FEDERAL INVOLVEMENT IN HYDROELECTRIC DEVELOPMENT

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Department of the Environment
Water Planning and Management Branch
Socio-economic Division
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Foreword

Except for its crown corporation, the Northern Canada Power Commission, and ownership of several small hydroelectric plants in southern Canada by federal agencies, the Government of Canada does not directly own or operate hydro plant capacity.

It would be a mistake to assume no federal involvement in hydroelectric production, however, when in fact it has considerable proprietary and jurisdictional responsibility throughout the country in water resources and water power development and in related environmental issues. Its mandate in regard to hydroelectric power springs from its powers and duties defined in major legislation such as the Constitution Act, 1983; the Boundary Waters Treaty, 1909; the International River Improvements Act, 1955; the Dominion Water Power Act and Regulations, 1954; the Northern Inland Waters Act, 1972; and the Fisheries Act, 1970. Through them, the Government of Canada is able to exercise important influence over the course of hydro power projects when it is in the national interest to do.

To illustrate current involvement the following report provides brief details of some recent hydroelectric-related issues and programs in which departments and agencies of the federal government have been involved.

Reference to on-going operation of small federally-owned hydro plants or to Northern Canada Power Corporation, which is empowered to plan, construct and manage commercial public utilities (mainly electrical) in the Northwest Territories and Yukon Territory, has been purposely excluded.

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PROJECT NO. 1. NATIONAL HYDRO INVENTORY PROGRAM

Background:

The national hydro inventory program involves a cooperative effort by federal departments of Energy, Mines and Resources and of Environment on computerization and collection of environmental and economic data on developable hydroelectric sites. The inventory, based on data held by the sponsoring departments, includes both small (up to 20 MW) and large sites, and covers both existing and potential development. The program will include data by site, location, size, plus other engineering, environmental, and economic values. A complete data system developed by Energy, Mines and Resources under a format jointly established by D.O.E. and E.M.R., is now undergoing system testing.

Cooperation has been maintained with provincial power agencies.

Federal Interest:

Although lists of known undeveloped hydroelectric sites have been compiled for most provinces, no Canada-wide survey of all sites has been conducted. Having a complete inventory would assist the government in assessing the extent and use of the national hydroelectric resources, and in better formulating policies directed toward development of hydro and other primary energy.

Contact:

Federal departments of Environment (Inland Waters Directorate); and Energy, Mines and Resources (Electrical Energy Branch).

PROJECT NO. 2. SMALL HYDRO SUPPORT

Background:

Most provinces and both territories are assessing small hydro potential, and finding economically viable prospects for expansion of existing small plants, or the retrofit of elderly, decommissioned units within power grids. New small-hydro sites, however, have a relatively high per-unit development cost.

Demonstration projects for small hydro and other initiatives, with costs shared between private initiators, federal and provincial-territorial governments, are supported through Conservation and Renewable Energy Demonstration Agreements (CREDA) and similar arrangements initiated by the federal Department of Energy, Mines and Resources up to March, 1985. Federal contributions were made to eighteen new or recommissioned hydro facilities of size .2 to 2,500 kW. A four-year replacement program, ENERDEMO, an $80 million conservation and alternative energy demonstration program, was designed. Activity under federal and provincial-territorial agreements was reinitiated to run to 1989.

Small-size hydro development also has been supported by the Remote Community Demonstration Program (RCDP) designed to run from 1984 to 1989. This two phase program is intended to meet the energy problems of some 400 isolated communities outside integrated electrical or gas systems, covers small hydro and other non-oil applications. Phase I involves financial aid for study of off-oil options and Phase II provides funds for selected, economically feasible energy supply and conservation projects.

Federal Interest:

Promote national interest in security of energy supply by encouraging use of indigenous energy in place of imported oil products.

Contact:

Federal Department of Energy, Mines and Resources.

PROJECT NO. 3. ALTERNATE HYDRAULIC ENERGY

Background:

Ocean energy in the form of salinity gradients are renewable energy sources of international interest that were the subject of research and development in Canada until early in 1985. Wave energy, involved in a research and development project with the International Energy Agency, has been discarded in the Canadian context as being a too-costly, long-range, and discontinuous source. A prototype generator which extracts energy from salinity gradients by reverse electrodialysis has been developed by Retech, a British Columbia company. The 6-watt model developed was funded by the federal Department of Fisheries and Oceans.

