



Province of British Columbia

Water Act

ORDER SECTION 87 AND 88

File Nos.: 0265017 and 1001701

WHEREAS British Columbia Hydro and Power Authority (BC Hydro) is the operator of the Puntledge River Power Development, in respect of which it holds Conditional Water Licences 120302 and 120301;

WHEREAS, the works authorized by Conditional Licences 120302 and 120301 at the Puntledge River Power Development include: a dam, gated sluiceway, spillway, and fish ladder at the outlet of Comox Lake (PD31095), a diversion dam and intakes, fish screens, penstock and powerhouse;

WHEREAS the works have been regulated by an order dated November 7, 1997;

WHEREAS, the operation of the works can also benefit the viability of fish and fish habitat; flood safety; and recreation in Comox Lake Reservoir and the Puntledge River;

WHEREAS, BC Hydro has engaged in public consultation to determine values for system parameters and to develop operating procedures that may provide benefits as described above;

WHEREAS the licensee has submitted a Water Use Plan, which recommends changes to the operations of Puntledge River power development which are intended to provide specific benefits to fish and fish habitat, ecological values, recreation and flood routing;

WHEREAS, I have accepted the Water Use Plan for the Puntledge River Power Development, dated December 1, 2004; and

WHEREAS, BC Hydro has proposed a monitoring program to determine if operating the works in accordance with the operating parameters and procedures in the Puntledge River Water Use Plan will provide the above listed expected benefits;

I HEREBY ORDER THAT:

1. The Order dated November 7, 1997 regulating the Puntledge River Power Development is revoked.

2. The licensee must operate the Puntledge River Power Development in accordance with Schedule A.
3. The licensee must evaluate the effectiveness of operating in accordance with 1 above by undertaking a monitoring program as set out in Schedule B.
4. In lieu of ordering more restrictive regulation of the works, which would be intended to provide benefits for fish and wildlife, the licensee must place approximately 2000 square metres of spawning gravel and permit the diversion of water from the penstock to the Lower Puntledge River Hatchery as set out in Schedule C.
5. With respect to the maintenance and provision of records the licensee must:
 - a. keep records of:
 - i. Comox Lake Reservoir elevation
 - ii. Puntledge River discharge at the location of Water Survey of Canada gauges 08HB084 and 08HB006.
 - iii. Browns River discharge at the location of Water Survey of Canada gauges 08HB025.
 - iv. Powerhouse facility discharges.
 - v. Estimates of Lower Puntledge River Hatchery Discharges according to Schedule C, 2a.
 - b. Provide a written report to the Comptroller of Water Rights on or before February 1 of each year summarizing the records from the previous calendar year.
 - c. Provide on request of the Comptroller of Water Rights records collected under 5.a.
6. The licensee may operate the works in an alternate manner in the event of an emergency, a dam safety requirement, or an extreme hydrological event.
7. All emergency operations or other deviations from operations ordered under 1 above be reported to the Comptroller of Water Rights in a timely manner.

Dated at Victoria BC this 19th day of January, 2005



Pieter Bekker
Deputy Comptroller of Water Rights

**Schedule A
OPERATING PARAMETERS**

**OPERATING CONDITIONS FOR THE PUNTLEDGE RIVER HYDROELECTRIC
SYSTEM**

The Puntledge River Power Development has divided the Puntledge River into a series of distinct reaches. The first reach, or reach A, is Comox Lake Reservoir, which is formed by the Comox Lake Dam. The second, or reach B, is the headpond reach, which is that portion of the river between Comox Lake Dam and the Diversion Dam. The third reach, or reach C, is the diversion reach, which is that part of the river between the Diversion Dam and the Powerhouse. The Diversion Reach may be further sub-divided into Upper and Lower, the lower section being that part below the confluence of the Puntledge and Browns rivers. The final reach (D) is that part of the river downstream from the Powerhouse.

The parameters and procedures by which the authorized works of the Puntledge River Power Development must be operated are set out in the following conditions. The conditions are grouped by the reach of the river they affect or by the specific works which must be regulated.

