AN OUTLINE OF IAEA PROGRAMME FOR 1963

In IAEA's Programme and Budget for 1963 the Agency's Board of Governors draws attention to four distinctive features of the document:

(a) The programme includes more activities of a potentially long-term character than in the past;

(b) To a larger extent than before the programme has been developed on the basis of the advice and help given by the Agency's Scientific Advisory Committee and ad hoc groups of scientists;

(c) Greater efforts have been made to devise a programme that offers as much help as possible to Member States whose needs are the most urgent; and

(d) An attempt has been made to reduce the mainly administrative expenses of the Secretariat and thus facilitate the undertaking of more scientific and technical work.

Some of the important details of the programme are given in the following paragraphs. As an introduction to this outline, it may be pointed out that from the financial point of view the Agency's work is divided into two categories. The first comprises activities which fall under the Regular Budget and are financed out of assessed contributions by Member States, while the second consists of activities under the Operational Budget, financed out of voluntary contributions by Member States to the Agency's General Fund and other resources, such as funds made available under the United Nations Expanded Programme of Technical Assistance (EPTA) and gifts of equipment, free services of experts and free training facilities. Chief among the latter activities are technical assistance and training.

Technical Assistance and Training

The Agency's technical assistance programme has grown from year to year. For 1962, the Board of Governors approved requests for assistance involving the services of 40 experts and equipment worth $229 750. This was in addition to some 36 experts who would be serving in 1962 under previously sanctioned projects and equipment worth about $100 000 to be procured during the year under the EPTA biennial allocation for 1961-62.

It is estimated that in 1963 the need will arise for the services of some 90 field experts, in addition to those whose assignments continue from previous years. Requests for equipment are expected to exceed the value of $250 000.

It is also expected that the Agency will be called upon to assist certain Member States in making arrangements to receive technical assistance directly from other Member States. Similarly, it may be required to assist some Member States in preparing suitable projects for assistance from the United Nations Special Fund and other international financing institutions.

By the end of this year, a total of 46 countries will have been visited by preliminary assistance missions, which are dispatched primarily to ascertain Member States' needs for assistance from the Agency. It is planned to send out one such mission in 1963. Besides, two follow-up missions are planned for next year, to renew direct contacts with atomic energy organizations and to assist Governments in preparing requests for technical assistance.

The Agency's training programme includes the award of fellowships and research grants, exchange of scientists and visiting professors, the organization of training courses and regional training centres, and the use of mobile laboratories for training in the Member States themselves.

Applications for fellowships have increased steadily, but there has not been a corresponding increase in the funds available for the purpose. The Agency hopes to make more extensive use next year of cost-free fellowships made available by Member States, but even then it may not be possible to meet all deserving requests for fellowship awards. The practice of providing in-service training at the Agency's own laboratory will be further developed next year and it is expected that it will be possible to accept 20 fellows for training in the laboratory.

The number of requests for the organization of training courses in the less-developed countries is also increasing, but due to the inadequacy of financial resources it will be possible to finance in 1962 only four such courses from Agency funds and two from EPTA funds. To the extent that funds are available, this part of the programme needs increasing support in 1963. In the past, Agency funds have not been available for the establishment of regional training centres, but in 1963 part of the funds available under EPTA for regional projects could be utilized to defray a proportion of the costs of establishing such centres.

The Agency's two mobile laboratories have, in past years, provided training on the spot to approximately 750 trainees in the Far East, Latin America and Europe. It is expected that one of the laboratories will move to Africa late in 1962 or early in 1963.

Nuclear Power and Reactors

The Agency will continue its studies on the economics of nuclear power as well as on the technology and economics of small and medium sized power reactors. It is planned to convene in 1963 a panel of experts to discuss the Agency's report on the results of an investigation into the cost of nuclear power in an

A six-week international seminar on theoretical physics was recently held by IAEA in Trieste. Picture shows the Director General, Dr. Sigvard Eklund, (left) talking to Professor Abdus Salam, of Pakistan, who acted as Scientific Director of the seminar

integrated system and its comparison with the cost of conventional power production.

It is proposed to hold next year a conference to discuss the experience gained in the operation and maintenance of power reactors which have been functioning for a sufficiently long time to yield useful information, with special attention to nuclear superheat reactors.

The Agency will continue to provide, on request, technical advice and guidance to Member States on their nuclear power programmes, and it is expected that two further power survey missions will be sent out next year to examine the prospects of nuclear power in interested Member States. Such missions may lead to the initiation of nuclear power projects, possibly in some cases on a regional or international basis - in which case, the Agency may be involved in such matters as selection of the type, size and site of the plant, hazards evaluation, and the evaluation of international bids.

