DEPARTMENT OF ATOMIC ENERGY

A Note on the programme of work of the Isotope Division during the IV Plan period.

During the Fourth Plan period, the activities of the Isotope Division, Bhabha Atomic Research Centre in the field of production, and application of radioisotopes will be increased considerably to meet the varied and growing requirements of the users of radioisotopes in the country. It is proposed to widen the scope of the activities already carried out in the Third Plan period, with the help of facilities completed in the Third Plan period and proposed to be built during the Fourth Plan period.

The Radiological Laboratories now nearing completion will provide facilities for the handling of wide variety of radioisotopes in multicurie to kilocurie quantities. In addition to about 70 primary radioisotopes used in the research and industry, it is proposed to set up plants for the production of large quantities of tritium required for use in the preparation of self-luminous compounds used in Defence and in industry for marking purposes. Plants for the separation of curie quantities of fission products such as strontium-90 and cesium-137 will be built and useful quantities of these materials will be separated from fission-products waste for use in medicine and industry.

Radiopharmaceuticals, which find extensive use in clinical medicine, will be produced on a bigger scale. New radiopharmaceuticals, for the study of different disease states in human beings, will be developed for extending radiotracer techniques in nuclear medicine. With the facilities being provided in the Radiological Laboratories and with the planned increase in the production, it will be possible

to step up exports of radiopharmaceuticals which have already found some market, partcularly in South-East Asian countries.

The production of carbon-14 and tritium labelled compounds for use in biochemical and medical research will be stepped up, and the benefits of low operational costs due to large batch size will be derived. Since the production of these compounds is essentially labour intensive and since our labour costs are low compared with other isotope producing countries, efforts to exploit the large export potential in this field will be intensified.

With the availability of handling facilities for kilo-curie quantities of cobalt-60, it will be possible to supply cobalt-60 sources required for the teletherapy units in the treatment of cancer. The availability of such indigenous cobalt-60 sources will enable savings of foreign exchange to the tune of Rs.5-10 lakhs per year, in the field of radiation therapy alone. Much larger cobalt-60 sources required for irradiation units in industries, agriculture and research will be produced and supplied.

High Intensity Radiation Utilisation Project proposed to be taken up during the Fourth Plan period, will provide developmental facilities for determining design parameters of different types of cobalt-60 irradiators for radiation processing of medical and food products and for building proto-type units. The development of the food and marine products irradiators will help to solve the problem of large losses of food and marine products due to inadequate transport and improper storage. In the fields of medicine, the radiation sterilisation of bandages, sutures, syringes and other disposable surgical materials, etc. will help in extending medical facilities to hospitals in the country.

In addition, the project will also help greatly in creating a market for megacurie quantities of cobalt-60 which will be available from the power reactors at Rajasthan during the course of the Fourth Plan period.

Initial work has already been done by this Division in the field of radioisotope applications in industry. However, for furthering the uses of radioisotopes in industry, considerable work will have to be done to demonstrate the use of radioisotope techniques for gauging for the determination of different parameters in chemical processes, and for non-destructive testing. With the facilities provided in the Radiological Laboratories and the technical know-how gained so far, it will be possible to extend this work further for the benefit of the national economy.

In the field of hydrology, large scale radiotracer studies will be carried out for the study of the underground water resources in the country. Radioisotopes will also be used for the problems of seepage in dams, and canals. Radio-tracer techniques will be used for the study of the silt movement in various harbours, thus enabling the port authorities to take appropriate decisions both on the choise of suitable dumping sites for the spoils obtained in large scale dredging operations and also on the suitability of channel alignments in the proposed expansion activities at various harbours.

In conclusion, it may be stated that the isotope programme aims primarily at providing radioisotopes and radioisotope application services to users in the country and thereby effecting substantial savings in foreign exchange due to indigenous production and due to development of know-how. There is no doubt that there is a vast potential for the utilisation of radioisotopes in the country. It is, therefore,

by intensive drive in publicity and extensive education of the industrial management. The radioisotope programme is also aimed at earning revenue and on the basis of preliminary studies carried out, it appears that the programme will be self-supporting towards the end of the Fourth Plan period. Already, the revenues earned by the provision of radioisotopes and associated expertise amounts to about 16 lakhs per year. This is expected to multiply several times over by the end of the Fourth Plan period. In fact, the sale of radioisotopes and equipment will provide a fair return on investment and will also earn considerable foreign exchange.

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