In regard to river current energy, development of a vertical axis hydraulic turbine (VAHT) was carried out for several years up to 1985 by National Research Council (Ottawa). VAHTs are based on windmill hydrofoil technology, and models of a 0.8 m diameter ratio with 3-5 vertical symmetrical hydrobails have been tested in Canada. A prototype ducted free-stream VAHT was installed at Cornwall and hooked to an electric grid. Efficiency of 34 percent was attained, and tested without duct, VHT efficiency of 33 percent was reached. Generator efficiencies were 48 percent and 61 percent respectively, and 2.5 kW of electrical power was delivered.

Federal Interest:

Research and development of alternate energy forms.

Contact:

Federal departments of Energy, Mines and Resources, Fisheries and Oceans.

PROJECT NO. 4. SAFETY OF DAMS

Background:

Presently, some 57 percent of total electric capacity in Canada comes from hydroelectric plants associated with dams. No dam failures have been reported in Canada. Although at the federal level there is no specific legislation requiring inspection of dams, there exists federal legislation that is relevant to dams and dam safety. The Navigable Waters Protection Act, for example, requires that works be built and maintained in accordance with the plans which have earlier been approved by the Minister. The International River Improvements Act of 1955 similarly reserves the right of the Governor-in-Council to order the removal or destruction of any improvement constructed, operated or maintained in violation of the Act. The Dominion Water Power Act of 1954 provides for free access to works by the Minister or his appointee to ascertain their condition.

Other legislation exists across Canada to enforce the implementation of comprehensive dam safety and surveillance programs at the provincial/territorial and local level. Currently, Alberta is the only province having legislation covering dam safety specifically under the Alberta Water Resources Act (O.C. 1033/78) Dam and Canal Safety Regulation (351/78). The province of British Columbia probably has the most extensive dam safety program followed by the high standard of on-going inspection, monitoring and re-evaluation by the larger provincial power utilities. B.C. Hydro, for example, as part of the dam safety program has just replaced the 56-year-old Alouette Dam with a new earth-fill one, and is upgrading the 70-year old Coquitlam Dam.

Like other owners of Canadian dams, federal agencies and departments have prime responsibility for their soundness. For example, the Prairie Farm Rehabilitation Administration has an extensive federal dam safety inspection program, but this relates only to dams used primarily for agricultural-irrigation purposes.

Federal Interest:

Other than as a proprietor, it appears unlikely that the federal level will operate a national program for dam safety. In the event of a dam failure, the Emergency Planning Canada would support the provincial health agents if requested to do so, as would occur in any other type of emergency.

Contact:

Federal departments of Indian and Northern Affairs; Environment; Public Works; and Transport.

PROJECT NO. 5. FISHERIES AND HYDRO DEVELOPMENT

Background:

Due to its responsibility under the Fisheries Act (1970) for the regulation of Canadian fisheries waters, the protection of fish and fish habitat, the federal Department of Fisheries and Oceans has a strong interest in hydroelectric developments throughout Canada. "Canadian fisheries waters" means to all waters in the fishing zones, the territorial waters, and all internal waters of Canada. The Fisheries Act particularly refers to the safe passage of fish at man-made obstructions and the provision of sufficient water in the riverbed below a dam for the safety of fish and the flooding of spawning grounds.

Federal Interest:

The federal government acts to carry out its jurisdictional responsibilities in regard to conservation of fisheries.

Contact:

Federal Department of Fisheries and Oceans.

PROJECT NO. 6. LOW-HEAD POWER PROJECT, ANNAPOLIS RIVER

Background:

A cooperative federal-provincial low-head power project, the 20-MW "Straflo" unit on the Annapolis River was commissioned in 1984. Sponsored by the federal and provincial governments, the unit was built by Nova Scotia Power Corporation for the Tidal Power Corporation, using a modified low-head European design with a tube turbine. It is the largest installation ever built of the type, and will determine the feasibility of using similar designs for the proposed Fundy tidal project and in low-head river installations. Presently, a post operational assessment is under way.

