

Substantial savings were made in capital and operating costs by the development of the new process for green salt production.

The research and development division surveyed existing methods for production of metal from green salt (UF_4) and selected the "dingot" type of process which had been developed at Mallinckrodt Chemical Works, St. Louis, because of potential advantages in quality, uniformity and costs. The metal plant commenced operation in April 1958 and was brought to a stage of successful operation as regards yield and quality.

Many associated processes for re-treatment of slag, scrap and intermediate products were developed in connection with the metal plant. A method for controlling the carbon content of the metal was developed.

The quality of green salt is high and this high quality material has contributed to the better than estimated yield of scalped metal "dingots". The higher yield has reduced the amount of uranium returned for a costly recycle to the head of the refinery process. Also contributing to the higher yield has been the development work on the heating cycle, heat distribution, magnesium type, etc.

The principal value of green salt and metal development has been to establish in Canada a process which is capable of producing uranium metal at competitive prices despite the small yearly tonnage.

If the production of metal can be increased through foreign sales, Eldorado and other Canadian uranium producers which can custom-refine their concentrates at Port Hope, will be in a more favourable position as regards costs and quality of metal. Without the process development outlined above, Canada's position in the world uranium metal market would be much less favourable.

Ceramic Oxide

The Port Hope refinery is now producing "ceramic oxide" for manufacture of fuel elements for Canadian power reactors. This oxide must have special qualities which enables the production of high density compacts of stringent specifications.

The research and development division has co-operated with the refinery and the staff of Atomic Energy of Canada Limited in improving the quality and methods of production of this oxide. The present product is of high quality. Studies are in progress to replace batch operations with a continuous process.

The Eldorado refinery operations are described separately in this brief.

In connection with the fabrication of uranium metal to reactor fuel rods, Eldorado has been working with the staff of Atomic Energy of Canada Limited toward controlling the quality and structure of metal. The research and development division has assisted in developing control methods and in metallographic studies.

Research for Canadian Uranium Industry

Since 1957, when the Eldorado Metallurgical Laboratories in Oatwa were established, the research and development division has been able to augment the work carried out at the mines branch toward improving efficiency and reducing processing costs at Canadian mills. Some of this research work is not of direct benefit to Eldorado but is aimed at assisting other Canadian producers. The results of this research are distributed to the industry through the uranium producers metallurgical committee which was initiated by Eldorado in March 1959.

The research is aimed at developing simplified methods for production of nuclear grade products rather than "yellow cake" at the mills. Such methods include the following:

- (a) Solvent extraction from ore slurries rather than filtered solutions.