So far as research reactors are concerned, the Agency expects to receive an increasing number of requests for technical advice, guidance and assistance. It is planned to convene in 1963 two panel meetings to discuss in detail the work that can be done in specific circumstances by research reactors of low and medium power. It is also planned to organize discussions between scientists from Member States who face analogous problems in their research establishments, members of the Agency's scientific staff, and consultant specialists on problems relating to the operation and utilization of research facilities in newly established centres.

The study of the physics of specific reactor lattices will continue, and a group of experts will be convened next year to discuss the physics of heavy water lattices, especially to review the data that have been developed since a panel of experts on this subject met in 1959. It is also proposed to organize a symposium to examine exponential and critical experiments from the points of view of reactor design, safety, operation and relative results.

Another symposium planned for next year will discuss the choice of materials for reactor control rods, the metallurgical and physical properties of these materials, the design and fabrication of the rods, and their performance under actual operating conditions.

Hazards evaluation of individual reactor plants will continue to be made. Another continuing activity will be the award of research contracts on subjects of particular interest to newly developing reactor centres.

It is expected that several requests will be received next year for the supply of special fissionable materials for reactor projects in Member States. In general, the Agency will continue to provide information and advice on all aspects of the production, fabrication and utilization of various types of nuclear material. It is also intended to organize a conference on new nuclear materials technology, with special reference to the use of such materials in the fabrication of non-metallic fuel elements.

Radioisotopes

There has lately been an increasing awareness in Member States of the immediate practical benefits that can be derived from the application of radioisotopes in medicine, agriculture, hydrology and industry.

So far as the medical applications are concerned, it is intended to award research contracts in tropical medicine with the object of promoting the application of established radioisotope techniques to the study of diseases affecting large groups of people in the less-developed countries in tropical regions. A smaller part of the funds for medical research contracts will continue to be used to promote the development of new techniques and the application of new isotopes. The Agency-sponsored research on calcium-47 is likely to be terminated next year, but it is proposed to convene a second meeting of the panel on the research applications of calcium-47, to review the results achieved and discuss the future role of the Agency in this field. As regards the use of radioisotopes for teletherapy, dosimetric data and related information will continue to be supplied to Member States. The use of external radiation beams from cobalt-60 and caesium-137 sources for total body irradiation will be studied. As at present, the whole-body counting facility set up in the Agency's laboratory will be used for the examination of persons who have absorbed radium and thorium, as well as for training. Work on the calibration and standardization of measurements of radioiodine uptake by the thyroid gland will continue.

In the field of agriculture, it is planned to hold a symposium on the use of radioisotopes and radiation sources for the control of plant pests. Efforts will also be made to give effect to the recommendations made by a panel of experts on the radiation disinfestation of grain. Another important activity next year will be in connection with the Special Fund project to promote atomic energy applications in agriculture in Yugoslavia, for which IAEA will be the Executing Agency. As regards research contracts, the emphasis on soil-plant relationships will be maintained, but it is intended gradually to shift the emphasis on genetics research towards applications of more immediate value. In connection with a regional research programme on rice, which started this year, rice samples will be sent to the Agency's laboratory where they will be analysed for isotope content.

Activities to promote the use of radioisotopes in hydrology will be further strengthened, and research contracts will be placed in countries where facilities for such work exist. The activities will be mainly concerned with studies of hydrological problems in Member States, surveys of existing facilities for the use of isotope techniques, advice on possible applications, and assistance in interpreting results. A symposium on the uses of isotopes in hydrology is also planned for next year. The world-wide survey of the concentration of hydrogen and oxygen isotopes in natural water will continue, with the addition of a programme of river water sampling arranged in cooperation with the World Meteorological Organization (WMO).

The survey of isotope applications in industry and of the savings obtained by them, which began this year, will continue. The possibilities of using the resources of the Agency's laboratory for a training course on the industrial application of isotopes will also be investigated.

Health, Safety and Waste Management

It is proposed to convene in 1963 a panel of experts to study the acceptable emergency doses in connection with the safety of nuclear installations and the emergency measures necessary to safeguard both the employees of such installations and the populations near them in the event of an accident.

A scientific meeting held this year on the diagnosis and treatment of radioactive poisoning has continued the examination of problems studied at a similar meeting in 1960, and based on the results of these meetings a manual on the handling of patients will be issued next year. It is also proposed to hold in 1963 a symposium on the biological effects of neutron irradiation, and to convene a panel on the effects of radiation on the endocrine system. Further research contracts on the effects of radiation and on radiobiology will be awarded. Another continuing research activity will be the project to study the effects of radioactivity in the sea, which started in 1961 at the Laboratory of Marine Radioactivity in the Oceanographic Museum at Monaco.

