

# COMMISSION OF THE EUROPEAN COMMUNITIES

SEC(90) 2132 final

Brussels, 13 November 1990

## COMMUNICATION FROM THE COMMISSION TO THE COUNCIL

Objectives, standards and criteria  
for radioactive waste disposal in  
the European Community

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"OBJECTIVES, STANDARDS AND CRITERIA  
FOR RADIOACTIVE WASTE DISPOSAL IN  
THE EUROPEAN COMMUNITY"

Disposal activities have to be carried out within an appropriate legal and regulatory framework which is under permanent development at national, Community and international levels.

Guiding and regulatory measures cover a wide spectrum, from general principles or objectives - including philosophical or ethical principles - to quantitative technical rules or criteria. Some are binding, like the provisions of a nuclear law or a decree, while others are recommendations. They represent a hierarchy of measures, from the general to the specific, and may be conveniently described as a "pyramidal approach".

Using this pyramidal approach, the existing radioactive waste disposal regulatory framework in the EC countries has been examined\*, with a view to identifying common features and differences. An appraisal is made of the overall situation and of differences at national level, and also suggestions made for possible harmonisation. It is important here to recall the Community's general objectives of ensuring an equal and satisfactory level of protection for workers, members of the public and the environment and of suppressing unnecessary disparities which may be harmful to industrial activities in the European Common Market after 1992.

GENERAL PRINCIPLES AND INTERNATIONAL GUIDANCE

Legal and regulatory measures are based on a few common general principles. Most of these principles encompass a much broader field than waste disposal or nuclear energy. They deal with :

- radiological protection;
- ethical and sociological questions;
- environmental and natural resource protection
- nuclear safeguards.

These principles are laid down mainly at international level and constitute an international guidance for implementation at EC and/or national level. Their aim and meaning, as far as the specific problem of waste disposal is concerned, their development and the international bodies involved, the present trends and their state of introduction into legal structures, notably at EC level, are reviewed. It appears that several recent developments and proposals have not, as yet, been incorporated into national or international laws or regulations.

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\* A report has been prepared by a working group of experts, set up within the task "Joint elaboration of radioactive waste management policies" of the Commission's shared-cost action programme on "Radioactive waste management and disposal 1985-1989".

COMMON PRINCIPLES, STANDARDS AND REQUIREMENTS APPLICABLE TO RADIOACTIVE WASTE IN THE EUROPEAN COMMUNITY

The Treaty of the European Atomic Energy Community (Euratom) of 1957, the Treaty of the European Economic Community (EEC) of 1957 and the Single European Act of 1987 have established a set of principles, standards and requirements applicable to nuclear matters (Euratom Treaty) and environmental matters (EEC Treaty supplemented by the Act) in all Member States of the European Community. These are under continuous development and updating, reflecting the general progress of Science, Technology, and Society, and international guidance.

The Commission is generally assisted in this task by appropriate advisory Group of experts; the main groups currently relevant to radioactive waste activities and their development are:

- For radiation protection matters: the group of experts in charge of advising the Commission on the implementation of Articles 31 and 37 of the Euratom Treaty;
- For research and development matters: the Committee for management and coordination (CGC) "Nuclear fission energy/fuel cycle/radioactive waste" and the Scientific and Technical Committee of Euratom;
- For radioactive waste policy matters: the Advisory Committee on the implementation of the Community Plan of Action on radioactive waste management.

European Community legal or regulatory measures are present in most fields covered by the general principles referred to in the paragraph above, with different impacts however (i.e. legally binding or not). In relation with radioactive waste, radiological Protection appears to be the best developed instrument, the well-known system of dose limitation is expressed in terms of justification, optimisation and individual dose limitation. Justification is given through a net benefit of the whole energy production cycle or the use of radioactive substances, and is consequently not applicable to waste disposal standing alone; on the contrary, optimisation of protection may be applied to the cycle as a whole, as well as to individual management steps. Optimisation reflects the principle that exposure should be kept "as low as reasonably achievable, economic and social factors being taken into account", and is of paramount importance in site selection. Individual dose limitations for doses presumed to occur with a high degree of certainty are well established. These limits are well suited for the operational period of a repository, but do not cover the post-operational phase of a disposal facility where a probabilistic approach is needed.

The system of control in radiation protection requires that no source or practice involving exposure to man to ionising radiation shall be authorised unless it is subject to control by a system of notification, registration and licensing as established by the competent authorities; the system of control with the "source" being radioactive waste is applied in all stages of waste management and disposal.

The principles included under ethical and sociological questions are often expressed in an indirect manner in current legislation. Under the EURATOM Treaty, each Member State of the European Community shall provide the Commission with data relating to plans for disposal of radioactive waste in order to enable the determination of whether such a plan is liable to result in the radioactive contamination of the water, soil or air space of

another Member State. After having consulted an expert group, the Commission delivers its opinion concerning the plan. The "public involvement principle" is now included in Community legislation, specifying that licensing projects and the supporting information will be made available to the public, and that the public has the opportunity of making known its opinion before the project is started. The "polluter should pay" principle also was introduced formally into European legislation; it is the basis for financing waste management and disposal. It was incorporated into the laws of a number of Member States. The principle of compensation for damage, or otherwise the civil liability in the field of nuclear energy, asks for adequate and equitable compensation to persons suffering damage caused by nuclear incidents, including those involving radioactive wastes. Multilateral Conventions have been concluded to that effect. They have been ratified by most of the Community Member States.

