

New emphases of the IAEA's waste management programme

Services are being developed that more flexibly respond to different needs of Member States

by B. Semenov, J.L. Zhu, and D.E. Saire

The IAEA has been assisting its Member States in the management of radioactive wastes for almost three decades. An integrated waste management programme exists to assist Member States in the safe and effective management of nuclear wastes by organizing the exchange and dissemination of technical, safety, and regulatory information on the subject, providing guidance, technical assistance and training, and supporting research and development in the field.

The Agency's mechanisms for fostering international co-operation and collaboration are well established and include:

- collection, review, and publication of up-to-date information in technical reports series, technical documents, and safety series documents;
- dissemination and exchange of information at international conferences, symposia, and seminars;
- sponsorship and co-ordination of research work and the development of data through co-ordinated research programmes for Member States;
- technical assistance projects, training opportunities, and technical advice to developing Member States.

The waste management programme is organized into four major areas, namely, waste processing and storage, radioactive waste disposal, radiological/environmental effects of waste disposal, and the decontamination and decommissioning (D/D) of nuclear installations. Programme implementation is managed with several sub-programmes contained in each area of activity. (See accompanying figure.)

New initiatives

The Agency is in a continuing process of exploring ways to modify its waste management programme to support the changing needs and requirements of its Member States. This process is in itself a challenging undertaking due to the diverse nature of the waste

management activities that are planned or under way in Member States. For example, in an effort to cover the status of national activities in this field, five categories have been developed and used by the Agency's Waste Management Section. These categories span the level of activity from waste generated from the use of radioisotopes for medicine on one end of the spectrum to waste generated from nuclear fuel cycle activities on the other end.

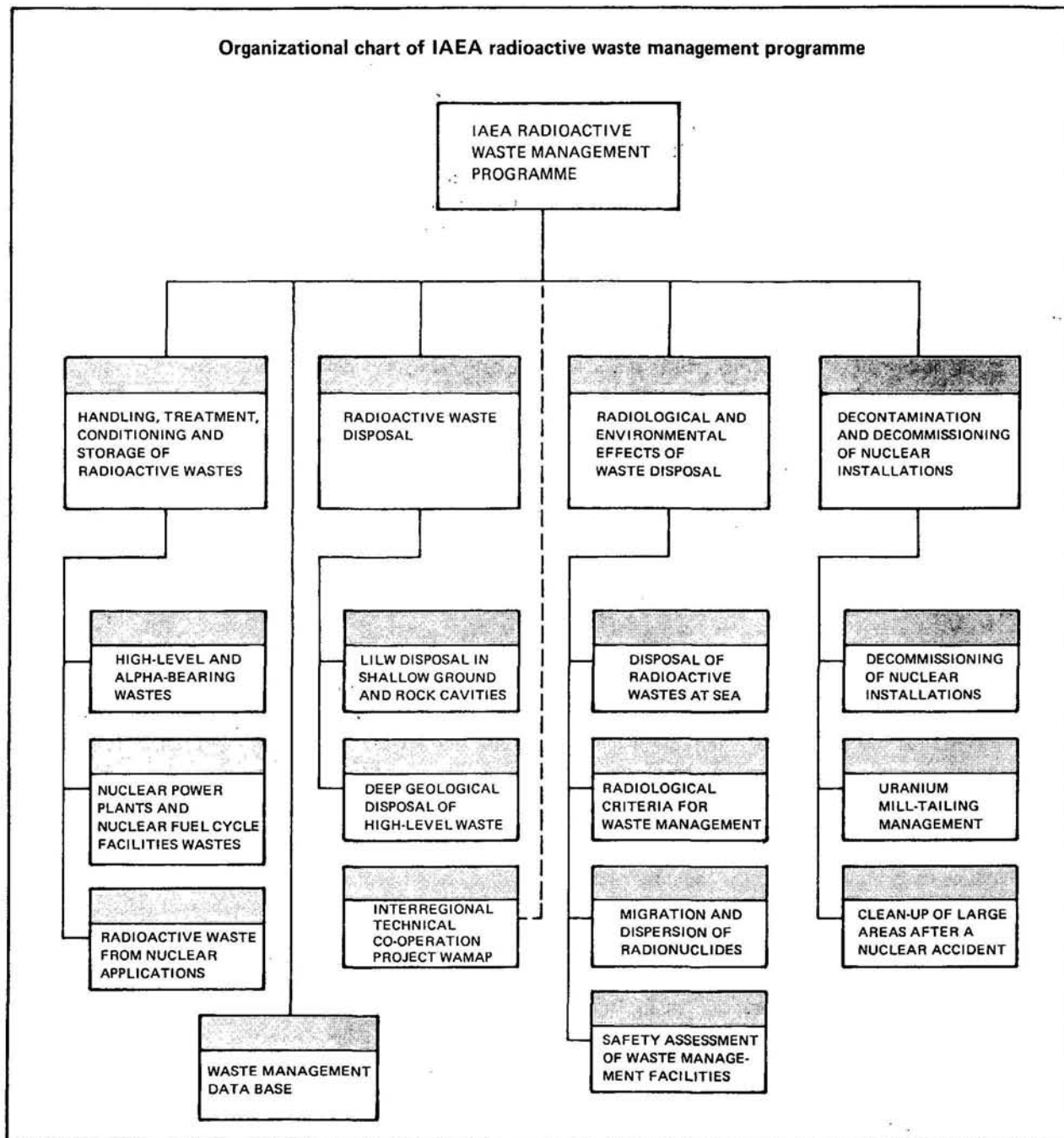
Generation of radioactive waste in Member States

