) an annual rental of fifty (50) cents per installed horsepower;
    - (ii) an annual rental of one dollar and twenty-five cents (\$1.25) per horsepower year output.
  - (b) The annual rental to be paid after the expiry of the said twenty year period shall be determined as provided in the regulations in force at such time.

#### Observance

Manitoba Hydro paid annual water rentals in accordance with the Regulation and provincial direction of the time. The Deputy Minister of Natural Resources notified Manitoba Hydro in a February 29, 1996 letter of a change in billing practice from an annual to a monthly basis beginning in April 1996. Since then Manitoba Hydro submits generation data and then invoices and payments are generated on a monthly basis. [Appendix D](#) shows a copy of the 1996 letter on page 74.

9. The Licensee shall assume the proportionate share of the capital cost of water storage in Lake of the Woods and Lac Seul, which prior to the first day of January, A.D. 1952, was charged to the Pine Falls site as an undeveloped power site; and shall, commencing with an initial payment on the first day of January, A.D. 1953, make like equal annual payments on the first day of January in each succeeding year ending with the payment due on the first day of January, A.D. 1980. These annual payments shall be determined on the basis of an amortization of the capital cost of storage on Lake of the Woods and Lac Seul computed using an interest rate of five per cent per annum over the period commencing on the first day of January, A.D.

1952, and ending on the first day of January, A.D. 1980. The Licensee shall also from the first day of January, A.D. 1952 pay annually the proportionate share chargeable to its development of the annual operating costs of the aforesaid storage; the first of such annual payments shall be made on the first day of January of each and every year until the termination of this Licence; each payment to represent the Licensee's share of the said annual operating costs for the preceding calendar year.

Observance

Manitoba Hydro paid annual payments from 1952 to 1979 for storage on Lake of the Woods and Lac Seul.

Currently, Manitoba Hydro makes payments to Ontario Power Generation (previously Ontario Hydro) and Environment Canada (Lake of the Woods Secretariat and Water Survey of Canada Winnipeg).

10. The Severance Line as defined in Section 1 of the Regulations shall be as shown in red and marked "Severance Line" upon the said Record Plan numbered 21-2-1024 filed in the office of the said Director, and which is the Licensee's Drawing No. 0107-E-0207 (Rev.0).

Observance

This provision requires no observance statement by the licensee.

11. All record plans filed with the said Director and referred to in this Final License are incorporated herewith and made a part hereof.

Observance

This provision requires no observance statement by the licensee.

12. This Final License is issued upon the express condition that it shall be deemed to incorporate and shall be subject to the provisions of the Regulations and all subsequent amendments thereto.

Observance

This provision requires no observance statement by the licensee.

## Observance of Current Short-term Extension Licence Terms

1. This Second Short-term Extension Licence shall apply from October 1, 2015 to and including September 30, 2020.

### Observance

This provision requires no observance statement by the licensee. [Appendix B](#) shows a copy of the Second Short-term Extension Licence on page 61.

2. On the second day of January in each year the Licensee shall pay an annual rental in advance for the use and occupation of lands of the Province described in parts (a), (b), and (c) of Article 3 of the Final Licence at the rates set from time to time by Regulation under The Water Power Act.

### Observance

Manitoba Hydro pays land rental rates annually in advance on a fiscal year basis in accordance with the Regulation and Ministerial notification of changes in billing practice. Land rental payments are discussed in the observance of Final Licence Term 7.

3. The Licensee shall pay an annual rental for the use of water for the development of power at the rates set from time to time by Regulation under The Water Power Act and payable at the times and in the manner provided for by Regulation under The Water Power Act.

### Observance

Manitoba Hydro pays water rental rates monthly in arrears in accordance with the Regulation and Ministerial notification of changes in billing practice. Final Licence Term 8 outlines water rental payments.

4. The terms and conditions set out in the Final Licence apply as if set out specifically in this Second Short-term Extension Licences, except where inconsistent with the terms and conditions set out specifically in this document, in which case the terms and conditions set out in this document will apply.

### Observance

This provision requires no observance statement by the licensee.

5. The Licensee shall comply with The Water Power Act and the Water Power Regulation.

Observance

Manitoba Hydro believes it has fulfilled its obligation under Regulation as demonstrated through its observances of pertinent articles as follows.

## Observance of Pertinent Water Power Act Regulation Articles

This section of the report provides supporting information for pertinent articles of the Regulation to demonstrate the fulfillment of the requirements of the Regulation. Manitoba Sustainable Development (MSD) has agreed to the selection of those articles of the Regulation that are pertinent to the Renewal Licence application. Each article is shown in italics followed by a statement how the licensee has fulfilled its obligations.

### *Renewal or termination*

*46 (1) Not less than four nor more than six years prior to the termination of any licence, the licensee may apply in writing for an extension of rights held under such licence, and applications may also be filed with the director by any persons looking to the future utilization of the site to which the licence applies. Any application for this purpose including the application for renewal of the licence shall be in such form and contain such statements and information as will satisfy the laws and regulations then in force, and such application for renewal by the licensee shall in every case be accompanied by a suitable undertaking on the part of the licensee that he or she will comply with all the said laws and regulations.*

### Observance

Manitoba Hydro submitted the application to renew the Final Licence on June 18, 1997. The four to six year window for application as defined by Section 46 (1) spanned January 1, 1996 to January 1, 1998. Manitoba Water Resources Branch responded on September 5, 1997 requesting additional information. Copies of the letters of application and provincial response are attached in [Appendix D](#) on pages 77 and 78.

Manitoba Hydro switched focus to completing WPA licence finalizations for Churchill River Diversion and Lake Winnipeg Regulation and did not respond further at the time.

Without having a renewal licence in place, Manitoba Hydro requested to extend the Final Licence on February 4, 2010 in accordance with Section 92 of the Water Power Regulation, Manitoba Regulation 25/88R of The Water Power Act for 5 years. Manitoba Water Stewardship issued a Short Term Extension Licence on November 3, 2010. Manitoba Hydro then requested to extend the Final Licence for a second time on June 26, 2015 for five years. Manitoba Conservation and Water Stewardship (now Sustainable Development) issued a Short Term Extension Licence on September 8, 2015 for five years.



***Land use rental rates***

*48 (3.1) A licensee shall pay rent for the use of Crown lands occupied for water power purposes under a license issued under the Act or a regulation at the annual rate of \$1.80 per acre.*

Observance

Manitoba Hydro has made annual land rental payments since the beginning of project operation at the rate in effect at the time. Manitoba Hydro provides details for observance of Final Licence Term 7 on page 22.

***Water use rental rates***

*48 (3.2) A licensee shall pay rent for the use of water under a licence issued under the Act or a regulation. (b) in the case of a licensee with a total capacity less than 268,096 horsepower, at an annual rate equal to the greater of (i) the horsepower capacity of the licensed installation during the year, multiplied by \$3.96, or (ii) the horsepower year output of the licensed installation during the year, multiplied by \$9.90.*

Observance

Manitoba Hydro has made annual and then monthly water rental payments in accordance with the Final Licence Term 8, or at the rate in effect at the time. Manitoba Hydro provides details for observance of Final Licence Term 8 on page 23.

***Water use rental statement***

*48(3.4) A licensee shall, on or before March 1 following each rental period, submit all data required by the director for the determination of the annual water use rental for the rental period. On receipt of the required data, the director shall without delay prepare and provide to the licensee a statement of the water use rent payable by the licensee for the rental period.*

Observance

Manitoba Hydro has submitted all data required by the director for the determination of the annual water use rental in accordance with Section 48(3.4) throughout the duration of the Final Licence. The Deputy Minister of Natural Resources notified Manitoba Hydro on February 29, 1996 of a change in billing practice from an annual to a monthly basis beginning in April 1996. Since then, all data required for the determination of water rentals for the Pine Falls GS, has been submitted on a monthly basis. [Appendix D](#) provides a copy of the February 29, 1996 letter on page 74.

### ***Time of payment of rentals***

*48(3.5) The rent for each rental period is payable (a) in the case of land use rental, on January 2 of the rental period; and (b) in the case of water use rental statement for the year for the rental period.*

### Observance

Requisite payments have been provided as follows:

- (a) Manitoba Hydro paid land use rentals on a fiscal year basis during the term of the Final Licence. The January 2<sup>nd</sup> due date was observed from 1991 to 1996. A final change to billing practice included payments being made on a fiscal year beginning with the 1997-1998 fiscal year. Details provided in observance of Final Licence Term 7 on page 22.
- (b) Manitoba Hydro paid water use rentals in arrears on a fiscal year basis and within 60 days of the director's rental statement. Details provided in observance of Final Licence Term 8 on page 23.

*48(11) Every licensee generating electrical energy, unless excused by the director in writing from compliance with this subsection, shall install an approved curve drawing recording wattmeter and shall preserve and produce for inspection all records made by such wattmeter.*

### Observance

The Pine Falls GS is equipped with meters which continuously measure power at each generator. The meters transmit the power readings to the control room where they are recorded electronically in the station operating records. These records are available to the province.

### ***Care of lands***

*54(1) The interim or final licensee shall at all times maintain the lands, works and property held or used by the licensee in respect of his or her licence in a manner satisfactory to the minister, including the maintenance of all flooded or other areas in a sanitary condition and the improvement of the lands from the point of view of landscape architecture, and shall do all in his or her power to protect the lands and the interest of the Crown therein against injury by anyone engaged on or about the works, or by any other person.*

## Observance

Manitoba Hydro considers safety of its staff and the public at Manitoba Hydro facilities important. As such, Manitoba Hydro implements Manitoba Hydro's Public Water Safety Around Dams Program at Pine Falls GS. Page 13 discusses some of Pine Falls' key public safety features. Manitoba Hydro also strives to meet or exceed all provincial regulatory requirements related to workplace health and safety through its regular development and enforcement of safety policies, safe work procedures, communication regarding safety awareness, investigation of incidents and deployment of improvement measures, and employee training.

*54(2) Every interim or final licensee shall do everything reasonable within his or her power, both independently and on request of the minister to prevent and suppress fires on or near the lands to be occupied under the licence.*

*54(3) For the purpose of limiting the spread of fires or for other reasonable purposes, every interim or final licensee shall clear and keep clear the lands of the province along his or her transmission lines for such width and in such manner as the minister may direct.*

*54(4) Every interim or final licensee shall, to the satisfaction of the minister, dispose of all brush, refuse or unused timber on lands of the province resulting from the construction and maintenance of the works, and shall keep the lands covered by his or her licence clear of unnecessary combustible material at all times.*

## Observance for Sections 54(2) to 54(4)

Manitoba Hydro maintains site lands and transmission rights-of-way to reduce the risk of fires and implements Manitoba Hydro's corporate fire prevention and protection program designed to eliminate risks of fire or explosion.

*56 Every interim or final licensee shall protect all telephone, telegraph and power transmission lines in existence prior to the construction of his or her own lines where crossed by or in close proximity thereto to the satisfaction of the director or competent provincial authority if any, and shall operate, maintain and render safe to the public his or her own transmission, telephone and other lines to the satisfaction of the director or the said authority if any.*

### Observance

Manitoba Hydro uses Canadian Standards Association clearance standards in the design of Manitoba Hydro's transmission system for safety of staff and the public. Manitoba Hydro further enhances public safety through regular maintenance, signage, and public safety education campaigns.

*57(1) Except as expressly provided in this regulation, the interim or final licensee shall not erect any buildings or structures whatever upon any lands of the province without first submitting plans thereof to the director and securing the director's approval for such building or structure and the site thereof.*

### Observance

Manitoba Hydro has notified the province of all significant maintenance and rehabilitation of works which would require Manitoba Hydro to erect temporary structures.

*58 No roads, trails, telephone lines, buildings or other improvements that are the property of the Crown shall be removed, altered or in any way affected by any interim or final licensee in the construction or operation of his or her works, without the minister's consent in writing having been first obtained, and except upon such conditions as the minister by such writing may impose. The minister, if the minister considers it necessary, may require the licensee to furnish a bond for the satisfactory carrying out of the provisions of this section.*

### Observance

Since the issuance of the Final Licence in 1965, there have been no removals, alterations or other effects to Crown-owned improvements.

*59 Any lands desired by an interim or final licensee for subdivision for townsite or other purposes shall be set out in the application, interim or final licence separately from lands required for other purposes connected with the undertaking, and the promotion of any such townsite shall be subject to the approval of the minister and to such conditions with respect to town planning, landscape architecture and sanitation as the minister may impose.*

### Observance

Manitoba Hydro's Final Licence did not allocate land for a townsite.

*61 Any authority granted under this regulation for entry upon, or for the use or occupation of lands situated within any forest reserve or park shall, notwithstanding any provisions of this regulation, be subject to the careful observance by the interim or final licensee of the provisions of any regulation relating to forest reserves and parks, and also of any conditions which the minister may, from time to time, impose with respect to the care, upkeep and management of such forest reserve or park.*

#### Observance

Manitoba Hydro complies with all provincial legislation as it relates to forest reserves and parks.

#### ***Works, maintenance and operation***

*62(1) The licensee shall at all times install and use first class, modern, standard works, plant, and equipment, giving consideration to their requisite suitability of design, safety, strength, durability, efficiency, and all other relevant factors whatsoever, and shall maintain the same in good repair and condition, and shall exercise all due skill and diligence so as to secure satisfactory operation thereof.*

#### Observance

The installed equipment, machinery and structural components at Pine Falls are technologically modern and designed according to appropriate engineering standards. It is in Manitoba Hydro's best interest to continuously optimize all components that have a role in producing electricity.

