



## ABSTRACT

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### **Abstract :**

This report summarizes the results of the hydrodynamics and winter regime monitoring of La Grande Rivière between the Robert-Bourassa reservoir and its estuary in the James Bay, in order to comply with La Grande-2-A and La Grande-1 authorisation certificates issued in 1987 and 1988.

The natural flow conditions of the La Grande River ended in November 1978, when the filling of the Robert-Bourassa reservoir began. Progressive commissioning of the La Grande-1 generating station followed, and the reference period spans from 1985 to September 1991, the later date corresponding with the commissioning of the first generator of the La Grande-2-A station. The monitoring of the river regime since the complete commissioning (1995) and comparison with the reference period allowed to characterise the main impacts with regards to flows, water levels and velocities, water temperatures and ice conditions.

The main impacts of the La Grande complex were observed as soon as the Phase 1 project was completed, and the commissioning of the La Grande-2-A and La Grande-1 stations resulted in minor adjustments. The long-term river discharge reflects the natural runoff from the watershed and remained unchanged. The flow was however increased during the winter period, and reduced during the ice-free season. Larger installed capacities allowed reaching, occasionally, the maximum 5 950 m<sup>3</sup>/s flows envisioned during the preliminary studies. The commissioning of the La Grande-1 generating station resulted in larger short-term flow variations in its downstream reach.

The ice covers proved to be able to sustain large flow variations without failing, and the water temperature issued from La Grande-1 is the main factor controlling the ice-cover extend. The leading edge of the cover, downstream of La Grande 1, as well as freeze-up and break-up dates, was not significantly affected and remained close to their Phase-1 values.

**Key words :**

La Grande complex, Robert-Bourassa reservoir, La Grande-1 reservoir, La Grande River La Grande-1 Generating Station, La Grande-2-A Generating Station, monitoring, hydrometry, hydrology, hydraulics, discharges, water levels, water temperature, winter and ice conditions

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