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INTERNATIONAL CENTRE FOR THEORETICAL PHYSICS
34100 TRIESTE (ITALY) - P.O.B. 586 - MIRAMARE - STRADA COSTIERA 11 - TELEPHONE: 9240-1
CABLE: CENTRATOM - TELEX 460392-1

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The IAEA's Programme and Activities in Radiation Protection

F.N. FLAKUS
Radiation Protection Section
Division of Nuclear Safety
IAEA, Vienna, Austria

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F.M.Flakus
Radiation Protection Section
Division of Nuclear Safety

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INTRODUCTION

1. When the International Atomic Energy Agency was established more than 30 years ago, it was mandated to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world. This mandate carries with it a concomittant responsibility for the protection of individual human beings, their progeny and mankind as a whole, as well as their environment, from any harmful effects of ionizing radiation arising from nuclear activities.

2. Article III/A/6 of the Agency's Statute inter alia specifies that "The Agency is authorized: ... to establish or adopt, ... standards ... for protection of health and minimization of danger to life and property ... and to provide for the application of these standards ..., at the request of a State, to any of that State's activities in the field of atomic energy ..." From the very beginning, therefore, radiation protection has been an integral part of the Agency's programme.

3. Radiation protection is involved in practically all IAEA activities: in the nuclear fuel cycle, in nuclear medicine, in food and agriculture, in safeguards.

4. In the following I will try to give a brief overview on the Agency's programme and activities in the various thematic areas of radiation protection. I will consider the following functions of the Agency: preparation of standards, fostering exchange of scientific information, providing generic services, supporting research and development work, and strengthening technical co-operation.

PREPARATION OF STANDARDS

5. One of the main functions of the Agency is to establish in collaboration with the specialized Agencys concerned, standards of safety for the protection of health and minimization of danger to life, including such standards for working conditions. The Agency must also provide for the application of these standards not only to the operations under its control, but also - at the request of a State - to any of that State's activities in the field of atomic energy.

6. The Agency has from the beginning of its existence formulated basic safety standards on radiation protection. The International Commission on Radiological Protection (ICRP) has provided and continues to provide the recommendations which ensure the scientific basis for these standards.

7. Although the recommendations of the ICRP formed the basis for the radiation protection policy of the Agency, they only describe the basic principles of radiation protection and are not formulated in regulatory terms. One step towards national implementation is through specialized international agencies such as the IAEA, the International Labour Organization (ILO), and the World Health Organization (WHO), and interregional organizations such as the Commission of European Communities (CEC), the Council for Mutual Economical Assistance (CMEA), and the Nuclear Energy Agency (NEA) of OECD.

8. In 1982, a revised edition of the Basic Safety Standards for Radiation Protection was issued jointly by IAEA, WHO, ILO and NEA/OECD. These new standards represent the culmination of efforts under way since 1977 to provide a world-wide basis for harmonized and up-to date radiation protection standards. They reflect a considerable advancement over the previous BSS and they will in many circumstances substantially improve radiation protection for workers and the general public. The standards can serve as an example to other industrial activities involving hazards to man.

9. The new Basic Safety Standards marked the introduction of a new radiation protection philosophy under the framework of a universal system of dose limitation which was developed by ICRP over the past decades. In addition to stipulating specified dose limits for limiting individual risks arising from exposure to ionizing radiation, this system also requires that all practices involving such exposure be justified and that radiation protection be optimized in order to reduce doses to a level deemed to be as low as reasonably achievable, taking into account social and economic factors. Although these concepts have received world-wide acceptance, a significant amount of work is still required to develop methods for their implementation in practice.

10. In the practical application of the standards, questions still remain. One area where further clarification is needed, for example, is in implementing the protection optimization mentioned above. A clearer understanding is needed on procedures for reducing collective doses and individual doses, for optimizing (where this is a strictly numerical technique) and for integrating this input into decision-making. Guidance is also needed on evaluating the necessary trade-off between various competing factors, such as that between doses to workers and doses to the public, between doses to critical groups (i.e. members of the public most likely to receive the highest dose) and doses to the remainder of the population, and between doses received now and those received in the future.

11. As a consequence of these needs, the Agency decided that the main long-term goals of its radiation protection activities should be directed towards preparing guidelines on the practical implementation of the system of dose limitation set forth in the Basic Safety Standards. Thus, in September 1984, the Agency's General Conference adopted a strengthened programme on radiation protection for the period of 1985/86. Subsequently, after the nuclear accident at Chernobyl in 1986, this programme was further expanded.

