

the draft manual. Circumstances requiring safety reports and the timing of their presentation are reviewed. Recommendations are made as to the topics which should be covered in the safety reports. These provide an exhaustive description of the project, including its physics, engineering and administrative aspects.

An example is also given of a critical assembly core certificate, referred to above as a device to acquaint all personnel with the current condition of the assembly.

## Emergency Procedure

The concluding part of the draft manual deals with plans which should be made to cope with any accidents which may arise. Possible accidents are divided according to severity into three classes - local incidents, site emergencies, and public emergencies - each of which calls for a different type of planning.

Local incidents are considered to be those involving only a limited number of personnel, most likely being confined to one room or a small part of a building.

Site emergencies would involve some release of radiation to the surroundings of the reactor but not beyond the area under control by the establishment.

A public emergency would involve release or threat of release of undesirable amounts of radioactive materials outside the confines of the establishment.

In preparing for both local incidents and site emergencies it is essential to designate clearly in advance the persons who will be responsible and their precise tasks. The manual makes various suggestions along these lines. Means and lines of communications must also be clearly established.

A public emergency will involve participation and control by public authorities, but the site emergency staff must be prepared to deal with it in its initial stages. Radiation monitoring would become particularly crucial at such times and the manual specifies the equipment which should be provided for this function and suggests procedures which should be followed.

It also suggests arrangements which should be worked out in advance with public authorities.

## Conclusion

The procedures proposed by the manual for achieving safety in critical assemblies and research reactors are thorough and leave very little to chance. Indeed, prospective reactor owners or operators may be somewhat surprised at how much should be done. It must be stressed, however, that similar procedures to those outlined have been evolved in many Member States as a result of experience, that they have been shown to function with little interference to the experimental programs, and that their use has contributed to the remarkably good safety record which critical assemblies and research reactors have achieved.

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# AN OUTLINE OF 1961 PROGRAM

The program of work for 1961 which the International Atomic Energy Agency's Board of Governors has presented to the Agency's General Conference for final approval provides for steady amplification of its work in technical assistance to specific projects, training of scientific personnel and scientific research. These activities and certain others are of special interest to those areas of the world that are less advanced in the utilization of atomic energy. This is in accord with the Agency's Statute which requires that it bear in mind "the special needs of the under-developed areas of the world". At the same time, the Board indicated that the 1961 program "provides for activities intended to create a basis for general progress in the safe utilization of atomic energy for peaceful purposes which is of concern to all Member States. Thus the delay in the advent of generally economic nuclear power is used to build up the necessary technological infrastructure in the less-developed countries and to establish an international framework of norms and regulations which an orderly and safe development of widespread nuclear industries will require."

Some highlights of the 1961 program are presented below.

## Technical Assistance

The Agency has followed a policy of sending missions of experts to Member States which are in a relatively early stage in the development of atomic energy for peaceful purposes in order to make broad initial assessments of requirements and potentialities. It is expected that there will be two more such missions in 1961, one to survey the situation of newly independent countries in Africa and the other to visit countries in Latin America which are establishing atomic energy operations for the first time.

Except for these two areas, the need for preliminary missions appears largely to have been met, and emphasis in technical assistance work has begun to shift towards the support of specific projects in Member States. Accordingly, it is expected that in 1961 there will be more experts in the field for more man-months than in 1960.

Requests for scientific and technical supplies and equipment as an integral part of technical assistance projects have increased considerably during 1960 and are expected to increase further in 1961.

It is also anticipated "that the Agency will be increasingly concerned with the supply of fissionable

and other materials and facilities, and arrangements for the processing, fabrication, shipment and delivery thereof".

In connection with the Agency's supply functions, it is planned to convene in 1961 a conference on nuclear electronics, a symposium on prospecting for nuclear raw materials, and panels on standardization of fuel elements and on equipment for tropical areas.

The Agency's programs to alleviate the world-wide shortage of manpower for nuclear work have been expanding over the past two years and a continuation of this trend is expected next year. A further rise in the number of candidates for fellowships, together with arrangements and supervision for successful candidates, is expected to bring beyond 1 000 the number of individual cases under active administration during the year.

An increased number of visits is expected in 1961 under the exchange program by which teachers are brought to students in the Member States. The Agency also expects in 1961 to assist in organizing a larger number of training courses than has been possible so far, to organize a symposium or conference on nuclear education, and to continue its work leading to the establishment of regional training centers.

## Atomic Safety and Atomic Safeguards

The need to assure health and safety in connection with the peaceful uses of atomic energy has been increasingly recognized as a matter of international concern and IAEA's role in this field is a growing one. This will be manifested in 1961 in an expansion of Agency-supported research on health and safety matters.

In addition, the Agency will continue its work leading to the promulgation of rules or standards to assure health and safety. It expects to issue recommendations of the panel convened in 1960 on basic safety standards for the Agency's own work. Production of various other handbooks and codes of practice dealing with selected topics in the safe use of radioactive materials will be continued and expanded. Model legislation in this field may be prepared as a guide to Member States.

The subject of disposal of radioactive wastes will receive greater attention. A manual will be prepared on low level waste disposal techniques. An international register of disposals of radioactive wastes in the sea may be organized.

The number of requests from Member States for individual advice on health and safety problems has risen steadily and 1961 is expected to bring a further rise.

