NEW EMPHASIS OF IAEA'S PROGRAM ON DECOMMISSIONING

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ABSTRACT

Decontamination and decommissioning (D/D) activities were introduced in the IAEA's program in 1973. At present, all D/D activities of the IAEA are consolidated within the Waste Management program. Since 1980, the Agency has published 11 technological review reports and four safety and regulatory guidance reports in the area of D/D. It is recognized that the existing IAEA technical publications generally satisfy the current needs of Member States. As decommissioning activities become more frequent, emphasis of the Agency's D/D program has been shifted to other areas of interest which cover regulations, standards, guides and direct assistance to Member States. A highlight of the program is the preparation of the Safety Standards on Decommissioning to be accompanied by two Safety Guides. In response to specific needs of developing Member States, work has been initiated on the preparation of reports on planning and management aspects, including economic evaluation, of decommissioning of research reactors or other small nuclear facilities, such as radiochemical laboratories, hot cells, etc. Transfer of experience and know how will be provided via an interregional training course on decontamination of research reactors scheduled to be held in France this year. Increased emphasis will also be placed on technical assistance and expert services to developing countries on the safe confinement, rehabilitation, and long-term storage of mill tailings, and environmental restoration of these mining and milling sites. Co-ordinated Research Projects on decontamination and environmental restoration to be carried out in co-operation with the Chernobyl Center for International Research have been launched by the IAEA.

INTRODUCTION

By the year 2000, more than 60 nuclear power plants and 250 research reactors (Fig. 1) around the world are expected to become potential candidates for decommissioning (1,2). Through national and international forums, various countries are co-operating to strengthen the base of experience for the decommissioning work that lies ahead. The IAEA and a number of international organizations, such as the Nuclear Energy Agency (NEA) of the OECD and the Commission of the European Community (CEC), have long served as co-operative forums through which experience and knowledge about decommissioning have been shared among technical communities around the world.

Over the past 35 years, considerable experience has been gained in decommissioning and rehabilitating many types of nuclear facilities. All in all, some 145 nuclear facilities in 17 countries are listed in IAEA'S inventory of projects either completed, planned, or in progress (Fig. 2).

