

There are three reactors at the Chalk River Project of AECL—ZEEP (Zero Energy Experimental Pile), NRX (National Research X-metal or X-perimental) and NRU (National Research Universal)—and the company is collaborating with the Canadian General Electric Company Limited and The Hydro-Electric Power Commission of Ontario (HEPC) in the building of an experimental atomic power station, to be known as NPD (Nuclear Power Demonstration), near Des Joachims, 12 miles up the Ottawa River from the Chalk River plant. All of these reactors use heavy water for a moderator.

The decision to build NPD followed a power reactor feasibility study, started late in 1953 and carried out by engineers of AECL, HEPC, the Montreal Engineering Company Limited, the Shawinigan Water Power Company, the British Columbia Electric Company Limited, and the Brazilian Traction, Light and Power Company Limited. The power reactor is expected to generate 20,000 kw. of electricity.

While the building of NPD proceeds, a preliminary design study for a larger atomic power station with a projected electrical output of 100,000 kw. is being carried out at Chalk River, and engineers of several utilities across Canada are participating in the study.

Nuclear Power Role Forecast.—A forecast of the likely role of nuclear power in Canada was presented to the International Conference on the Peaceful Uses of Atomic Energy, Geneva, Aug. 8 to 20, 1955 in a paper* by Dr. W. B. Lewis and Dr. John Davis. These authorities forecast that by 1980 nuclear power plants may account for as much as 10 p.c. to 15 p.c. of the total electrical generating capacity in Canada. Although by that year water power will still be the principal source of electrical energy in this country, thermal generation will have risen from the relatively minor proportions of a few years ago to at least 30 p.c. of installed capacity. One-third to one-half of this thermal generation will be by nuclear plants despite the fact that Canada has large reserves of petroleum and natural gas and an abundance of coal that can be strip mined in certain regions.

Costs of conventionally produced electrical power are expected to rise despite significant improvements in long distance transmission and further advances in the efficiency of central electric stations burning conventional fuels. At the least, nuclear energy will set a ceiling on power costs in power-short regions of the country and will reduce the wide discrepancies in the price of electricity which now exist between one Canadian power consuming region and another, for the most attractive feature of nuclear power is its low fuel costs. These may make the economics of future atomic energy plants resemble more closely those of Canada's existing hydroelectric installations rather than those of steam plants burning coal or petroleum.

Nuclear energy will not be competitive anywhere in Canada until its price has fallen below 8 mills per kilowatt-hour. At 7 mills it might be able to compete with hydroelectric or with coal fired steam power but demands for nuclear power at this price would be limited. The highly developed power-consuming region of southern Ontario, where imported coal will soon be the only alternative to hydro power, could absorb large blocks of power at 6 mills without creating even a temporary surplus of generating capacity. Various engineering and economic studies under way at Chalk River suggest that nuclear plants capable of such performance will be under construction within the next 10 years.

The forecasters point out that the average annual rate of growth of total demand for electrical power in Canada is now about 6 p.c. a year and consumption can be expected to increase threefold to fourfold or more during the next 25 years. Furthermore domestic supplies of oil and natural gas are emerging as deterrents to the use of electrical power for steam generating and other heating purposes. Also if inexpensive nuclear power becomes available in from 20 to 30 years time, a large part of Canada's established demand for new increase in power would disappear, for the tendency would then be to locate certain heavy power-using industries, such as the refining of aluminum, close to the principal industrial

* W. B. Lewis, Vice-President, Research and Development, Atomic Energy of Canada Limited, Chalk River, Ont., and J. Davis, Economics Branch, Department of Trade and Commerce, Ottawa, Ont.: *An Economic Forecast of the Role of Nuclear Power in Canada.*