12. The main aim of the programme is to implement the Agency's policy in radiation protection and to promote a universal common understanding on this policy. Efforts were made to encourage the application of the principles of the dose limitation system not only in situations where exposure can be controlled but also for hypothetical abnormal situations, for instance the planning and preparedness for radiation emergencies.

13. The new programme covers the following thematic areas: basic principles and criteria, occupational radiation protection, environmental assessment and protection, emergency planning and preparedness, control of radiation sources, radiation safety of nuclear fuel-related activities and exposure assessment and handling. The programme will also continue to cover the radiation safety aspects of the transport of radioactive material, an area in which the Agency's authority is recognized world-wide. The latest edition of the regulations for the safe transport of radioactive material was published in 1985 and a supplement in 1986.

14. The IAEA organized and still organizes meetings of Advisory Groups, Technical Committees and Expert Groups, to provide supplementary guidance on specific topics. Many manuals of guidance on radiation protection prepared through such meetings have been issued by the IAEA in its Safety Series and Technical Reports Series. Specific results achieved during the past years are listed in Annex 1.

15. The International Atomic Energy Agency continues to play an important role in setting safety standards, but it is placing increased emphasis on promoting their use. The Basic Safety Standards for radiation protection have world-wide application. The use of a consistent set of standards world-wide will promote a common level of nuclear safety. The knowledge that standards have been developed and accepted on a world-wide basis will increase the confidence of the public and heighten the likelihood of gaining their acceptance of the nuclear power option.

FOSTERING THE EXCHANGE OF SCIENTIFIC INFORMATION

16. The IAEA organizes meetings to facilitate exchange of scientific information on radiation protection. The proceedings of a number of international symposia and seminars were published such as on the "Assessment of Radioactive Contamination in Man" (1985), on "Emergency Planning and Preparedness" (1986), on "Optimization of Radiation Protection" (1986) and on "Packaging and Transport of Radioactive Materials" (1987).

17. Considering how serious the consequences of errors can be in the nuclear field, it is vitally important that we thoroughly investigate and learn from each error. A major activity in 1986 was the organization of a Post-Accident Review Meeting on the Chernobyl Accident. A summary report of this meeting was subsequently prepared by the International Nuclear Safety Advisory Group (INSAG) and published by the IAEA few weeks later as Safety Series No.75-INSAG-1. This report synthesizes and integrates the written and oral presentations of the Soviet experts and the discussions among the participants, so that the accident and its consequences can be understood by the technical community and by non-technical decision makers. The report can serve as an important frame of reference for further consideration of the significance of the Chernobyl accident.

18. Similarly, a review meeting was organized on the Goiania Accident that had occurred in Brazil in September 1987 in order to evaluate the accident so that the lessons learned can be shared by a wider community. The review meeting was held in Rio de Janeiro in July 1988 and elaborated a comprehensive report on this radiological accident. The resulting report was recently published by the IAEA. Various projects are being initiated to enhance control of radiation sources world-wide.

19. This year, in 1988, the International Commission on Radiological Protection (ICRP) celebrates its 60th birthday, marking six decades of international co-operation on the harmonization of radiation protection criteria. In this connection, the Agency organized an international conference on Radiation Protection in Nuclear Energy, which took place from 18-22 April 1988 in Sydney, Australia. Over 350 experts from all over the world participated. The proceedings of this conference are published in two volumes, Volume I has already been issued.

20. In order to report regularly on the progress of IAEA safety programmes, as well as on world-wide safety efforts, the IAEA, since 1984, publishes an Annual Nuclear Safety Review. It is designed to provide Member States, news media and the interested public with a review of the main trends and developments in the field.

PROVIDING SERVICES

21. Safety problems can more easily be identified and solved if there is international co-operation. This is particularly the case for emergency preparedness, where countries must work together because a radiation release would not respect national boundaries. It is clear that adequate emergency preparedness is an important part of radiation protection. A major nuclear power plant accident would require a substantial response effort that could tax the resources of any country and be beyond the national capabilities of some. There are special concerns in connection with plants located in border areas, particularly in cases where the neighbouring countries do not have nuclear installations. Thus, while national planning is basic, bilateral and multilateral agreements for mutual assistance are indispensable.

22. Since 1958, the IAEA has been active in promoting the establishment of international arrangements through which countries could render mutual assistance in the event of a nuclear accident or radiological emergency. These efforts culminated, in 1986, in the adoption of two legal instruments: the Convention on Early Notification of a Nuclear Accident (Early Notification Convention), and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (Emergency Assistance Convention). As of 22 September 1988, there were 72 Signatories (32 Parties) of the Early Notification Convention. As of 17 October 1988, there were 70 Signatories (28 Parties) of the Emergency Assistance Convention.

