



Province of British Columbia

Water Act

FINAL WATER LICENCE

BC Hydro and Power Authority is hereby authorized to divert and use water as follows:

- a) The stream on which the rights are granted is Alouette Lake reservoir.
- b) The point of diversion is PD43847, located as shown on the attached plan.
- c) The date from which this licence shall have precedence is September 9, 1909.
- d) The purpose for which this licence is issued is power, which is to be generated at the Alouette Generating Station.
- e) The maximum quantity of water which may be diverted in a year is 625.1 million cubic metres; and the maximum rate at which the water may be diverted is 19.82 cubic metres per second.
- f) Water may be diverted and used throughout the whole year.
- g) This licence is appurtenant to the undertaking of the British Columbia Hydro and Power Authority to generate and supply power from the Alouette Powerhouse situated on the Southwest 1/4 of Section 11, Township 5, Range 3, West 7th Meridian, New Westminster District.
- h) The works authorized are a dam, intake, tunnel, surge tank, adit and powerhouse as shown on the attached plan and ancillary works required for the operation of the dam and Alouette Generating Station.
- i) The licensee must operate the works authorized under h) above in accordance with an order of the Comptroller that:
 - i. Sets values for the parameters of: flow releases into Alouette River, reservoir elevations and ramp rates. The values for the parameters are to be based on the Alouette River Water Use Plan dated April 15, 2009 and any amendments to the Plan accepted by the Comptroller.

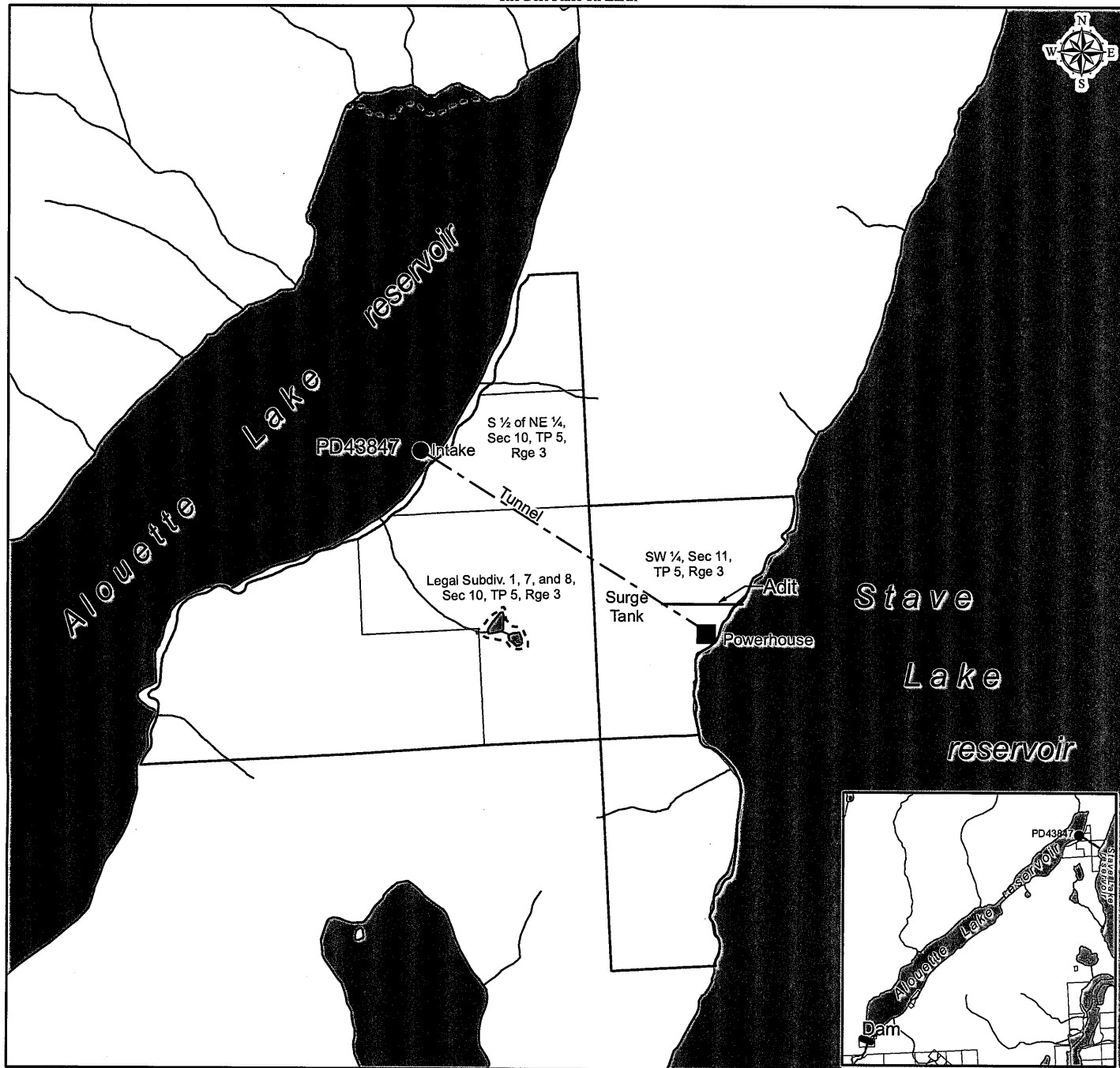
ii. Requires a monitoring programme to evaluate the effect of the regulation of the works as ordered in *i.* above. The monitoring programme is to be based on the Alouette River Water Use Plan dated April 15, 2009 and any amendments to the Plan accepted by the Comptroller.