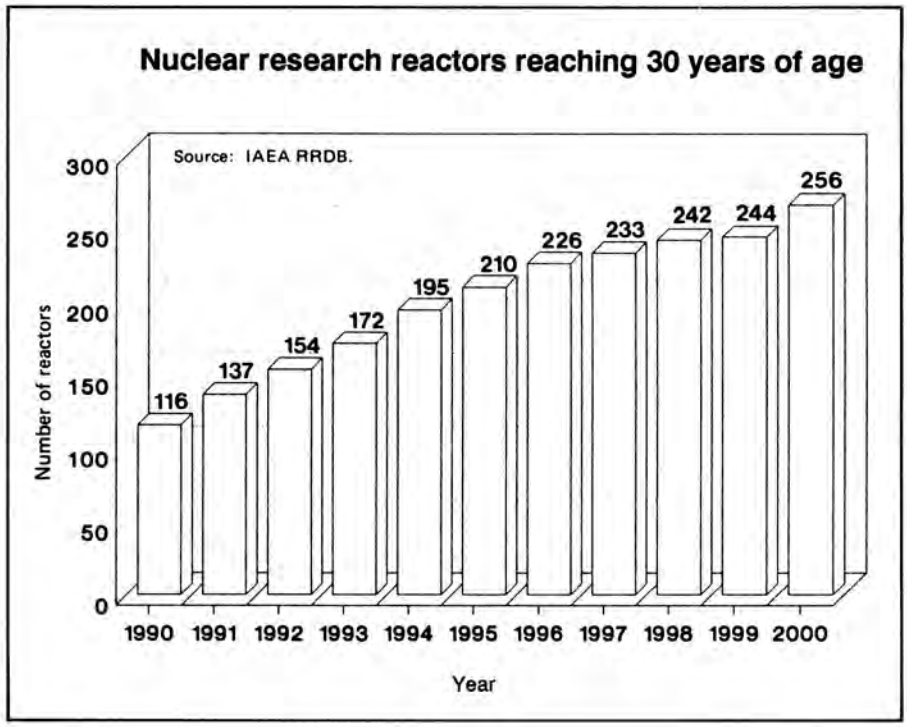
ROLE OF THE IAEA

It may be recalled that the IAEA is a specialized agency within the United Nations system. The IAEA's objectives set forth are to "seek to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world ...". In fulfilling these objectives, the IAEA maintains co-operation with international bodies and other United Nations Organizations such as, UNEP, UNSCEAR, WHO, ILO*, etc. Although the IAEA is not a regulatory organization, many of its Safety Standards and Codes of Practices documents are widely used for regulatory purposes and also form the basis of standards and regulations in many countries.

Decontamination and decommissioning (D/D) activities were introduced in the IAEA's program in 1973. At present, all D/D activities of the IAEA are consolidated within the Waste Management program. IAEA's role in D/D is to assist its Member States (at present 112 countries) in decommissioning their nuclear facilities, including uranium mining and milling, in a safe, timely and cost-effective manner. In this role, the IAEA reviews current scientific, technological and regulatory information, and disseminates them as internationally acceptable good practice, guidelines and standards.

The IAEA encourages, sponsors, and coordinates research work and the development of data and technology in promising areas. Technical assistance is provided to developing Member States in the form of expert missions, design assistance, and procurement of equipment and facilities to assist them in implementing their decommissioning pro-

* UNEP: United Nations Environment Program; UNSCEAR: United Nations Scientific Committee on the Effects of Atomic Radiation; WHO: World Health Organization; ILO: International Labour Organization



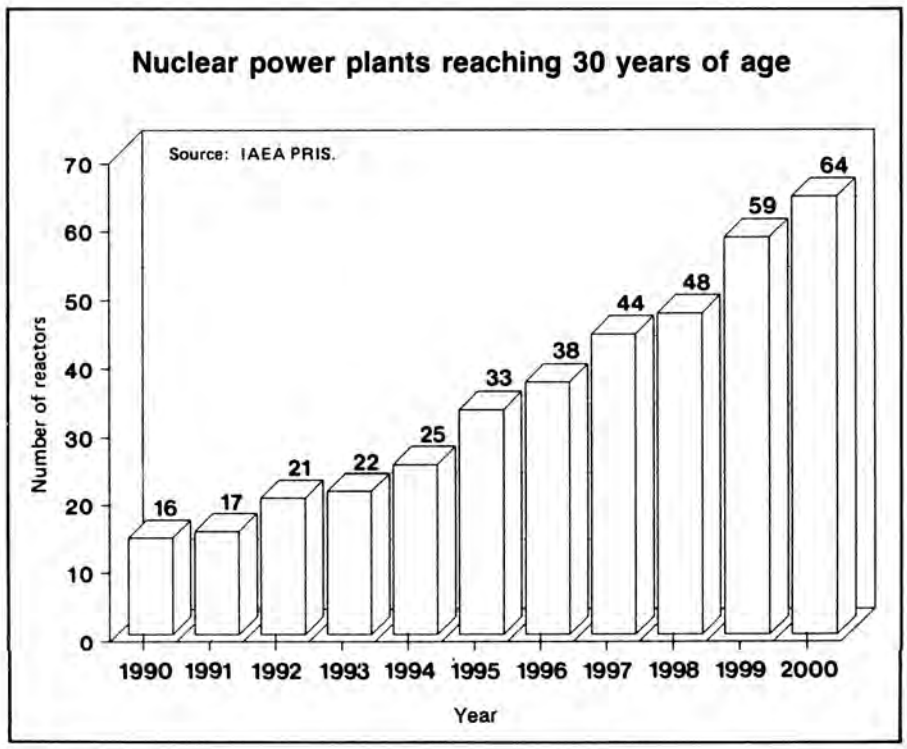


Fig. 1. Nuclear Reactors Likely to be Decommissioned by Year 2000.