Manitoba Hydro provides an Annual Flow and Water Level Report to the province which also contains an annual summary of major construction and maintenance activities. [Appendix C](#) provides a summary of activities from 2008-2018 on page 64.

*64 The licensee, before making any material change in any existing works or in their location, shall submit a complete and satisfactory statement and plans of such proposed change to the director, and shall not proceed to carry out the same until such proposed change has been authorized.*

#### Observance

There have been no material changes to the structures listed in the Final Licence.

*65(1) The director may require any licensee to install and maintain in good operating condition at such places and in such manner as the director shall approve, accurate meters, measuring weirs, gauges or other approved devices which shall be*

*adequate for determining the amount of water used or power developed in the operation of the works, for determining the flow of the stream or streams from which water is or will be diverted, and for determining the amount of water held in or drawn from storage.*

*65(2) The licensee shall keep accurate and satisfactory records of the determinations referred to in subsection (1) and shall from time to time make such returns, supported if necessary by statutory declaration, as the director may require.*

#### Observance for subsections 65(1) and 65(2)

Pine Falls GS is equipped with modern instrumentation necessary to adequately report on water usage and energy generation. Manitoba Hydro records water level data, unit discharge, spillway discharge, head, and plant output electronically in the station operating records as a record of station hydraulic activity. Manitoba Hydro maintains records of all gauge readings and submits energy and flow data to the province as part of monthly water rental billing. On an annual basis, Manitoba Hydro submits a flow and water level report to the province which the province uses for licence compliance monitoring.

#### ***Change in undertaking***

*68 If a licensee desires to develop, sell, use or dispose of any greater quantity of power than authorized by his or her licence, whether such increased disposal of power does or does not necessitate any addition to or alteration in the works, or desires to use or dispose of any power in connection with his undertaking in a manner or for a purpose other than as provided in such licence, the licensee must first apply for an interim licence authorizing the construction of the works or for a final licence authorizing such additional development, sale, use or disposal or authorizing such use or disposal in such other manner or for such other purpose, as the case may be.*

#### Observance

As explained in Division 2, Manitoba Hydro increased the licensed capacity with refurbishing three units in the 1990s and 2018. Manitoba Hydro is currently refurbishing Unit 3 to increase the capacity.

#### ***Stream regulation and control***

*72 Every licence shall be deemed to have been executed on the express condition that the licensee shall (a) divert, use, or store the water authorized to be diverted, used, or stored by him in such a manner as not to interfere, in the opinion of the*

*minister, with the maximum advantageous development of the power and other resources of the river or stream upon which the works are located; (b) conform to and comply with any orders in respect of the control or regulation of the flow of the waters of such river or stream as may be made from time to time by the minister or any person authorized by the minister in that behalf; and (c) at no time cause or permit the surface level of the waters of such river or stream or of any storage reservoir operated by the licensee to be raised or lowered beyond the limits which shall be fixed from time to time by the minister or by a person authorized by the minister in that behalf.*

#### Observance for subsections 72(a) to 72(c)

Manitoba Hydro optimizes the usage of the available water. Manitoba Hydro maximizes plant operations by operating when possible at the most efficient head and wicket gate opening based on periodic field tests. Manitoba Hydro also attempts to optimize the use of available stream flows on a system wide basis using computer models.

To date, the province has not ordered operations respecting the control or regulation of flow at the Pine Falls GS.

Observance of Final Licence Term 4 pertaining to a maximum water level limit is addressed on page 20.

#### ***Accounting***

*78 (1) Every licensee shall keep a true and detailed account of all expenditures made in each calendar year in respect of the works, lands and properties and such other information as follows: (a) respecting the works: (i) the actual cost thereof, giving separately each class of expenditures as indicated in the definition of "actual cost", (ii) amounts expended in that year for enlargements and permanent improvements authorized by the minister, and (iii) depreciation in value from any and all causes for that year; (b) respecting lands, tenements and appurtenances not included in clause (a), a statement setting out, in each case, the actual cost thereof in accordance with the provisions of section 36; (c) respecting capital stock: (i) the amount authorized and the number of shares into which it is divided, (ii) the number of shares subscribed for and allotted, the number of shares forfeited to date, and the owners, for the time being, of all outstanding shares, (iii) the amount of calls made on each share, and the total amount received from shareholders in cash on account of stock, (iv) the number of shares, if any, issued as fully paid up shares as consideration for any service rendered or otherwise, specifying in each case for what consideration*

*such shares were issued, and (v) the amounts of dividends declared and paid; (d) respecting bonds and debentures: (i) the amount authorized, and the period of redemption, (ii) the amount sold (face value) and the rate of interest, (iii) the amount realized from sales, (iv) the annual amount set aside as sinking fund to meet bonded indebtedness, and the date of commencement; (e) the indebtedness other than stock and bonds, specifying the nature and amounts, and the rate of interest such indebtedness is bearing; (f) a statement showing the total revenues of the undertaking, specifying the amount received from each and every source; (g) the maintenance and operation expenditures, separating those expenditures which are incurred at or near the works from head office and other expenditures relating to general administration; (h) the names of officers and the classification of employees, with salaries, expenses, or other remuneration paid or allowed; (i) the proposed extensions during ensuing years; (j) if a company, such annual return shall have attached thereto a copy of bylaws of the company, showing all amendments thereto during the year covered by that return; (k) such other data as the minister may require.*

*78(2) Every licensee shall file annually with the director on or before March 1 by a return for the year ending December 31 preceding a detailed summary of all information included under clauses 1(a) and (b).*

#### Observance for subsections 78(1) and 78(2)

Manitoba Hydro tracks financial information for the integrated system as a whole except for projects involving a partnership or separate legal entity. Manitoba Hydro does not submit annual financial information specific to Pine Falls GS with the director on or before March 1. Instead, Manitoba Hydro publishes an annual corporate report on a fiscal year basis ending on March 31st and makes these annual reports available to all Manitobans. The most current annual report is located at <https://www.hydro.mb.ca/corporate/financial.shtml>.

The annual reports contain financial reviews and consolidated financial statements which reference current system value of property, plant, and equipment. Financial information presented in the annual reports is prepared in accordance with International Financial Reporting Standards (IFRS) and undergoes an independent audit. The independent auditors' report summarized in Manitoba Hydro's 2017-2018 annual report concluded that "the consolidated financial statements present fairly, in all material respects, the consolidated financial position of Manitoba Hydro-Electric Board as at March 31, 2018, and its consolidated financial performance and its consolidated cash flows for the year then ended in accordance with the International Financial Reporting Standards."



Detailed information pertaining to clauses 1(a) and (b) of Section 78 is available upon request.

### ***Transfers***

*80(1) Lands inside the severance line used or occupied for the purposes of the undertaking shall not be alienated, sold, or disposed of by the licensee without either (a) the consent of the minister; or (b) failing such consent, an order of the court; and subject to such terms as the minister or the court may lay down for the protection of the undertaking.*

### **Observance**

Manitoba Hydro carries out all licence area amendments with the consent of the Minister or delegate.

### ***Miscellaneous provisions***

*82 Before executing any licence, the minister shall submit to the prospective licensee a draft of the proposed licence and shall secure from the licensee an acceptance thereof and an undertaking to observe and fulfill all the terms and conditions which under the licence and under this regulation such licensee is required to observe or fulfill, with particular reference to the right of Her Majesty to take over the works, lands and properties held by the licensee in connection with the licence in certain contingencies as this regulation provides. Such acceptance and undertaking shall be made to bind the executors, administrators and assigns, or in the case of a corporation the successors and assigns of the prospective licensee.*

### **Observance**

This provision requires no observance statement by the licensee.

*87 Notwithstanding any rights granted or approval given by any licence, every licensee shall comply fully with the provisions of the Navigable Waters Protection Act (Canada) and any rules and regulations promulgated thereunder, and shall also comply fully with the provisions of any provincial statutes or regulations governing the preservation of the purity of waters or governing logging, forestry, fishing, wildlife or other interests present or future which might be affected by any operations conducted under the licence and shall also observe and carry out any instructions of the minister concerning any of those matters not inconsistent with the said statutes and regulations.*

### Observance

Manitoba Hydro is committed to and continues to observe the provisions of the Navigation Protection Act (NPA) (formerly the Navigable Waters Protection Act (NWPA)) and all provincial statutes and regulations.

Pine Falls received a NWPA approval on September 21, 1951. Pine Falls received Navigation Protection Act (NPA) approval for installation of a safety boom and buoys on August 21, 2014.

#### ***Minister may issue short-term extension licences***

*92 (1) Despite section 46, if (a) a final licence has expired; or (b) the licensee has not applied for an extension of the final licence within the period set out in subsection 46 (1); the minister may, upon written application from the licensee in a form satisfactory to the minister and containing any information required by the minister, issue to the licensee a short-term extension licence for a term of not more than five years from the date issued.*

### Observance

Manitoba Hydro requested to extend the Final Licence on February 4, 2010 in accordance with Section 92 of the Water Power Regulation, Manitoba Regulation 25/88R of The Water Power Act.

Manitoba Water Stewardship issued a Short Term Extension Licence on November 3, 2010. Manitoba Hydro then requested to extend the Final Licence for a second time on June 26, 2015 for five years. Manitoba Conservation and Water Stewardship (now Sustainable Development) issued a Short Term Extension Licence on September 8, 2015 for five years. It applies from October 1, 2015 to and including September 30, 2020.

*92(2) A short-term extension licence may apply retroactively to the time that the final licence expired, in addition to a term of not more than five years as set out in subsection (1).*

### Observance

The first STEL states “this Short-term Extension Licence shall apply from January 1, 2002 to and including September 30, 2015” which includes the time period that the Final Licence expired. This is therefore a valid form of the WPA licence. The second STEL is from 2015 to 2020 and validates the WPA licence until 2020.

*92 (6) A short-term extension licence may be renewed for one or more terms, provided that the term of any such renewal does not exceed five years. A renewed short-term extension licence must include the terms and conditions contained in the final licence, except where the minister considers it in the public interest to amend any term or condition, and may include such other terms or conditions as the minister may impose.*

Observance

Manitoba Sustainable Development renewed the Pine Falls Short-Term Extension Licence in 2015.

***Renewal of final licence***

*93(1) Where a short-term extension licence is issued under subsection 92(1), or authorized under subsection 92(5), the licensee shall be deemed to have applied for an extended final licence, and section 46 applies with necessary changes.*

Observance

This provision requires no observance statement by the licensee.

*93(2) The minister may (a) conduct any public hearing that the minister considers necessary in accordance with subsection 46(3); and (b) provide for any consultations with First Nations or aboriginal communities about an extended final licence; during the term of the short-term extension licence.*

Observance

This provision requires no observance statement by the licensee.

## Division 4 – Closure Statement

Manitoba Hydro continues to operate the Pine Falls Generating Station in accordance with the second Short Term Extension Licence and the terms of the expired Final Licence for the development of water power at the Pine Falls Site on the Winnipeg River. Manitoba Hydro operates and maintains the generating station and associated structures based on the Canadian Dam Association Dam Safety Guidelines. Manitoba Hydro maximizes operations of the Pine Falls Generating Station to produce reliable energy for the benefit of all Manitobans. Pine Falls GS continues to be integral to the overall system energy supply. Manitoba Hydro submits this report to Manitoba Sustainable Development to provide supporting information in the decision to issue a Renewal Licence under the Water Power Act for another set term as specified by the Minister.