j) This licence is issued in substitution of Final Water Licence 7147.



Pieter J. Bekker
Deputy Comptroller of Water Rights

File: 0045208 Date Issued: *April 20, 2009* Final Licence: 124725



WATER DISTRICT: NEW WESTMINSTER
 PRECINCT: PITT LAKE
 LAND DISTRICT: NEW WESTMINSTER

Signature: *W. B. Bell*
 Date: April 20, 2009

LEGEND

Scale: 1:20,000
 Point of Diversion: ●
 Map Number: 092G.039
 Tunnel: -----

F.L. 124725 for F.L. 7147
 File 0045208



Province of British Columbia

Water Act

Order
Water Act
Section 88

File No. 0087939, 0045208/Alouette

WHEREAS British Columbia Hydro and Power Authority (BC Hydro) is the operator of the Alouette Project hydroelectric system in respect of which it holds Final Water Licences 124724, 124725 and 124726;

WHEREAS the Alouette hydroelectric system has been regulated by an order dated October 3, 1997;

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

WHEREAS the licensee has submitted the Alouette Project Water Use Plan dated April 15, 2009 which recommends operational changes to the Alouette hydroelectric system with the intent of providing benefits to fisheries, recreation and flood mitigation;

WHEREAS the Alouette Project Water Use Plan has proposed a monitoring programme to determine whether operating the facility in accordance with the operating parameters and procedures in the Alouette Project Water Use Plan will provide the expected benefits; and

WHEREAS I have accepted the Alouette Project Water Use Plan dated April 15, 2009;

I HEREBY ORDER THAT:

1. The Section 39 order on Alouette River, dated October 3, 1997, is hereby revoked.

Fish Flow Releases

2. The licensee shall provide a minimum flow release into the Alouette River, to enhance downstream fisheries habitat, by setting the low level outlet to its fully open position at all times. If a flow greater than 3.0 cubic metres per second is being provided by either the crest gate or free crest weir, the low level outlet may be closed.
3. From April 15 to June 14, the licensee shall provide a minimum crest gate release of 3.0 cubic metres per second to assist in out migration of kokanee while maintaining the reservoir at a minimum level of 121.85 metres measured at the dam using the Geodetic Survey of Canada (GSC) datum.
4. To further assist in out migration of kokanee the licensee shall provide a pulse flow of between 6.0 and 9.0 cubic metres per second from the crest gate continuously for a period of 7 days between April 15 and June 14 for four out of every eight years.

