

Ontario Hydro system was generated by nuclear energy from the 200,000-kilowatt Douglas Point station and the first 540,000-kilowatt unit at the Pickering station near Toronto. Moreover, the Gentilly 250,000-kilowatt station being commissioned for Hydro Quebec had reached 45 per cent of its designed output. The second 540,000-kilowatt unit at Pickering also started up during the Conference. All four reactors are of the CANDU type.

The heavy-water moderatory is held at low pressure in a tank threaded by separate channels containing the nuclear fuel in the form of bundles of small, short rods. The heat is transferred from the fuel by a heat-transport fluid or *caloporteur*, which in the Ontario Hydro reactors is heavy water under pressure and in the Hydro Quebec reactor is ordinary or "light" water that boils. A third *caloporteur*, a specially-developed type of hydrocarbon oil or organic liquid, has given outstanding performance at higher temperatures (e.g., 400°C or 750°F) in an experimental CANDU reactor developing 40,000 thermal kilowatts; this, the WR-1 reactor, is located at AECL's Whiteshell Nuclear Research Establishment in Manitoba. This organic liquid, in conjunction with thorium fuel and enriched uranium, promises to allow a reactor to operate at more than three times the power density of existing installations and so reduce its capital cost. Moreover, the operating costs are expected to be much lower, for, after five years operation of WR-1, the *caloporteur*-circulating pumps and piping show negligible radiation levels and allow easy maintenance.

In addition, 1971 saw the successful start-up of KANUPP, a generating station using a CANDU reactor of 125,000 kilowatts rating designed and built by the Canadian General Electric Company in Pakistan near Karachi. Four more 200,000-kilowatt CANDU reactors are under construction by the Department of Atomic Energy in India.

Operating difficulties initially experienced with the Douglas Point generating station have been largely overcome and fuel has been changed routinely with the reactor at power since March 1970.

The success of these operating reactors has not lessened the demand on AECL for supporting work of many kinds. In particular, a shortage of heavy water for new reactors is foreseen, resulting from the failure of a production plant commissioned from private industry. AECL has now been assigned responsibility for rebuilding and commissioning this plant. Meanwhile AECL is building a larger plant at Bruce, close to Douglas Point, Ontario.

The large-scale engineering work undertaken by AECL has also included the construction of a high-voltage DC transmission-line to bring power from the Nelson River in northern Manitoba to Winnipeg. This line has been successfully built but manufacturing problems have delayed much of the power-conversion equipment.

AECL has continued to expand its production of radioactive cobalt-60, used throughout the world in radiation teletherapy units for cancer treatment and also in industrial plants for the sterilization of packaged medical supplies and similar purposes.