## FIGURES

Figure 1

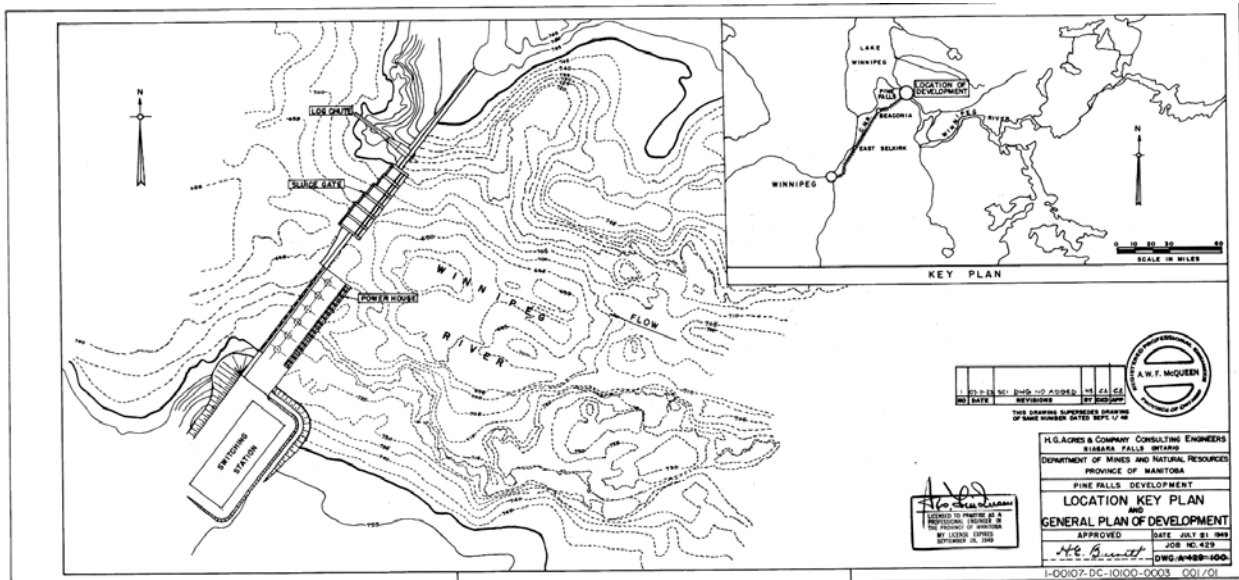
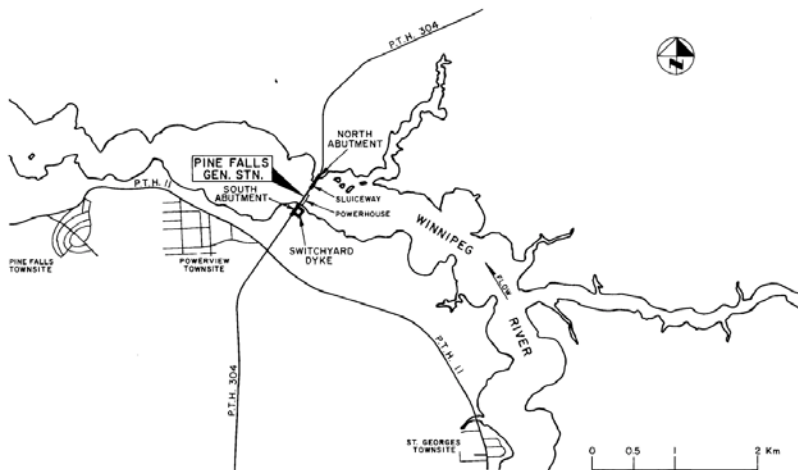


Figure 2



PINE FALLS GENERATING STATION  
GENERAL ARRANGEMENT

NO.	DATE	REVISION	ADDED S.C.I. No.	J.P.S. J.P.S. J.P.S.	BY	CHKD.	APP.
0	06.01.20				J.P.S.	J.P.S.	J.P.S.

1-00107-DA-10100-0009 0001/00

Figure 3 Pine Falls Generating Station



Figure 4

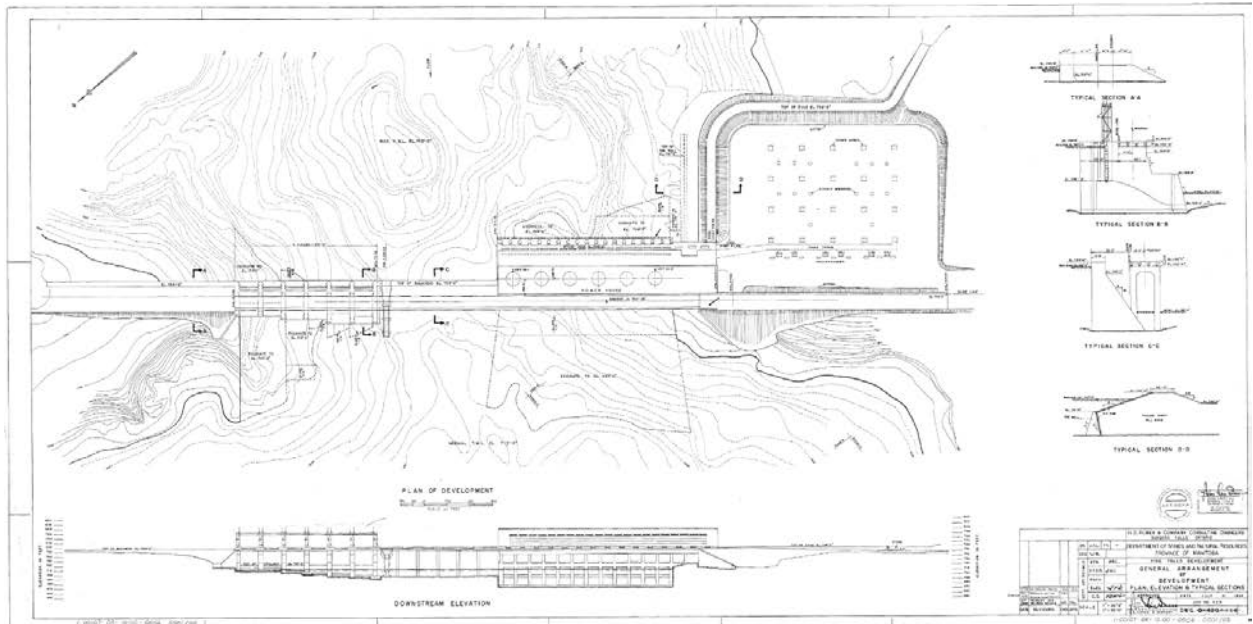




Figure 5 Pine Falls GS Historic Water Level Compliance

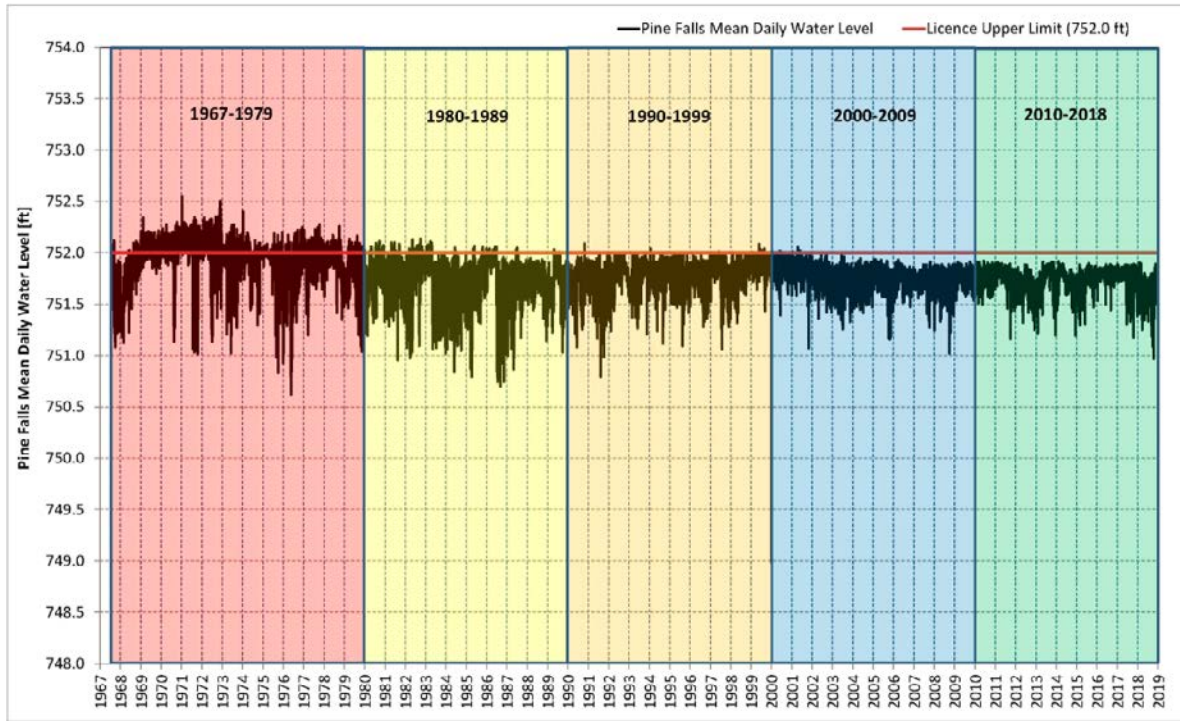


Figure 6 Pine Falls GS Historic Power Generation (horsepower)

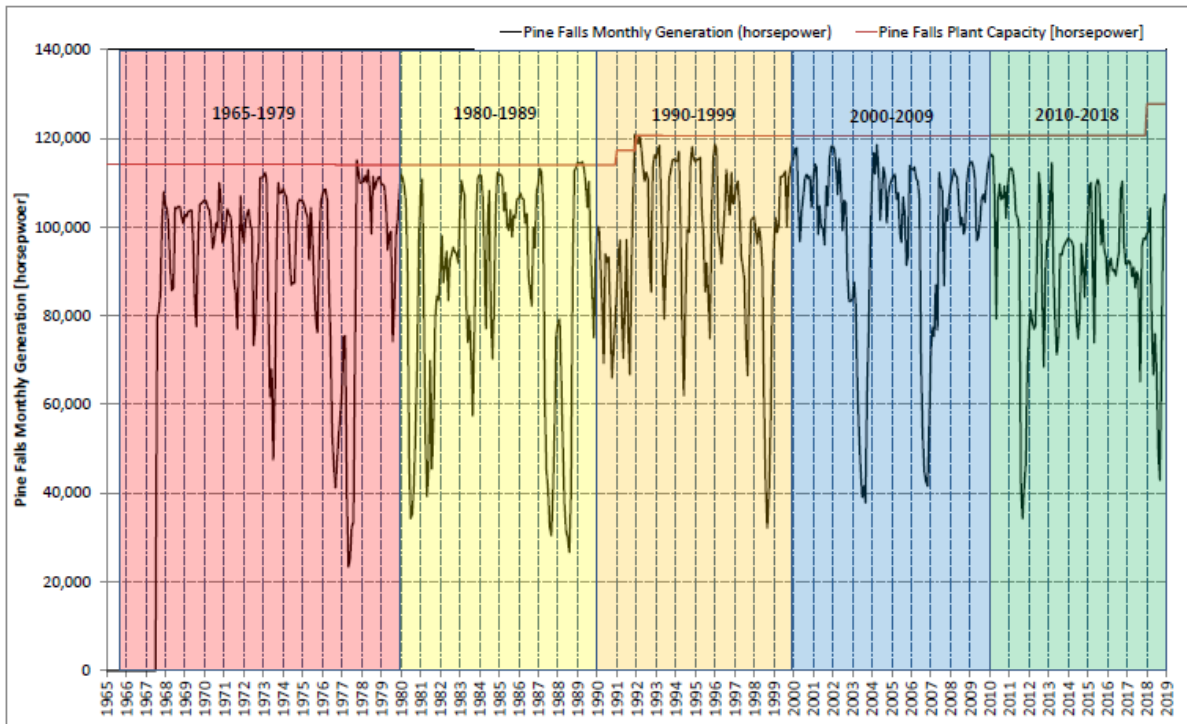




Figure 7 Unit No. 1 Nameplate Original

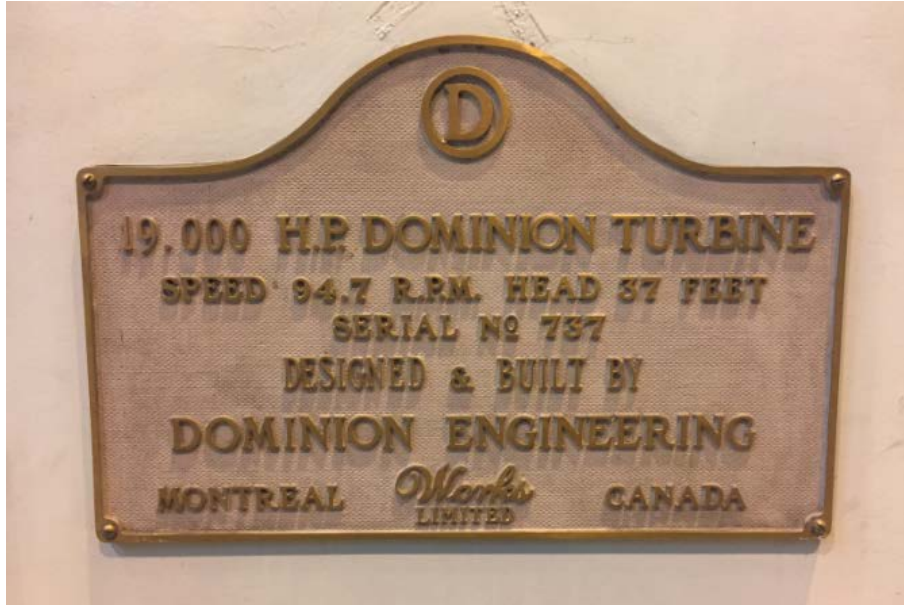


Figure 8 Unit No. 2 Nameplate Original



Figure 9 Unit No. 3 Nameplate Original

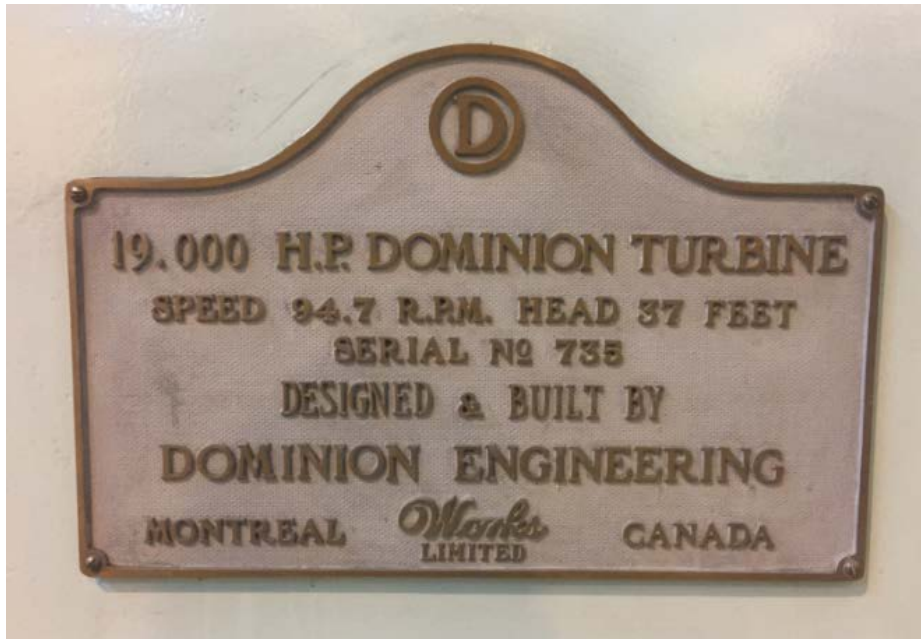


Figure 10 Unit No. 4 Nameplate post refurbishment, 2017



Figure 11 Unit No. 5 Nameplate post refurbishment 1991



Figure 12 Unit No. 6 Nameplate post refurbishment 1990



Appendix A – Renewal Licence Request



P.O. Box 815 • Winnipeg Manitoba Canada • R3C 2P4  
Telephone / N° de téléphone : (204) 474-3018  
Fax / N° de télécopieur : (204) 452-5639