Category	Waste Generation Sources
A	Medical isotope applications
B	Multi-isotope applications
C	Small nuclear research centres, Multi-isotope production/applications
D	Nuclear power plants
E	Nuclear power plants/nuclear fuel cycle

With such a diverse field of interest among its Member States, the Agency's programme must be carefully balanced so as to place sufficient resources in activities which are beneficial to all Member States, regardless of the degree of sophistication that a country may have reached in the management of radioactive wastes. This often means that some activities/tasks will be directed toward industrialized countries while other programmes are established to assist developing countries. Of course, there are also programmes that are beneficial to all Member States regardless of the waste management activity level or category of the country.

In introducing new programmes a very careful analysis must be performed to determine the costs/benefits of the proposed programme since the Agency is operating under a "zero growth" budget environment. Under such an environment, implementation of a new programme, by definition, means the shifting of resources away from other programmes. New activities or initiatives are therefore carefully evaluated to determine if their implementation will strengthen the overall programme considering that other activities will generally have to be proportionally reduced by the resource

Mr Semenov is Deputy Director General of IAEA's Department of Nuclear Energy and Safety. Mr Zhu is Director of the Division of Nuclear Fuel Cycle and Waste Management. Mr Saire is Head of the Division's Waste Management Section.



commitment to the new activities. In this article, four new programmes are identified which are either in the planning stage or have recently been incorporated. Two of the programmes are especially designed to provide assistance to developing countries, one programme is structured for the needs of industrialized countries, and one programme should be useful to all countries. The four new activities are:

- Waste Management Advisory Programme (WAMAP)
- Waste Management Assessment and Technical Review Programme (WATRP)
- Waste Processing and Storage Facility (WPSF)
- Waste Management Data Base (WMDB)

Waste Management Advisory Programme (WAMAP)

WAMAP is an advisory waste management programme developed to facilitate Agency efforts to provide assistance to developing Member States as they plan and implement national radioactive waste management programmes. It was initiated to complement existing technical assistance efforts of the Agency by concentrating on specific areas of concern that are identified by developing countries in the management of low- and intermediate-level radioactive wastes. The objectives of the programme are to provide a technical assistance mechanism which offers international expertise to waste management problems/issues faced by developing nations; and to develop and implement waste

management solutions to common problems faced by developing countries on a regional basis.

WAMAP thus helps developing Member States to utilize international experience in the assistance and practical development and implementation of waste processing, storage, and disposal projects. The objective is the enhancement of safety and the protection of people and their environment from hazardous radioactive wastes.

Since the programme's inception in 1987 through late 1989, a total of 24 developing countries have made requests to the Agency for WAMAP services. WAMAP missions are performed when the Member States supply certain basic information on their radioactive waste management needs. This information is used by the Agency to determine the composition of the WAMAP team (i.e. type of expertise required) that will visit the Member State. Usually the team will be composed of experts from the Agency staff and outside experts from Member States that have vast experience in the area that the mission will cover. The advice and recommendations offered by a WAMAP team often provides the initial assessment of the country's needs. They further result in a precise plan and practical solutions to the waste management problems the country faces, taking into account its resource capabilities. WAMAP recommendations also serve to determine the types and nature of follow-up Agency assistance and/or technical assistance projects that may be needed to successfully implement the country's waste management programme.