Federal Interest:

Energy, Mines and Resources, the lead federal agency, and associated departments, have set up a project committee. The objectives are to reduce importation of oil in to the Atlantic Region, to prove the Straflo unit is capable of cost savings and has wider Canadian applicability, and to encourage the building of large Straflo hydraulic units here for possible export. An interdepartmental committee has been set up.

Contact:

Federal departments of Energy, Mines and Resources, Environment and Regional Industrial Expansion.

PROJECT NO. PROJECT NO. 7. IDENTIFICATION OF SMALL-SCALE HYDRO SITES, ATLANTIC CANADA

Project Description and Background:

Under the joint sponsorship of federal department of Environment, Energy, Mines and Resources, and Supply and Services, consultant Monenco Limited completed two-volume report of Phase I of "Identification of Environmentally Compatible Small-Scale Hydroelectric Projects in Atlantic Canada". (January, 1984). For hydro sites in the 1-20 MW range in New Brunswick and about 0.25 MW size in Prince Edward Island, the assessment provided locational, economic and engineering data of a preliminary nature, identifying locations for future detailed feasibility analysis and possible development. The study included a review of suitable small-hydro conventional turbine types, as well as of off-shelf control and governing features.

Federal Interest:

The study filled a gap in knowledge of hydro sites in the region, and advanced the cause of indigenous energy considerations for replacement of imported oil to an energy-short area.

Contact:

Federal departments of Energy, Mines and Resources (Electrical Energy Branch); and Environment (Water Planning and Management Branch).

PROJECT NO. 8. BAY OF FUNDY TIDAL POWER

Background:

A 1982 update by Shawinigan Engineering on the proposed Bay of Fundy tidal power project was done for the Tidal Power Corporation, an agency of the Nova Scotia Government. Funded under a Canada-Nova Scotia agreement, the study concluded that the project would be economically viable at the then existing cost of alternative power if much of the power output is exported to the northeastern United States. A 20 MW pilot generating station is in operation on the Annapolis River, and testing has begun.

The proposed project will have transboundary effects impacting on the states of Maine and Massachusetts, such as disruption of tidal regimes and flooding in the estuarine area along the New England coast. For this reason, a United States Senate Committee held hearings in 1983, and $10 million for study of project environmental effects has been provided to United States Army Corps of Engineers. Canada has assured the United States Government that an impact assessment will precede any project undertaking.

Federal Interest:

Support on indigenous, non-oil energy project in a presently energy-short region.

Contact:

Federal Department of Energy, Mines and Resources.

PROJECT NO. 9. GRAND FALLS, NEW BRUNSWICK, REDEVELOPMENT

Background:

A proposed redevelopment of the 56-year-old, 66-MW Grand Falls, N.B. hydroelectric plant, has raised transboundary concerns. The environment of the headpond involves international water. If the dam elevation is raised, flooding of mainly agricultural land could occur in the state of Maine. Routine water quality monitoring is under way. If the project proceeds, a reference will probably be made to the International Joint Commission.

Federal Interest:

International water impacts are involved in a Canadian development.

Contact:

New Brunswick Electric Power Commission; federal departments of Environment, and External Affairs.

PROJECT NO. 10. HYDROLOGIC METHODOLOGIES FOR SMALL HYDRO ASSESSMENT

Background:

A two-phase research and development project under the federal Energy R&D program was initiated in 1983 to develop hydrologic methodologies for determination of design flow and flood magnitudes at ungauged small-scale hydro sites.

Phase I, completed in 1984, provides methodologies for prefeasibility site screening for 13 hydrologic regions throughout Canada, by which hydrologic characteristics are determined from basic data off published topographic maps and from climatic information. Phase II will develop refined hydrologic methodologies applicable for feasibility studies, and will focus on regions with a high small-hydro potential. The first stage of the phase II study for the Atlantic Region is expected to be completed in early 1985.

Federal Interest:

Environment Canada is responsible for this project as part of its water research mandate. The federal Department of Energy, Mines and Resources provided funding under its non conventional energy supply encouragement goal.

