A YEAR OF EXPANSION

IAEA EXTENDS ITS OPERATIONAL ACTIVITIES

The past year has been marked by a rapid expansion of the operational activities of the International Atomic Energy Agency. The pace and extent of expansion are reflected in the second annual report submitted by the Agency's Board of Governors to the General Conference, the plenary body of the Agency on which all Member States are represented. The report covers the period 1 July 1958 - 30 June 1959.

The Agency's basic aim, as defined in its Statute, is to "accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world." If this is not to remain a vague ideal or the mere expression of lofty sentiment, it is essential, first of all, to determine these aims in terms of concrete programmes.

The peaceable uses to which the energy of the atom can be put can be considered under two broad heads: the generation of nuclear power and applications of nuclear radiation. The activities of the Agency must, of necessity, be directed towards these two broad aims. But, in view of some of the possible harmful effects of nuclear radiation and the possible application of nuclear energy to purposes that are not peaceful, the very pursuit of these two aims imposes upon the Agency a third basic function. And that is to ensure that the development of atomic energy throughout the world, to which the Agency lends its assistance, does not constitute a hazard to health and safety or a threat to security and peace.

The Agency's annual report points out that the production and use of radioisotopes and the eventual generation of economic nuclear power, under safe and secure conditions, continue to be the main objectives of most of the Agency's work. An international organization itself cannot undertake actual programmes of development on behalf of its Members. What it can do is to assist Member States in initiating and carrying out such programmes. The primary role of the Agency is, therefore, that of assistance, guidance and co-ordination.

Forms of Assistance

Such assistance can take various forms, one of the most important being the provision of experts and equipment to help particular projects. Again, valuable assistance can be given by an exchange of information, so that all countries, with varying degrees of development, may enjoy the benefits of the latest advances in research and technology. In some cases, the international body itself can give an impetus to research and technical development and fill the gaps in existing knowledge. Furthermore, it can help in laying the foundations of development by arranging the training of technical personnel. And above all, it can render substantial assistance by arranging and co-ordinating the supply of nuclear materials and equipment in a manner that would best meet the needs of all Member States and reduce the chances of retarded or unbalanced development in particular areas.

IAEA has been following all these varied lines of approach. But, inevitably, the relative emphasis or success is conditioned by the facts of concrete situations.

A significant feature of the Agency's activities has been to ensure that its operations yield the greatest possible benefit to the less developed areas of the world which are in the greatest need of its assistance. The first special session of the Agency's General Conference recommended that priority should be given to those activities which would benefit the less developed countries to the maximum possible extent. This was again stressed by the General Conference at its second regular session which recommended a continuing study of the possibilities of utilizing nuclear power in the less developed countries.

Certain fields of the Agency's activities are, however, of interest not only to the less developed countries, but to all Member States. In these fields also, the scope of the Agency's work has continued to expand. These include not only the establishment of health and

Banner welcomes the IAEA team to Seoul, Korea

safety standards and the evolution of international conventions and safeguards procedures, but also an exchange of scientific and technical information among all nations.

Experts, Equipment and Materials

Many Member States have indicated that they wish to have general guidance about their atomic energy programmes before formulating specific requests for technical assistance. Accordingly, the Agency has sent out several teams of experts to different areas to make preliminary surveys of conditions and needs. Early this year, an Agency mission visited Burma, Ceylon, Indonesia and Thailand, and later, another mission went to China, Japan, the Republic of Korea, the Philippines and Viet-Nam. A third mission was sent to Argentina, Brazil and Venezuela during the summer. Smaller missions or individual advisers have been sent to Greece, Morocco, Pakistan, Thailand, Tunisia and the United Arab Republic, and arrangements are being made for visits to Iran, Turkey and Yugoslavia.

By June 1959, 62 requests for technical assistance had been received by the Agency, in many cases as a sequel to the visits of preliminary assistance missions. By that date the Board of Governors had approved requests for the provision of a total of 27 experts: three for Brazil, three for Burma, four for Greece, four for Indonesia, three for Pakistan, seven for Thailand and three for the United Arab Republic. The Board had also approved the supply of some items of scientific equipment to Brazil, Burma, Greece, Indonesia, Thailand and the United Arab Republic. The total cost of this assistance in the form of experts and equipment has been estimated at $409 150.