WAMAP is still a relatively new initiative and it is expected that changes will occur as the programme matures. Considering that the Agency has over 80 Member States which use radioisotopes in medicine and other fields, there exists considerable potential that WAMAP efforts will be expanded in the future. The Agency's developing Member States are encouraged to review the WAMAP concept and make full use of this programme as they develop plans to implement national waste management strategies and programmes. (More information on WAMAP is featured in the article "Waste management in developing countries" in this edition.)

Waste Management Assessment and Technical Review Programme (WATRP)

While WAMAP focuses on waste management concerns of developing countries, the Waste Management Assessment and Technical Review Programme (WATRP) has been developed to provide a mechanism by which the Agency could establish a forum for technical assessments/peer reviews of waste management policies and practices of industrialized countries. This concept is in the earlier stages of development. The objective of WATRP is to assist Member States with nuclear power plants and fuel cycle activities in their evaluation of the technical, operational, safety, and per-

formance features of waste management systems planned or in operation by providing independent peer reviews of such systems by groups of international experts under the IAEA's auspices. The members of the WATRP panel would act in their individual capacities. Therefore, the views and comments expressed by panel members regarding the programme under review will be their own and will not necessarily represent the opinion or views of their respective governments or the Agency. Unlike WAMAP, this programme is directed toward Agency Member States that have a well-established waste management programme or detailed plans for such a programme. The WATRP concept will function as a service that would be available upon specific request from a Member State. Member States requesting this service would be expected to provide the necessary funds to cover the cost of the programme.

In implementing and executing a WATRP review, the following terms/items need to be agreed to by the Agency and Member State organization requesting the service: terms of reference; source material requirements; composition and size of the team; mechanism of review; timing/schedule for the review; and costs involved.

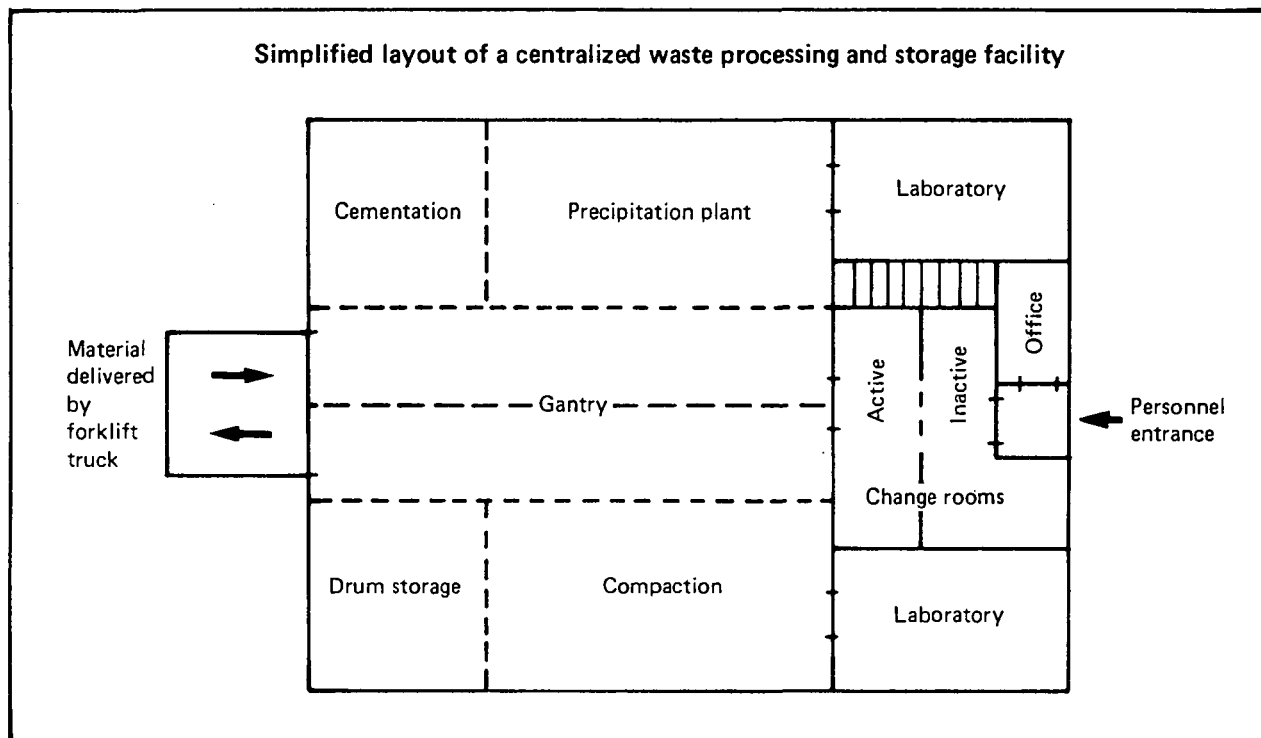
The terms of reference need to be clearly established by the customer requiring the service. This is the initial step in the implementation process for a WATRP mission and is necessary to ensure that the proper experts are selected, appropriate source materials are available for use in accomplishing the task, and that the scope and timing of the proposed task can be performed within the resources of the Agency. The customer, in defining the terms of reference of the WATRP mission, must also provide the necessary source materials which form the basis for the independent assessment by the expert groups. Source materials may include technical documents, flowsheets, organization policies/regulatory manuals, programme documents, etc. The source material may also be a physical plant or complex that is to be visited by the team of experts.