Contact:

Federal departments of Environment, (Inland Waters Directorate) and of Energy, Mines and Resources.

PROJECT NO. 11. LINCOLN SCHOOL HYDROELECTRIC PROPOSAL

Background:

The Lincoln School hydroelectric project replaces the previous Dickey Dam-Lincoln School hydroelectric proposal, which has been deauthorized. The new project involves a run-of-river hydro plant. A 1984 report by United States authorities assessing the project, has concluded that the new proposal is not presently feasible, and it has been shelved. The project likely would have had minor transboundary effects in the province of New Brunswick, such as siltation and turbidity during construction.

Federal Interest:

A consultative committee involving federal-provincial and United States participation is following development with a view to determination of possible transboundary enviromental concerns.

Contact:

Federal Department of Environment, New Brunswick Department of Environment.

PROJECT NO. 12. GEORGIA-PACIFIC CORPORATION DAMS

Background:

The United States-owned Georgia-Pacific Corporation has hydroelectric dams on the St. Croix River at Woodland and Grand Falls in Maine, which in 1984 were up for re-licensing for 50 years by the United States Federal Energy Commission. The hydro development impacts adversely on New Brunswick, and damages long-range efforts to re-introduce salmon into the St. Croix, by obstructing migratory routes and through turbine mortality of smolts. The corporate owner of the dams is examining alternative downstream migration paths, although fisheries scientists do not believe action presently is necessary.

Federal Interest:

Input was made to the licensing process.

Contact:

Federal Department of Fisheries and Oceans.

PROJECT NO. 13. LEWISTON. (N.Y.) POWER PLANT EXPANSION AND NIAGARA TREATY

Background:

Expansion of the Lewiston, New York, hydro station on the Niagara River, beginning in 1986, could adversely affect levels and flows in the Niagara River during and after construction. Increased capacity could result in increased water transfers to the United States because of an arrangement between Ontario Hydro and New York Power Authority, by which Canada's water entitlement may be dispatched to the United States to maximize energy production. This would affect Quebec and Ontario.

The project involves disturbing a former chemical plant site. Studies and water quality sampling to identify contaminants and remedial action are to be undertaken by New York Power Authority, and steps to address contamination have been referred to in its application to the United States Federal Energy Regulatory Commission.

Power expansion also could lead to pressure to reduce treaty flows over Niagara Falls and greater diversion to the United States. This would affect the spectacle of the Falls and associated scenic areas. Current United States studies have examined possible diversions, and informal inquiries have been received in Canada regarding treaty flows at Niagara.

Federal Interest:

An international water basin is involved, with revision to the Niagara Treaty possible. Canadian agencies are pondering Canadian interests and position regarding Niagara waters.

Contact:

New York Power Authority.

PROJECT NO. 14. NORTH TROY HYDRO PROPOSAL

Background:

A proposed hydroelectric development at North Troy, Vermont on the Champlain-Richelieu River will have adverse environmental effects on Quebec due to low flow releases during ponding, as well as impacts during construction. To date, an application has been filed with Vermont Agency for Environmental Conservation by the owner, Vermont Public Power Supply Authority.

Federal Interest:

Concern over environmental effects of development on a boundary water body fall within the national sphere.

Contact:

Federal Department of Environment.

PROJECT NO. 15: ST. LAWRENCE SEAWAY AND POWER PLANTS

Background:

The St. Regis Mohawk Indians complained to the International Joint Commission that the construction and operation of the international St. Lawrence Seaway and flow fluctuations to meet power demands on Canadian and United States power plants have impacted adversely on their lands.

The international St. Lawrence River Board of Control has concluded that no harm has occurred to Indian lands. In 1983, the I.J.C. approved an addendum to the guide to regulation (Plan 1958D) permitting peaking and ponding conditionally, and requiring review by I.J.C. every five years.

Federal Interest:

The Canadian government has jurisdiction over navigation and is part-owner of the Seaway, as well as being represented on the International Joint Commission and its control boards. It also has responsibility for Indian affairs and developments on international waterways.