The types of assistance which Member States seek from the Agency give a general idea of the nature of the problems that different countries encounter in the early stages of their work for the development of atomic energy. The requests can be grouped in six broad categories: (a) general advice and assistance for the setting up of atomic energy establishments and the development of atomic energy programmes, (b) technical assistance in exploring the possibilities of utilizing nuclear power in specific locations, (c) assistance in the design, construction and use of reactors, (d) assistance in specific fields, such as the use of radioisotopes and the production of nuclear materials, (e) advice on reactor safety problems, and (f) equipment and other technical supplies.

During the period under review, the Agency began to assume its major role as a supplier of nuclear materials for activities to be carried out under its standards of health and safety and its safeguards against military use. Under the first supply operation, Japan secured from the Agency three tons of natural uranium - the first purchase of nuclear fuel by a country through truly international channels. The material had been made available to the Agency free of charge by Canada.

Signing of agreements for the supply to Japan of three tons of natural uranium donated to the Agency by Canada. Left to right, sitting: Dr. H. Furuuchi, signing on behalf of the Japanese Government; Mr. Sterling Cole, Director General, signing for the Agency; Mr. C.A. Bernardes, Chairman of the IAEA Board of Governors; and Mr. W.H. Barton, who signed on behalf of Canada. In the background members of the Board and IAEA officials

Several Member States have notified the Agency that they are prepared to supply it with substantial quantities of natural uranium and thorium. As regards enriched uranium, the offers by the Soviet Union, the United Kingdom and the United States have now been embodied in general agreements, which ensure that in all a minimum of 5 140 kg of contained uranium 235 will be available to the Agency.

Training and Information

Exchange of experts and training of personnel are obviously major forms of technical assistance, but can be considered separately in view of their basic importance in any scheme for atomic energy development. The Agency's programme of exchange and training has continued energetically in three main fields: training in general techniques, specialized training and research training. It has been necessary to expand this programme rapidly because of the pressing needs of Member States for trained personnel, and it has been possible to do so because the execution of this programme needs less elaborate preparations than are required for the more complex types of technical assistance.

Nuclear science fellowships were initiated in April 1958 and Member States were requested to submit nominations. Under the 1958 fellowship programme, a total of 287 nominations were received from 30 countries. Of the 287 candidates, 218 have been selected for placement in 28 countries. By 30 June 1959 a total of 522 nominations had been received from 41 countries.

Another feature of the programme is the exchange of visiting professors to give special courses on such subjects as nuclear physics, radiochemistry and reactor engineering or on special techniques to be

applied to specific research problems. Under this scheme the Agency arranged for the visit of an eminent British radiochemist to Greece to give a series of lectures as part of a course in the use of radioisotopes.

The Agency has also been engaged in a survey of the available training facilities in Member States. Besides, it has been studying the possibility of establishing one or more radioisotope training centres in Africa and the Middle East. Organization of specialized training courses is another activity in this field which the Agency has been trying to promote. (The first such course was held from 20 July to 10 September 1959 under the joint sponsorship of IAEA and FAO, in co-operation with the United States Government and Cornell University. Preparations for two more courses are in progress. Problems of training were discussed at a seminar held in July at Saclay, France).

In the field of scientific and technical information, considerable progress has been made in documentation, in the building up of a library, in the editing and publication of scientific and technical papers and in the organization of conferences, symposia and seminars. The report says: "The assumption that the Agency would be in a unique position to assemble and disseminate information in its specific field and to promote the exchange of information between Member States has proved to be valid."

The library has been expanding rapidly, and in the field of documentation the Agency has become a ready source of reference on atomic energy. The number of scientific and technical papers published by the Agency has increased. As for scientific meetings organized by the Agency, the first was a seminar on medical radioisotope scanning, sponsored jointly with WHO and held in Vienna in February 1959. Another meeting, also held in Vienna, dealt with the subject of radioactivation analysis and was sponsored jointly by the Agency and the Joint Commission on Applied Radioactivity of the International Council of Scientific Unions. (A major conference on the application of large radiation sources in industry was held in September in Warsaw. Other scientific meetings to be organized by the Agency this year include a symposium on radioactive metrology to be held in Vienna in October and a conference on the disposal of radioactive wastes to be held in Monaco in November.)

Isotopes and Research

During the Agency's first year of operation, it became apparent that one of the major areas of its work would concern research and radioisotopes. This was recognized at the second session of the General Conference which allotted substantial funds for research and studies to be carried out either at Agency Headquarters or to be contracted out to research institutions in Member States.