Storage and Recreation

5. From June 15 to July 15 the reservoir will be operated at or above an elevation of 122.00 metres GSC for recreation.
6. From July 16 to September 5 the reservoir will be operated at or above an elevation of 122.50 metres GSC for recreation.
7. From September 6 to September 15 the reservoir will be operated at or above an elevation of 121.25 metres GSC for recreation.

Flood Mitigation

8. When the reservoir level exceeds 122.60 metres GSC between October 1 and March 31, or 124.70 metres GSC between April 1 and September 30, the licensee shall open the adit gate to manage the flood buffer, up to the capacity of the power tunnel.
9. When the reservoir elevations are between 124.70 metres and 125.87 metres GSC, the licensee shall keep the adit gate fully open, and adjust the crest gate to allow a total discharge from the crest gate and the free crest weir of between 31.9 and 53.1 cubic metres per second.
10. When the reservoir level is greater than 125.87 metres GSC, the licensee shall close the crest gate, leave the adit gate fully open, and manage the reservoir level using the free crest weir.
11. In order to satisfy clauses 8, 9, and 10 above, changes to the adit gate or crest gate must be initiated within 24 hours.

Ramp Rates

12. For public safety, ramp up rates at the crest gate will not exceed 6.3 cubic metres per second every 40 minutes.
13. To prevent fish stranding, ramp down rates from the reservoir will be such that the plunge pool stage elevation does not decrease by more than 0.05 metres every hour.
14. Ramp rates in 12 and 13 do not apply when the licensee is free spilling over the free crest weir or when flows as measured in the vicinity of WSC gauge #08MH005 on the Alouette River exceed 25.0 cubic metres per second.

Priorities

15. If the requirements in this order cannot simultaneously be met, the licensee shall give priority first to flood mitigation, then ramp rates, then fish flow releases, and then storage and recreation.

Monitoring

16. The licensee shall submit, within 6 months of the date of this Order, for approval by the Comptroller, terms of reference for the following monitoring studies:
 - a) Enumerate smolts in Alouette River to measure effectiveness of the minimum flow release;
 - b) Monitor out-migration of kokanee to measure effectiveness of the spring surface release (clause 3) and pulse flows (clause 4);
 - c) Assess quality of substrate in Alouette River to determine whether flushing flows are necessary;
 - d) Enumerate adult sockeye returns to the Alouette River;
 - e) Monitor temperature of water in Alouette River to determine effect of flow regime;
 - f) Kokanee age structure study to determine whether recruitment in Alouette Lake reservoir is limited; and
 - g) Non-intrusive monitoring of archaeological sites in the drawdown zone of Alouette Lake reservoir and in the Alouette River.

17. Upon receiving, from the Comptroller, approval of the above terms of reference and leave to commence, the licensee shall:
- a) Implement the effectiveness monitoring programmes in accordance with the approved terms of reference; and
 - b) Submit annual reports before June 1 of each year to the Comptroller of Water Rights on the results of the approved studies and monitoring until the conclusion of the programmes as specified in each terms of reference.
18. With respect to the maintenance and provision of records the licensee must:
- a) Keep records of
 - i) elevations of Alouette Lake reservoir;
 - ii) flow release from the low level outlet, crest gate and free crest weir;
 - iii) plunge pool stage elevation during crest gate operations;
 - iv) total flow release into Alouette River;
 - v) generation discharge from Alouette Generation Station;
 - vi) diversion flows through the adit; and
 - vii) annual cumulative volume diverted from Alouette Lake reservoir to Stave Lake reservoir associated with Final Water Licences 124724 and 124725, and annual cumulative volume diverted through the adit.
 - 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; and
 - c) Provide on request of the Comptroller of Water Rights records collected under 18a).
19. The licensee may operate the works in an alternate manner in the event of an emergency, dam safety requirement, or an extreme hydrological event.

20. All emergency operations or other deviations from operations ordered above shall be reported to the Comptroller of Water Rights in a timely manner.

Dated at Victoria, B.C., this 20th day of April, 2009.



Pieter Bekker
Deputy Comptroller of Water Rights