Contact:

International Joint Commission, federal Department of Transport (St. Lawrence Seaway).

PROJECT NO. 16. REHABILITATION OF RIDEAU FALLS HYDRO STATION

Background:

The Rideau Falls rehabilitation proposal involves a rental lease from Public Works Canada of their 76-year old small-hydro site for redevelopment into a modern plant to generate electric power. Gananoque Light and Power, a privately owned utility, has been approved by Treasury Board as the lessee, and the company is presently finalizing a proposal for negotiation.

Construction may begin in 1985. Location of the plant is in a National Capital Commission park on the eastern side of East Falls, on the Rideau River near Green Island. Power would be sold to Ontario Hydro.

Federal Interest:

The project would provide a demonstration of federal interest in small hydro development.

Contact:

Federal Department of Public Works (Engineering Resources, National Capital), Gananoque Light and Power.

PROJECT NO. 17. GREAT LAKES MANAGEMENT

Background:

The International Great Lakes have had some regulation of their levels by agreement since the 1920s in Lake Superior and the late 1950s in Lake Ontario. Periodically, the regime of regulation has been studies and changed. The lakes, being boundary waters, come under the Boundary Waters Treaty and the auspices of the International Joint Commission.

There are several issues involving the hydroelectric power and other water applications in the Great Lakes Basin. The International Joint Commission reported to governments concerned in January 1984 on results of a four-year study of effects of level regulation in Lake Erie on hydroelectric production, navigation and shoreline flooding elsewhere in the basin. The final report recommended against regulation because costs exceeded benefits.

In connection with water diversions from the Great Lakes, in February 1985, eight Great Lakes states and Quebec signed a non-binding charter to confine Great Lakes water use to the basin. Ontario did not sign.

At Long Lac and Ogoki, diversions of Hudson Bay basin water into Lake Superior was agreed to in 1940 by Canada and United States, increasing water supply levels and outflows for Quebec, Ontario and Great Lakes states. Canada has exclusive use of diverted water by bilateral arrangement, but is credited with only 5,000 cfs at Niagara for power purposes, although diversions are usually greater. The Ontario Ministry of Natural Resources wants full use of diverted water at Sault Ste. Marie, and has asked Department of External Affairs to open discussions with the United States State Department. There is also other potential for diversions of Canadian northern waters to the Great Lakes for power purposes.

A board of inquiry reporting to I.J.C. on Canada and United States consumptive water uses and the effects on hydro-electric generation, navigation and recreation, resulted in a recommendation of periodic monitoring of consumptive use effects. An I.J.C. report to governments concerned will be submitted in 1985.

Federal Interest:

The Government of Canada is represented on the International Joint Commission and its boards, and exercises its jurisdictional responsibility in matters regarding international waters.

Contact:

Federal Departments of Environment, Public Works, and Transport are involved in Great Lakes issues. The departments provide staff to carry out studies and to serve boards and committees involved with the Great Lakes problems.

PROJECT NO. 18. LAKE OF THE WOODS CONVENTION AND PROTOCOL

Background:

The historic Lake of the Woods Convention and Protocol of 1925, signed by Canada and United States, was the result of an International Joint Commission reference. It provided for flow regulation from the lake and establishment of permanent Canadian and international Boards of Control to oversee the undertaking. The establishment of the Canadian Board was an early example of cooperative federal provincial water management involving Ottawa, Ontario and Manitoba.

Over the intervening years, the water interests issues changed from concern for high water level damage and navigation needs, to include power development, particularly in Manitoba's Winnipeg River. After 1930, natural resources ownership and administration were returned to the western provinces. At that time, storage costs for the lake were assigned one-third to Canadian navigational interest, and two-thirds to Ontario's and Manitoba's power generation accounts.

In later years the concerns have become more environmentally oriented - destruction by erosion of sand islands; tourist resort development; declining fish populations due to improper levels affecting spawning beds; and demands of Indians, under aboriginal rights, for the control of water levels to optimize wild rice production. The latter problem may be the subject of serious consideration in the near future.

Federal Interest:

The federal level has responsibility for issues involving boundary waters.

Contact:

Canadian Lake of the Woods Control Board.

