

Clayton Falls Project Water Use Plan

Monitoring Program and Physical Work Annual Report: 2007

- **Aquatic Productivity**
- **Water Release and Measurement Device**

For Water Licences 120176 and 120177

BC Hydro Clayton Falls Project Water Use Plan Monitoring Program and Physical Work Annual Report: 2007

1 Introduction

This document represents a summary of the status and the results of the Clayton Falls Water Use Plan (WUP) monitoring program and physical work to 31 May 2007, as per the Clayton Falls Order under the *Water Act*, dated 9 December 2004. There is one monitoring program and one physical work:

- a) Aquatic Productivity
- b) Water Release and Measurement Device

2 Background

The water use planning process for BC Hydro's Clayton Falls project was initiated in September 2002 and completed in April 2003. The conditions proposed in the WUP for the operation of the project reflect the July 2003 recommendations of the Clayton Falls WUP Consultative Committee.

In July 2003, the Clayton Falls WUP was submitted to the Comptroller of Water Rights (Comptroller).

On 9 December 2004, BC Hydro was ordered to implement the conditions proposed in the Clayton Falls WUP and prepare the monitoring program and physical works terms of reference (TOR).

On 15 August 2005, the Clayton Falls monitoring program TOR was submitted to the Comptroller for review and approval. On 16 September 2005, the TOR was accepted by the Comptroller.

On 28 October 2005, the Clayton Falls physical work TOR was submitted to the Comptroller for review and approval. On 8 December 2005, the TOR was accepted by the Comptroller.

As outlined in the Clayton Falls WUP, BC Hydro will review the results of the monitoring program five years after implementation of this WUP. A formal review of the WUP is recommended in ten years. A review of the WUP could be triggered sooner if significant risks are identified through the analysis of the monitoring results.

3 Status

The following table outlines the status and schedule for the Clayton Falls WUP monitoring program and physical work.

Table 3-1: Status of Clayton Falls WUP Monitoring Program and Physical Work Implementation

	2005 WLR YR1	2006 WLR YR2	2007 WLR YR3	2008 WLR YR4	2009 WLR YR5 Interim Review
Monitoring Program					
Aquatic Productivity	✓	✓	■	■	
Physical Work					
Water Release and Measurement Device	✓				

4 Clayton Falls WUP Monitoring Program

This section outlines the status of the Clayton Falls WUP monitoring program as per the Order under the *Water Act*, dated 9 December 2004.

4.1 Aquatic Productivity

4.1.1 Overview

The objective of this monitoring program is to assess the ecological benefits of the proposed flow release and to collect the information needed to help inform future decisions.

The Clayton Falls WUP Consultative Committee expressed concern that the lack of a guaranteed base flow in the mainstem channel between Clayton Falls and the confluence of the tailrace channel might affect the overwinter survival of fish and their invertebrate prey. To address this concern, the Consultative Committee recommended that the WUP include a 0.05 m³/s minimum continuous flow release from the Clayton Falls Dam. Because of uncertainty regarding the benefits of this flow release to fish and their invertebrate prey, the Consultative Committee also recommended a monitoring program to assess the ecological response to the new flow regime.

Monitoring Indicators: a) Invertebrate abundance.
 b) Invertebrate community diversity.
 c) Salmonid standing crop.

The monitoring program has three components:

1. Collect ecological information on salmonid abundance, invertebrate abundance, and invertebrate species diversity both prior to (one year) and during (three years) the flow release;
2. Assess changes in these measures pre and post flow release; and

3. Compare the salmonid abundance in reaches of Clayton Falls Creek with data from nearby, unregulated systems to assess the adequacy of changes and help to distinguish between natural variation and the effects of flow releases.

4.1.2 Status

This monitoring program was initiated in September 2005 and will be carried out over four years. The first program report was received in December 2006 and the second program report was received in June 2007.

Status updates from the field sampling implementers highlighted that two of the monitoring program's three components, the physical measurements and fish sampling were implemented effectively. However, challenges occurred under the invertebrate sampling component, given the frequent high flows in this steep creek during September 2005, typical of this period. As a result, and in consultation with the Ministry of Environment, invertebrate sampling was repeated during low flows in February 2006 in an effort to collect data prior to implementation of the minimum flow release in April 2006. Further sampling challenges were encountered in February 2006. As a result, the invertebrate sampling component of the monitoring program was re-evaluated in September 2006, in consultation with the Ministry of Environment. The recommended sampling refinements are being incorporated into a TOR addendum to be submitted by August 2007.

4.1.3 Interpretation of Data

Data on salmonid standing crop were successfully collected in 2005 and 2006. As outlined above, challenges were encountered collecting the invertebrate data. As noted in the Terms of Reference, interpretation of data will occur after the conclusion of data collection in Year 4.

5 Clayton Falls WUP Physical Work

This section outlines the status of the Clayton Falls WUP physical work as per the Order under the *Water Act*, dated 9 December 2004.

5.1 Water Release and Measurement Device

5.1.1 Overview

The objective of this physical work includes the design and construction of a water release and measurement device to be installed in Clayton Falls Dam in order to ensure a minimum flow of 0.05 m³/s from the dam.

The Clayton Falls WUP Consultative Committee expressed concern that the lack of a guaranteed base flow in the mainstem channel between the Clayton Falls and the confluence of the tailrace channel might impact the over-winter survival of fish and their invertebrate prey. To address this concern, the Consultative Committee recommended that the WUP include a 0.05 m³/s minimum continuous flow release from Clayton Falls Dam. The 0.05 m³/s release will be provided via an engineered structure that will be designed to ensure passage of the minimum flow requirement.

5.1.2 Status

The water release and measurement device was installed on 8 March 2006 during the annual maintenance period. The Clayton Falls Water Release and Measurement Device Construction completion Report was submitted to your office in August 2006.

5.1.3 Interpretation of Data

Flow through the device is uncontrolled and dependent on reservoir level. The device has been designed to deliver the required minimum flow under normal operating conditions. During the annual maintenance period, the reservoir is drawn down below the crest of the spillway and the minimum flow release pipe will be dewatered. During this period of time, the sluice gate is opened to pass the project inflow while the unit is out of service thus sustaining the minimum flow to the downstream channel. At the end of the maintenance period when the sluice gate is closed to allow the headpond to refill, there will be a short period of time (one to three hours) when there will be no minimum flow release until the headpond fills to the elevation of the flow release pipe. This exception was noted in the TOR submitted to the Comptroller and was considered to be acceptable variance.

6 Clayton Falls WUP Monitoring Program and Physical Work Costs

The following table summarizes the Clayton Falls WUP monitoring program and physical work costs approved by the Comptroller and actual costs to 30 June 2007.

Table 6-1: Clayton Falls WUP Monitoring Program and Physical Work Costs

Description		Costs Approved by Comptroller of Water Rights	Actual Costs to 30 June 2007
Monitoring Program			
Aquatic Productivity	Direct Management	\$39,089	\$21,505
	Implementation	\$43,900	\$11,601
Physical Work			
Water Release and Measurement Device	Direct Management	\$4,693	\$3,644
	Implementation	\$5,025	\$8,182