

# Manitoba Hydro Kettle Generating Station Licence Implementation Guide for Water Levels

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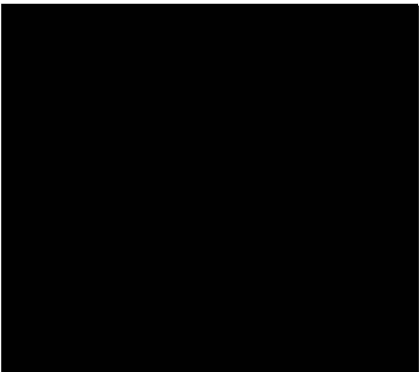
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Manitoba Hydro  
Kettle Generating Station  
Licence Implementation Guide for Water Levels



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# Executive Summary

## Introduction

Manitoba Hydro prepared this guide to document a common understanding of compliance with the water regime terms of the Kettle 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.

## Kettle Forebay Water Level

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

## Compliance

The forebay water level shall be in compliance if the hourly **Kettle Forebay Water Level**:

- a) does not exceed 463.0 feet (141.1 m) by more than 0.1 feet (0.03 m); and
- b) does not exceed 463.0 feet (141.1 m) more than one time in any 24-hour period

## Reporting

In the event that the **Kettle Forebay Water Level** is not in compliance with the licence limit, Manitoba Hydro will notify Manitoba Environment and Climate Change 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 Environment and Climate Change. A record of water levels and licence compliance will also be provided in an annual report.

## Ongoing and Other Requirements

The Water Power Act Short-term Extension Licence and the associated cover letter from Manitoba specify a number of ongoing and other requirements that are not directly related to the day to day operation of the Kettle Generating Station. Manitoba Hydro will participate in and report on these additional requirements as directed.

## Change Management

Proposed revisions to this Guide will be drafted by Manitoba Hydro as required or directed by Manitoba Environment and Climate Change. Following review and approval of revisions by Manitoba Environment and Climate Change, a revised copy of this Guide will be produced and distributed by Manitoba Hydro.

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# 1. Introduction

The Kettle Generating Station is located approximately 700 km northeast of the City of Winnipeg and 3 km upstream from the Canadian National Railway's river crossing near the town of Gillam. Kettle is located 16 km upstream from the Long Spruce Generating Station and can be accessed by PR 280 as shown on the site map in the Appendix.

The Kettle Generating Station is the second largest plant on the lower Nelson River and in the Manitoba Hydro system. It was constructed between 1966 and 1974 and has a total licenced capacity of 1,680,000 horsepower (1,252.8 MW) through 12 vertical turbine units each with a generating capacity of 140,000 horsepower (104.4 MW).

Manitoba Hydro currently operates the Kettle Generating Station under a Short-term Extension Licence (STEL) issued in accordance with the provisions of The Water Power Act on November 1, 2022. The STEL is in effect until November 1, 2027. The operating terms of the STEL are identical to those of the final licence.

## 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 526D located in the south abutment of the bridge over the Nelson River downstream of Kettle GS.

**Kettle 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.

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

## 1.2 Datum

In accordance with Section 12 of the Kettle Final Water Power Act Licence, water level information for the operation of the Kettle 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 Kettle Generating Station.

Kettle benchmarks were established by level transfer from the **Controlling Benchmark** using spirit levelling methods.

### 1.3.2 Direct Water Level Measurements

Staff monitor the **Kettle Gauge** equipment and take direct water level measurements to maintain gauge performance. If the direct measurements differ by more than 0.025 m from the gauge reading, staff will take corrective action including re-calibrating the gauge if required.

### 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 the System Control Centre. The system is generally capable of measuring water levels accurate to about 0.01 m.

## 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 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 staff as needed. Once data has been verified, it may be used for operations planning, studies, model development and reporting.

## 2. Kettle Forebay Water Level

Section 5 of the Final Water Power Act Licence places a limit on the **Kettle Forebay Water Level**. A map showing the location of the **Kettle Gauge** is provided in Appendix A. Water levels are largely influenced by the operation of the Kettle Generating Station and local meteorological events. Due to the location of the **Kettle Gauge**, wind effects on the **Kettle Forebay Water Level** are typically negligible.

**Kettle 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 Kettle Water Power Act Licensing Requirement

#### Maximum Water Level

Section 5 of the licence stipulates that:

*“The Licensee shall not raise the headwater, as measured at the powerhouse, higher than 463.0 feet above mean sea level, Canadian Geodetic Datum. A higher elevation may be created only with written permission by the Director and in accordance with Section 72 of the Regulation.”*

The forebay water level shall be in compliance with the limit described above if the hourly

#### **Kettle Forebay Water Level:**

- c) does not exceed 463.0 feet (141.1 m) by more than 0.1 feet (0.03 m); and
- d) does not exceed 463.0 feet (141.1 m) more than one time in any 24-hour period

Based on the accuracy and location of the **Kettle Gauge**, Manitoba Hydro defines instances where the licence limit is exceeded by 0.1 feet (0.03 m) as reportable events.