PROJECT NO. 19. SLAVE RIVER PROPOSAL

Background:

In June 1982, a Steering Committee under an Alberta Government directive, released the Slave River Hydro Feasibility Study, which found large scale development economically viable. The preliminary stages considered dam sites between Fitzgerald and Fort Smith, with detailed evaluation concentrated on Site 4 south of Fort Smith on the Alberta-Northwest Territories border. An 1850 MW $8 billion project is presently being considered. The development would affect federal, provincial and territorial water interests, with possible effects on whooping crane nests on wetlands and bison migrations in Wood Buffalo National Park, white pelican at Smith Rapids, muskrat, beaver, fish, and native people's sustenance. The project also would involve exports of power initially.

Presently, a management committee is involved in a pre-investment phase. Participants include Alberta Department of Utilities and Telecommunications, Alberta Power Limited and Tranalta Utilities Corporation.

Federal Interest:

Two federal departments, Environment and Fisheries and Oceans have membership on several federal-provincial-territorial committees involved with Slave River technical and environmental studies. The groups include a hydrology advisory committee, a fish and wildlife committee and a hydrology sub-committee of the Peace-Athabasca Delta Implementation Committee. Services include scientific information exchange under federal-provincial agreement, monitoring of flows, and operation of a hydrodynamic model to assess impacts on the Peace-Athabasca Delta of various dam alternative characteristics and operating patterns.

Contact:

Hydrology technical group, R. Deeprose, Alberta Environment; Peace-Athabasca Delta Implementation Committee, M. Kowalchuk, Inland Waters Directorate, Regina; Slave River Project, C. Primus, Alberta Environment.

PROJECT NO. 20. STIKINE-ISKUT HYDRO PROPOSAL

Background:

Environmental and engineering studies of potential hydro development in the 21st century are being conducted by B.C. Hydro on the Stikine-Iskut rivers. The development could impact in several ways on Alaska. In addition to water quality and quantity, fisheries and navigation concerns, there is conflict with a United States wilderness designation for the Stikine-Leconte area. Ratified in 1981, consultation with Canada on access to the Stikine region is required, as well as a report to Congress by December, 1985. The United States has received Canadian access requirements and is conducting studies.

Presently, British Columbia and Alaska are cooperating on information exchange with federal participation. A joint federal-provincial preliminary environmental assessment, begun in 1984, will contribute to Canada's discussions with the United States State Department on Canadian access to the Alaskan Panhandle in connection with Stikine development. The External Affairs Department is preparing a Canadian perspective on access, based in part on preliminary environmental study of seven possible corridors to the sea done by B.C. Environment, Environment Canada and Department of Fisheries and Oceans.

Federal Interest:

The B.C. Department involves international relations and requires federal and foreign approvals and support. Certification is required under the International Rivers Improvement Act, administered by federal Department of Environment.

Contact:

B.C. Ministry of Environment; federal departments of External Affairs, Environment.

PROJECT NO. 21. SKAGIT VALLEY FLOODING

Background:

The state of Washington's utility, Seattle City Light, has long proposed to increase generating capacity by raising Ross Dam on the Skagit River, flooding 2,020 hectares of valuable land in British Columbia. The International Joint Commission first approved the project during World War II, and in 1967 the B.C. government signed a 99-year lease with flood rights. The I.J.C. Order was reviewed on request in 1983.

In April 1983, Seattle City and B.C. agreed in principle to an 80-year agreement providing that B.C. supplies the utility with up to 300 MW (330 gwH) of mainly peaking power, equivalent to that of increased generation at Ross Dam, from year 1986-2066. In return, payment of $21.8 million will be made annually for the first 35 years, the cost equivalent of raising Ross Dam. The allotment also includes an environmental endowment for the Skagit-Ross Dam area and permission for B.C. to raise Seven-Mile Dam on Pend d'Oreille River and to flood a small area over the international boundary.

Federal Interest:

A Canadian-B.C. Agreement to implement the B.C.-Seattle Agreement was signed in October 1984, following a formal Canada-United States treaty signed in April 1984, and proclamation of the federal Skagit Valley Treat Implementation Act.