REACH A: COMOX LAKE RESERVOIR

1. The maximum normal elevation of Comox Lake Reservoir is:
 - a. 134.42 metres for the period of October 15 to February 15; and
 - b. 135.33 metres for the period of February 16 to October 14.
 - c. The maximum elevations noted above may be exceeded when routing high inflow events.

REACH B: HEADPOND REACH

2. There are no operating parameters or procedures regulating the headpond reach.

REACH C: DIVERSION REACH

Upper Diversion Reach

3. In the Upper Diversion reach of the Puntledge River the flows as measured at the location of Water Survey of Canada gauge 08HB084 shall be regulated such that:
 - a. The minimum flow is:
 - i. 5.7 cubic metres measured as a three day rolling average; and
 - ii. 5.1 cubic metres per second at all times
 - b. Pulse flow events, for the benefit of fish, of a minimum of 12 cubic metres per second, which shall be for a duration of at least 48 hours, inclusive of ramp

up and down which may occur at the maximum allowable rate as set out in 3.c below, are provided in accordance with the following schedule:

- i. From January 15 to February 15, provide four pulse flow events which are a minimum of five days apart;
 - ii. From March 15 to April 15, provide four pulse flow events which are a minimum of five days apart;
 - iii. From July 2 to August 15, provide five pulse flow events which are a minimum of five days apart. Pulse flow events during this period are subject to the following criteria: the pulse flow must be greater than the discharge from the powerhouse; BC Hydro shall schedule pulse flow events such that they will take place on the same two days of the week and not fall on a Saturday, Sunday or statutory holiday; and BC Hydro must make a public announcement of pulse flow events two weeks prior to commencement; and
 - iv. From October 1 to October 31, provide four pulse flow events which shall be a minimum of five days apart.
- c. The maximum rate of change of flow, increasing or decreasing, is 2.8 cubic metres per second per hour, when the flow is in the range 5.1 to 19.8 cubic metres per second. There is no maximum rate of change of flow, when the flow is greater than 19.8 cubic metres per second.

Lower Diversion Reach – Downstream from confluence with Browns

4. Within the diversion reach at the confluence of the Puntledge and Browns rivers a pulse flow for river-based recreation must be released when directed by the Comptroller of Water Rights. A pulse flow for river-based recreation is defined as being a minimum of 85 cubic metres per second, computed as the sum of the flow at the location of Water Survey of Canada gauge 08HB084 and the input of the Browns River, at the location of Water Survey of Canada gauge 08HB025 for a duration of at least 8 hours on two consecutive days between May 15 and June 15. Minor variations to these dates may be made if the change in timing is to accommodate scheduling the event on weekend days and there are no objections to the proposed dates.

POWERHOUSE

5. The Powerhouse must be operated such that the maximum rate of increase of flow, as measured at the location of Water Survey of Canada gauge 08HB006, is:
 - a. August 1 to September 30 for flows less than 21.3 cubic metres per second, as measured at the location of Water Survey Canada gauge 08HB006,
 - i. 2.8 cubic metres per second per hour when releases from powerhouse facilities are between 0 to 11.3 cubic metres per second;
 - ii. 8.5 cubic metres per second per hour when releases from powerhouse facilities are between 11.3 to 15.6 cubic metres per second;

- iii. There is no maximum rate of increase of discharge when releases from powerhouse facilities are greater than 15.6 cubic metres per second.
- b. October 1 to July 31 for flows less than 25.5 cubic metres per second, as measured at the Water Survey Canada gauge 08HB006,
 - i. 7.1 cubic metres per second per 15 minutes when releases from powerhouse facilities are less than 19.8 cubic metres per second,
 - ii. There is no maximum rate of increase of discharge when releases from powerhouse facilities are greater than 19.8 cubic metres per second.
- c. There is no maximum rate of reduction of discharge from the powerhouse.