## 3.2 Reporting

### 3.2.1 Compliance Reporting

In the event that the **Kettle Forebay Water Level** is not in compliance with the licence limit as described in Section 3.1, notification shall be made to Manitoba Environment and Climate Change 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 Environment and Climate Change.

### 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 is provided to Manitoba Environment and Climate Change of the upcoming licence deviation together with the reason. This will include a description of the operating plan, details of the expected licence deviation, a

summary of anticipated 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
3. Following the deviation, notification by letter is provided to Manitoba Environment and Climate Change on the details of the operation(s).

### **3.2.3 Regular Annual Reporting**

Water levels and licence compliance will be reported annually to Manitoba Environment and Climate Change.

## **4. Ongoing and Other Requirements**

### **4.1 Future Planning, Studies, and other Initiatives**

Term 5 of the Water Power Act Short-term Extension Licence stipulates that:

“The Licensee shall participate in future planning, studies and other initiatives as instructed by the Minister, in areas impacted by the Undertaking along with affected communities and other stakeholders.”

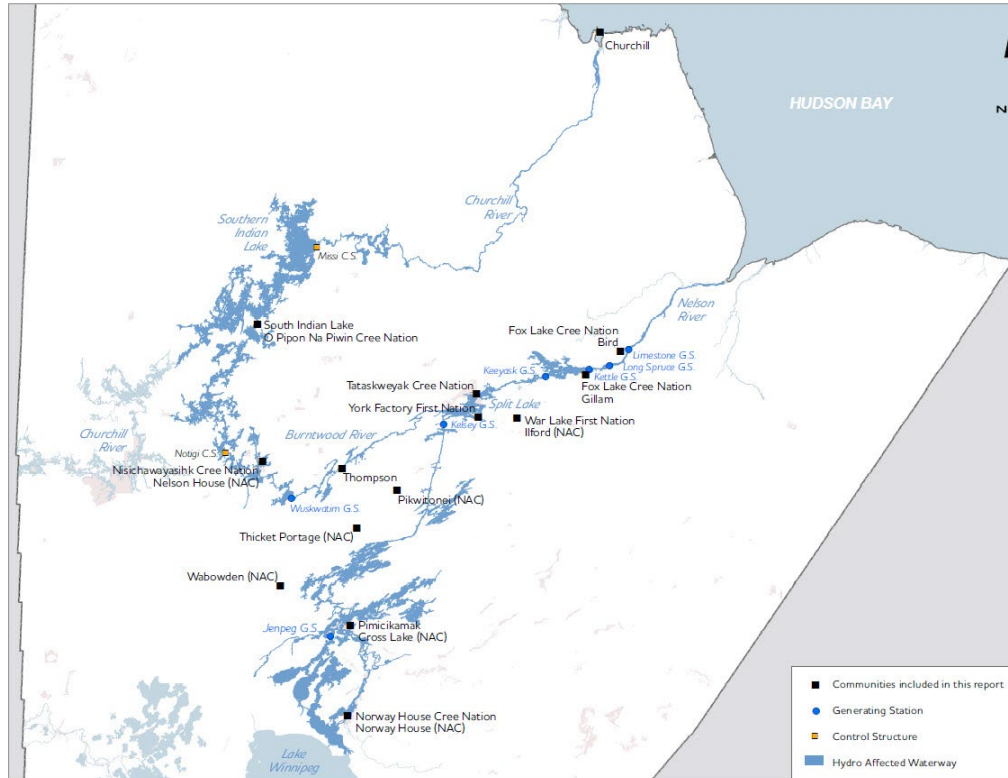
Manitoba Hydro will participate in any future planning or other studies and initiatives as directed by the Minister. Progress updates will be provided as required in the Annual Water Levels and Flows Compliance Report.

### **4.2 Indigenous Engagement Report**

Term 6 of the Water Power Act Short-term Extension Licence stipulates that:

“The Licensee shall within eight months of the issuance of this Short-term Extension Licence, and annually thereafter submit a report to the Director documenting the Licensee’s engagement with Indigenous communities on the continued operation of the Undertaking.”

Manitoba Hydro submits an annual report by June 1 each year that provides an overview of the forums, programs and activities through which it has engaged with Indigenous communities on the continued operation of Churchill River Diversion, Lake Winnipeg Regulation and Jenpeg Generating Station which includes the area affected by operation of Kettle Generating Station. Map 1 shows the communities that are included in the annual report. Engagement activities associated with Kettle Generating Station will be included in the annual report going forward.



