



THE INSPECTOR

DECEMBER 1988

FIRST TIDAL POWER EVENT

Bay of Fundy Project

E.I.A. OFFICERS

President

Dave Fitger

Vice-President

Karl Jessen

Immediate Past President

Rick Porcina

Secretary

Ted Simmons

Treasurer

George Ward

P.O. Box 80716

Burnaby, BC V5H 3Y1

Phone: 224-4264

DIRECTORS

James Hill

Jack Muir

Gus Wendril

ASSOCIATE DIRECTORS

Serge Bousquet

Rod Gray

EDITORIAL COMMITTEE

Serge Bousquet

Rod Gray

George Ward

Ernie Mortimer

EDITOR

Evelyn Pingarson

308/5777 Willingdon

Burnaby, BC V5H 4B1

Phone: 430-3469

Work is under way on Canada's first ever tidal power generating station. It is a \$55 million pilot project and is located at Annapolis Royal on the lower reaches of the Annapolis River, Nova Scotia.

The project is considered a pilot project for the purpose of evaluating the operational characteristics of the large STRAFLO turbine and the potential of such turbines for large scale tidal power developments in the Bay of Fundy,

The turbine is a single effect tidal unit designed to generate power during discharge from the reservoir into the sea. When the sea level is higher than the reservoir level, the water passage of the turbine will be used to sluice sea water into the reservoir during each tidal cycle.

Special seals have been developed to prevent leakage of water into the generator and into the main bearing housings. These seals consist of curved segments of special synthetic material pressed against polished stainless steel surfaces on the rotor rim and propeller hub. The seals are supplied with filtered water for lubrication.

The rotor rim seals are housed in a manifold surrounding the turbine casing.

Special attention has been given to protect the turbine and generator components from corrosion due to contact with sea water and exposure to sea air. Extensive studies were

(Continued on Page 2)

TIDAL POWER

(Continued from Page 1)

undertaken to select appropriate materials and protective coatings. In addition cathodic protection will be installed to protect the steel structure.

The possibility for exploiting the extraordinary tidal ranges occurring in the Bay of Fundy to generate power were first studied in earnest in 1944. A joint Canada-New Brunswick investigation considered a two-basin concept for the Petitodiac and Memramcook tidal rivers. This scheme was judged to be uneconomic.

Between 1956 and 1961 studies were carried out by an International Joint Commission of Canadian and US interests on another arm of the highly complex geography around the Bay of Fundy, namely the Passamaquaddy Bay project. Later in the mid-1960s a further study of this site was made by the US Army Corps of Engineers, who have since re-examined the project in the late 1970s.

It was in 1966 that work was really begun on a comprehensive analysis of large scale tidal power possibilities in the area, financed by the governments of Canada, New Brunswick and Nova Scotia. A body was formed called the Atlantic Tidal Power Programming Board, whose report was published in 1969.

Twenty-three potential sites were examined. Out of all the alternatives three sites were selected for detailed study. These were chosen not only as being potentially the best developments, but also because they were considered to represent a wide range of conditions.

By 1974 fossil fuel prices had risen sufficiently, along with the financial implications of increasingly stringent environmental safeguards, for the economical picture to look very different indeed. Hence a complete reappraisal of the previous studies was commissioned.

Current economic conditions now make the Bay of Fundy tidal power schemes look decidedly attractive but at the same time massive sums are already being invested in the James Bay (Quebec) and Churchill Falls (Labrador) hydro-power projects which are every bit as huge.

The costs in the reassessment studies were based on the use of bulb-type turbine-generator sets, primarily because both their price and performance could be predicted with confidence.

On the other hand, the low inertia of this kind of machine may infer dynamic stability problems. Although there is less experience of STRAFLO type turbines to draw on, the preinvestment design study team tend to favour this approach since it would offer substantial savings in civil works, generator and ancillary electrical equipment costs as well as giving higher performance and offering easier maintenance. The Annapolis project will help to justify this view.