1997 06 18

Mr. S.D. Topping  
Director  
Water Resources Branch  
1577 Dublin Avenue  
Winnipeg, Manitoba  
R3E 3J5

Dear Mr. Topping:

RE: Pine Falls Water Power Licence Renewal Application

Manitoba Hydro hereby applies for the renewal of the Pine Falls Final Licence under the provisions set out in subsection 46(1) of the Water Power Act and Regulations. This renewal application falls within the specified two year period of "not less than four nor more than six years prior to the termination" of the licence on 2001 12 31.

To our knowledge, Manitoba Hydro has met all the requirements of the existing licence and complied with all laws, regulations and special requests from the Director or Minister. Manitoba Hydro intends to continue these practises at the Pine Falls site.

Yours truly,  
Original Signed by: R.R. Raban

K.K. Kadan  
Manager  
Hydraulic Engineering and Operations

HJE/sb

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**MANITOBA HYDRO**  
Torch Run  
Le Relais du Flambeau  
1997





P.O. Box 815 • Winnipeg Manitoba Canada • R3C 2P4  
Telephone / N° de téléphone : (204) 360-3018 • Fax / N° de télécopieur : (204) 360-6136  
wvpenner@hydro.mb.ca

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2009 05 14

Our file #00107-07311-0005\_00

Mr. S.D. Topping  
Executive Director  
Regulatory & Operational Services  
Manitoba Water Stewardship  
Box 11, 200 Saulteaux Crescent  
Winnipeg MB R3J 3W3

Dear Mr. Topping:

Re: **PINE FALLS WATER POWER LICENCE - FIRST RENEWAL**

We are replying to your September 5, 1997 information request on the Pine Falls Generating Station. We will continue to work with your Department on the Pine Falls Water Power Act Licence as part of our ongoing effort to address this outstanding Water Power licence.

Manitoba Hydro continues to operate the generating station in compliance with the Final Licence dated 1965 11 30 which expired in 2001.

The configuration of this station and its primary structures remains unchanged. Units #5 and #6 were rewound and rerunners with increased capacity in 1991 and 1990. The nameplate rating for both of these units is now 22,300 horsepower. The original installed nameplate rating was 19,000 horsepower.

Manitoba Hydro's Dam Safety Program is based on the Canadian Dam Association Guidelines. Both concrete and earth structures continue to be inspected at regular intervals for any anomalies or deficiencies. Routine inspections by plant staff are performed bi-weekly for the earth structures and bi-monthly for the concrete structures, including the spillway. Intermediate inspections of all water retaining structures are performed by specialists from Manitoba Hydro's Engineering Services Division annually. Dam Safety Review (DSR) inspections are performed by external experts on a periodical basis with the most recent completed by SNC Lavalin. They determined that "the dam is well maintained and operated". As part of the Water Power Act licence renewal process, we will be providing a condition assessment report of the generating station and its associated structures.

S.D Topping  
2009 05 14  
Page 2

The severance line shown on drawing 21-4-1024 (licensee's drawing no 0107-E-0207), referenced in the Final Licence, defines the licence area for this generating station. There have been numerous drawing revisions to reflect the amendments made to the licence area since the signing of the licence on 1965 11 30. Manitoba Hydro intends to acquire additional lands along the Winnipeg River so that the upstream end of the licence area will abut with the Great Falls licence area. As lands are acquired we will request that they be included as part of the area defining the Pine Falls licence.

Our next steps include:

- Land acquisition and licence area updating
- Structural report preparation
- Review of licence compliance
- Development of an operating implementation guide
- Tour of the facility (can be arranged at your convenience)

We look forward to working in collaboration with you and your staff on the renewal of this licence.

Please call me at 360-3018 if you need additional information.

Yours truly,

Original signed by:

***Wesley Penner***

W.V.Penner, P.Eng.  
Manager  
Hydraulic Operations Department

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## Appendix B – Final Licence & STELs

PROVINCE OF MANITOBA  
DEPARTMENT OF AGRICULTURE AND CONSERVATION  
WATER CONTROL AND CONSERVATION BRANCH

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FINAL LICENSE FOR THE DEVELOPMENT OF WATER POWER  
Pine Falls Site, Winnipeg River

Issued in accordance with the provisions of the Water Power Act, Chapter 288, Revised Statutes of Manitoba, 1954, and amendments, and of the Regulations in force thereunder to govern the mode of granting and administering Provincial water-power rights.

---

WHEREAS Manitoba Hydro, a corporation duly incorporated by Act of the Legislature of the Province of Manitoba, and whose head office address is 820 Taylor Avenue in the City of Winnipeg, (hereinafter called "the Licensee") has completed and is operating a hydro-electric development at the Pine Falls site on the Winnipeg River in the Province of Manitoba;

AND WHEREAS the said development has been constructed in accordance with plans filed with and approved by the Director of Provincial Water Powers at Winnipeg (hereinafter called "the Director") but without the issuance to the Licensee of an Interim License under the provisions of the Water Power Act, R.S.M. 1954, Cap. 288 (hereinafter called "the Act") and the Manitoba Water Power Regulations being Manitoba Regulation 95/45 and all amendments thereto (hereinafter called "the Regulations");

AND WHEREAS the Licensee by letter dated September 14, 1959, signed by D. M. Stephens, Chairman and General Manager, has applied to the Director for a Final License for the said Pine Falls Development, and has done all things which in the opinion of the Director are required to be done prior to the issuance of the said Final License;

AND WHEREAS the Licensee has duly executed an acceptance of the terms and conditions of this Final License and has undertaken to observe and fulfil all the terms and conditions which under this Final License and

under the Act and Regulations thereunder the said Licensee is required to observe and fulfil;

NOW THEREFORE, under authority of and subject to the provisions of the Act and Regulations thereunder this Final License is issued granting to the Licensee:

- (a) The right to impound, divert and use waters of the Winnipeg River at and near the Pine Falls site.
- (b) The right to develop electric power and energy from the said waters,
- (c) The right to generate, transmit, distribute, sell and deliver the said electric power and energy and for that purpose to use and occupy the lands of the Province hereinafter described, and
- (d) The right to operate and maintain the undertaking, the location and description of which is shown upon the record plans numbered and filed in the office of the Director at Winnipeg.

SUBJECT, nevertheless, to the provisions of the Regulations and any other regulations now or hereafter in force governing the granting and administering of Provincial water-powers and the lands required in connection with the development and use thereof, and to the following special terms and conditions, namely:

1. The Licensee may divert and use continuously for the development of power at the said Pine Falls site all the water of the Winnipeg River which may be flowing at the said site from time to time during the term of this Final License, subject, however, to the provisions of Section 72 of the Regulations.
2. The undertaking authorized to be maintained and operated by the Licensee under this Final License shall comprise the following: a concrete dam with sluice gates and non-overflow sections; a powerhouse with six vertical type hydro-electric units of 19,000 horsepower capacity; switching station; transmission lines; roads; and all necessary works, machinery and equipment for the complete development, generation and transmission of electric power available at the said Pine Falls site, all as shown by plans and descriptions

thereof filed in the office of the said Director at Winnipeg, as follows:

Manitoba Water Control and Conservation Branch File Number	Licensee's File Number	Description
21-2-1026	D-429-114 (Rev. 2)	General Arrangement of Development Plan, Elevation & Typical Sections
21-2-1025	0107-E-0401 (Rev. 0)	General Plan, Pine Falls Power Development
21-2-3001	D-429-145 (Rev. 1)	Powerhouse Superstructure Sectional Plan Above El. 756'-10", Units 1 to 4
21-2-3002	D-429-144 (Rev. 2)	Powerhouse Superstructure, Sectional Plan Above El. 756'-10" Units No. 5 and 6 and Erection Bay
21-2-3003	D-429-149 (Rev. 0)	Powerhouse Substructure, Sectional Plan Above El. 721'-0", Units 1 to 4
21-2-3004	D-429-148 (Rev. 0)	Powerhouse Substructure, Sectional Plan Above El. 721'-0", Units No. 5 and 6 and Erection Bay
21-2-3005	D-429-132 (Rev. 0)	Powerhouse Typical Cross Section Through Centre Line of Units
21-2-3006	D-429-138 (Rev. 1)	Powerhouse Longitudinal Section on Centre Line of Units 1 to 4
21-2-3007	D-429-137 (Rev. 0)	Powerhouse Longitudinal Section on Centre Line of Units 5 - 6 and Erection Bay
21-2-3008	D-429-1001 (Rev. 6)	Main Dam, General Arrangement and Concrete Details. Plan, Elevation, Sections and Details
21-2-3009	D-429-134 (Rev. 1)	Powerhouse Superstructure Downstream Elevation
21-2-3010	D-429-133 (Rev. 0)	Powerhouse Superstructure Upstream Elevation
21-2-3011	D-429-135 (Rev. 0)	Powerhouse, North and South Elevation. Elevation and Details

3. Lands of the Province which may be entered upon, used or occupied for the maintenance and operation of the said works shall be the following:

(a) Lands of the Province not covered by water required for main diverting works, powerhouses, etc.

All those parts of River Lots Nineteen (19), Twenty (20) and

Forty-six (46) in Township Eighteen (18) and Range Ten (10) East of the Principal Meridian in Manitoba not covered by the waters of the Winnipeg River, as shown outlined in green on Record Plan No. 21-2-1027 filed in the office of the said Director at Winnipeg and which is the Licensee's No. 0107-E-0211 (Rev. 1).

- (b) Lands of the Province covered by water required for main diverting works, powerhouses, etc.

All those parts of Section Twenty-nine (29) in Township Eighteen (18) and Range Ten (10) East of the Principal Meridian in Manitoba covered by the waters of the Winnipeg River, as shown outlined in red on the said Record Plan No. 21-2-1027.

- (c) Lands of the Province required only to be flooded in connection with the storage or pondage of water

All those portions of the following Townships shown outlined in brown on Record Plan No. 21-2-1028 filed in the office of the said Director at Winnipeg and which is the Licensee's No. 0107-E-0212 (Rev. 0), excepting thereout all those lands heretofore described as required for works:

- (i) Township Eighteen (18) in Range Ten (10) East of the Principal Meridian in Manitoba.
- (ii) Townships Seventeen (17) and Eighteen (18) in Range Eleven (11) East of the Principal Meridian in Manitoba.

4. The Licensee shall not raise the headwater of its development to an elevation higher than 752.0 above mean sea level, Canadian Geodetic Datum, 1929 Adjustment. A higher elevation may be created only with prior written permission by the Director and in accordance with Section 72 of the Regulations.
5. The Licensee shall acquire by purchase, lease, or otherwise, all privately-owned lands required for water storage or flooding purposes along the Winnipeg River above the development and shall be liable for damage occurring to other lands caused by the raising of the headwater at its development above elevations from time to time authorized.
6. In accordance with Section 45 of the Regulations, the term of this Final License shall be Fifty (50) years from and after the First day

of January, A. D. 1952, and the said term shall thereafter be subject to renewal or extension in accordance with the provisions of the laws and Regulations relating thereto and then in force.