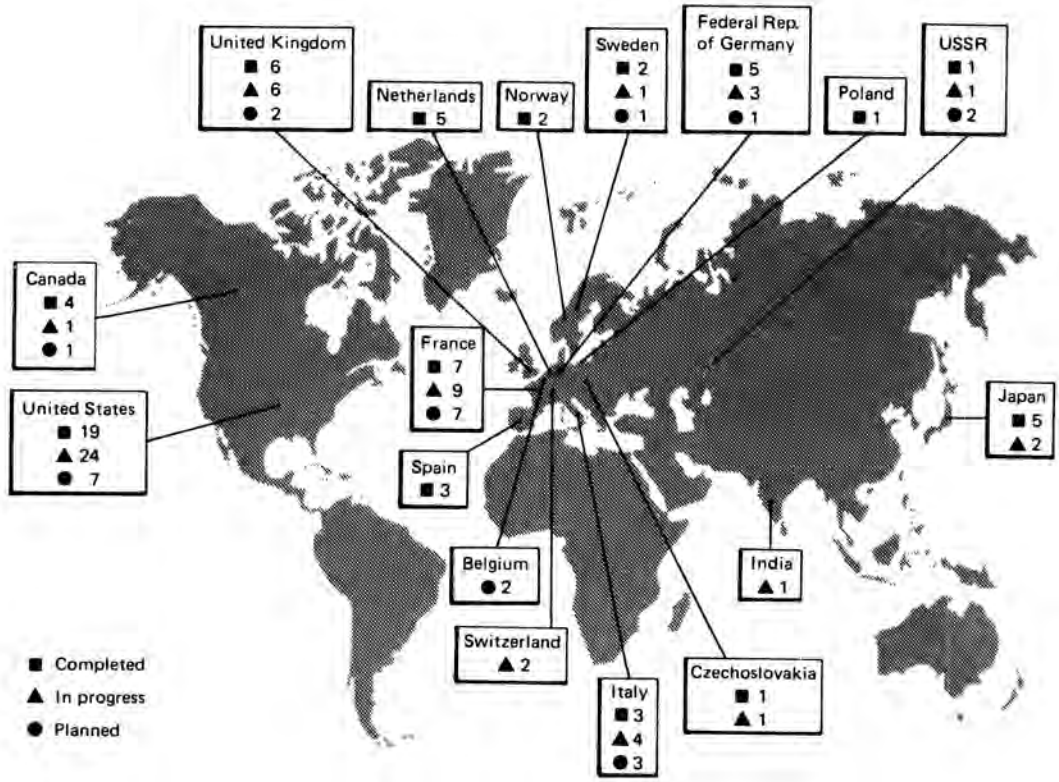


Fig. 2. Nuclear decommissioning projects around the world.

grams. The IAEA also provides training courses, fellowships, and study tours to assist in the development of staff.

D/D information is available to the IAEA's Member States through regular publications, technical papers, and other information materials. The IAEA also organizes regular exchanges of information through conferences, symposia, and seminars; sponsors research and training courses; awards fellowships; provides expert missions; and helps in design of systems and procurement of equipment to enable Member States to carry out their programs.

Since 1980, in the area of decontamination and decommissioning the IAEA has published 11 technological review reports and four safety and regulatory guidance reports, all of which have been well received by the Member States. Five technological review reports have been completed and are ready for publication (Tables I and II).

NEW EMPHASIS ON D/D PROGRAM

Every year the IAEA program is reviewed by the Member States at its General Conference. During this review, program directions are modified and new priorities are set as a response to the current needs of the Member States. In particular, a newly set up standing advisory committee of senior experts called INWAC (International Waste Management Advisory Committee) provides reviews and specific recommendations on the radioactive waste management program, including decommissioning. As a result of these reviews, a number of D/D areas have received special focus in the program of work for 1991-92.