It is anticipated that most of the WATRP requests will probably be performed by a careful review of source materials followed by technical discussions between the team of experts and the professional staff of the customer at the Agency's headquarters in Vienna or at the customer's site.

WATRP is being offered to provide a mechanism for independent international peer reviews of national plans and projects and may be seen as a way of assisting Member States in establishing the reliability and confidence of such systems. The Agency welcomes comments from Member States on ways to improve implementation of this important programme.

Waste Processing and Storage Facility (WPSF)

Many developing countries generate similar volumes and activities of radioactive wastes from the use of radioisotopes. In recognition of the need to assist them



A simplified layout of a centralized waste processing and storage facility is shown here. Its main features include a precipitation plant for the handling and treatment of low- and intermediate-level liquid wastes; compaction equipment for the treatment of solid wastes; cementation equipment for immobilizing of the sludge resulting from treatment of liquid wastes and other concentrates; and an area for the storage of drums containing treated and conditioned waste.

in planning for the processing and storage of wastes from nuclear applications, the Agency is in the process of developing a plant design package of reference materials for handling, processing, and storage of low- and intermediate-level waste. This package could be used by developing Member States that have a requirement for a centralized radioactive waste facility.

By offering such a package, the Agency and Member States benefit in two important ways. First, it promotes the availability of a plant design that has been structured according to the needs of Member States that generate waste only from nuclear energy applications. This means that the plant would be designed for low volumes of waste and with process technologies that are easy to operate and maintain.

Secondly, since the resources available for providing technical assistance to developing countries are limited, there is considerable merit to develop an application or concept which meets the needs of several countries and can be used repeatedly. The reference package would serve as the basis for construction of facilities to handle radioactive waste from nuclear energy applications. (See accompanying figure.)

The WPSF would also include the necessary support facilities including analytical laboratories, employee changing rooms, and office space. The plant would be sized to handle waste volumes that are typical of countries with a well-developed isotope applications programme. With the establishment of a standard refer-

ence plant design, the Agency's technical assistance missions to Member States in the area of handling and processing low- and intermediate-level waste would be greatly enhanced. Experts visiting developing Member States could use the WPSF as the basis for providing an effective technical and economic solution to waste management handling, processing, and storage problems.

Waste Management Data Base (WMDB)

The Agency is now in the process of developing and implementing a Waste Management Data Base (WMDB). This system is being designed to support its waste management activities and to enhance its work with Member States. Information put into the WMDB will be derived from a questionnaire that was forwarded to all Member States in May 1989. It requested information on radioactive waste management infrastructures in Member States and plans for the handling, treatment, conditioning, storage, and disposal of low-level waste, intermediate-level waste, alpha-contaminated waste, high-level waste, spent fuel, spent radiation sealed sources, decommissioning waste, and uranium mining/milling tailings.

The WMDB will be structured so as to provide a waste management profile of Member States. This is a very practical form to both collect and produce data, since the waste management issues faced by the Agency