For the development of radiation protection measures, a panel of experts will be organized next year to assess the basic requirements for an adequate system of personal dosimetry for workers exposed to radiation. Another panel will consider the development of standard methods of measuring radioactive contamination. Further, a comparison of film dosimetric techniques between laboratories of different countries is proposed to be undertaken.

The Agency will continue to give Member States, on request, certain technical services relating to radiation protection, such as the quantitative assessment of a number of radionuclides in foodstuffs and in the environment, a bio-assay survey, and the assessment of body burden of certain radionuclides. Research contracts in the field of radiation protection will be concentrated on such subjects as the development of medical compounds to protect workers against radiation, the treatment of radiation injury by bone marrow transplantation, and measurements of the body burden of radionuclides. A symposium on radiological health and safety in the mining and milling of nuclear materials will be held next year, and a panel of experts, which held its first meeting this year, will meet again to consider the problems involved in the establishment of health physics surveys for nuclear installations, with particular reference to the needs of the developing countries.

Questions of hazards evaluation of nuclear installations and emergency procedures in the event of a serious accident are assuming increased importance, and it is proposed in 1963 to review the general problems of emergency conditions and to convene a

IAEA experts inspecting a US reactor at Brookhaven under an IAEA-USA agreement intended to help the Agency in developing and testing its safeguards system. Right to left: the two IAEA inspectors, Michael J. Higatsberger and Carlos Buchler, with a Brookhaven technician. (Photo Brookhaven National Laboratory)

panel to consider the establishment of emergency procedures and adequate emergency monitoring techniques. The Agency's plans for the provision of international emergency assistance to Member States in the event of a serious accident will need to be developed further.

As regards waste management, increased attention will be paid to the development of techniques for dealing with the specific problems that may arise, and visits to Member States may be necessary in order to obtain first-hand information on such problems. A panel of experts will be called together to consider problems of air cleaning and atmospheric pollution. Research contracts on waste management will be concentrated on studies of the natural processes of transport and distribution of radioactive material, on the treatment of radioactive wastes to remove or immobilize their radioactive components prior to further operation, and on methods of storage. The charting of sea-disposal and sea-monitoring data provided by Member States and of the levels of concentration of various radionuclides in the sea will be continued.

The experience gained from the use made of the Agency's Regulations for the Safe Transport of Radioactive Materials will be analysed, and any necessary revision of the regulations will be considered.

Research and Scientific Services

The Agency's Scientific Advisory Committee (SAC) has endorsed a proposal to establish a committee to guide the programmes of practical work to ensure international co-operation in the measurement and collection of basic nuclear data. It is proposed that the first steps to carry out this proposal should be taken next year.

Studies have continued on the possible establishment of a permanent institute of theoretical physics; in the meantime, SAC has recommended that this year's seminar on high energy theoretical physics should be followed next year by a similar seminar on some aspect of nuclear, solid state or plasma physics. It is also proposed to study the desirability and feasibility of developing a super high energy accelerator on an international co-operative basis.

The distribution of calibrated radionuclide samples will be extended further in 1963, and new calibration methods will be developed. The Agency will also continue to participate in the international intercomparison measurements of radionuclides, organized by the International Bureau of Weights and Measures (IBWM).

A conference on experimental facilities for and applications of large radiation sources (excluding radiation therapy) is expected to be held next year.

A comparative study of methods used in different laboratories for the chemical analysis of nuclear materials, which began this year, will be continued. It is also envisaged that there will be a considerable amount of radiotracer work such as is necessary in most modern studies of analytical methods. An optical spectroscopy group will start functioning, in collaboration with other groups in the Agency's laboratory working on general chemical analysis and analysis by radiation activation.

The work begun this year on the determination of trace elements in the marine environment will also be continued. In mass spectroscopy, the programme will consist of the application of stable isotopes to analyses by the isotope dilution method, and the use of the mass spectrograph for the direct analysis of trace elements in sea water and nuclear materials. The development of methods to improve the measurement of tritium in tritium-hydrogen mixtures will be continued, depending on the results obtained by the end of this year with the gas chromatography project now in progress.

The analysis of radionuclides in air, water, soil, plants, food and human bio-assay samples submitted by Member States will be continued and, as in the past, the results communicated to the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR).

A service for the distribution of standards for radiochemical analysis, which began this year, will be extended in 1963.