The Agency proposes to heighten its readiness to arrange for international aid to any Member State suffering an accident involving radioactive materials. Among the steps to be taken are the collection of information on the types of assistance which Member States can render in such fields as emergency

engineering, decontamination, radiation monitoring, medical service and administrative advice.

About the legal aspects of health and safety protection, it is stated that a diplomatic conference may be called in 1961 to draft and approve an international convention on third party liability for atomic hazards. Documents relating to such a convention have been submitted for comments to all Member States.

Other legal problems to which attention will be given during the year will concern insurance, mobile reactors, transportation of radioactive materials, and radioactive waste disposal into the sea.

More Member States are likely to request assistance from the Agency in drafting national legislation on atomic energy. Two such requests were approved in 1960.

It is also expected that there will be further amplification during 1961 of the preparatory work done in 1959 and 1960 in the field of safeguards, i. e. preventing the diversion of nuclear materials obtained through the Agency from peaceful to military uses. There may be opportunity during the year to bring safeguards procedures and accounting methods into practice, either in connection with Agency projects, or if requested, with bilateral or multilateral agreements or with nuclear facilities in Member States.

## Research and Radioisotopes

The Agency will continue in 1961 to place contracts with institutions in Member States for research which can be of immediate or early benefit in the Agency's main fields of interest. As in previous years, the emphasis will be on research related to health and safety (health physics, radiation protection, radiobiology, disposal of radioactive wastes), safeguards, small and medium power reactors, and practical applications of radioisotopes. In 1960, the lack of adequate funds has restricted the natural and desirable growth of this work but in 1961 it is hoped that more support may be given to it.

With the growth in size and experience of its scientific staff and with the establishment in 1961 of the functional laboratory at Seibersdorf, the Agency will be in a position to render more scientific services with its own resources. It will continue the work it has been doing on the standardization of radioisotopes and the measurement of environmental activity, the latter on a larger scale. In addition, it is planned to initiate in 1961 a program for the world-wide determination of the tritium concentration in water. There will also be an increase in the volume of measurements and analyses performed in the Agency's facilities in support of its own program in the fields of safeguards and health and safety, and in its work in the field of nuclear instrumentation.

The Agency will again convene meetings on topics related to its scientific research interests. Subjects of such meetings in 1961 may include the use of tritium as a tool in physics, chemistry, and biology; progress in thermonuclear fusion research; radiation damage

in solids and reactor materials; beta and gamma spectroscopy; and low level counting techniques in nuclear instrumentation.

Closely related to the Agency's research work are its activities to promote the practical applications of radioisotopes and radiation sources. During 1961 the Agency will sponsor with other interested United Nations agencies a major conference on the use of radioisotopes in the biological sciences. As in the past, the Agency will conduct during 1961 various studies related to radioisotopes and radiation sources. Studies are now planned relating to teletherapy, agricultural uses of radioisotopes, molecular biology, radioactive waste disposal, and the economics of radioisotope production and distribution.

It is planned to bring up to date the International Directory of Radioisotopes and Labelled Compounds and to publish a new edition.

It is foreseen that there will be more requests for small missions of experts to advise Member States on specialized isotope programs. In addition, short-term visits will continue to be made to assist with the installation and initial operation of radiocobalt teletherapy units.

## **Nuclear Power**

Economic studies on nuclear power initiated in 1959 and continued in 1960 will be accelerated in the coming year. They will help prepare for other nuclear power activities planned for 1961, namely, two nuclear power survey missions and participation in two specific nuclear power projects.

Regarding studies on nuclear power the program document adds:

"It should be noted that in late 1960 and during the year 1961, a number of new nuclear power stations will come into operation and that consequently technical and economic estimates on the application of nuclear power to less advanced countries will become easier and rely on more recent experience in construction and operation".

It is possible that in 1961 the Agency may initiate a program whereby several Member States can collaborate in developmental efforts on one or more promising but relatively untried power reactor systems.

Pursuant to an invitation by the United States of America, Agency personnel will continue in 1961 to follow the planning and construction of several US prototype power reactors.

Further hazards evaluations of individual reactor plants, such as the one made in 1959 of the Swiss reactor DIORIT, will be performed in response to requests by Member States.

A number of scientific meetings on topics connected with reactors are expected to be held in 1961. Subjects contemplated for such meetings include programming of research reactors, physics of intermediate and fast reactors and problems of reactor siting and containment.

## **Information Activities**

The Agency's work in facilitating the exchange of scientific information through conferences, publications, and reference and library services is expected to follow the lines of previous years. At least three major conferences and nine seminars and symposia on various subjects are anticipated. As mentioned above, the conferences will be on controlled thermonuclear fusion, nuclear electronics, and radioisotopes in the biological sciences. A possible fourth conference may be convened to embody, in an international convention, the results of the Agency's work on civil liability for nuclear damage.

As in the past, the Agency may also act as co-sponsor of conferences organized by the United Nations or its specialized agencies.

Scientific and technical publications of the Agency in 1961 will be similar to those published in the preceding two years. The main types of publications will include scientific and technical manuals such as those in the Safety Series; compilations on such subjects as nuclear reactors, radioisotopes, and equipment; proceedings of various meetings; lists and bibliographies; the International Journal on Thermonuclear Fusion and Plasma Physics; technical reports on the results of Agency or Agency-supported scientific work; further issues of this Bulletin; and various program and publicity leaflets.

The entire publications program for the year is expected to involve approximately 12 000 pages of manuscript.