In carrying out the Agency's functions in support of research, particularly in relation to safeguards, radiation safety and protection, and health, a number of research contracts have been placed with various institutions in Member States. By the end of June 1959, a total of 15 contracts had been awarded or were in an advanced stage of negotiation.

The view that for the effective discharge of some of its functions involving scientific analysis, measurements and testing, the Agency should have a functional laboratory of its own was endorsed by the General Conference last year, and during the period under review the Board of Governors approved detailed plans for its construction. The laboratory building is expected to be completed around the middle of next year and the scientific equipment will be installed immediately thereafter. It should be possible to start operating the laboratory in the last quarter of 1960.

To collect scientific information, some members of the Agency's scientific staff have visited research institutions in Member States. In particular, a survey has been made of the trends of research on the treatment of food and drugs by ionizing radiations, a problem which is of considerable interest to the less developed countries. Besides, the scientific staff themselves have carried out studies on certain specific problems. One such study has dealt with the use of large radiation sources in radiotherapy. Some members of the staff have also been engaged in advising Member States on certain research problems, particularly in connexion with radioisotopes. Specialists in the application of isotopes in agriculture and medicine were included in the missions to South-East Asia, the Far East and South America.

The Agency's work in the field of isotopes and research is also helped by its programme of scientific meetings. The two meetings in Vienna, on medical radioisotope scanning and on radioactivation analysis, have been extremely useful for an exchange of information on some of the latest results and problems of research.

The Agency is preparing an International Directory of Radioisotopes and Labelled Compounds, the first volume of which has already been published. The

Dr. Michael J. Higatsberger, a Managing Director of the Austrian Society of Atomic Energy Studies (right), and Dr. Henry Seligman, Deputy Director General of IAEA, after the signing of an agreement leasing to IAEA the site for its laboratory at Seibersdorf, near the Austrian atomic laboratories. Close collaboration will obtain between the Agency's scientific staff and those of Austrian laboratories

directory will give detailed information on all radioisotopes and labelled compounds which are now commercially available, together with information on their radiation characteristics, the forms in which they are obtainable, their prices and their producers. To keep it up to date, it is intended to revise this document periodically and issue supplements. A catalogue of teletherapy units using radioisotopes has also been compiled.

Nuclear Power

The Agency's two-year programme of studies on the utilization of nuclear power in the less developed areas of the world was initiated early in 1959. The studies fall into four parts, three of which have been undertaken simultaneously. These are: (a) collection and evaluation of technical data on reactor systems particularly suitable for small or medium power output, (b) economic studies, i. e. studies of cost data on reactor systems regarded as potentially suitable from a technical point of view, and (c) an enquiry into situations in which the introduction of nuclear power is likely to yield early, even if limited, benefits. These investigations, when complete, will merge into specific case studies of selected situations, and this will constitute the final phase of the Agency's study programme, the results of which will be available in time for a conference on small and medium power reactors to be held next year.

So far as the technical studies are concerned, data are being collected and analyzed on reactor systems with proven and relatively simple technology, e. g. pressurized water reactors, boiling water reactors, graphite-moderated gas-cooled reactors, and graphite-moderated pressurized water-cooled reactors. The present study programme will not cover reactor systems which are still more or less experimental. Technical evaluations of systems with proven technology and operating experience are now in progress, with special reference to such aspects as safety, reliability, maintenance and operation, transportability, fuel technology and fuel cycling. Apart from studying published literature, the Agency has held consultations with scientists and nuclear engineers as well as with manufacturing organizations in different countries.

As for the economic factors, it has been evident from the beginning that cost studies will have to progress rather slowly and be examined very carefully in order to avoid misleading generalizations. This is important particularly because the construction of power reactors in the less developed areas would be subject to certain conditions which might differ widely from those under which the prototype units have been built and are being operated. Available data are meagre, and such information as can be obtained on the construction and operation of power reactors in highly industrialized countries does not provide a ready basis of estimates for under-developed areas. If the available data are to be extrapolated, it is essential to have precise information on conditions under which the costs have been calculated. The Agency has been trying to secure detailed data from Member States and from manufacturers, constructors and operators.

