Portland Creek Development – Final Feasibility Study, p. B-7, $796,000

Q. Please provide a summary of the results of the 1987 pre-feasibility report.

A. In 1987, a pre-feasibility study of the Portland Creek Hydroelectric Development was carried out by SNC/BAE Joint Venture for Hydro. It included hydrological analysis, site arrangements, aerial photo interpretation, preliminary site survey and mapping, access road routes, reconnaissance surveys, preliminary design, a construction schedule and cost estimates.

The proposed Portland Creek project is located on the west coast of the Great Northern Peninsula near Daniel's Harbour. It is located on a major westerly flowing tributary, locally known as Main Port Brook, which joins Portland Creek 3 km upstream of its mouth on Inner Pond. Main Port Brook drains east to west and has a total drainage area of 65 km^2. A further 43 km^2 of drainage is available from the diversion of an adjacent basin. The powerhouse is located at the confluence of Main Port Brook and Portland Creek. (See the attached map of the development area.)

Three relatively small concrete gravity dams are required consisting of diversion, storage and head pond dams. The diversion dam has a maximum height of 12 m and a length of 110 m. The storage dam has a maximum height of 23 m and a length of 110 m and the headpond dam has a height of 10 m and a length of 115 m. The construction and operation of the reservoir will raise the existing water level in the storage pond 20 m and in the head pond 10 m.

The penstock from the headpond to the powerhouse consists of a 1.1 m steel conduit 2840 m in length supported by steel saddles on concrete bases. The storage dam is located 1 km west of the headpond dam and the small diversion dam and canal is located approximately 3 km to the south of the headpond dam. The powerhouse will contain a single 12.1 MW horizontal shaft synchronous generator driven by a 12,600 kW Pelton Twin Jet turbine. Permanent access to the project site would be from the Great Northern Peninsula highway near Daniel's Harbour over 6 km of existing forest access road and 20 km of new access road through difficult terrain. Secondary access roads totaling 10 km will connect the powerhouse to the dams. The total duration of on-site construction for this project is estimated to be 32 months. A 27 km, 69 kV transmission line following the access road and connecting to the existing grid at Daniel's Harbour would interconnect the development to the main Island grid and deliver power and energy from the site.

The mean annual flow at the intake is 4.45 m^3/s with an average net head of 375 m. Assuming an average turbine/generator efficiency of 86 %, the annual average and firm energy output of the development is estimated to be 89.8 GWh and 84.1 GWh, respectively.

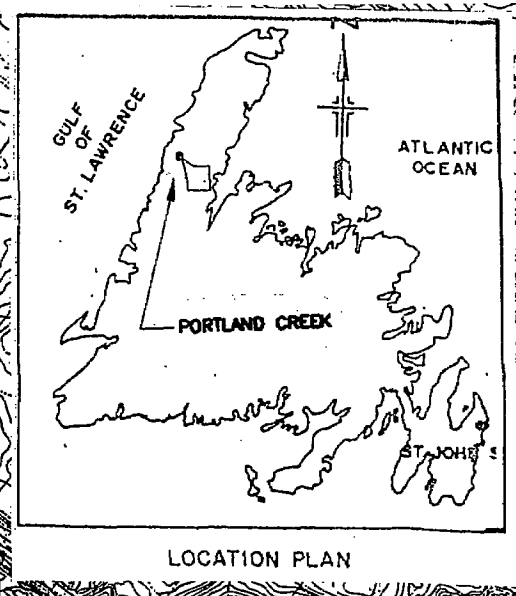
Portland Creek is a scheduled salmon river, however fish access to Main Port Brook, the tributary to be developed, is obstructed at its mouth by the brook's steep slope. The stream proposed to be diverted is similarly obstructed.

The report confirmed the technical feasibility of the project and the following advantages were noted:

- A large component of firm energy due to the availability of upstream storage;
- Further possible cost savings, in the next study stage, brought about by combining the storage and intake (headpond) dam;
- Voltage support for the Great Northern Peninsula transmission line;
- Providing the possibility of peaking capacity using this plant; and
- Opening of the area so that other potential hydroelectric projects could share access and transmission.

The 1987 report recommended that:

- The project be included in Hydro's system development plans in order to determine the best timing for future studies;
- Detailed feasibility study be carried out, in order to optimize the design features; and
- For this study, no allowance was made for the value of capacity. As a result, the plant capacity factors are higher than usual and therefore the use of the plant for peaking should be examined.



LOCATION PLAN

STORAGE CONTROL DAM

HEADPOND DAM

DIVERSION DAM

POWERHOUSE

LAKE A

LAKE B

LAKE C

P O N D

INNER

Portland Creek Pond

1000 0 1000 2000 3000 m

LEGEND

- PROPOSED ACCESS ROAD
- POWERHOUSE
- DAM
- PENSTOCK / CANAL
- TRANSMISSION LINE

HYDRO
NEWFOUNDLAND AND LABRADOR HYDRO

1987 SMALL HYDRO STUDIES
ISLAND OF NEWFOUNDLAND

SNC - BAE JOINT VENTURE

PREFEASIBILITY STUDY
PORTLAND CREEK
ACCESS AND TRANSMISSION LINE ROUTE

DATE DEC. 1987 | FIGURE NO. 5.1