REACH D: DOWNSTREAM FROM POWERHOUSE

- 6. In the lower reach of the Puntledge River downstream from the Powerhouse the flows, computed as the sum of the flow at the location of Water Survey of Canada gauge 08HB006 and the discharge from the Fisheries and Oceans Canada Lower Puntledge River Hatchery, shall be regulated such that:
 - a. The minimum flow, subject to (b), is:
 - i. 15.6 cubic metres per second as measured on a three day rolling average; and
 - ii. 15.1 cubic metres per second at all times.
 - b. If, based on historical inflows, the confidence level of providing 15.6 cubic metres per second drops below 95 per cent, the flow below the powerhouse shall be reduced to the extent necessary to provide a 95 per cent level of confidence of maintaining the reduced flow;
 - c. If, in accordance with the procedures set out above, the flow is reduced below 11.3 cubic metres per second BC Hydro shall notify the Comptroller of Water Rights, and include with that notification comments from Fisheries and Oceans Canada, the Ministry of Water, Land, and Air Protection with respect to continued operations; and
 - d. For the period of September 21 to December 31 any increase in discharge from the powerhouse that increases flow in the Puntledge River downstream from the Powerhouse above 15.6 cubic metres per second, up to 20.7 cubic metres per second, must be maintained for the remainder of that period, except for those flows which are required to bring the generating unit into service after an outage.

SCHEDULE B MONITORING PROGRAMS

- 1) BC Hydro shall within four months of the date of issue of this order develop terms of reference with a budget and proposed schedule for a monitoring program with the following objectives.
 - a) Puntledge River Adult Chinook and Steelhead Migration. This shall be a three year study which is to be completed within the first five years of the issuance of this order, undertaken to determine the effectiveness of the pulse flows ordered under Schedule A section 3.b in stimulating fish migration.
 - b) Puntledge River Spawning Habitat Incubation. This shall be a study of two years in duration undertaken to provide egg to fry survival information for the Puntledge River.
 - c) Puntledge River Steelhead Production. This shall be a study five years in duration which is undertaken to evaluate juvenile and adult Steelhead abundance and size-at-age growth information.
 - d) Puntledge River Reach C Ramping Rates and Stranding. This shall be a study of approximately one year duration which is undertaken to evaluate the effectiveness of the ramping rates ordered under Schedule A section 3.c in preventing and minimizing stranding of fish.
- 2) BC Hydro shall prepare the terms of reference for a cost-benefit study of the kayak pulse flow event. This shall be a study conducted in years when an order is issued for a kayak pulse flow event, which is undertaken to determine the economic costs and benefits of the kayak pulse flow.
- 3) Following review and acceptance in writing of the terms of reference developed in accordance with 1 and 2 above by the Comptroller of Water Rights the licensee shall undertake the monitoring program as directed.
- 4) BC Hydro shall prepare and submit to the Comptroller of Water Rights in the time period set out in the accepted terms of reference a report summarizing the data collected from the monitoring studies which provides the following:
 - a) How effective were the parameters and procedures ordered in Schedule A in providing the expected benefits;
 - b) A summary of deviations from the parameters and procedures, reasons for and the responses to those deviations; and
 - c) Recommendations for future changes to the parameters and procedures.

SCHEDULE C
WORKS AND DIVERSIONS IN LIEU OF OPERATIONAL CHANGES

1. WORKS

- (a) In lieu of more extensive regulation of the works authorized under Conditional Water Licences 120302 and 120301 in order to provide increased benefits to fish and fish habitat in the Puntledge River, BC Hydro shall in consultation with Fisheries and Oceans Canada and the Ministry of Water, Land and Air Protection, prepare and submit for approval to the Comptroller of Water Rights terms of reference for the placement and periodic maintenance of approximately 2000 square metres of spawning gravel in the Puntledge River.
- (b) On the direction of the Comptroller of Water Rights BC Hydro shall implement the gravel placement project.
- (c) BC Hydro shall report progress of the construction and effectiveness of the works provided as set out in the terms of reference for the project.

2. DIVERSIONS IN LIEU OF OPERATIONAL CHANGES

- (a) In lieu of more extensive regulation of the works authorized under Conditional Water Licences 120302 and 120301 in order to provide increased benefits to fish in the Puntledge River, BC Hydro shall permit Fisheries and Oceans Canada to divert water from the penstock to the Lower Puntledge River Hatchery in accordance with Table 1 up to a maximum of 0.85 cubic meters per second.

Table 1. Mean monthly Diversions from the Penstock to the Lower Puntledge River Hatchery.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Flow (m ³ /s)	0.40	0.42	0.57	0.57	0.74	0.14	0.14	0.48	0.57	0.57	0.48	0.34