There cannot fail to be widespread interest in the project, particularly if it proves to be highly successful.

Although nothing has been noted in the informational material about the possible application of the idea elsewhere it would not be surprising if studies were to be started in other parts of Canada as the project progresses.

The Newsletter is indebted to Al Horwell of North Vancouver for supplying the very comprehensive information compiled by A. Douma of the Nova Scotia Power Corporation and G. D. Stewart, Dominion Bridge-Sulzer Inc. This article is only a small portion of the complete material. Additional information is available by contacting the newsletter Editor.

See also Page 4 - "Straflo Unit"

PRESIDENT'S CHRISTMAS MESSAGE

As the Christmas season approaches there are two thoughts in my mind -- satisfaction and warmth over the past year's activities within the Association and a feeling of optimism for the coming year.



It has been a good year for me, as your President -- good to meet and greet so many new members of the Association; good to have had the experience of working with so many tried and true members; good for the growth I have known in my own work with the Association.

Change is ahead, not only through the retirements and replacements that have taken place in the Provincial Safety office, but through the plans even now germinating in the minds of Executive members for new and exciting activities in the New Year.

May your Christmas season be filled with peace and joy within your family circle. A Very Merry Christmas to you all!

Dave Fitger

A VERY MERRY CHRISTMAS TO YOU



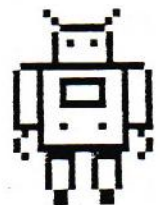
The members of the Executive of the Electrical Inspectors Association of British Columbia wish each and every member a Very Merry Christmas, a rewarding time with family and valued friends, and a renewal of ideas and objectives.

Dave Fitger...Karl Jessen...Rick Porcina...Ted Simmons...George Ward...James Hill...Jack Muir...Gus Wendril...Serge Bousquet... Rod Gray...Ernie Mortimer..... Evelyn Fingarson.

MEMBERSHIP RENEWAL

PLEASE RENEW MY MEMBERSHIP IN THE ELECTRICAL INSPECTORS' ASSOCIATION OF BRITISH COLUMBIA

ENCLOSED IS \$25.00 AS - AN INSPECTOR _____
AN ASSOCIATE _____



SIGNATURE _____

ADDRESS _____

MAIL TO: ELECTRICAL INSPECTORS ASSOCIATION
P. O. Box 80716
BURNABY, B. C. V5H 3Y1

STRAFLO UNIT

The Straflo unit is the modern version of the axial flow turbine with rim type generator patented by Leroy Harza in 1919. It is a low head propeller turbine arranged in a horizontal water passage with the generator field poles attached to a rotor rim mounted around the periphery of the propeller.

The propeller/rotor assembly rotates within a generator stator located outside the water passage of the turbine. The Straflo unit is normally housed in a low profile concrete powerhouse structure.

The kinetic energy of the water flow through the turbine is transferred by the propeller blades into rotational torque about the horizontal axis of the machine, which turns the rotor rim of the generator where a magnetic flux developed by the generator field poles reacts with the generator stator winding to complete the hydro-electric energy conversion.

The turbine and generator form a direct coupled unit without a driving shaft, and this technology provides the greatest compactness yet achieved for low head units with resulting savings in powerhouse construction costs.

In 1974 Escher Wyss developed a new generation of low head turbines called Straflo turbines, based on 140 years of hydro power technology and 40 years of successful operating experience.

These Straflo turbines feature new developments in bearing arrangements and rim seals and include an adjustable blade propeller version. This innovative technology is applicable to both run of the river and tidal power plan applications. The largest Straflo turbine with propeller diameter 7.6m is now under construction for the Annapolis Royal Tidal Powerstation in Nova Scotia.

PARKER REPORT

Jim Barker, EIA's new representative on this committee (replacing retired Don MacIntyre) gave a spirited and complete report at the last general meeting of the Association.

