

How are we going about solving these problems?

First, it seemed obvious that at some stage we should apply the nuclear technology which we have developed at Chalk River since 1947. We know of no better way of doing this than by designing and building a power reactor using existing nuclear data. Early in 1954 a power reactor feasibility study was started at Chalk River. The objective of this study was to determine an outline specification for a small power reactor with an electric output of somewhere between 5,000 and 10,000 kilowatts, and to prepare a rough estimate of its cost.

As a result of the study, it has now been decided to design and construct a small or prototype power reactor. Proposals have been invited from a group of companies which have available the necessary design and development experience and shop capacity. The prime contractor will be responsible for designing and building the reactor and for mechanical performance. The contractor will also be expected to make some contribution to the cost of the project. The nuclear data will be supplied by Chalk River. Since it is unlikely that any single company can provide the full range of engineering resources needed for the job, it is expected that other companies with engineering experience in special fields will be employed by the prime contractor. In this way the participation of industry will be on the broadest possible scale.

While final specifications have not been determined, it is probable that the reactor will be designed to produce steam sufficient to generate 20,000 kilowatts electric. It will use heavy water as a moderator and possibly also as a primary coolant. The heavy water will be pressurized and will raise steam from ordinary water in a heat exchanger. The nuclear fuel will be, in the main, natural uranium, but some separated plutonium may also be used as a fuel in order to reduce the physical size of the reactor. The uranium fuel will be in the form of metal rods or tubes clad in zirconium alloy. It is not expected that this reactor will produce power at competitive costs but it will produce the kind of design, operating and cost experience which will permit a scale-up to a large and economic power reactor. The detailed design of the reactor will begin in the second quarter of 1955, with a view to the completion of construction early in 1958.

We would like to have one of the utilities join with us in the small reactor project. We envisage an arrangement whereby the utility would provide the power plant and site, and would undertake to purchase steam from the reactor at some agreed price. The reactor and the power plant would be operated by the utility and the power generated would be fed to an existing power system.

At Chalk River we will continue and expand the present programme of research and development. Its main objective will be a preliminary design study for a large power reactor capable of producing 100,000 kilowatts electric. This will involve research on reactor cores, the testing of fuel systems and materials in the NRX and NRU reactors - which are ideally suited for this purpose - and engineering development. It is our hope that a large part of the engineering development will be undertaken by industry.