Map 1: Communities located along waterways affected by CRD, LWR, Jenpeg Generating Station and Kettle Generating Station

### 4.3 Licence Modernization Processes

The Water Power Act Short-term Extension Licence cover letter from the Province of Manitoba instructs Manitoba Hydro to:

“Participate in the modernization of water power licensing.”

Manitoba Hydro will participate in any future water power licensing modernization processes as directed by Manitoba. Progress updates will be provided as required in the Annual Water Levels and Flows Compliance Report.

## 5. Change Management

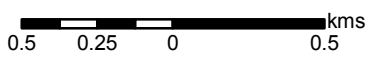
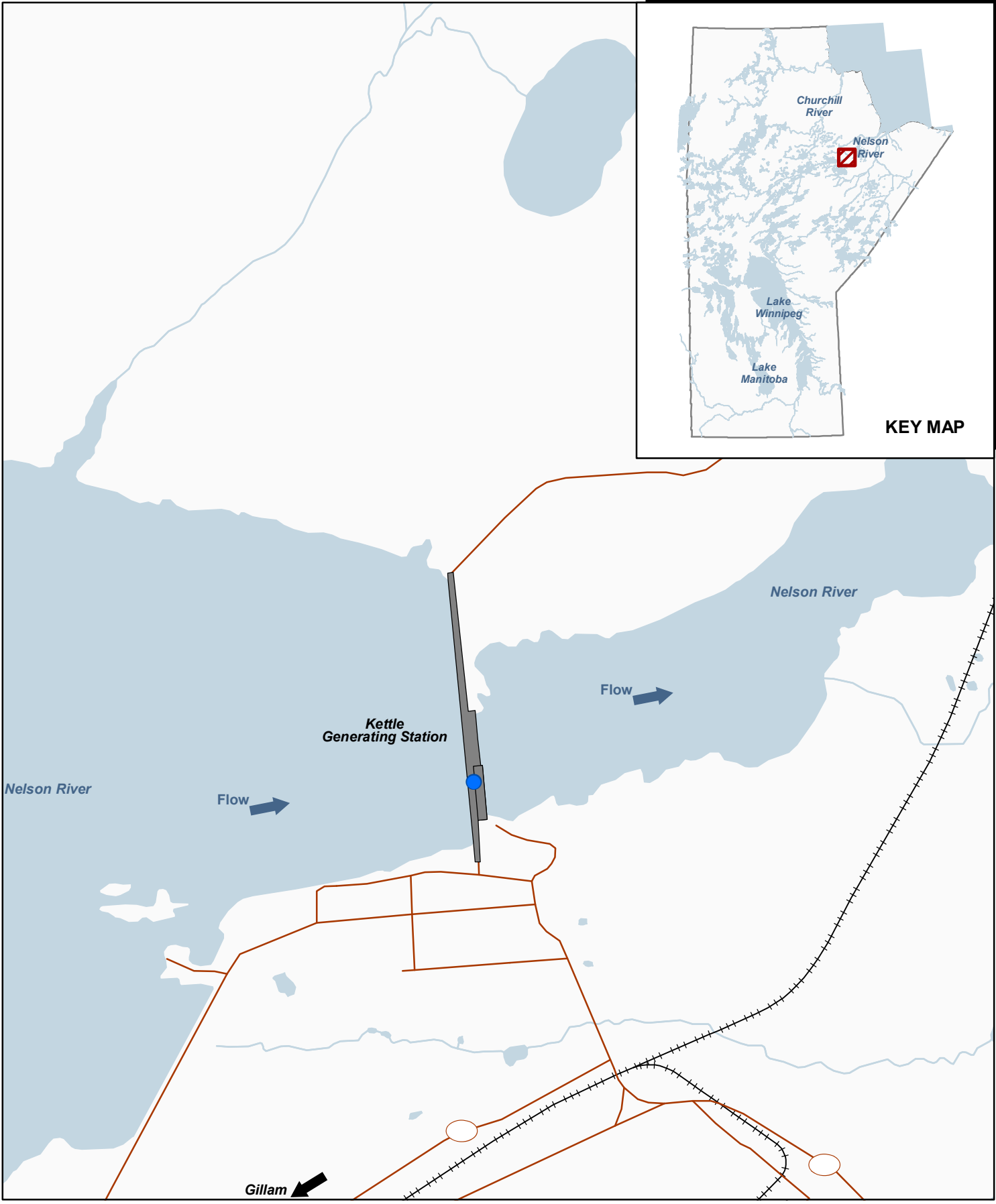
### 4.1 Regular Updates

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by Manitoba Environment and Climate Change, a revised copy of this Guide will be produced and distributed by Manitoba Hydro.

## Appendix A

### Site Map and Forebay Water Level Gauge Location



**KETTLE G.S.**  
**GEOGRAPHICAL LOCATION**  
**FIGURE 1**

- Generating Station
- Dam
- Road
- Rail