In the field of environmental and natural resources protection, three relevant principles may be identified: prevention of damage, rectification of damage, and protection of natural resources. The non-radiological concerns related to radioactive waste disposal are adverse effects to future utilisation of natural resources, release of non-radioactive contaminants, degradation of water supplies, effects on plant and animal life, etc. In European Community legislation, the requirements to preserve, protect and improve the quality of the environment, and to ensure a prudent and rational utilisation of natural resources have been institutionalised, and an environmental impact statement has to be established for new installations.

Nuclear safeguards are well implemented in the control of nuclear materials for the prevention of their diversion. The Community already has its own safeguards required through the EURATOM-Treaty of 1957.

#### THE SETTING UP AND IMPLEMENTATION OF BASIC CRITERIA BY INTERNATIONAL INSTITUTIONS AND NATIONAL SAFETY AUTHORITIES IN THE EC

International guidance and EC principles, standards, and requirements, constitute sets of recommended (or legally binding in the case of the EC) measures, general enough to be acceptable for possible incorporation in the national legal framework of all member countries.

These sets of general measures also provide a useful framework around which more concrete and technical measures can be developed or derived, at national level, or at the level of safety authorities, for operational purposes.

The development or derivation and implementation of such measures depends in most cases on the local environment, on the people concerned, on the political, legal and institutional systems adopted by each country, etc.. This makes attempts at harmonisation difficult. However, the methodological approach for setting up these measures for radioactive waste disposal is similar in all EC Countries and is being undertaken in two ways:

- by a careful review of existing knowledge (e.g.: the degree of relevance of seismicity in the site selection process for a waste repository). Usually, groups of experts and scientists are convened and mandated, at governmental or international level, to recommend criteria; this is usually a qualitative procedure, and is not site-specific;

- by a performance assessment of the proposed repository. This is a quantitative procedure performed by highly specialised scientists employing mathematical modelling. Performance assessment is generally linked to a specific project and the results do not have common application.

Scientific approaches to the radioactive waste disposal problem define the technical choices to be made, without endangering disposal safety. For example the disposal of waste of low radioactivity and short-lived can take different routes, such as near-surface disposal or deep geological disposal; on the other hand, waste with a high level of radioactivity and/or with a very long life must be disposed of along the second route for radiological protection reasons.

The choices made and the disposal options adopted by governments reflect national radioactive waste management policies; these policies are largely influenced by geographic, economic, socio-political, institutional factors, etc. and must not be confused with legal measures to ensure health and safety.

#### THE ROLE AND THE DUTIES OF THE OPERATORS OF RADIOACTIVE WASTE INSTALLATIONS

Within the national regulatory framework, the management of the waste is entrusted to an executive body or national Agency; these waste operators have been in existence for a number of years in the various EC Member States with nuclear programmes; they are separate from the safety authorities and are either themselves directly responsible for waste disposal or act through subsidiary or shareholder companies, by means of a public or private statute. A country-by-country description may be found in the full report.

As far as radioactive waste disposal is concerned, the waste facility operators, or their agents, have to:

- present proposals to the competent national authorities for the siting, design, operation, closure and postclosure of disposal facilities; these proposals must comply with the relevant national and EC regulations, standards and criteria and be in agreement with the national radioactive waste management policy; they must include a safety case to be submitted to the licensing body as well as radiological and environmental assessments to be submitted to the authorising department(s);
- build and operate the facilities agreed upon by the competent national authorities;
- collect and dispose of the waste generated by the waste producers in the authorised facilities.

To that effect, the operators must provide a number of performance and safety assessments which include site-specific, detailed criteria.

#### CONCLUSIONS

The present review of general principles and the regulatory framework for radioactive waste disposal shows that a large number of legal and administrative recommendations and requirements exist at international, European Community and national level. Basic principles established at international level and European Community regulations provide common guidelines and requirements from which a large proportion of national measures are derived.

National measures therefore share several common features, mainly in the field of radiological protection: most nations share the same broad objectives, which have been developed at international level and, in the case of EC countries, within the framework of the Euratom Treaty.

On the other hand, policies and strategies for carrying out the management of the radioactive wastes are matters of national competence, as are the ways and means ensuring technological safety. Moreover, choices frequently have a political dimension. As a result differences exist from one EC country to another.

Finally, the needs for administrative and legal measures in the field of radioactive waste management are evolving all the time, and this requires adaptation, and even innovation. The very long periods of time during which waste disposed of underground will remain radioactive are a factor to be considered in radiological protection, nuclear safety, and public acceptance.

Recognising that the equivalent level of safety in waste management and disposal is desirable throughout the European Community, harmonisation of national measures or practices would be beneficial in this field, whenever feasible.

This review has identified the following technical issues for future consideration by the competent national and Community authorities:

- Efficiency of natural and man-made barriers (the time during which no radioactive release through the barrier under consideration should occur and the retardation effect of the barriers);
- Quantitative figures for maximum alpha content acceptable in waste for near-surface disposal and for maximum heat generation acceptable in waste declared as non-heat emitting waste for disposal;
- General site selection criteria for underground repositories;
- Methodologies for performance assessment and safety evaluation of repositories, in particular for human intrusion scenarios leading to site-specific evaluation.

In addition, study of the following matters, already undertaken at international and/or Community level, should be pursued:

- Definition of waste being "below regulatory concern" (application of internationally agreed principles to particular waste streams), particularly for waste arising from dismantling of nuclear installations;
- Guiding principles in waste equivalence problems;
- Optimisation of radiological protection in waste disposal (the application of the ALARA principle).

Finally, the apparent fuzziness in radioactive waste categorisation in Europe, even though the result of differences in national policies, should be looked at with a view to achieving a better public understanding of waste management and to facilitating international cooperation between the waste operators.

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