INDUSTRIAL ISOTOPES STUDIED IN FOUR COUNTRIES

After two months of intensive tours in USSR, UK, France and Czechoslovakia, representatives of fifteen nations interested in using radioisotopes for industrial purposes returned home in November. As a result of the detailed information they were able to obtain their intention is to make recommendations for the benefit of industry in their countries.

The tour was the first of such importance sponsored by the Agency and was financed from funds made available under the United Nations Development Programme. The countries represented were Argentina, Bulgaria, Colombia, Greece, Hungary, India, Iraq, Israel, Mexico, Pakistan, Philippines, Poland, Thailand, United Arab Republic and Yugoslavia.

DEVELOPMENTS IN USSR

Much emphasis has been placed in the USSR on the development and application of radioisotope instruments to increase industrial efficiency and output, and to automate industrial processes. During the five years to 1965, different types installed have been : thickness gauges (1054), density gauges (1314), gamma relays (1249), beta switches (776), moisture gauges (64), accelerator neutron generators for analysis by activation (10). It has been estimated that economic savings in 1964 amounted to 36 million roubles ($36.36 million) out of the total savings of the whole atomic energy industry, estimated at 200 million roubles ($202 million). More than twenty organizations in the main branches of industry are developing techniques, particularly for analysis by neutron activation, X-ray fluorescence, the Mössbauer effect, etc. In the exploration and exploitation of mineral sources novel nuclear borehole logging is extensively developed and applied and has reduced by a factor of five the number of exploratory wells drilled. There are also more than 3000 gamma radiography units in use for inspection of welds and castings. Another important development is in radioisotope power sources, of which 100-150 are to be used in remote meteorological stations in the next few years, as they are cheaper than primary cells by a factor of three. More than 3000 static eliminators are in use. Eight, possibly nine, large-scale irradiation units are to be used for vulcanization of synthetic rubber, polymerization of chemicals, to inhibit sprouting in potatoes and to disinfest dried foods.

The group started its tour on 1 September with a visit to the atomic energy pavilion at the Exhibition of Economic Achievement, Moscow, and thereafter had a full programme lasting until 23 September. Towns visited were Moscow, Leningrad, Riga, Tiflis and Bogucharovo, where factories, research institutes and exhibitions were seen. In Leningrad there was also an opportunity

to board the motor vessel Altai, where a new method had been developed of investigating the rate of wear of part of the machinery.

INCREASING PRODUCTION IN UK

A tour lasting nearly a fortnight started in UK on 26 September. Here an industry has developed over the last fifteen years devoted to the development and manufacture of instruments employing radioisotopes. Industrial gauges worth about £750 000 ($2.1 million) are produced annually and indications are that requirements are growing rapidly. Thickness and density gauges and gamma relays are produced in quantity and there is also an increasing requirement for moisture gauges and equipment for analysis. An interesting new development is a portable X-ray fluorescence analyser for ore assays, a technique also used for controlling galvanizing and tin-plating operations. There has also been a marked increase in the use of radioisotope light sources for telephone dials, compasses, domestic switches and meters. As an example of the savings which could be achieved, one firm with a radioisotope group of 25 people stated that the annual figure for its own purposes could be as high as £4 million. A number of large plants for sterilizing medical equipment have been built and many other aspects are being pursued.

Visits were made to research and development establishments of the UK Atomic Energy Authority, the National Coal Board Mining Establishment, laboratories of the Ministry of Technology and to factories producing and using industrial instruments.

INDUSTRIAL USES IN FRANCE

After considerable research by the Commissariat à l'Energie Atomique, there has been a steady growth in the manufacture of radioisotope instruments by companies in France. It is estimated that the number of gauges used by industry is above 3000, and the variety available is extremely wide. One unusual example is the use by the Post Office of a device for sorting mail ready for stamping. There are three irradiation plants on a commercial scale, and other techniques useful for a large number of industries have been developed. These include X-ray fluorescence, at present in use for galvanizing steel.

During the period from 10-20 October, the group visited centres of the CEA at Saclay and Grenoble, and other institutes and factories making and using radioisotope instruments.

TECHNIQUES IN CZECHOSLOVAKIA

In Czechoslovakia, where applications of radioisotopes are under the overall control of the Atomic Energy Commission, about 250 institutes and laboratories are using them in industry, agriculture, medicine and pure research. Of these, about 150 are working on industrial uses. Among instruments already installed are thickness, density, level and moisture gauges, gamma relays and coal-ash monitors. A number of research institutes are working on radiation

processing using radioactive cobalt and accelerator sources. By 1969 industrial plants will be operating to synthesize tetrabromoxylene (used in producing non-inflammable foam polystyrene for building), for sterilizing surgical products and probably for irradiating potatoes to increase storage life.

Some idea of the developments and actual use of radioactive material was gained by the visits between 24 and 27 October to the Institute of Research, Production and Use of Radioisotopes in Prague; the Research Institute of Building Materials and the Textile Research Institute, Brno; the Research Institute of Rubber and Plastic Materials, Gottwaldov; the crude oil mines at Hodonin; and, in Bratislava, the National Welding Research Institute, the Institute of Physics and the Chemical Faculty of the Department of Radiochemistry and Radiation Chemistry.

VALUE FOR THE FUTURE

The members of the group, all of whom had background knowledge of the subject, were generally agreed that the tour was of the utmost value in gaining detailed knowledge of techniques now in routine use, the reasons for specific applications and possible future developments. They also considered it of great importance to have established international contacts with those actually engaged in practical work, as well as of having had the opportunity of informal discussion among themselves of problems related to their particular countries. They felt that the recommendations they would be able to make would have far-reaching consequences in increasing industrial productivity and efficiency, particularly with the co-operation of the Agency in keeping them informed of progress in many possible applications throughout the world.

A full report of the tour is to be published later by IAEA.