

At Douglas Point on the shore of Lake Huron, the country's first full-scale nuclear power station went into commercial production at the end of 1966. The station, built with the co-operation of Ontario Hydro, houses a 200,000-kw. CANDU reactor. Experience gained in the design and operation of this reactor has encouraged the development of even larger units and construction of the two-unit, 1,080,000-kw. Pickering nuclear station is under way near Toronto, with in-service dates for the two units scheduled for 1970 and 1971.

A further step in the development of the CANDU reactor is the use of boiling light water instead of pressurized heavy water as the coolant. This change offers further reductions in unit energy costs. Quebec's proposed Gentilly nuclear station on the south shore of the St. Lawrence River near Trois-Rivières will utilize boiling light water in its CANDU reactor. This station is scheduled for service in 1971 with 250,000 kw. of nuclear-electric capacity.

Subsection 5.—Electric Power Transmission

The nature of the loads handled by the small, widely scattered generating systems in the early days of the electric power industry in Canada did not warrant the expense of interconnecting power systems. However, as the demand for dependable electric power increased and improved techniques reduced power transmission costs, the benefits of integrating power systems to achieve reliability of service and flexibility of operation were re-appraised.

The number of amalgamations of small systems into larger operating groups has increased steadily and today most of Canada's generating stations are components of large, integrated and often interconnected power systems operated by power utilities and companies in the various provinces.

Constant research in the field of power transmission has developed techniques that enable power producers to develop hydro-electric sites previously considered beyond economic transmission distances. Most noticeable, perhaps, is the progressive stepping up of transmission line voltages. In Canada, there are a number of transmission lines designed for operation at 500,000 volts. A 574-mile, 500,000-volt line is being constructed to carry power from the Peace River to the lower mainland of British Columbia. In Ontario, a 435-mile, 500,000-volt line was completed in 1966 from hydro-electric plants in the James Bay watershed to Toronto. In 1965, power was carried for the first time at 735,000 volts when the 375-mile transmission line between Quebec's Manicouagan-Outardes hydro complex and the cities of Quebec and Montreal went into operation.

Although at present power is transmitted exclusively as alternating current (a.c.), Canadian producers are considering the advantages of carrying power at high voltages over long-distance direct current (d.c.) lines. One such transmission line with a rating of $\pm 260,000$ volts is expected to be placed in service in 1968 to augment an existing a.c. line between Vancouver Island and the mainland.

The search for economies in transmission systems has led to changes not only in materials used but also in tower erection and cable-stringing methods. Guyed aluminum V-shaped and Y-shaped transmission towers are being used increasingly in place of self-supporting towers where the terrain is suitable, and erection costs are being reduced by the use of helicopters to transport tower sections to the site and for tower assembly. The use of helicopters for spraying in brush control on the right-of-way and for line inspection and maintenance is becoming more widespread.

At present, domestic interconnections of from 66,000 volts to 230,000 volts exist between systems in Alberta and British Columbia; Saskatchewan, Manitoba and north-western Ontario; the interconnected northeastern and southern Ontario systems and Quebec; and between New Brunswick and Nova Scotia. Important international interconnections exist between British Columbia and the State of Washington; Ontario and the State of Michigan; Ontario and the State of New York; Quebec and the State of New York; and New Brunswick and the State of Maine.