radioactive isotopes of high specific activity (*i.e.*, the relation of the amount of radiation to a given weight of material). Both the United States and the United Kingdom are, like AECL, using NRX for atomic power studies. This reactor now operates at a power output of 40,000 kw. (a measure of the heat produced).

In 1946 the United Kingdom established its own atomic energy program and in the same year the Atomic Energy Control Act was passed in Canada "to make provision for the control and supervision of the development, application and use of atomic energy". This Act created the Atomic Energy Control Board.

The Chalk River project was operated on behalf of the Atomic Energy Control Board by the National Research Council until 1952 when AECL was established to operate the project on behalf of the Board. A 1954 amendment to the Atomic Energy Control Act requires AECL to report directly to the Cabinet Minister who is Chairman of the Committee of the Privy Council on Scientific and Industrial Research. The Atomic Energy Control Board continues to report to the same Minister.

The next stage in the Canadian program, following the creation of a separate United Kingdom program, consisted mainly of carrying on fundamental research at Chalk River, using the facilities of the two natural uranium heavy-water reactors. The need for a source of higher neutron flux for fundamental research and for engineering studies resulted in the decision in 1951 to build another natural uranium heavy-water reactor known as NRU. This reactor, placed in operation on Nov. 3, 1957, has a heat output of 200,000 kw., five times that of NRX. The NRU reactor has three main functions: the production of significant quantities of plutonium; the provision of advanced experimental facilities for fundamental research and for the testing of power station fuel-coolant systems; and the production of radioactive isotopes of high specific activity, particularly Cobalt-60 which is used in the treatment of cancer.

Activities of the Chalk River Project.—The principal function of this project is to carry out fundamental research and preliminary engineering development. The project provides the data that utilities and manufacturers need for a nuclear power program. The work is carried out by an Administration and Operations group and a Research and Development group. The former is responsible for general administration, the operation of the nuclear reactors and associated chemical process plants, the construction and maintenance of buildings, the provision of steam and auxiliary power for the project, and the correlation of the experience of the operating branches with the results obtained by the research branches to produce engineering information for major projects handled by outside organizations. The activities of the Research and Development group, which cover a wide field of fundamental and applied research in physics, chemistry, metallurgy, and biology, are carried out by five divisions—Reactor Research and Development, Chemistry and Metallurgy, Physics, Biology and Health Physics, and Research Engineering. These divisions conduct short-term and long-term investigations—the short-term to provide the basic information required to design and operate the first Canadian power reactors. A wide variety of possible reactor systems makes it necessary to conduct extensive investigations, both mathematical and experimental, to determine which are likely to be the most economic and efficient. The longer term work, though mainly the responsibility of physicists and biologists, also involves the chemistry of substances which have become important (or have come into existence) only since the development of atomic energy.

The Reactor Research and Development Division is engaged in experiments and calculations required for the design of nuclear reactors for atomic power stations. Control systems for such plants and for the Chalk River reactors are being studied. The ZEEP reactor has been in constant use in determining the reactive efficiency and other characteristics of various fuel element arrangements. Construction began in 1959 of a larger, low-power reactor, known as ZED-2, which will provide information on the physics of reactor cores for studies of power station reactors. Late in 1957, a swimming pool type of reactor