In its search for potentially promising situations, the Agency addressed a circular letter to all Member States to find out whether they would be interested in participating in a survey of their power needs. By the beginning of May, 16 out of a total of 31 replies, had indicated positive interest and intention to participate. They came from Argentina, China, Finland, Greece, Italy, the Republic of Korea, Pakistan, the Philippines, Portugal, Thailand, Tunisia, Turkey, the Union of South Africa, the United Arab Republic, Venezuela and Yugoslavia. Data on the power situations in these countries are being assembled and analyzed. As these countries represent fairly wide variations in stages of industrial development, their nuclear power needs will also be different. The Agency had forwarded to these countries an outline of the minimum information that will be required to assess their power needs and the prospects of economic utilization of nuclear power in specific locations.

From the outset, the Agency has established contact with the United Nations and its regional economic commissions as well as with the International Bank for Reconstruction and Development. These bodies have already supplied the Agency with much useful information and assured the Agency of their full co-operation and assistance in carrying out its two-year programme.

An international directory of power reactors was issued in June 1959 and directories of other types of reactors are now under preparation. Preparations are also being made for several scientific meetings dealing with reactors.

Regulatory Functions

As already indicated, regulatory functions are an essential and inseparable adjunct to the Agency's main operational activities. Part of these functions is concerned with the establishment of standards for health and safety in connexion with atomic energy work, while another part is concerned with the establishment of safeguards against diversion of Agency assistance to military use.

Radiation protection is becoming an increasingly important part of the Agency's activities. The work takes the form of drafting regulations and recommendations, technical assistance and evaluation of specific hazards. In the regulatory field, after two series of meetings of a panel of experts, the Agency's first health and safety guide, a manual of safe practice for the handling of radioisotopes, was issued in December 1958. An expert panel met in April 1959 to start work on recommendations on the transport of radioisotopes. (Another panel which started work in July is concerned with the transport of substantial quantities of radioactive materials, such as irradiated fuel elements.) A panel on problems of radioactive

Radioisotopes transportation panel at work in Vienna. At head of table facing is the Chairman of the panel, Mr. G.E. André of Belgium

waste disposal into the sea met in December 1958 and in March and June 1959. At the conference to be held in Monaco in November, geologists, oceanographers and atomic specialists will discuss this subject, as well as that of waste disposal in the soil. It is expected that all this work, in addition to identifying specific problems and pointing to means for their solution, may provide a basis for international conventions.

Numerous requests for health and safety services have been received; for instance, to provide expert advice and make evaluations of the safety aspects of reactor projects, to assist Member States in drafting health and safety programmes, and to advise them on the purchase of equipment or on the formulation of regulations. Two Agency experts visited the site of the reactor accident that took place at Vinca, Yugoslavia, and a report is being prepared in collaboration with Yugoslav scientists.

In connexion with the supply of materials to Japan, the Agency was for the first time called upon to prepare a set of safeguard rules. General principles for the application of safeguards are now being considered by the Board.

From the beginning the Agency has been faced with the need for international co-ordination and harmonization of the principles governing third party liability in the event of nuclear damage. The absence of special legislation in this field may leave injured victims without redress and tends to generate difficulties in bilateral agreements, and a multilateral approach is likely to be even more seriously affected by legal uncertainty. The difficulties might increase further if different national legislations on the subject were to incorporate different principles and procedures.

Considering the nature of the problem, the IAEA Director General constituted a panel to advise him on the question of Civil Liability and State Responsibility for Nuclear Hazards. The panel met twice during the period under review - in February and May 1959. Substantial agreement was reached on minimum international norms to be adopted in the field of civil liability; at the second session the panel ended the first reading of a draft convention. (The panel completed its work at a series of meetings in August).

Summing Up

In a general summing up of the Agency's activities during the period under review, the Board of Governors says: "During the past year, the Agency has begun to work in all the fields covered by its Statute. The extent of its activities has, however, varied considerably, the most notable growth being in the field of technical assistance, including fellowships, and health and safety and radiation protection. The Agency's programme of conferences has also successfully begun, as has its work of promoting and helping research. The Agency has begun to fulfil its role as a supplier of material, and this has led to the first application of its safeguards. The Agency has thus started to meet the needs of its Member States in many domains, and the Board expects that 1960 will be a year of consolidation during which most of its programmes will become firmly established and will expand at a more even rate. Further major extension of the Agency's activities will depend to a considerable extent on the degree to which it is called upon to fulfil its functions in regard to the development of nuclear power and the supply of materials."