Supplementary Paper No. 62/7

How Canadian industry can win atomic business

(The president of A.E.C.L., J.L. Gray, bases this article on an address given to a recent alumni reunion at the Banff School of Advanced Management, Alberta.)

THERE REALLY IS no such thing as a Canadian atomic industry, at least not in the field normally associated with atomic energy—the production of electric power. But there is one specific phase in the utilization of atomic energy that may be singled out, and the industrial organizations handling this phase could perhaps be classed as atomic industry. They are the uranium producers, the uranium refiners and the uranium fuel manufacturers. In Canada, then, in my view the only "atomic industry" per se is the nuclear fuel industry.

There is, of course, atomic business for Canadian industry. While it has been relatively small to date, it could easily grow to quite significant proportions within the next fifteen to twenty years. This work, which will concern mainly the design, fabrication and operation of nuclear power stations, can be easily handled by the existing industrial organizations so far as plant and equipment are concerned. It may tax the design and development capacity of our heavy engineering industry beyond its present capacities, but so long as industry is aware of this it has a chance to strengthen the areas where weaknesses exist.

Nuclear fuel

There is no obvious reason why Canadian industry cannot become a leading world supplier of natural uranium fuel elements for nuclear power plants. We have ample resources of raw materials that should be competitive in the world markets. We have some of the best development and test facilities in our Chalk River reactors to prove fuel element designs and manufactured products.

In the production of uranium oxide pellets Canadian industry has developed what we believe to be the best and most economical process in the world. Although most of this work has been paid for by AECL, some of the most significant advances are due entirely to the ingenuity and efforts of industry. The techniques of fabricating these pellets into zircaloy-clad fuel elements are also outstanding and indicate that Canada can produce quality products at quite acceptable costs, with every indication that costs will steadily fall with increase in production rate.

Although enriched uranium is not available from Canadian sources, it is available from the United States at their domestic prices. There seems no reason why the Canadian fabricators could not compete in this field against U. S. private industrial organizations when there is no assured market for any particular fuel design.

There is no technical reason why private industry in Canada could not build and operate a facility for producing enriched uranium. However, there is no economic justification for such a plant related to the foreseeable civil nuclear power program, even if a good share of the potential world market was assured.

The situation in the uranium mining industry is fairly well known. We are in a period of over-production based on present needs, with the result that many high cost Canadian mines have been closed to allow the lower cost producers a longer period of operation.

A recent study of the future potential markets for natural uranium in the western world by Eldorado Mining and Refining Limited shows the picture is not as bleak as some people have assumed. The study makes various assumptions as to the requirements of the uranium enrichment plants in the U. S., the U. K. and France, along with estimated needs for research reactors, U. S. propulsion reactors and civil power reactors. It indicates a total annual consumption in 1965 of about 32,000 tons of U_3O_8.

The study further estimates that in 1975 the demands might reach 39,000 tons per year. If we assume that the United States will aim for self-sufficiency from sources within their own territory, this will require about 22,000 tons, leaving 17,000 tons per year as a minimum requirement to be supplied from Canada, South Africa and France.

Although the study tends to be conservative, there are one or two unpredictable variables which cannot be used as a basis of calculation. If there should be a drastic reduction or increase in military requirements, the picture could change appreciably. If the nuclear power stations now coming into operation throughout the world prove to be exceptionally good, this could move the estimated requirement for 1970 ahead one or two years.

The critical period for the present uranium producers, then, is still from 1965 to 1968 or 1969. But there are some very good signs that by 1970 we should have a healthy industry.

Radioactive isotopes

For many years the NRX reactor at Chalk River had a neutron flux higher than other reactors. This made Canada more capable of producing substantial quantities of high specific activity radioisotopes than any other country in the world. With this facility, and later the NRU reactor, we undertook to exploit them and formed our Commercial Products Division. Since the research reactors at Chalk River are still the only significant source of radioactive isotopes in Canada, the only Canadian industry of any magnitude in this field has grown around this group.

The Canadian market for radioisotopes is relatively small and a much greater volume is essential for a satisfactory operation. This can be achieved only by creating volume through exports. A vigorous sales program has led to exports which now account for 93% of our total sales.

These markets are created and main-