7. On the second day of January in each and every year during the term of this Final License, the Licensee shall pay an annual rental in advance of three hundred dollars (\$300.00) for the use and occupation of lands of the Province described in Article 3 hereof.
8. The Licensee shall also pay an annual rental during the term of this Final License for the use of water for the development of power, determined in accordance with the principles set out in Section 48 of the Regulations and payable at the times and in the manner therein provided, and at the following rates:
  - (a) The rentals in the first twenty years of the term of this License shall be the greater of:
    - (i) an annual rental of Fifty (50) cents per installed horsepower;
    - (ii) an annual rental of one dollar and twenty-five cents (\$1.25) per horsepower year output.
  - (b) The annual rental to be paid after the expiry of the said twenty year period shall be determined as provided in the regulations in force at such time.
9. The Licensee shall assume the proportionate share of the capital cost of water storage in Lake of the Woods and Lac Seul, which prior to the first day of January, A. D. 1952, was charged to the Pine Falls site as an undeveloped power site; and shall, commencing with an initial payment on the first day of January, A. D. 1953, make like equal annual payments on the first day of January in each succeeding year ending with the payment due on the first day of January, A. D. 1980. These annual payments shall be determined on the basis of an amortization of the capital cost of storage on Lake of the Woods and Lac Seul computed using an interest rate of five per cent per annum over the period commencing on the first day of January, A. D. 1952, and ending on the first day of January, A.D. 1980. The Licensee shall also from the first day of January, A.D. 1952 pay annually the proportionate share chargeable

to its development of the annual operating costs of the aforesaid storage; the first of such annual payments shall be made on the first day of January, A.D. 1953 and subsequent annual payments thereafter shall be made on the first day of January of each and every year until the termination of this License; each payment to represent the Licensee's share of the said annual operating costs for the preceding calendar year.

10. The Severance Line as defined in Section 1 of the Regulations shall be as shown in red and marked "Severance Line" upon the said Record Plan numbered 21-2-1024 filed in the office of the said Director, and which is the Licensee's Drawing No. 0107-E-0207 (Rev.0).
11. All record plans filed with the said Director and referred to in this Final License are incorporated herewith and made a part hereof.
12. This Final License is issued upon the express condition that it shall be deemed to incorporate and shall be subject to the provisions of the Regulations and all subsequent amendments thereto.

ISSUED at Winnipeg this 30th day of November A.D., 1965,  
at the direction of the Honourable the Minister of Agriculture and Conservation.

Original Signed by: George Hutton



**PROVINCE OF MANITOBA  
MANITOBA WATER STEWARDSHIP**

**SHORT-TERM EXTENSION LICENCE  
FOR THE DEVELOPMENT OF WATER POWER  
Pine Falls Site, Winnipeg River**

Issued to Manitoba Hydro, being a duly incorporated by Act of the Legislature of the Province of Manitoba whose head office address is at 360 Portage Avenue, Winnipeg, Manitoba, R3C 2P4  
Issued in accordance with The Water Power Act (C.C.S.M. c. W60),  
and the Water Power Regulation (M.R. 25/88R).

WHEREAS:

- A. Manitoba Hydro (hereinafter called "the Licensee") is the holder of a Final Licence for the development of water power at the Pine Falls Site, dated November 30, 1965 (a copy of that Final Licence is attached as Schedule "A" to this Short-term Extension Licence);
- B. The term of the Final Licence was for a term of fifty (50) years from January 1, 1952;
- C. The Licensee by letter dated June 18, 1997 signed by R.R. Raban, Manager of Hydraulic Engineering and Operations, applied for a renewal of the Pine Falls Final Licence;
- D. The Final Licence has not yet been renewed, and the Licensee has applied by letter dated February 4, 2010 signed by W. V. Penner, Manager, Hydraulic Operations Department, to the Executive Director of Regulatory and Operational Services of Manitoba Water Stewardship for a Short-term Extension Licence for the Pine Falls development in accordance with section 92 of the Water Power Regulation and has done all things which, in the opinion of the Executive Director, are required to be done by the Licensee prior to the issuance of a Short-term Extension Licence;
- E. It is contemplated that decisions will be made about the application for a renewal of the Final Licence during the term of this Short-term Extension Licence.
- F. The Licensee has duly executed an acceptance of the terms and conditions of this Short-term Extension Licence and has undertaken to observe and fulfill all the terms and conditions which the Licensee is required to observe and fulfill under this Short-term Extension Licence.

This Short-term Extension Licence is issued, granting to the Licensee:

- (a) The right to impound divert and use water of the Winnipeg River at and near the Pine Falls Site,
- (b) The right to develop electric power and energy from the said waters,
- (c) The right to generate, transmit, distribute, sell and deliver the said electric power and energy and for that purpose to use and occupy the lands of the Province



described in the Final Licence, and

- (d) The right to operate and maintain the undertaking, the location and description of which is shown upon the record plans numbered and filed in the office of the Executive Director at Winnipeg.

on the same terms and conditions as set out in the Final Licence, subject to the following specific terms and conditions:

1. This Short-term Extension Licence shall apply from January 1, 2002 to and including September 30, 2015.
2. On the second day of January in each year the Licensee shall pay an annual rental in advance for the use and occupation of lands of the Province described in parts (a), (b), and (c) of Article 3 of the Final Licence at the rates set from time to time by Regulation under *The Water Power Act*.<sup>1</sup>
3. The Licensee shall pay an annual rental for the use of water for the development of power at the rates set from time to time by Regulation under *The Water Power Act* and payable at the times and in the manner provided for by Regulation under *The Water Power Act*.<sup>2</sup>
4. The terms and conditions set out in the Final Licence apply as if set out specifically in this Short-term Extension Licences, except where inconsistent with the terms and conditions set out specifically in this document, in which case the terms and conditions set out in this document will apply.
5. The Licensee shall comply with *The Water Power Act* and the Water Power Regulation.

ISSUED at Winnipeg this

3<sup>rd</sup>

day of

November

, 2010.

Original Signed by: Christine Melnick

<sup>1</sup> Rental rates for land use are currently set out in s. 48(3.1) of the Water Power Regulation.

<sup>2</sup> Rental rates for the use of water for the development of power are currently set out in s. 48(3.2) of the Water Power Regulation.

**PROVINCE OF MANITOBA  
MANITOBA WATER STEWARDSHIP**

**SECOND SHORT-TERM EXTENSION LICENCE  
FOR THE DEVELOPMENT OF WATER POWER  
Pine Falls Site, Winnipeg River**

Issued to Manitoba Hydro, being a duly incorporated by Act of the Legislature of the Province of Manitoba whose head office address is at 360 Portage Avenue, Winnipeg, Manitoba, R3C 2P4  
Issued in accordance with The Water Power Act (C.C.S.M. c. W60),  
and the Water Power Regulation (M.R. 25/88R).

WHEREAS:

- A. Manitoba Hydro (hereinafter called "the Licensee") is the holder of a Final Licence for the development of water power at the Pine Falls Site, dated November 30, 1965 (a copy of that Final Licence is attached as Schedule "A" to this Second Short-term Extension Licence);
- B. The term of the Final Licence was for a term of fifty (50) years from January 1, 1952;
- C. The Licensee by letter dated June 18, 1997 signed by R.R. Raban, Manager of Hydraulic Engineering and Operations, applied for a renewal of the Pine Falls Final Licence;
- D. The Final Licence has not yet been renewed. The Final Licence was extended by a Short-Term Extension Licence, dated November 3, 2010 with a term to and including September 30, 2015. The Licensee has applied by letter dated June 26, 2015 signed by W. V. Penner, Manager, Hydraulic Operations Department, to Rob Matthews, Manager of Water Use Licensing, Manitoba Conservation and Water Stewardship for a renewal of the Short-term Extension Licence for the Pine Falls development in accordance with section 92 of the Water Power Regulation and has done all things which, in the opinion of the Executive Director, are required to be done by the Licensee prior to the issuance of this Second Short-term Extension Licence;
- E. It is contemplated that decisions will be made about the application for a renewal of the Final Licence during the term of this Second Short-term Extension Licence.
- F. The Licensee has duly executed an acceptance of the terms and conditions of this Second Short-term Extension Licence and has undertaken to observe and fulfill all the terms and conditions which the Licensee is required to observe and fulfill under this Second Short-term Extension Licence.

This Second Short-term Extension Licence is issued, granting to the Licensee:

- (a) The right to impound divert and use water of the Winnipeg River at and near the Pine Falls Site,

- (b) The right to develop electric power and energy from the said waters,
- (c) The right to generate, transmit, distribute, sell and deliver the said electric power and energy and for that purpose to use and occupy the lands of the Province described in the Final Licence, and
- (d) The right to operate and maintain the undertaking, the location and description of which is shown upon the record plans numbered and filed in the office of the Executive Director at Winnipeg.

on the same terms and conditions as set out in the Final Licence, subject to the following specific terms and conditions:

1. This Second Short-term Extension Licence shall apply from October 1, 2015 to and including September 30, 2020.
2. On the second day of January in each year the Licensee shall pay an annual rental in advance for the use and occupation of lands of the Province described in parts (a), (b), and (c) of Article 3 of the Final Licence at the rates set from time to time by Regulation under *The Water Power Act*.<sup>1</sup>
3. The Licensee shall pay an annual rental for the use of water for the development of power at the rates set from time to time by Regulation under *The Water Power Act* and payable at the times and in the manner provided for by Regulation under *The Water Power Act*.<sup>2</sup>
4. The terms and conditions set out in the Final Licence apply as if set out specifically in this Second Short-term Extension Licences, except where inconsistent with the terms and conditions set out specifically in this document, in which case the terms and conditions set out in this document will apply.
5. The Licensee shall comply with *The Water Power Act* and the Water Power Regulation.

ISSUED at Winnipeg this 26<sup>th</sup> day of August, 2015.

Original Signed by: Tom Nevakshonoff

<sup>1</sup> Rental rates for land use are currently set out in s. 48(3.1) of the Water Power Regulation.

<sup>2</sup> Rental rates for the use of water for the development of power are currently set out in s. 48(3.2) of the Water Power Regulation.

Appendix C – Maintenance and Construction Record

The major maintenance and construction activities that occurred between 2008-2018 calendar years are summarized for the Pine Falls Water Power Act licence area:

2008

- The full length of the switchyard dyke slopes were refaced with armour riprap rock to increase the freeboard level.

2009

- Replaced carbon steel cables on the spillway hoists with upgraded stainless steel material.
- New safety fencing was erected at the east shoreline downstream of the spillway to prevent fishers from accessing turbulent water.

2010

- As part of the Winnipeg River Bank Protection Program, the riverbank was stabilized at one property upstream of the generating station to prevent localized erosion.
- Powerhouse fall protection equipment was installed for staff safety.
- The 115 kV switchyard breakers were replaced.

2011

- None

2012

- Civil construction for a new battery banks room was completed.

2013

- Construction and commissioning of Battery Room B was completed.
- Disassembly of Unit #2 in preparation for the upcoming stator rewind was completed.

2014

- Unit 2 rewind completed

2015

- Completed the accumulator tank replacements for Units 1-6
- Began the disassembly of Unit 1 for the upcoming rewind

2016

- Completed overhaul and generator rewind work for Unit 1
- Commenced overhaul and re-runnering work for Unit 4
- Completed Sewer and Water Upgrade Project
- Replaced stoplogs damaged by ice last winter
- Completed Powerhouse Crane Modernization

2017

- Substantially completed construction on Unit 4 re-runnering and major generator overhaul – commissioning outstanding

2018

- Unit 4 generator overhaul and re-runnering completed
- Unit 3 generator overhaul and re-runnering initiated

## Appendix D – Correspondence

B1510

MANITOBA HYDRO  
INTEROFFICE MEMORANDUM

FROM P. M. Abel  
Manager  
Reservoir and Energy Resources  
System Operating Division

TO Mr. L. J. Whitney  
Executive Director  
Water Resources Branch  
1577 Dublin Avenue

DATE 1990 03 08

FILE NO.

SUBJECT MODIFICATIONS TO WINNIPEG RIVER GENERATING STATIONS

A few weeks ago, during a telephone conversation, we had discussed Manitoba Hydro's program for upgrading turbines installed in the four plants on the Winnipeg River. At the time, you requested me to advise you formally in writing the details of this program.

The work involved at Great Falls, Seven Sisters and Pine Falls consists of the replacement of turbine runners to coincide with the major rehabilitation of the associated generators. The major rehabilitation of a generator includes a complete rewind of the generator stator and requires an outage of six to eight months. It is a once or twice-in-a-lifetime project. If a generating station is deemed to have a life of, say, sixty-six years, a generator rewind is certain to be required sometime during that period after thirty or forty years' service. If civil works are deemed to have a life of 100 years, such rewinds could occur twice in that lifetime. Two of the generators at Pine Falls are beginning to show their age after 39 years of service. Some of the generators at Great Falls and Seven Sisters are coming in for their second rewinds, as these plants are now 67 and 59 years old respectively. The outage time of six to eight months can create a serious loss in generation potential and can result in high cost. Therefore such outages are not taken casually.

In the world of hydraulic runner design, considerable progress has been made in the last decade with the availability of advanced digital computers to add to the old analog methods. There has been significant improvement in efficiency and capacity/diameter ratios over what was available in 1923 and 1931. There are undoubted benefits simply to replace all runners immediately, but the costs of outage time of another six or eight months for turbine refitting and refurbishment often swallows up the benefits achieved.

Therefore, the policy which has evolved for an ongoing maintenance program for the Winnipeg River is to leave units as they are until a rewind job on the generator becomes mandatory, and then simultaneously to replace the turbine runner with an improved design, making one six-to-eight month outage do double duty.

We have tended to regard this program as simply one of prudent maintenance in which there were no implications with regard to licensing or the Water Power Act. On the other hand, because of the considerable cost of rewinding and rewheeling, it is expedient to consider the work as a capital maintenance project, with costs spread out over the expected future life of the turbine and generator.

