REPORT TO THE GENERAL CONFERENCE

In its annual report to the fifth session of the IAEA General Conference, the Board of Governors records how the Agency's work has been consolidated and most of its programs firmly established. The report, which covers the period 1 July 1960 - 30 June 1961, points out that although more will have to be done to deepen and extend the effectiveness of the present programs, the Agency has now reached a stage where some of its operations can be further developed.

The work of the Agency relates to three principal subjects, namely, the development of nuclear power, the use of radioisotopes or larger radiation sources, and protection against radiation and other regulatory activities. Work in each of these fields is conducted through a variety of operational programs, such as the dissemination of scientific and technical information, training of scientists, technical assistance in the form of equipment and services of experts, promotion of research, and the formulation of health and safety rules.

Nuclear Power, Reactors and Fuels

General studies on nuclear power costs and on methods of estimating these costs have continued, and two documents have been prepared. Besides, surveys have been conducted in two Member States to assess the prospects of introducing nuclear power in specific situations. One of these was in Finland, where the Agency collaborated in studies to determine the extent to which nuclear power would be needed in that country in the next decade; and the other was in the Philippines, to study the prospects of utilizing a nuclear power plant in the Manila area in the late 1960's.

At the invitation of the United States Government, the Agency is closely following the technical work undertaken in the USA on the design, construction and start-up of seven small power reactors of four different types. Members of the Agency's scientific staff have been making periodic visits to the United States to study and discuss different aspects of these reactor projects, such as design criteria, siting, reactor safety and cost breakdown. It is expected that the experience gained from the Agency's participation in these projects will be of special significance to its less developed Member States.

Reactor problems have been discussed at several scientific meetings organized by the Agency during the year under review, including a large conference on small and medium power reactors. A joint program of research on reactor physics has been undertaken in co-operation with the Norwegian Government, which has made its zero power reactor NORA available for this program.

A few Member States are obtaining nuclear fuels under the Agency's auspices. Arrangements have been made for the supply of enriched uranium to Finland from the United States for a Triga Mark II research reactor; the Agency has made use of a US grant of $50 000 to provide the material free of charge. Preliminary steps have also been taken for the supply of three kilograms of enriched uranium from the USSR for a critical assembly in Finland.

Under an agreement between the Agency, Norway and the USA, an enriched uranium fuel charge will be loaned to Norway for the zero power reactor NORA. Furthermore, the Agency is assisting the Yugoslav Government in securing a Triga Mark II reactor and some enriched uranium for it.

Isotopes and Radiation Sources

As in previous years, a very substantial part of the Agency's work has been concerned with the uses of radioisotopes and radiation and there has been some progress in promoting their employment in the less developed countries. Over one third of the fellowships granted, nearly one third of the experts sent out, and approximately one quarter of the research contracts awarded by the Agency during the year under review were related to the applications of radioisotopes and radiation. These applications have also been discussed at a number of scientific meetings.

Signing of agreements in Vienna on 30 December 1960 for the supply with the assistance of IAEA of a reactor and its fuel from the USA to Finland. Seated, left to right: Mr. C.O. Frietsch, representing Finland; Mr. Sterling Cole (IAEA); and Mr. Paul F. Foster, representing the USA

Participants in a regional radioisotope training course held by IAEA in Cairo during March-May 1961

In the medical field, preparations have been made to calibrate and standardize thyroid radioiodine uptake measurements and to compare the results with those in different Member States. On the agricultural side, one of the important events was an international training course on radioisotope techniques in soil-plant studies held jointly with FAO at Wageningen, the Netherlands, during April-May this year. So far as the industrial applications are concerned, new activities include a systematic survey of isotope uses in relation to particular industries, and a survey of the published information on industrial savings achieved from these uses. The Agency is also making an economic study of the production, import and distribution of isotopes in Member States; among the questions being studied is whether it is more economical to import the isotopes from the major producing countries or to manufacture them internally if small research reactors are locally available. The uses of isotopes in the physical sciences and industry were reviewed at a large scientific conference in Copenhagen last September. A regional training course on radioisotope techniques was held in Cairo during March-May this year.

For all operations in which substantial amounts of radiation are used, it is essential to have accurate reference sources against which the radiation can be checked, and the Agency has taken steps to provide such reference sources.

A world-wide survey has begun to determine the concentration of hydrogen and oxygen isotopes in natural water. With the help of the World Meteorological Organization, monthly sampling of rainfall from various parts of the world has been started, and a number of national laboratories are co-operating with the Agency in measuring these samples. The information obtained from the survey is expected to provide essential knowledge of background radioactivity which will be later needed for detailed hydrological experiments in a particular area. Such experiments may be of particular importance in arid zones in the less developed areas; for instance, to determine the storage time of ground water and its movement under the earth, or to deal with river control problems which arise in irrigation works. The Agency is taking part in hydrological studies in Greece in connection with a Special Fund irrigation project which FAO is carrying out in that country.