Other Activities

Present indications are that in 1963 a number of nuclear facilities will be subject to Agency safeguards. Plans are being made to buy the essential minimum of portable equipment that will be needed for inspections. Work will also be done on other procedures for the application of safeguards, and some work for the development of the relevant techniques will be carried out in the Agency's laboratory. The organization of a panel on non-destructive analysis of irradiated fuel is also planned for next year.

As regards the Agency's programme for the exchange of information, some of the scientific meetings planned for next year have been referred to in earlier paragraphs. In all, eleven meetings are proposed to be held. As in the past, the Agency's publications and library and documentation services will constitute a major part of the programme. For example, plans are being made to make the Agency a centre of information on radioisotope techniques in hydrology. Besides, special attention will be paid to giving assistance to the developing Member States in the organization of scientific information services. There is also a proposal to undertake the production of a short educational film dealing with the safe transport of radioactive substances.

Resources and their Allocation

For the overall programme of work outlined in the preceding paragraphs, the Board of Governors has proposed a total budget of $9 562 100, which represents an increase of approximately 7.5 per cent over the adjusted total budget for the current year. Of the

total amount for next year, $7 337 500 are for estimated expenditure under the Regular Budget, while the estimates under the Operational Budget amount to $2 224 600.

Some of the major allocations under the Regular Budget are: panels and committees - $170 000; seminars, symposia and conferences - $188 000; distribution of information - $245 000; and scientific and technical services and laboratory charges - $1 110 000. Under the Operational Budget, $935 000 are allocated for exchange and training and $ 864 000 for technical assistance. The allocation for laboratory facilities is $205 600, while $180 000 are provided for the award of research contracts.

As noted earlier, the Operational Budget is financed mainly out of voluntary contributions by Member States. The target for voluntary contributions in 1963 has been set at $2 000 000.

In addition to these estimates relating to the Agency's own funds, a sum of $1 116 000 is expected to be available for the training and technical assistance programmes out of funds made available to the Agency under EPTA.

PROSPECTS OF NUCLEAR POWER IN EL SALVADOR

A nuclear power expert of the International Atomic Energy Agency, * who was sent to El Salvador at the request of that country's Government, has recommended that the possibility of using nuclear energy as a competitive source of power generation in El Salvador should be kept under review and given a more serious study within the next few years.

The report submitted by the expert after his mission to El Salvador contains a preliminary assessment of the prospects of nuclear power in the country. His main findings are:-

(a) The demand for power in El Salvador is now adequately met by a 60 MW hydro power system, supplemented by an additional 20 MW generated from steam, diesel and hydro sources. A few projects are now under way to meet the requirements up to 1965, and it is proposed to develop further hydro projects to cope with increased demand up to 1970.

(b) Nuclear energy could not be considered as an alternative means of meeting the power needs for this period, especially because of the relatively low cost of the small hydro projects envisaged. After 1970, however, the size of the generating units required will be larger, and for the period 1972-1982 nuclear power would be more competitive than it is at present. Although the country's hydroelectric potential is adequate to meet the power needs during this period also, an analysis of the probable cost of selected alternative programmes incorporating nuclear or oil-fired power generation appears promising.

(c) If a nuclear plant were to be commissioned in 1972, it would be necessary to reach a decision by 1964-66. A more serious study of the possibility of building such a plant should therefore be completed within the next two to four years, especially in the light of developments in the projected power demand and nuclear power costs, the establishment of more firm cost data and plans for the remaining hydro projects, and the price of oil for future steam plants.

Some of the data relating to the power situation and prospects in El Salvador on which these findings are based are summarized below.

Power Reserves and Present Generation

In comparison to present demand, the reserves of hydro power in El Salvador are quite large. The main source is the Rio Lempa, with an estimated hydroelectric potential of 540 MW. There are no known reserves of coal or oil. The small amount of oil that is used for power generation is imported. So far as nuclear raw materials are concerned, little prospecting has been done, and the geological conditions do not appear favourable for the occurrence of any economic deposits.

The demand for electricity in El Salvador has more than doubled in the last six years. While the present output is relatively small, the demand will reach significant proportions in the next decade if the present rate of growth is maintained.

The two principal organizations interested in the prospects of nuclear power in the country are the El Salvador Nuclear Energy Commission, and the Hydroelectric Executive Commission, called CEL (Commission Ejecutiva Hidroelectrica del Rio Lempa), which produces most of the electricity in El Salvador.

* *Mr. George Petretic, until recently a member of the staff of IAEA's Division of Economic and Technical Assistance. Mr. Petretic, who had been with the USAEC before joining the Agency, has now returned to the Commission.*