In carefully reviewing the provisions of the Water Power Regulations, paragraph 68 might apply in a formal sense, requiring any "licensee desiring to develop ..... a greater quantity of power than authorized by his licence ..... must first apply to the Minister..... for an interim licences ..... or for a final licence authorizing such additional development....." We had always interpreted this paragraph to mean the installation of additional turbines above the number licenced. If a narrower interpretation is required, involving an application for licence changes where the capacity of existing units is affected, then Manitoba Hydro should lose no time in submitting the appropriate applications for revised licences.

However, as you know, renewal of the final licences for both Great Falls and Seven Sisters have been held up for a number of successive reasons, making the amendment of expired licences a little awkward. The new licences could be reworded as required. Pine Falls, on the other hand, has a full and valid final licence remaining in force until the year 2001. It could be handled by applying for an amended final licence. We have no immediate plans for modifications at McArthur, for which the final licence remains valid until 2004.

The following is a detailed description of the program:

#### Great Falls

The original turbines for units 1, 2 and 3 were rated at 28 000 hp, as were units 5 and 6 later on. These five units are Dominion Engineering Works turbines, with Canadian General Electric generators. Although rated at 28 000 hp, these units have been called upon to deliver about 29 500 hp almost since original commissioning with the Great Falls forebay raised to a higher elevation. Generator no. 1 had been recently rewound for the second time, when in 1984, the turbine was considered to be in sufficiently poor shape, it would have to be replaced. For example, the throat ring was loose and literally flapping in the breeze. It was taken out of service on May 11, 1984 at 05:10 hours and returned to service on November 26, 1984 at 19:47 hours.

During this period, the maintenance work included a redesigned runner, a slightly larger throat ring, with the turbine setting lowered by some 14.5 inches. The rotational speed had to remain the same at the generator's synchronous speed, as there was no intention to alter the number of poles in the generator.



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Mr. L. J. White

1990 03 08

Page 3

The new runner has about 6% greater efficiency and has been assigned a horsepower rate of 32 500 hp at a net head of 56 feet. While we, as system operators, prefer to rate turbines at gross head (averaging about 58 feet) as this is the observed difference between forebay and tailrace, turbine manufacturers prefer to rate turbines at net head, that is, the net Bernoulli hydraulic head acting on the turbine. This excludes entrance, trash and trashrack losses, but considers velocity head in the intake and lost velocity head in the draft tube.

The increase from 28 000 hp to 32 500 hp represents an increase of 16%, although in comparison to the output the plant has been producing for years with its raised forebay, it is an increase of only 10%. Nonetheless, if all six units at Great Falls were eventually modified, it would increase the plant capacity from 132 MW to 145 MW. The original nameplate rating for the plant was only 113.4 MW at a power factor of .90, or 126 MW at a power factor of unity.

With the success of turbine no. 1, when generator no. 5 came up for a rewind, it was decided to install a new runner in its turbine. Unit no. 5 was taken out of service on May 19, 1987 at 02:10 hours and returned to service with its new runner, lower setting and enlarged throat ring, on December 11, 1987 at 16:25 hours.

At the present time there is no firm commitment to do any further units at Great Falls, but there is a general understanding that units 3 and 6 will come up for consideration some time in the next few years. There is less certainty about unit 4, as it is an S. Morgan Smith turbine of a significantly different design, especially in the draft tube. Unit no. 2 on the other hand, had its runner replaced once before and is not like to justify replacement in the near future. Some doubt has been suggested as to whether there are economic benefits available to last through all six conversions. In any event, we feel the licence should be amended to provide for all six units.

It should be pointed out that the expired Great Falls licence provided for the installation of 28 000 horsepower turbines (total of 168 000 hp) which was done, but also allowed the forebay to be raised above the normal forebay level of 808.0 feet, as high as 814.0 feet, but not to be operated above 808.0 feet after the next upstream development was completed. Almost immediately after initial commissioning in 1923, Great Falls was operated up to 812 feet, and occasionally as high as 813 feet. This amounts to licence approval to operate at 29 500 hp per unit (total of 177 000 hp).

Even after McArthur was built, the forebay at Great Falls continued to be operated at these higher levels, with the result that McArthur, licenced for 80 000 hp, has been nominally rated at only 75 000 hp. Generator capacity, with a nameplate of 64 MW, is nominally rated at only 56 MW. We are not aware of the

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requisite permission of the Minister having even been requested nor granted to continue operating Great Falls at a higher level after the completion of McArthur. Nes Mudry and I discussed the problem in an exchange of correspondence in 1979. But the fact remains that part of the increased capacity at Great Falls is due to the raised forebay. The licence article covering the forebay should be revised to suit the field conditions.

#### Seven Sisters

Nothing as yet has occurred at Seven Sisters. Manitoba Hydro has committed itself to a contract with Dominion Engineering Works (C.G.E.) to conduct hydraulic model studies for turbine no. 1. It was determined that the generators for units 1 and 3 were due for rewind jobs, and budget estimates were submitted for runner replacement on these two turbines, but these have not yet received management approval. On the other hand, budget estimates for generator rewinds have not yet been submitted.

The original turbines were rated at 37 500 horsepower apiece at a design head of 66 feet, a total of 225 000 hp for six units. This was based on the expectation the tailrace could be excavated deep and wide enough. This was only partially successful due to cost restrictions, and it was decided the last five feet could be better developed by raising the McArthur forebay. Hence Seven Sisters has operated since 1948-1952, when the plant was enlarged, at a nominal head of 61 feet, and a capacity of only 200 000 hp, or 33 333 hp per unit. The generators all along have been capable of considerably higher output, but have never been taxed to capacity. The proposal for Seven Sisters is to replace runners, and possibly enlarge throat ring diameters, to reach a capacity of 37 500 hp per turbine, as originally intended, with an expected increase in efficiency of at least 6%. The increase in capacity at Seven Sisters would be 12.5%. Preliminary calculations have suggested the cost-benefit ratios at Seven Sisters are even higher than at Great Falls.

We would draw your attention to the fact that the expired Seven Sisters final licence already provided for an installation of 225 000 horsepower, a capacity which it never attained.

#### Pine Falls

The situation at Pine Falls is entirely different. When Pine Falls was under consideration by the Department of Mines and Natural Resources, the Manitoba Paper Company was well established with certain rights on the Winnipeg River, and had used it for running booms of logs, and requiring a certain percentage of the flow in the river. Thus, the turbine installation was limited to six units, where normally a seventh unit would have been installed if the plant were to be designed to the same level of development as the other plants on the river.

The seventh unit was replaced by a log chute. The paper company used the log chute for a number of years, but it proved to be a slow tedious job to pass a boom of logs. The company, with Manitoba Hydro's reluctant approval, permitted the much faster and efficient run of logs through a main sluice opened wide, reducing a two day job to a two hour one. Manitoba Hydro's objection was that it used twice as much water.

It was soon realized that the passage of booms occurred relatively infrequently, and has not happened at all since 1968. Pine Falls was built under the direction of Mr. D. M. Stephens, who was deputy minister at the time. As Manitoba Hydro's first chairman, he readily acknowledged that Pine Falls should have been built with seven units. The six unit configuration created the need for careful routing of flow from Great Falls. At peak discharge, Great Falls' 34 000 cfs was greater than Pine Falls' peak discharge of 30 000 cfs. At lower flows this required continual forebay manipulation and the correct sequence of bringing units on or taking them off load each day. With higher flows, the surplus water was wastefully spilled at Pine Falls.

We had sometimes considered the option of adding a seventh unit, but the benefits of utilizing the spillage could not begin to cover the considerable capital cost of civil works, cofferdamming, construction mobilization and overhead.

With the improvements being achieved in turbine design, it came to be realized that another option was available at a fraction of the cost. This option was to replace runners when generators came due for rewinding, in spite of the fact that the existing turbines and runners are perhaps the best in the system with regard to their operating and efficiency characteristics. By combining rerunning with rewinding, it was determined that the costs could be covered by the expected benefits.

Manitoba Hydro has therefore adopted a program for progressive replacement of runners, with unit no. 6 committed for the summer of 1990 and unit no. 5 for the summer of 1991. The original turbines have a nameplate rating of 19 000 hp each (total plant = 114 000 hp) at a gross head of 37 feet. The new runners are expected to have a nameplate rating of 22 300 hp each, or an increase of 17.3%, although no increase in efficiency is expected. When all six turbines have been replaced, the total plant capacity will equal 134 000 hp. In this way, the "seventh" unit will have been achieved at a fraction of the cost.

It would therefore appear appropriate for Manitoba Hydro to apply for an amended final licence to provide for this program.

In conclusion

I would recommend that the program which has already begun at Great Falls, and which is anticipated for Seven Sisters, be

Mr. L. J. Whitn  
1990 03 08  
Page 6

dealt with in the licence renewals. These licence renewals have been pending for a number of years, and my current objective is to pursue these actively to clean them up. I am writing a separate memo on this subject, which you will be receiving shortly.

With regard to an amended licence for Pine Falls, I would request your instructions as to how you would like me to proceed. Presumably this would take the form of a formal application under the provisions of the Regulations, and would be forwarded through our Corporate Counsel, Mr. J. F. Funnell.

It may be worth noting that the enhanced capacity at these three plants will not affect water rentals payable by virtue of a greater installed capacity, since all the Winnipeg River plants have a sufficiently high annual load factor that the payment of water rentals based on capacity will never come into play. All water rentals have been, and are expected to continue, being based on energy generated as expressed in horsepower-years. In this regard there can be expected a modest increase in water rentals payable, reflecting the increased efficiency at Great Falls and Seven Sisters of about 6% for each unit rewheeled, and reflecting the generation of some water previously spilled at Pine Falls. It is also worth noting that the rewheeling of units 1 and 5 at Great Falls has already produced some increased water rentals paid over the past five years.

PMA/eeh  
xc: J. F. Funnell  
M. J. Minor  
D. A. Kilgour  
D. A. Shearer  
E. A. Zaleski  
B. J. Osiowy  
J. LeRoye

PMA90-12.doc



## Memorandum

Date May 8, 1990

To Mr. P.M. Abel, P. Eng.  
Manager, Reservoir & Energy Resources  
System Operating Division  
Manitoba Hydro  
P.O. Box 815, Winnipeg. R3C 2P4

From L.J. Whitney, P. Eng.  
Executive Director  
Water Resources Branch  
1577 Dublin Avenue

Subject **MODIFICATIONS TO WINNIPEG RIVER  
GENERATING STATIONS**

Telephone File: 21.2.2; 21.3; 21.7  
6395

First | Fold

This is in response to your memorandum dated March 8, 1990 regarding modifications to the capacity of the Pine Falls, Great Falls and Seven Sisters generating stations.

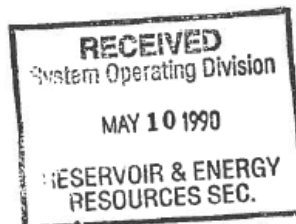
I concur with your suggestion to incorporate these changes in output capacity into the Renewal Licences for Great Falls and Seven Sisters. These changes will be included in the drafts of the Renewal Licences.

Your memorandum will be considered as an application for an amendment to the Pine Falls Final Licence pursuant to Sec. 68 (Change in Undertaking) of the Water Power Regulation. We will subsequently prepare a draft Amended Final Licence for Manitoba Hydro's consideration.

Please provide any comments and/or concerns relative to the above.

Original Signed by: L.J. Whitney

c.c. V.M. Austford





Minister of  
Natural Resources

Legislative Building  
Winnipeg, Manitoba, CANADA  
R3C 0V8

October 30, 1991

RECEIVED

NOV 4 1991

EXECUTIVE VICE-PRESIDENT

Mr. R.O. Lambert, P. Eng.  
Executive Vice-President  
Manitoba Hydro  
P.O. Box 815  
Winnipeg, Manitoba  
R3C 2P4

Dear Mr. Lambert:

Pursuant to Section 85 of the Water Power Regulation, you are hereby notified that the time of payment of rentals on Crown land required for water power purposes will be changed starting with the rentals due for 1992.

Currently, the annual land rentals (payable in advance) and the water power rentals (payable in arrears) for all the hydro-electric generating stations are invoiced for payment by the end of the fiscal year. Land rentals for Churchill River Diversion and Lake Winnipeg Regulation are invoiced individually.

Effective immediately, all land rentals associated with water power developments, due to this department by Manitoba Hydro, will be invoiced during November for payment by the first normal working day of the following January.

Your cooperation in providing payment of the account by the due date would be appreciated.

Original Signed by: Harry J. Enns

cc. L.J. Whitney  
V.M. Austford

1991 11 04 xc: D.W. Gunter  
"ROL"

**Manitoba**



**RECEIVED**

Deputy Minister of  
Natural Resources

FEB 29 1996

Legislative Building  
Winnipeg, Manitoba, CANADA  
R3C 0V8

**EXECUTIVE VICE-PRESIDENT  
ENGINEERING AND ENVIRONMENT**

FEB 29 1996

Mr. Ralph O. Lambert  
Executive Vice President  
Manitoba Hydro  
P.O. Box 815  
Winnipeg, Manitoba  
R3C 2P4

Dear Mr. Lambert:

The purpose of this letter is to notify Manitoba Hydro of a change in billing practice for water use rental as provided in The Water Power Act and Regulations.

Heretofore charges for water power rental have been applied at the end of each calendar year based on the actual usage for that year. Beginning with the month of May 1996, water power rental charges will be applied monthly. The methodology of doing so will be decided after consultation with Manitoba Hydro staff.