23. The emergency response capability needed in the Agency and in Member States to make the Conventions really operative in a contingency is being build up, particularly also communication systems and procedures. The IAEA had maintained its own Radiation Emergency Assistance Plan and Programme since 1959, under which to arrange for the provision of assistance at the request of any Member State in which an accident has occurred involving exposure to ionizing radiation. These arrangements are being extended to enable the Agency to channel requests for, and offers of, assisstance to a Member State in the event of a serious nuclear accident or radiological emergency.

24. It is recognized that requests for external assistance could probably not be met within the first few days of an accident occurring and it is important, therefore, that countries ensure, to as great an extent as possible, that they have their own capability to respond during this early accident phase. Upon request by a Member State, the Agency is prepared to assist with the development and improvement of emergency plans and preparedness arrangements, to advise on the adequacy of existing arrangements, and to provide assistance in testing these plans through the observation and evaluation of emergency preparedness exercises.

25. Following the radiological accident last October in Goiania, Brazil, the Brazilian Government approached the Agency with a request for assistance within the framework of the Emergency Assistance Convention - the first time that the Convention had been invoked by a Member State.

26. The IAEA arranged for the provision of assistance by two medical experts from the USA. It also arranged for expert assistance and the supply of dosimeters through its technical co-operation programme and for the provision of other monitoring instruments by Member States: within a few days, a variety of radiation monitoring equipment had been provided by France, the Federal Republic of Germany, Hungary, Israel, the Netherlands and the United Kingdom. Several countries, including Argentina, France, the Federal Republic of Germany, the Soviet Union, the United Kingdom and the USA also provided assistance in the form of experts and radiation protection equipment direct to Brazil.

SUPPORTING RESEARCH

27. Under its research contract programme the Agency provides support for research work on radiation protection topics in the form of research contracts or research agreements preferrably executed within co-ordinated research programmes (CRPs). In the recent years, several such CRPs on radiation protection were supported: One on "Carbon-14 from Nuclear Facilities", with scientists from 12 Member States; one on "Use of Chromosomal Aberration Analysis in Lymphocytes for Estimating Radiation Dose", with scientists from 15 Member States; one on "Study of Radioactive Material in the Baltic Sea", with scientists from 8 Member States; and one on "Use of a Realistic Chest Phantom for Calibration of Chest Monitoring Equipment for the Assessment of Intake of Transuranium Elements", with scientists from 10 Member States. Currently two new CRPs are being launched, an intercomparison programme for individual monitoring and a programme on dose-per-unit-intake-factors for members of the public.

28. The potential advantage of international co-operation in nuclear safety research through shared technical and budgetary resources is obvious. Co-operation also opens the door for small countries to participate in research which they could not normally undertake.

STRENGTHENING TECHNICAL CO-OPERATION

29. The Radiological Safety Section, as other technical sections of the IAEA, is intimately involved in technical co-operation activities by provision of technical advice and support for projects including project identification and formulation, project implementation, outputs monitoring and evaluation of results. In 1987 the Agency's involvement in current technical co-operation projects on radiation protection amounted to over 100 projects in some 40 Member States. Up to now, more than a total of 60 developing Member States have already requested training and assistance in radiation protection.

30. The actual involvement of Agency staff members in technical co-operation projects on safety is even higher. About an equal number of projects is being executed in the nuclear safety field and a number of other technical co-operation projects extend into the safety area, such as those on radiation protection regulation, radiation dosimetry or radioactive waste management.

31. Generally the Agency's programme on technical co-operation for nuclear safety is, to a great extent, responsive in character and the Agency's response tailored to the needs identified by developing countries. However, the Agency's assistance alone is not sufficient: technical co-operation can only be successful and most effective when there is also a strong input from the counterpart of a particular project. National Governments' committment is fundamental to the success of a project. Technical co-operation is most fruitful if the Agency's assistance capabilities and the receipient country's co-operation capabilities match.

32. Modes of co-operation comprise mainly single projects hosted in individual institutions of a country, but also regional and interregional projects in which more than one country co-operate. Two major regional co-operation programmes are already underway for a number of years, one in the Latin America Region known by the acronym ARCAL and one in the Region of South East Asia and the Pacific known by the acronym RCA. Efforts are underway to implement similar projects in the region of the Middle East and in Africa.

33. The objective of the technical co-operation programme on radiological safety is to enhance the level of safety in the various operations that involve the use of radioactive material and radiation sources in developing countries. Activities supported range from establishment of national regulatory frameworks for radiation protection and implementation of means to ensure compliance with such regulations, to strengthening of technical capabilities such as radiation protection equipment resources. The inputs of the Agency comprise mainly provision of expert services and equipment, but also fellowships and, to a lesser extent, scientific visits awards. These are supplemented by a variety of training courses on safety and by support of attendance of experts from developing countries in scientific meetings.