Contact:

Federal Department of External Affairs.

PROJECT NO. 22. CANAL FLATS DIVERSION

Background:

B.C. Hydro has under study plans for a diversion at Canal Flats from the Kootenay River into the international Columbia River and then into Mica Reservoir, in order to increase generation at Mica and Revelstoke hydroelectric plants. The right to divert is allowed after September, 1984 under the Columbia River Treaty. It would affect the States of Idaho and Montana, and would result in lower power generation at Libby as well as less dilution of nutrients and pollutants. Additional study needs have been deferred, since development is unlikely for another decade.

Federal Interest:

Project has environmental and economic implications of a transboundary nature on the Columbia River.

Contact:

B.C. Hydro.

PROJECT NO. 23. SIMILKAMEEN HYDRO PROPOSAL

Background:

A proposed hydroelectric development in the state of Washington on the international Similkameen River, may impact on British Columbia by affecting flows at the boundary. The United States Army Corps of Engineers is carrying out preliminary design and environmental studies, and public hearings are planned for 1985.

Federal Interest:

Possible Canadian impacts in a boundary river basin from a United States development.

Contact:

Federal Department of Environment.

PROJECT NO. 24. COLUMBIA RIVER TREATY

Background:

The Columbia River Treaty, signed in Washington, D.C. in 1961 and approved by Canadian Parliament in 1964, lead to cooperative development of the international Columbia River and establishment of a two-nation permanent engineering board. The treaty provided for construction of three dams in British Columbia, and for Canada-United States sharing in added power benefits created downstream in United States through regulation. Since then, a number of dams and hydro plants have been constructed on schedule, including B.C.'s Revelstoke dam and 1,843 MW hydro plant. Future Canadian projects under terms of the treaty include diversion of the Kootenay River at Canal Flats and construction of the Murphy Creek hydro plant some time in the 1990's.

Federal Interest:

In carrying out its jurisdictional responsibilities in regard to international rivers, the Government of Canada negotiated the Columbia River Treaty, achieving a landmark in international waters cooperation and a basis for future bilateral arrangements.

Contact:

Columbia River Treaty Permanent Engineering Board.

PROJECT NO. 25. MURPHY CREEK HYDRO PROJECT

Background:

The electric utility B.C. Hydro has proposed a low-head hydroelectric project at Murphy Creek near Trail, B.C., using already regulated flows of the Columbia-Kootenay Rivers, which would result in degraded water quality in the state of Washington. Detailed environmental and engineering studies already have been completed by the utility, and a 15-volume environmental impact statement submitted. The federal Department of Environment has reviewed the impact statement and returned comments to B.C. Hydro and the provincial government. Development of the project is unlikely for some years.

Federal Interest:

Since boundary water levels may be affected, licensing or exception therefrom would be required under the International Rivers Improvement Act administered by the federal Department of the Environment.

Contact:

Federal Department of Environment, B.C. Hydro.

PROJECT NO. 26. HYDROELECTRIC SEVEN-MILE STATION, TRAIL, B.C.

Background:

Under the terms of the 1983 Skagit River Agreement, the province of British Columbia can operate the reservoir of the 608 MW Seven-Mile hydroelectric station so as to raise the level of the Pend d'Oreille River near Trail, B.C. to normal full-pool elevation of 1730 feet. This will flood 60 acres in the State of Washington, with potential floodback to Seattle City Light Boundary Dam.

Federal Interest:

Transboundary effect of B.C./Hydro development.

Contact:

Federal Department of Environment, B.C. Hydro.

PROJECT NO. 27. KOOTENAY FALLS DEVELOPMENT (U.S.)

Background:

A hydro development plan of the United States in the Kootenay River would result in long-term water quality impairment in British Columbia. A draft environmental impact statement has been issued and reviewed.

Federal Interest:

Transboundary water pollution impacts are being discussed.

Contact:

Federal Department of Environment.

PROJECT NO. 28. YUKON RIVER HYDRO DIVERSIONS

Background:

In the longer-term future, three hydro development proposals for the Yukon River would involve diversions from transboundary rivers. The Yukon-Taku, the Yukon-Taiya and the mid-Yukon projects all would impact on Alaska, and possibly conflict with a United States National Monument designation.