Research Reactors

Decommissioning of research reactors is receiving special attention, particularly from developing countries. In these countries alone, there are over 40 research reactors which have been in operation for over 20 years and are likely candidates for decommissioning and/or major refurbishment. Soon decisions will have to be taken to either completely decommission these reactors or refurbish them with modern, versatile and more powerful reactor systems. In response to specific needs of developing Member States, work has been initiated on the preparation of technical documents on planning and management aspects (3), including economic evaluation, of decommissioning of research reactors, or other small nuclear facilities such as radiochemical laboratories, hot cells, etc.

An interregional training course on decontamination of research reactors and research facilities is also scheduled for June this year. This training course will be carried out in Saclay, France, in co-operation with the Institut National des Sciences et Techniques Nucleaires (INSTN), Saclay.

TABLE I

IAEA Documents on D/D Published Since 1980

Safety and Regulatory Reports	
1. Factors Relevant to the Decommissioning of Land-Based Nuclear Reactor Plants	Safety Series No. 52 (1980)
2. Safety in Decommissioning of Research Reactors	Safety Series No. 74 (1986)
3. Safe management of wastes from the mining and milling of uranium and thorium ores: Code of practice and guide to the code	Safety Series No. 85 (1987)
4. Regulatory Process for the Decommissioning of Nuclear FacilitiesSafety	Safety Series No. 105 (1990)
Technology Review Reports	
1. Decommissioning of Nuclear Facilites: Decontamination, Disassembly and Waste Management	Technical Reports Series No. 230 (1983)
2. Decontamination of Nuclear Facilities to Permit Operation, Inspection, Maintenance, Modification or Plant Decommissioning	Technical Reports Series No. 249 (1985)
3. Methodology and Technology of Decommissioning Technical Reports Series Nuclear Facilities	Technical Reports Series No. 267 (1986)
4. Methods for Reducing Occupational Exposure During the Decommissioning of Nuclear Facilities	Technical Reports Series No. 278 (1987)
5. Decontamination and Demolition of Concrete and Metal Structures During the Decommissioning of Nuclear Installations	Technical ReportsSeries No. 286 (1987)
6. Factors Relevant to the Recycle and Reuse of Components Arising from the Decommissioning of Nuclear Facilities	Technical Reports Series No. 293 (1988)
7. Cleanup of Very Large Areas Contaminated as a Result of a Nuclear Accident	Technical Reports Series No. 300 (1989)
8. Management of Wastes from the Refining and Conversion of Uranium Ore Concentrate to Uranium Hexafluoride	IAEA TECDOC-241 (1981)
9. Decontamination of Operational Nuclear Power Plants	IAEA-TECDOC 248 (1981)
10. Decontamination and Decommissioning of Nuclear Facilities: Final Report of Three Research Meetings (1984-87)	IAEA-TECDOC 511 (1989)
11. Management of Wastes from Uranium Mining and Milling, IAEA-OECD/NEA Symposium, Albuquerque, USA, 1982	Proceedings Series

TABLE II

IAEA Reports on D/D Ready for Publication

1. Planning for Cleanup of Large Areas Contaminated as a Result of a Nuclear Accident	Technical Reports Series (to be published)
2. Disposal of Material From the Cleanup of Large Areas Contaminated as a Result of a Nuclear Accident	Technical Reports Series (to be published)
3. Application of Remotely Operated Handling Equipment in the Decommissioning of Nuclear Facilities	Technical Reports Series (to be published)
4. Monitoring for Compliance with Criteria for Unrestricted Release Related to Decommissioning of Nuclear Facilities	Technical Reports Series (to be published)
5. Current Practices for the Management and Confinement of Uranium Mill Tailings (Supersedes TRS No. 209)	Technical Reports Series(to be published)

A regional seminar for the Asia and Pacific region is also being planned on ageing, decommissioning and major refurbishment of research reactors. This seminar, scheduled for February 1992, is likely to be held in Bangkok, Thailand.