34. The results of the Agency activities are clearly visible: a more uniform level of technical awareness of the nuclear safety problems, a general effort towards a better safety level, an increasing number of well trained personnel in the different areas related with nuclear safety. There are sure signs of the fact that developing countries are absorbing well and efficiently the new technologies. An indicator of this is the increasing number of requests for advisory missions on very specialized problems and a corresponding lower need for missions and assignments for more general problems. The number of experts being recruited from developing countries for technical co-operation field missions in other developing countries is also increasing.

35. As I said before, the Basic Safety Standards for Radiation Protection, issued in 1982, were a major milestone in providing a set of internationally acceptable standards. However, these recommendations have not yet been incorporated into the national practices of many Member States. Particularly in developing Member States which do not yet have nuclear power, but where there is uranium mining, work with radioactive isotopes or with radiation-producing devices, there is often a shortage of trained radiation protection personnel. Moreover, some Member States do not as yet have the infrastructure required to set national standards and regulate national practices.

36. The Agency believes that increased efforts can and should be made to assist interested Member States in implementing the Basic Safety Standards for Radiation Protection, and created a new mechanism to perform this task. Radiation Protection Advisory Teams (RAPATs) were established which can respond to requests by Member States for assistance in identifying potential or existing radiation protection problems.

37. Such teams, composed of experts in various aspects of radiation protection, visit a Member State to discuss with the authorities the activities requiring radiation protection, review existing practices and propose further action. The aim is to ensure that adequate preventive and protective measures would govern the handling, use, storage, transportation and disposal of radioactive material, and that adequate measures were at hand to cope with radiation emergencies. To date RAPAT missions visited over 30 Member States.

38. The mission of the RAPAT in no way constitutes an intrusion into the internal affairs of a Member State, nor does it attempt to investigate deficiencies in a national system. It operates only at the request of a Member State, and in response to the national authorities' need for assistance in applying standards to meet that State's particular needs.

39. It is already clear that the RAPAT scheme of missions, to a great extent, enhances <u>systematic</u> long-term technical co-operation planning in radiation protection.

CONCLUSION

40. I have only briefly outlined the Agency's role in promotion of radiation protection activities. These efforts however need to be seen as part of the Agency's role in promoting nuclear safety and nuclear safety is an international issue. Safety problems can more easily be identified and solved if there is international co-operation. The Agency will do its part to make this co-operation possible.

41. The IAEA has given great importance to stimulate co-operation among its Member States in the field of nuclear safety practically from the beginning of its operation 30 years ago. It has always been a good forum for the exchange of technical information in the international nuclear community. The role of the Agency is growing because it offers a centre for contact and exchange between East and West, North and South. It has served as a catalyst in the interaction among countries of different technical and industrial backgrounds. New initiatives are under way to intensify international co-operative safety efforts. The Agency will continue to provide a forum for explanation and clarification.

Annex 1

LATEST IAEA PUBLICATIONS ON RADIATION PROTECTION

Safety Series Number	Year Published	Title
80	1986	Schedule of Requirements for the Transport of Specified Types of Radioactive Material Consignments
67	1985	Assigning a Value to Transboundary Radiation Exposure
76	1986	Radiation Protection Glossary (in English, French, Spanish and Russian)
84	1987	Basic Principles for Occupational Radiation Monitoring
83	1987	Radiation Protection in Occupational Health. Manual for Occupational Physicians
77	1986	Principles for Limiting Releases of Radioactive Effluents into the Environment
82	1987	Application of the Dose Limitation System to the Mining and Milling of Radioactive Ores
86	1987	Techniques and Decision Making in the Assessment of Off-Site Consequences of an Accident in a Nuclear Facility
73	1985	Emergency Preparedness Exercises for Nuclear Facilities: Preparation, Conduct and Evaluation
72	1985	Principles for Establishing Intervention Levels for the Protection of the Public in the Event of a Nuclear Accident or Radiological Emergency
81	1986	Derived Intervention Levels for Application in Controlling Radiation Doses to the Public in the Event of a Nuclear Accident or Radiological Emergency. Principles, Procedures and Data
87	1988	Emergency Response Planning and Preparedness for Transport Accidents Involving Radioactive Material
88	1988	Medical Handling of Accidentally Exposed Individuals

Technical Reports Series Number	Year Published	Title
283	1988	Radiological Safety Aspects of the Operation of Proton Accelerators