

The onslaught of World War II in August 1939 pushed into the background interest in harnessing the vast energy now recognized to be contained within the nucleus of the atom, but when scientists drew to the attention of their respective governments the possible military application of atomic energy, development work was accelerated.

In Canada, first investigation of the possibility of releasing a large quantity of energy from uranium took place under the direction of Dr. George C. Laurence in 1940 at the National Research Council.

While experiments continued at the National Research Council, the United States moved quickly toward achieving a chain reaction, and on Dec. 2, 1942, the first nuclear chain reaction to be initiated by man began a controlled release of the tremendous energy stored within the atom. This was done by American scientists, at the University of Chicago, working under the direction of Enrico Fermi.

In 1942, the Governments of the United Kingdom and of Canada agreed to set up a joint Canadian-United Kingdom atomic energy project in Canada. By January 1943, British scientists arrived to work with hastily recruited Canadian scientists in a research centre established on Simpson Street, in Montreal, Que. In February, the group moved to the University of Montreal where considerable progress was made in the investigation of fundamental nuclear processes.

At the Quebec Conference in August 1943, President Roosevelt, Prime Minister Churchill and Prime Minister Mackenzie King agreed that closer co-ordination of the allied efforts in the nuclear field was desirable and it was agreed that a large heavy-water pile should be built immediately in Canada. A technical committee consisting of General Leslie Groves, Sir James Chadwick and Dr. C. J. Mackenzie was set up to co-ordinate this joint program on atomic energy. Dr. J. D. Cockcroft of Britain was appointed Director and a Crown company, Defence Industries Limited, was engaged to undertake the detailed design and construction of the atomic energy pile at Chalk River, about 130 miles west of Ottawa. Construction was started in 1944 and by September 1945 a small low-power atomic energy pile, known as ZEEP, was in operation. This was the first pile, outside of the United States, to produce energy by nuclear fission.

In December 1946, by Act of Parliament, all matters concerning atomic energy in Canada were placed under the Atomic Energy Control Board. The Board immediately asked the National Research Council to assume responsibility for the operation of the establishment at Chalk River, and the Council formally took over that responsibility on Feb. 1, 1947. By then, 400 scientists and engineers were engaged on research and development of atomic energy, the largest organization ever created in Canada to carry out a single research project.

Dr. David A. Keys took on direction of the Chalk River project in 1947, with the research program being directed by Dr. W. B. Lewis. Dr. Cockcroft returned to England to take charge of the United Kingdom atomic energy project, which was founded in 1946.

In July 1947, Canada's second reactor (the term reactor has replaced "pile" in atomic energy parlance) went into operation. This reactor was of special significance because it had the highest neutron flux of any known reactor and, like ZEEP, used natural uranium as a fuel and heavy water as a moderator. It has produced radioactive isotopes with a high specific activity for which there is great demand.