Radiation Protection

The Agency has continued to work on a wide range of subjects connected with protection against radiation, in order to fulfill its statutory functions of establishing or adopting standards of safety "for protection of health and the minimization of danger to life and property". In setting up these standards it is necessary to fill the existing gaps in knowledge about the effects of ionizing radiation. In trying to promote research in this field, the Agency has concentrated on such subjects as radiobiology, disposal of radioactive wastes, and radiation dosimetry. Attention has also been given to the safety aspects of nuclear propulsion and questions of legal liability arising in the event of nuclear accidents. As the safety standards are formulated, they become in turn the basis for regulations, manuals or codes of practice.

Contracts awarded by the Agency for research in radiobiology have been concerned with three major problems, namely, the mechanism of primary radiation damage at the cellular and sub-cellular level, radiation effects on genetic material, and problems of food sterilization by radiation. So far as health physics and radiation protection are concerned, the main subjects have been the effectiveness of chemical compounds to protect radiation workers against the effects of accidental radiation exposure, new ways of treating radiation workers who have been exposed to lethal amounts of radiation, and the practical application of radioactive calcium in various metabolic studies.

Contracts have also been awarded for investigations into the radioactive contamination of the biosphere and methods of safe disposal of radioactive wastes. An agreement has been made with the Government of Monaco and the Institute of Oceanography in Monaco for a three-year joint research program on the effects of radioactivity in the sea.

Radiation protection problems have been discussed at scientific meetings and by panels of experts convened by the Director General.

The Agency's laboratory has carried out measurements of the radioactive contamination of the environment and of food samples. Approximately 300 food samples from nine countries have been analyzed. Some holders of Agency fellowships are being trained in the laboratory in methods of analyzing environmental contamination.

The Agency has also undertaken several special projects to evaluate the safety aspects of new reactors at the request of Member States; these include an

evaluation of the hazards of a high-flux reactor being constructed at Petten in the Netherlands. A survey of reactor incidents is being compiled as a basis for studies on the adequacy of present reactor safety precautions. The Agency is also considering what part it can play in arrangements for emergency assistance in the event of a nuclear accident in a Member State.

Progress was made during the year in the establishment of basic safety standards for application to operations conducted or assisted by the Agency. Work was completed on the formulation of regulations for the safe transport of radioactive materials. Health physics and medical addenda to the Manual on the Safe Handling of Radioisotopes were published. A manual on the use of film badges for personnel monitoring has also been prepared.

Work has continued on the preparation of draft conventions on civil liability for nuclear damage.

The Main Programs

In 1960 the Agency spent or earmarked more than one million dollars from its own resources for technical assistance activities (including training); in addition, equipment valued at $192 000 was donated by one Member State. Furthermore, nearly $600 000 were spent by the Agency on technical assistance out of funds made available under the United Nations Expanded Program of Technical Assistance (EPTA).

Two preliminary assistance missions were sent out in 1960; early this year, one mission visited four African States. In addition, several smaller missions have been organized. The recommendations of these missions often form the basis of the Agency's program of assistance to its Member States.

In 1960, 648 nominations were received and 468 candidates selected for the award of fellowships. By 30 June 1961, 605 nominations had been received from 44 countries and 242 had been selected under this year's program. Under the 1960 program, 17 visiting professors were sent to various Member States, and by 30 June eight had been appointed under the 1961 program.

In addition to the training courses organized by the Agency, two mobile radioisotope laboratories have been used for training in general radioisotope techniques.

The services of 40 experts were made available to Member States in 1960, while the program for 1961 provides for nearly one hundred experts. Supply of equipment valued at over $168 000 (in addition to the equipment specially donated by a Member State) was approved under the 1960 program; the allocation for 1961 amounts to over $293 000.

Thirteen scientific meetings were organized by the Agency during the period under review. These were attended by 2 327 participants from 58 Member States and 18 international organizations.

There has been a considerable expansion in the program of scientific publications, which include the proceedings of scientific meetings, reviews covering different branches of nuclear science and technology, directories and manuals. The publication of a scientific journal on plasma physics and thermonuclear fusion began in October 1960.

The 1000th IAEA fellowship was awarded to Dr. P.P.G.L. Siriwardene, of the University of Ceylon, Colombo, for training at the UKAEA Isotope School at the Wantage Research Laboratory in Berkshire, UK. Picture shows Dr. Siriwardene operating a vacuum apparatus used in the counting of tritium (Photo UKAEA)

The Agency's library now has over 49 000 scientific and technical publications.

The research contract program is perhaps the first of its kind to be undertaken on a substantial international scale by an organization of the United Nations family. Forty-eight new research contracts were awarded during the year under review and 35 contracts were renewed. The contracts have been placed with institutions or laboratories in 33 countries.

In January 1961 the Board of Governors adopted by a majority vote a document containing the principles and procedures for the application of Agency safeguards. They are being applied to the supply of a research reactor and its fuel to Finland, and the supply of fuel for the NORA reactor.

The Agency has received two formal joint communications - one from the Governments of Canada and Japan, the other from the Governments of Japan and the United States - proposing consultations for the transfer to the Agency of the administration of safeguards arising out of bilateral agreements between the Governments concerned for co-operation in the peaceful uses of atomic energy. In addition, the United States Government has indicated that formal proposals will be made to the Agency in connection with its offer to place four reactors in the USA under the Agency's safeguards.