Federal Interest:

Advance awareness of issue; no action presently, as it would be premature.

Contact:

Federal departments of Environment; Indian and Northern Affairs; and Northern Canada Power Commission.

PROJECT NO. 29. DINA ASSESSMENT OF HYDRO POTENTIAL

Background:

The Department of Indian and Northern Affairs, as part of their mandate to manage water resources in the Yukon and Northwest Territories, assesses the hydroelectric potential of northern rivers. The Northern Canada Power Commission, the federal crown corporation concerned with the planning, construction and management of northern public utilities, primarily electrical, carries out feasibility studies on selected sites and also develops them.

The Department of Indian Affairs and Northern Development has assessed the hydro power potential for large areas of Yukon and Northwest Territories. Surveys of theoretical hydro potential have identified more than 150 sites ranging in size from 5 MW to 4,850 MW. Presently, relatively small growth in electrical demand in most settled areas precludes large-scale additions to capacity, while small hydro development (under 20 MW) involves high per-unit capital expenditure. However, increasing delivered cost of diesel fuel should lead to reassessment of the economic viability of some small sites, and to full feasibility studies of the most promising ones.

Survey results are contained in the following reports:

Yukon River Basin Report - (1962). The following rivers were investigated: Yukon, Teslin, Pelly, Stewart, White, Takhini, Primrose, Kluane, Nisutlin, Wolf, Big Salmon, Little Salmon, Ross, Lapie, Hess, Beaver, McQuesten, Aishihik and Kathleen Rivers.

Hydro-Electric Resources Survey of the Central Yukon Territory - (1968). Principal rivers investigated: Teslin, Pelly, Stewart and White. Forty-three sites on the above rivers and their tributaries were investigated. The main stem of the Yukon River was excluded from this study.

Power Survey of the Central Mackenzie District, Northwest Territories - (1969). Areas included in this study were the Coppermine River Basin, Lockhart River, Taltson River Basin, Snowdrift River, Little Buffalo and Buffalo Rivers. Twenty-six sites were identified in this study.

Power Survey of the Liard River Basin Yukon and Northwest Territories - (1970). Rivers included in the report are: Frances, Liard, Coal, Beaver, Petitot, Flat, South Nahanni and Hyland Rivers. Twenty-two sites were investigated during the study.

Power Survey of the Kazan, Dubawnt, Thelon and Hanbury River Basins, Northwest Territories - (1970). Nine sites were identified during the study.

Yukon and Northwest Territories Power Survey Pre-Reconnaissance Study - (1971). An office study of the hydro-power potential was completed for the following rivers: Porcupine, Peel, Rat, Arctic Red, Mountain, Keele, Redstone, Dahadinni, Root, Great Bear, Camsell, Willow Lake, LaMartre, Anderson, Horton, Hornaday, Burnside, Hood, Back, Hayes, Quoich, Ferguson, Maguse, Tha-Anne and Thlewiaza Rivers.

Preliminary Field Investigations of Hydro Potential Dam Sites on the Willow Lake, Root, Redstone, Keele, Mountain, Carcajou, Arctic Red and Peel Rivers - (1973). Twenty-six sites were investigated during the study. Seventeen of the sites had been identified by the GEPAC Study (1971).

Power Site Survey for the Northwest Territories for the Burnside, Hood, Camsell, Back and Hayes River - (1979). Twenty-nine sites were investigated during this study.

Power Site Survey Northwest Territories for the Tha-Anne, Thlewiaza, Ferguson and Maguse River - (1980). Seventeen sites were investigated during this study.

Power Site Survey Northwest Territories Quoich River - (March, 1985). Six sites were surveyed during the study.

Identification of hydroelectric power potential by site in the Yukon and Northwest Territories is now complete. The hydro power potential of streams in the Arctic Islands will not be assessed.

Federal Interest:

Necessary inventory of possible hydroelectric potential north of the 60th parallel.

Contact:

Federal Department of Indian and Northern Affairs, and Northern Canada Power Commission.