There have been a number of meetings over the summer at which two important subjects have been dealt with: (1) The Electrical Work Regulations; and (2) The Standard for Overhead Line Construction in B. C. Both regulations received the support of the Safety Advisory Committee. After legal editing they will be forwarded to the Ministry.

Earlier in the year the draft copy of the proposed regulations which was sent to members of the electrical industry for comment stimulated several submissions. As a result two notable changes were made:

1. Retention of the "B" certificate for a two-year period after implementation.
2. Relaxation of the supervisory ratio from 1-1 to 2-1.

Out of the discussion by the Safety Advisory Committee of proposed regulations to encompass all overhead lines, including utility transmissions and distributio, came a major submission from B. C. Hydro. As a result of this submission numerous changes were made to the regulations which will now include diagrams and standard installations of this kind.

Jim's report indicated that the approval of the documents was a milestone in the history of the electrical industry in the province and culminated many years of work.

He thanked Don MacIntyre for his hard work done on behalf of the Association, and commended the committee members for their efforts.



MANY DIFFERENCES IN UNITED KINGDOM

by Ernie Mortimer

In Great Britain all electricity generated and marketed is solely under the Central Electricity Generating Board (CEGB). The main load dispatch headquarters is located in London.

The major portion of the power is still generated by coal-fired units and will probably be that way well into the next century.

Although in Northern England approximately 10% to 12% of the power is produced by hydro plants, in Scotland it is a little less -- 5% to 10%.

Scotland has some of the most unique types of hydro generating stations, although quite small in terms of North American standards. All power feeds into a common grid or network and the voltages are 132 KV and 275 KV to 400 KV.

Coal is very important to the British economy since thermal power is approximately 90% of the total output. There have been two nuclear stations built fairly recently but their output is quite minimal, probably in the neighbourhood of 5% of total production. In comparison, in France, nuclear power makes up around 70% of the total output.

In England, most of the industrial and commercial installations are done with cable of various types similar to our own (Pyro-A.S.-PVC etc.) Main breakers are backed up with fuse protection downstream and it seems a very reliable system.

The residential is similar to our own here in Canada except for the voltage which is 240 AC. Their houses, at one time, used what was commonly known as ring mains, but lately most installations are being done to North American standards, e.g. the loop method.

Each power point (kitchen appliance) is protected by a 3 or 13 amp. fuse at each outlet. It would seem that this makes for a safer and more easily maintained wiring system. Their receptacles are much larger and huskier than ours, in addition to which each receptacle has a snap switch at the outlet which provides added safety.

Practically all outside distribution is underground, even in remote areas. In many cases, in order to satisfy the environmentalists, a good many high voltage lines have been put underground.

The only wires running overhead are the telephone cables in the suburbs, where a common pole will feed as many as a dozen or more homes.

There seems to be little worry about aerial trespasses in Britain and in some cases, they even "hop" power from house to house with the service wires.

Many of the British Rail lines have been electrified and a pantograph collector is used which steps the voltage down to 250-500 DC. The London underground uses a third rail system of 250-500 volts DC. After riding its intercity 125 trains, riding on our own Skytrain is slow and noisy.

POWER BEAM COMING

It's a mystery from outer space.

A cosmic ray packing a quadrillion volts of energy is beaming its way toward Earth and may signal the presence of a new type of elementary particle never before detected, scientists are saying.

Elementary particles are the infinitesimal constituents of atoms. The powerful beam is coming from a neutron star 15,000 light years from Earth, or about a quarter of the way across the Milky Way Galaxy.

It has about 1,000 times more power than atom smashers can produce on Earth.

A team of U.S. astrophysicists first detected the amazingly powerful beam early last year. It is emanating from the neutron star portion of a double star system called Hercules X-1 in the constellation Hercules.

"Because the beam is neutral, it is able to come across huge distances in the galaxy through magnetic fields that would have scrambled a charged particle," one scientist said.

This interesting piece was picked up from the Vancouver Province