Early in May, an invoice will be issued for the months of January, February, March, and April of 1996 to bring the water use rental charges up to date for the start of monthly billing.

The details of the monthly billing procedure will be communicated to you after the above noted consultations have taken place.

Staff look forward to working cooperatively with Manitoba Hydro in the implementation of this revised billing practice.

Yours truly,  
Original Signed by: David Tomasson

David Tomasson  
Deputy Minister

1996 02 29  
xc: E.A. Zaleski  
"ROL"

CIRCULATE	
ROL	
EAZ	
PEB-F	
DGC	
ADC	
ETF	
RGK	

**RECEIVED**  
FEB 29 1996  
DIVISION MANAGER  
SYSTEM OPERATING DIVISION

# Manitoba



Deputy Minister of  
Natural Resources

Legislative Building  
Winnipeg, Manitoba, CANADA  
R3C 0V8

NOV - 4 1996

35011

Mr. A.D. Cormie, P. Eng.  
Manager  
Energy, Security & Sales  
Power Supply  
Manitoba Hydro  
820 Taylor Avenue  
Winnipeg, Manitoba  
R3M 3T1

Dear Mr. Cormie:

The purpose of this letter is to notify Manitoba Hydro of a change in billing practice for land use rentals as provided in The Water Power Act and Regulation.

Heretofore, land use rentals have been payable at the beginning of each calendar year, on January 2. Beginning with the 1997-1998 fiscal year, land use rentals will be payable at the beginning of the fiscal year, on April 1.

The purpose of this change is to eliminate the need to accrue the revenue received to the proper fiscal year as required under the accounting procedure recently adopted by the department.

Early in February of each year, an invoice will be issued for the annual land use rentals for the ensuing fiscal year. Payment of this amount will be required on April 1. Early in November, 1996, an invoice will be issued for January, February, and March of 1997. The payment of this amount, which is 90/365 of the annual rentals, will be required on January 2, 1997.





- 2 -

This payment will bring the land use rentals up-to-date for the start of the fiscal year billing interval.

My staff looks forward to working cooperatively with Manitoba Hydro in the implementation of this revised billing practice.

Yours truly,

Original Signed by: David Tomasson

David Tomasson  
Deputy Minister



P.O. Box 815 • Winnipeg Manitoba Canada • R3C 2P4  
Telephone / N° de téléphone : (204) 474-3018  
Fax / N° de télécopieur : (204) 452-5639

1997 06 18

Mr. S.D. Topping  
Director  
Water Resources Branch  
1577 Dublin Avenue  
Winnipeg, Manitoba  
R3E 3J5

Dear Mr. Topping:

RE: Pine Falls Water Power Licence Renewal Application

Manitoba Hydro hereby applies for the renewal of the Pine Falls Final Licence under the provisions set out in subsection 46(1) of the Water Power Act and Regulations. This renewal application falls within the specified two year period of "not less than four nor more than six years prior to the termination" of the licence on 2001 12 31.

To our knowledge, Manitoba Hydro has met all the requirements of the existing licence and complied with all laws, regulations and special requests from the Director or Minister. Manitoba Hydro intends to continue these practises at the Pine Falls site.

Yours truly,  
Original Signed by: R.R. Raban

R.R. Raban  
Manager  
Hydraulic Engineering and Operations

HJE/sb

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**MANITOBA HYDRO**  
Torch Run  
Le Relais du Flambeau  
1997



Canada  
Jeux du  
Canada  
1997



Natural Resources



Water Resources Branch  
1577 Dublin Avenue  
Winnipeg, Manitoba  
R3E 3J5  
Tel: (204) 945-7488  
Fax: (204) 945-7419

September 5, 1997

File: 21.2.2

Mr. R. R. Raban, P. Eng.  
Manager, Hydraulic Operations  
Systems Operating Division  
Manitoba Hydro  
Box 815  
WINNIPEG MB R3C 2P4

Dear Mr. Raban:



**RE: Pine Falls Water Power License Renewal Application**

Your letter of June 18, 1997 will constitute Manitoba Hydro's formal notification to renew the Pine Falls Water Power License. This notification is required under Subsection 46(1) of The Water Power Regulation.

Please provide a report assessing the present condition of the development at the Pine Falls Site to allow the Water Resources Branch to consider your renewal request. This report should also provide a summary of any remedial works carried out during the current license term, and an indication of any works proposed to be carried out in the foreseeable future. An inspection tour should be arranged to allow my staff to verify the condition of the development.

Please also provide plans indicating the area of additional land that may be required for the development. The annual land rental charges would be calculated accordingly. "As constructed" drawings would also be required for any extensive rehabilitation works.

I further suggest that an early meeting be arranged between my staff and you to help expedite the license renewal process. Tat Lui of the Water Licensing Section will contact you to make arrangements for the meeting and inspection tour.

Upon review of the report and suitable plans, the branch will prepare a draft renewal license for Manitoba Hydro's consideration.

Original Signed by: S.D. Topping

cc T. Lui  
TL/1



360 Portage Ave (16) • Winnipeg Manitoba Canada • R3C 0G8  
Telephone / N° de téléphone : 204-360-3018 • Fax / N° de télécopieur : 204-360-6136  
wpenner@hydro.mb.ca

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2016 09 08

R. Matthews, P.Geo.  
Manager, Water Use Licensing  
Manitoba Sustainable Development  
200 Saulteaux Crescent  
Winnipeg MB R3J 3W3

Dear Mr. Matthews:

**PINE FALLS UNIT #3 AND 4 RE-RUNNERING PROJECT**

Units # 4 and # 3 at Pine Falls Generating Station are scheduled to be taken out of service for re-runnering and rewinding work along with other associated upgrades on October 2016 and October 2017. Work on each unit is expected to take one year to complete. No concrete work within the draft tubes is planned. The nameplate capacity of each unit will be 26,145 hp (19.5 MW) at 34.7 feet of head, up from the original capacity of 19,000 hp (14.2 MW). This work will bring the total nameplate capacity of the Pine Falls Generating Station to 134,890 hp with Units #1 and #2 at 19,000 hp, Units #3 and #4 at 26,145 hp and Units #5 and #6 at 22,300 hp.

Manitoba Environmental Approvals Branch and Fisheries and Oceans Canada have both previously indicated that approvals or authorizations under their jurisdictions are not needed for re-runnering projects. Water regime modelling indicates that passing more water through the powerhouse and less through the spillway will redistribute flows in the channel downstream of the station. The overall range of downstream water velocities does not change; however, velocity changes do occur within central portions of the channel while no discernible effects on velocity are expected along shorelines. Manitoba Hydro reviewed water regime and aquatic fish habitat information with Manitoba Fisheries Branch who determined that the project will not impact on Manitoba's fisheries management objectives.

In April 2016, Manitoba Hydro posted information about the upgrade on our corporate website. ([https://www.hydro.mb.ca/projects/system\\_renewal/generating\\_stations.shtml](https://www.hydro.mb.ca/projects/system_renewal/generating_stations.shtml)). The upgrade was announced to local First Nations, the Manitoba Metis Federation, communities and potentially interested groups through the distribution of a letter, fact sheet and poster advertising the Public Information Meeting. In May 2016, an ad for the Public Information Meeting ran in the Lac du Bonnet Clipper and posters advertising the event were put up at various locations in the Town of Powerview - Pine Falls. The information meeting was held in the Powerview - Pine Falls community on May 25, 2016, and no public concerns were raised regarding the potential effects of the project.

R. Matthews, P. Geo.

2016 09 08

Page 2

If you have any questions related to this matter, please call me at 204-360-3018.

Yours truly,

Original signed by: *Wesley Penner*

W.V. Penner, P. Eng.

Manager

Hydraulic Operations Department

HJE/sl/00107-07311-0015\_00

2018 03 26

Mr. R. Matthews, P. Geo.  
Manager, Water Power Act Licensing  
Manitoba Sustainable Development  
200 Salteaux Crescent  
Winnipeg, MB R3J 3W3

Dear Mr Matthews:

**PINE FALLS UNIT #3 AND #4 RE-RUNNERING PROJECT**

In our September 8, 2016 letter we had indicated that we expected Unit #4 and #3 at Pine Falls Generating Station would be taken out of service for one year beginning in October 2016 and October 2017 for re-runnering and rewinding work along with other associated upgrades. Unit #4 was taken out of service on November 7, 2016 and returned to service later than expected on March 22, 2018. The nameplate capacity of Unit # 4 is now 26,145 hp (19.5 MW) at 34.7 feet of head, up from the original capacity of 19,000 hp (14.2 MW).

Unit #3 will be taken out of service for about one year beginning in November 2018.

If you have any questions about this matter, please call me at (204) 360-3018.

Yours truly,

Original signed by, *Wesley Penner*

W.V. Penner, P.Eng  
Manager  
Hydraulic Operations Department

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c: K. M. Tennenhouse

## Appendix E – Pine Falls Licence Implementation Guide

Environmental Stewardship Division  
Environmental Approvals Branch  
Water Power Act Licensing Section  
Box 16, 200 Saulteaux Crescent, Winnipeg MB R3J 3W3  
T: 204-945-6118 F: 204-948-2357

December 29, 2017

File: 21.2.2

Mr. W. V. Penner, P. Eng.  
Manager, Hydraulic Operations Department  
Manitoba Hydro  
16-360 Portage Avenue  
Winnipeg, MB R3C 0G8

Dear Mr. Penner:

**Re: Pine Falls Generating Station – Licence Implementation Guide**

This correspondence acknowledges receipt and acceptance of the Pine Falls Generating Station – Licence Implementation Guide for Water Levels (October 2017) received with your letter dated November 1, 2017. The Guide documents a common understanding of the water regime terms of the Pine Falls Water Power Act licence.

If you have any questions regarding this letter please feel free to contact Mr. Puru Singh, P. Eng. at 204-945-3613 or the undersigned at 204-945-6118.

Yours truly,  
Original Signed by: Rob Matthews

Rob Matthews, P. Geo  
Manager,  
Water Power Act Licensing Section,  
Sustainable Development

c: B. Webb, P. Singh





360 Portage Ave (16) • Winnipeg Manitoba Canada • R3C 0G8  
Telephone / N° de téléphone : 204-360-3018 • Fax / N° de télécopieur : 204-360-6135  
wvpenner@hydro.mb.ca

---

2017 11 01

R. Matthews, P. Geo.  
Manager, Water Power Licensing  
Manitoba Sustainable Development  
200 Saulteaux Crescent  
Winnipeg MB R3J 3W3

Dear Mr Matthews:

**PINE FALLS GENERATING STATION - LICENCE IMPLEMENTATION GUIDE**

Enclosed for your approval is a Licence Implementation Guide for the Pine Falls Generating Station. This Licence Implementation Guide documents a common understanding of the water regime terms of the Pine Falls *Water Power Act* Licence. The *Water Power Act* Licence specifies operating limits that must be met for compliance with the licence. As such, this document sets out the mutually understood and agreed to:

1. Methodology to be used for determining critical water levels;
2. Definition of licence compliance; and
3. Protocol for reporting.

Please contact me at 204-360-3018 if you have any questions or require additional information.

Yours truly,

Original signed by, *Wesley Penner*

W.V. Penner, P. Eng.  
Manager  
Hydraulic Operations Department

PGC/sl/00107-07311-0016\_00  
Att.

Manitoba Hydro  
Pine Falls Generating Station  
Licence Implementation Guide for Water Levels

*Prepared for:*  
Water Power Act Licensing Section  
Manitoba Sustainable Development  
200 Saulteaux Crescent  
Winnipeg, Manitoba R3J 3W3

*Prepared by:*  
Hydraulic Operations Department  
Manitoba Hydro  
360 Portage Avenue  
Winnipeg, Manitoba R3C 0G8

October 2017

Report No. WP&O 17/13

## Version History

Version	Description	Date
Rev 0	Issued to Manitoba Sustainable Development for Approval	2017-10-31

Manitoba Hydro  
Pine Falls Generating Station  
Licence Implementation Guide for Water Levels

Original Signed by: P.G. Chanel



PREPARED BY:

Original Signed by: P.G. Chanel

P.G. CHANEL

REVIEWED BY:

Original Signed by: B.W. Giesbrecht

B.W. GIESBRECHT

NOTED BY:

Original Signed by: W.V. Penner

W.V. PENNER

DATE:

2017-10-31

REPORT NO:

WP&O 17/13

## Executive Summary

### Introduction

Manitoba Hydro prepared this guide to document a common understanding of compliance with the water regime terms of the Pine Falls Water Power Act Licence. This document sets out the mutually understood and agreed to:

- 1) Methodology to be used for determining critical water levels;
- 2) Definition of licence compliance; and
- 3) Protocol for reporting.

### Pine Falls Forebay Water Level

The **Pine Falls Forebay Water Level** is directly measured at the beginning of each hour at the generating station.

### Compliance

Compliance with the Pine Falls Water Power Act Licence will be measured against the **Pine Falls Forebay Water Level**.

### Reporting

In the event that the **Pine Falls Forebay Water Level** is not in compliance with the licence limit, Manitoba Hydro will notify Manitoba Sustainable Development within one week of the incident. A follow-up report on causes contributing to the event and changes to operations, if any are needed to prevent such an event in the future, will be provided to Manitoba Sustainable Development. A record of water levels and licence compliance will also be provided in an annual report.