Regulations and Standards

It is generally felt that, in the technological area, the existing IAEA publications by and large satisfy the current needs of Member States. Therefore, emphasis has been shifted to another area of interest which covers regulations, standards and guides. Countries that have nuclear power programs follow national rules and laws to regulate nuclear energy. At present, many countries regulate decommissioning on a case-by-case basis, using the same regulations and guides as for other nuclear operations. As decommissioning activities become more frequent, however, it will neither be practical nor expedient to regulate decommissioning in this way. Many countries are, therefore, considering development of specific decommissioning regulations.

To respond to this regulatory need, an IAEA Safety Standards on decommissioning (none exists at present) is planned to be developed between 1991-94. This Safety Standards will be a part of the newly established program called RADWASS (Radioactive Waste Safety Standards). RADWASS are new Safety Series documents devoted to radioactive waste management (similar in concept to the IAEA NUSS Safety Series documents) to provide internationally agreed guidelines for the safe management and disposal of radioactive wastes.

The 1991 plan calls for establishment of a Standing Technical Committee (STC) on Decommissioning (similar STC's would be set up for four other waste management disciplines) to provide guidance on the preparation and review of the documents. Each STC would consist of eight to ten experts nominated by Member States, who are committed to be available for one or two week-long meetings a year.

An IAEA Safety Guide (4) on the regulatory process for decommissioning has been published. The IAEA is also providing guidance on the methodology for deriving practical exemption criteria for materials, facility and site arising during decommissioning. As a part of this work, it is hoped to generate quantitative guidance on limits/criteria for unrestricted release of slightly contaminated materials from decommissioning.

Environmental Restoration

There are many contaminated nuclear sites worldwide in need of cleanup, including scores of unstabilized uranium mill tailings piles. These sites are linked in the public's minds with development of new nuclear and waste management facilities, and are one of the obstacles to the growth of nuclear power. Unless progress is made in cleanup of some of these sites, public acceptance will remain poor.

Increased emphasis is, therefore, being placed on technical assistance and experts services to developing countries on the safe confinement, rehabilitation, long-term storage of mill tailings, and environmental restoration of these mining and milling sites. Availability of IAEA documents on technology, safety and regulations (5) of these sites are also being addressed in parallel with direct expert assistance.

An Agreement has recently been signed between the IAEA and Soviet Governments (6) to carry out research projects at the Chernobyl Center for International Research (Pripiyat Scientific Center at Chernobyl) in the area of nuclear safety and radiation protection. Within the purview of this Agreement, a research project on decontamination and environmental restoration has been launched by the IAEA. While the technical and administrative co-ordination for this D/D project will rest with the IAEA, several countries are expected to participate with the IAEA and carry out research at the Chernobyl Center. The project will offer unique opportunities of research andapplication of techniques and technologies on a "real life" situation of large area decontamination, cleanup and management of the resulting wastes and restoring the surrounding environment. It should be mentioned that a previous IAEA program established in the aftermath of the Chernobyl accident to provide guidance and to review the state-of-the-art in large area cleanup methodologies and technologies is almost completed (7,8).

SUMMARY

To summarize, in IAEA's program on decontamination and decommissioning, a modest effort will continue to be made to exchange information on decommissioning technologies. Greater attention will be given to the planning and regulatory aspects of decommissioning as more nuclear facilities will begin to reach the end of their useful life at the end of this decade. There will be a major shift of effort to the problems associated with the decommissioning of research reactors and other small non-power nuclear facilities. Assistance will be provided to developing Member States in this area in the form of training and guidebooks. Activities relating to the cleanup of large areas after a nuclear accident are expected to be completed during the 1991-92 period, however, research co-ordination efforts on decontamination at the Chernobyl Center for International Research will continue for another four to five years.

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