

staff to support the work of the Institute. Where appropriate, research emphasis will be on a multi-discipline approach to research problems, and it will, therefore, take advantage of the wide range of academic resources available at Queen's. These resources will be supplemented by the professional "know-how" available in government and railway laboratories and, where appropriate, professional staff will be seconded from these laboratories for periods of detached duty in Kingston.

The Minister drew attention to the fact that by establishing the Institute in collaboration with Queen's University it should be possible to attract young researchers and hence increase the flow of trained staff available for the transport industry. He emphasized that the research work to be undertaken by the Institute would be available and relevant to all sectors of the industry, both operating and manufacturing, and that, where appropriate, the Institute will be free to undertake contract research.

CANADA'S ATOMIC TECHNOLOGY FLOURISHES (Continued from P. 2)

station. Until the Bruce generating station is in operation, Douglas Point will serve as a steam supply for the heavy-water plant as well as for power generation.

Significant progress was made in the construction of the heavy-water plant and the design of the Bruce generating station.

Work on the heavy-water plant site started early in 1969 and by March 1970 the first-stage towers of Unit One had reached their full height. Tower construction for Unit Two and installation of piping will constitute a considerable part of the effort during 1970.

The Bruce generating station, to be built by Ontario Hydro, will be one of the world's largest nuclear-power plants. AECL is designing the nuclear steam-supply system and its central controls for Ontario Hydro. This work is being done both at Sheridan Park and Peterborough.

NUCLEAR POWER DEMONSTRATION

The NPD reactor continued to operate in the boiling heavy-water mode and has now achieved all the major objectives of the conversion from pressurized heavy-water coolant.

A boiler-tube failure in June was detected, located and repaired and has provided valuable experience for future maintenance of CANDU reactors.

A contract to supply replacement fuelling machines for NPD was completed by a private company. The machines are computer-controlled to simplify fuel handling. They also are equipped with positive mechanical drives to all components; exact positions of moving components can be easily detected and machine maintenance is reduced. The first fuelling with the new machines with the reactor at power was carried out in November; they performed well both then and in subsequent operations. From November

1963, when on-power refuelling was first accomplished, to the end of March 1970, 1,184 channels had been fuelled with the NPD reactor at power.

While its main functions were to serve as an engineering test reactor for AECL and a training facility for Ontario Hydro, NPD also produced a sizable amount of power - 94,977,000 kilowatt hours - during the year.

After preparation at CRNL, two shipments of irradiated NPD fuel, totalling 719 bundles, were shipped to Mol, Belgium, for recovery of plutonium for the French Commissariat à l'Énergie Atomique.

RAJASTHAN ATOMIC POWER PROJECT

The schedule for India's first CANDU station calls for operation of Unit One in 1972, with the second unit starting up in 1974. A second station, known as the Madras Atomic Power Project, has been committed by the Indian Department of Atomic Energy. This will employ the CANDU idea, but will be designed in India.

The Rajasthan project is being financed partly by standard-type loans from Canada's Export Development Corporation. These loans, totalling \$83 million, cover non-Indian content of the project and carry the requirement that 80 per cent be spent in Canada. The Indian Department of Atomic Energy is building the plant, with Montreal Engineering Company Limited as consultant for the conventional part of the station. AECL is designing the nuclear portion, which is based on the Douglas Point station.

Installation of equipment for the first RAPP unit is virtually complete. The team from Ontario Hydro that will assist the DAE in commissioning Unit One has begun to arrive on site. The team is being supplied under a sub-contract with AECL.

Training of the Indian staff in Canada, which was an important part of the project, has been completed. The six-year program, carried out under the auspices of the Canadian International Development Agency, involved the training of more than 110 Indians in power-plant design and operation, as well as industrial techniques.

MARKETING OF NUCLEAR POWER

The past year was AECL's first complete year in the nuclear-power marketing field. It was an active one, highlighted by the signing of a contract with the Republic of China for a research reactor to be built in Taiwan. The value of the Canadian content of this \$35-million project is approximately \$28 million.

Negotiations continued with Romania for the sale of a nuclear steam-supply system and a decision is expected soon.

Requests for preliminary tendering information were received from Brazil, Chile, Mexico, Australia and Thailand. By both Mexico and Australia AECL was invited to submit firm-price tenders for the nuclear steam-supply system. A bid has been submitted to Mexico for a 600-megawatt nuclear plant and a bid to Australia for a 500-megawatt unit is being prepared.