### Change Management

Proposed revisions to this guide will be drafted by Manitoba Hydro and reviewed by Manitoba Sustainable Development from time to time. Following review and approval of revisions by Manitoba Sustainable Development, a revised copy of this guide will be produced and distributed by Manitoba Hydro.

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## 1. Introduction

The Pine Falls Generating Station is located on the lower stretch of the Winnipeg River, approximately 120 km north-east of the City of Winnipeg and 40 km north of the Town of Lac du Bonnet. It is the final generating station to use the waters of the Winnipeg River before they enter Lake Winnipeg.

The Pine Falls Generating Station was built between 1949 and 1952, and is the last generating station on the Winnipeg River before it discharges into Lake Winnipeg.

Manitoba Hydro currently operates the Pine Falls Generating Station under a Short-Term Extension of the Final Licence. The Short-Term Extension Licence (STEL) was issued in accordance with the provisions of The Water Power Act on October 1, 2015. The STEL is in effect until September 30, 2020 and the operating terms are identical to those of the final licence issued on November 30, 1965. Pine Falls Generating Station has a licenced capacity of 85 MW (114,000 horsepower).

### 1.1 Definitions

For the purposes of this guide, unless the context otherwise requires, the following terms shall have the respective meanings set out below and grammatical variations of such terms shall have corresponding meanings:

**ASL** means above sea level

**Controlling Benchmark** means Geological Survey of Canada (GS of C) benchmark 2KA. This benchmark is a brass cap in bedrock located along the left bank about 750 feet downstream from the Pine Falls powerhouse.

**Pine Falls Gauge** refers to a float attached to a steel tape that is draped over a pulley connected to a Selsyn (self-synchronous) system that measures the forebay water level.

**Pine Falls Forebay Water Level** means the hourly water level as measured by the **Pine Falls Gauge**.

### 1.2 Datum

In accordance with Article 4 of the Pine Falls Final Water Power Act Licence, water level information for the operation of the Pine Falls Project is measured in terms of elevations ASL, GS of C, Canadian Government Vertical Datum (CGVD) 1928, 1929 Local Adjustment.

### **1.3 Quality Control**

#### **1.3.1 Benchmarks**

Vertical control surveys have been performed to establish appropriate local benchmarks around the Pine Falls Generating Station.

Pine Falls benchmarks were established by level transfer from **Controlling Benchmarks** using spirit levelling methods.

#### **1.3.2 Direct Water Level Measurements**

Staff monitor the **Pine Falls Gauge** equipment weekly and as necessary to maintain gauge performance. Direct water level measurements are taken during these checks and compared to the level indicated by the water level sensor. Direct water level measurements that differ by more than 0.1 feet are reported and repaired.

#### **1.3.3 Gauge Readings**

The forebay gauge consists of a float attached to a steel tape that is draped over a pulley connected to a Selsyn (self-synchronous) system. This system electronically transmits the angular position of the pulley to a receiving device in the control room. The position information is converted to a water level, indicated on a display and also output to the Remote Transmittal Unit for transmission to Manitoba Hydro's System Control Centre.

### **1.4 Quality Assurance Procedure for Water Level Data**

#### **Plant Data**

Data is collected on site and signed off by the operating supervisor. Data is then sent to the Energy Operations Planning & Technology Department of Manitoba Hydro, uploaded into a database and checked for errors. Data errors are then corrected or verified by plant operating staff with technical assistance from Energy Operations Planning & Technology staff as needed. Once data has been verified, it may be used for operations planning, studies, model development and reporting.



## **2. Pine Falls Forebay Water Level**

Article 4 of the Pine Falls Water Power Act Licence places a limit on the **Pine Falls Forebay Water Level**. A map showing the location of the **Pine Falls Gauge** is provided in Appendix A. Water levels are largely influenced by the operation of the Pine Falls Generating Station and local meteorological events. Due to the size of the forebay and location of the **Pine Falls Gauge**, wind effects on the **Pine Falls Forebay Water Level** are negligible.

**Pine Falls Forebay Water Level** measurements are taken continuously and recorded at the beginning of each hour and reported to Manitoba Hydro's System Control Centre.

### 3. Compliance

#### 3.1 Pine Falls Water Power Act Licensing Requirement

##### Maximum Water Level

Article 4 of the licence stipulates that:

*“The Licensee shall not raise the headwater of its development to an elevation higher than 752.0 feet above mean sea level, Canadian Geodetic Datum, 1929 Adjustment. A higher elevation may be created only with prior written permission by the Director and in accordance with Section 72 of the Regulations.”*

The forebay water level shall be in compliance with the limit described above if the hourly **Pine Falls Forebay Water Level**:

- a) does not exceed 752.0 feet by more than 0.1 feet; and
- b) does not exceed 752.0 feet more than two times or for more than two consecutive hours in any 24-hour period.

Based on the accuracy and location of the **Pine Falls Gauge**, Manitoba Hydro defines instances where the licence limit is exceeded by 0.1 feet as reportable events.

#### 3.2 Reporting

##### 3.2.1 Compliance Reporting

In the event that the **Pine Falls Forebay Water Level** is not in compliance with the licence limit as described in Section 3.1, notification shall be made to Manitoba Sustainable Development within one week of the incident. A follow-up report on causes contributing to the event and changes to operations, if any are required to prevent such an event in the future, will be provided to Manitoba Sustainable Development.

##### 3.2.2 Maintenance and Emergencies

During maintenance and emergencies there may be times when Manitoba Hydro is required to deviate from a licence condition for safety or other purposes. Manitoba Hydro will be considered compliant with the licence as long as:

1. Advanced notification by email is provided to Manitoba Sustainable Development of the upcoming licence deviation together with the reason, a description of the operating plan, details of the expected licence deviation, a summary of impacts to stakeholders, and confirmation that stakeholders will also be notified; and
2. Advanced notification is provided to stakeholders of pertinent impacts to flow and water levels; and

4

3. Following the work, notification by letter is provided to Manitoba Sustainable Development on the final specifics of the licence deviation.

### **3.2.3 Regular Annual Reporting**

Water levels and licence compliance will be reported annually to Manitoba Sustainable Development.

## **4. Change Management**

### **4.1 Regular Updates**

Proposed revisions to this Guide will be drafted by Manitoba Hydro and reviewed by Manitoba Sustainable Development from time to time. Following review and approval of revisions by Manitoba Sustainable Development, a revised copy of this Guide will be produced and distributed by Manitoba Hydro.

## **Appendix A**


### **Forebay Water Level Gauge Location**

7



Figure 1:  
Hydroelectric generating stations on the Winnipeg River



	MANITOBA HYDRO	
	HYDRAULIC OPERATIONS DEPARTMENT	
	PINE FALLS GENERATING STATION	
DRAWN BY PGC	FOREBAY WATER LEVEL GAUGE LOCATION	
YEAR 2017	PROJECT LICENCE IMPLEMENTATION GUIDE	FIGURE 2

## Appendix F – Glossary



## Glossary

**Canadian Dam Association Guidelines:** The guidelines were published in 2007 and revised in 2013. “The guidelines consist of principles that are applicable to all dams, and an outline of processes and criteria for management of dam safety in accordance with the principles.”

**Churchill River Diversion (CRD):** The diversion of water from the Churchill River to the Nelson River via the Rat River and the impoundment of water in Southern Indian Lake.

**Community:** In ecology, a community is an ecological unit composed of a group of organisms or a population of different species occupying a particular area, usually interacting with each other and their environment. For people, a community is a social group of any size, whose members reside in a specific locality.

**Control structure:** A type of structure designed to control the outflow from a waterbody.

**Cubic metres per second (cms or m<sup>3</sup>/s):** is a flow rate that quantifies the number of cubic metres of water flowing in one second.

**Dam:** A barrier built to hold back water.

**Dam Safety Emergency Plans:** The Canadian Dam Association (CDA) Guidelines specify that “all dams should have emergency response procedures and emergency preparedness plans in place if lives are at risk or if implementation of emergency procedures could reduce the potential consequences of failure”. The purpose of the emergency preparedness plan (EPP) is to provide contingency plans for a dam safety emergency, to ensure that all foreseeable eventualities have been thoroughly studied and to provide an appropriate, workable response plan to ensure safety of the public.

**Dam Safety Reviews (DSRs):** A Dam Safety Review is a systematic evaluation of the safety of a dam by means of comprehensive inspection of the structures, assessment of performance and review of the original design and construction records to ensure that they meet current criteria.

**Discharge:** is another word for flow rate often measured in cubic metres per second or cubic feet per second.

**Drainage Basin:** A large area of land that collects water and then drains into a body of water. (used synonymously with Watershed).

**Dyke:** An earth embankment constructed to contain the water in the reservoir and limit the extent of flooding.

**Ecosystem:** A dynamic complex of plant, animal and micro-organism communities and their non-living components of the environment interacting as a functional unit. (Canadian Environmental Assessment Agency)

**Environment:** The components of the Earth, including a) land, water and air, including all layers of the atmosphere, b) all organic and inorganic matter and living organisms, and c) the interacting natural systems that include components referred to in a) and b). (Canadian Environmental Assessment Agency)

**Environmental effect:** In respect of a project, any change that the project may cause in the environment, including any change it may cause to a listed wildlife species, its critical habitat or the residences of individuals of that species, as those terms are defined in subsection 2(1) of the Species At Risk Act.

**Environmental monitoring:** Periodic or continuous surveillance or testing, according to a predetermined schedule, of one or more environmental components. Monitoring is usually conducted to determine the level of compliance with stated requirements, or to observe the status and trends of a particular environmental component over time. (Canadian Environmental Assessment Agency)

**Erosion:** A process by which the Earth's surface is worn away by the actions of water and wind.

**Farm Electrification Program:** Starting in 1942, Manitoba Power Commission started the Farm Electrification Program due to farmers petitioning the provincial government to provide electrical service. By 1954, the Farm Electrification program was virtually completed, with about 75 per cent of all farms in Manitoba having electrical service.

**Flooding:** The rising of a body of water so that it overflows its natural or artificial boundaries and covers adjoining land that is not usually underwater.

**Flow:** Motion characteristic of fluids (liquids or gases); any uninterrupted stream or discharge.

**Forebay:** Impoundment area immediately upstream from a dam or hydroelectric plant intake structure that forms the downstream portion of the reservoir.

**Generating Station (GS):** A structure that produces electricity. Its motive force can be provided in a variety of ways, including burning of coal or natural gas, or by using water (hydro) power. Hydroelectric generating stations normally include a complex of powerhouse, spillway, dam(s) and transition structures; electrical energy is generated by using the flow of water to drive turbines.

**Hydroelectric:** Electricity produced by converting the energy of falling water into electrical energy.

**Impoundment:** The containment of a body of water by a dam, dyke, powerhouse, spillway or other artificial barrier.

**Kilovolt (kV):** The unit of electromotive force or electrical pressure equivalent to 1,000 volts (V).

**Landscape:** The ecological landscape as consisting of a mosaic of natural communities; associations of plants and animals and their related processes and interactions.

**LiDAR:** LiDAR is a remote sensing technology that measures distance by illuminating a target with a laser and analyzing the reflected light. It is used to make high-resolution maps.

**Megawatt (MW):** The unit of electrical power equivalent to 1,000,000 watts.

**Mitigation:** A means of reducing adverse effects. Under the *Canadian Environmental Assessment Act*, and in relation to a project, mitigation is the elimination, reduction or control of the adverse environmental effects of a project, and includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means.

**Model:** A description or analogy used to help visualize something that cannot be directly observed. Model types range from a simple set of linkage statements or a conceptual diagram to complex mathematical and/or computer model.

**Monitoring:** Measurement or collection of data.

**Outflow:** The water flowing out of a water body (lake, reservoir, etc.).

**Parameter:** Characteristics or factor; aspect; element; a variable given a specific value.

**Power:** The instantaneous amount of electrical energy generated at a hydroelectric generating station, usually expressed in megawatts.

**Powerhouse:** Structure that houses turbines, generators, and associated control equipment, including the intake, scroll case and draft tube.

**Reservoir:** A body of water impounded by a dam and in which water can be stored for later use. The reservoir includes the forebay.

**Shoreline:** The narrow strip of land in immediate contact with a lake or river.

**Spillway:** A concrete structure that is used to pass excess flow so that the dam, dykes, and the powerhouse are protected from overtopping and failure when inflows exceed the discharge capacity of the powerhouse.

**Species:** A group of organisms that can interbreed to produce fertile offspring.

**Topography:** General configuration of a land surface, including its relief and the position of its natural and manmade features.

**Transmission Line:** A linear arrangement of towers and conductors which carries electricity from generating stations and transmission stations to load centres like communities and industries to meet electrical needs.

**Tributary(ies):** A river or stream flowing into a lake or a larger river or stream.

**Velocity:** A measurement of speed.

**Water quality:** Measures of substances in the water such as nitrogen, phosphorus, oxygen and carbon.

**Water regime:** A description of water body (*i.e.*, lake or river) with respect to water levels, flow rate, velocity, daily fluctuations, seasonal variations, *etc.*

**Watershed:** A large area of land that collects water and then drains into a body of water. (used synonymously with Drainage Basin)

**Weir:** A low dam built across a river to raise the level of water upstream or regulate its flow.