

THE NEA MULTILATERAL CONSULTATION AND SURVEILLANCE MECHANISM FOR SEA DISPOSAL

Dr. B. Rügger
OECD Nuclear Energy Agency, Paris, France

INTRODUCTION

Sea dumping operations of certain types of packaged low and medium-level radioactive wastes were carried out on a national basis, from just after the war to the middle of the '60s, mainly by the United States in the Atlantic and Pacific Oceans and by the United Kingdom in the Atlantic. In 1967, the European Nuclear Energy Agency (ENEA), which later became the Nuclear Energy Agency (NEA), sponsored the first international radioactive waste disposal operation in which five European countries took part. Similar international operations have since then taken place almost every year with the result of the de facto cessation of purely "national" dumping operations.

The preparation of the first joint dumping operation began as early as 1965 with the undertaking by NEA, in collaboration with interested countries, of a series of studies on the practicability of such an operation, including scientific assessment of the risks, formulation on an experimental basis of a number of rules for the selection of a suitable dumping site, design of waste containers and the selection of ships. Procedures were also adopted for conducting and supervising the operation with the objective of ensuring overall safety and, in particular, protecting man and the environment against radioactive contamination.

At this time, in the absence of a specific legal framework, the application of the technical requirements and other rules formulated in common and supervised by NEA were based on the voluntary acceptance of the countries concerned, without any formal commitment. It is the considerable amount of practical experience accumulated during the early years of international co-operation which provided the basis for the formulation of the legal requirements adopted in the framework of the London Convention in 1972.

This Convention regulates the voluntary dumping of all kinds of waste, including radioactive waste. Dumping of high-level radioactive waste is specifically prohibited. Dumping of other radioactive waste is subject to the prior issuance of a special permit by the responsible authorities of the country carrying out the operation. The IAEA has been entrusted with the responsibility of defining high-level radioactive waste unsuitable for dumping at sea and of preparing recommendations to be taken into account by national authorities when issuing the special permit in compliance with the criteria and conditions laid down by the Convention. These recommendations concern the selection of the dumping site and the relevant environmental assessment, the conditioning and packaging of waste, the selection of ships and the supervision of operations by national authorities.

Under the terms of the London Convention, each government can itself authorise and supervise a dumping operation in accordance with the rules set up by the IAEA under the Convention. However, most NEA Member countries, and especially those objecting in principle to sea dumping, were in favour of continuing international co-operation to improve and update the rules for sea disposal operations and ensure effective international surveillance in addition to the national controls brought in under the London Convention. Furthermore, the London Convention encourages international and regional co-operation in the development of procedures for its effective application. Consequently, NEA's role had to be reviewed to take these developments into account. This resulted in a Decision of the OECD Council, in 1977, to replace the ad hoc and voluntary arrangements used until then by a Multilateral Consultation and Surveillance Mechanism for Sea Disposal⁽¹⁾. This Decision formally commits participating countries^(a) to apply the guidelines and procedures adopted within NEA, and to subject their operations to a system of prior consultation and international surveillance exercised by NEA.

(a) The following NEA Member countries are today party to the Mechanism: Belgium, Canada, Denmark, Finland, France, the Federal Republic of Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States.

MAIN FEATURES OF THE MECHANISM

The purpose of the Mechanism is to further the objectives of the London Convention. As such it affects none of the provisions of the Convention or the IAEA Definition and Recommendations, nor does it restrict the responsibilities and powers assigned to governments by the Convention regarding the granting of permits and the application of measures for preventing marine pollution and controlling dumping conditions. The Mechanism adds to the system formed by the London Convention and the IAEA Definition and Recommendations, the following four components:

- The establishment and review by NEA, in the light of the experience gained, of standards, guidelines and recommendations to be applied to dumping operations at sea; along the same lines, the assessment by NEA of the suitability of sites proposed by national authorities and review of those previously considered suitable for the dumping of radioactive waste. The OECD Environment Committee shall be consulted on all environmental policy aspects.
- Consultation among participating countries by means of a system of advance notification of detailed information about projected dumping operations. Time limits are set for these notifications in order to allow for the assessment, consultation and possible seeking of international advice.
- International surveillance for all dumping operations, which is provided by the appointment of national representatives by the Director-General of the NEA. According to the IAEA Recommendations, the direct control of a dumping operation is entrusted to an Escorting Officer, appointed by the national authorities and vested with the necessary powers regarding all aspects of radiological safety and protection. The role of the NEA Representative is to verify that the dumping operation is conducted according to the NEA recommended operational procedures for sea dumping. In the case of disagreement with the national Escorting Officer, he may request suspension of the operation pending consultation between national authorities and the Director-General of NEA.
- Finally, maintenance by the NEA Secretariat of records of wastes dumped and submission of reports on the operations to the NEA Steering Committee for Nuclear Energy, to the OECD Environment Committee and to the Inter-Governmental Maritime Consultative Organisation (IMCO) which is responsible for the secretariat of the London Convention.

OPERATIONAL FEATURES

Notification Phase

In practice, participating countries have to notify NEA as soon as they have decided to carry out a radioactive waste sea dumping operation, and in any case no later than six months before the operation is scheduled to take place. If a new dumping site is proposed, notification has to be given no later than twelve months before the operation. This first notification includes:

- Legal and administrative measures taken for applying, as appropriate, the London Convention, the IAEA and NEA standards, guidelines, recommended practices and procedures;
- Planned date of operation;
- Approximate indications of waste to be dumped, including:
 - . estimated quantities
 - . types of nuclides and activities for each category of waste (alpha, Ra-226, beta-gamma, tritium)
 - . origin and composition of waste
 - . type of conditioning and packaging consistent with the NEA Guidelines for Sea Dumping Packages of Radioactive Waste(2)
 - . detailed design specifications for new types of conditioning or packaging of wastes
 - . other information, as appropriate, on potential hazardous properties of the waste, other than from its radioactive content
- Position of the dumping site chosen with an environmental and ecological assessment or reference to a relevant assessment;
- Proposed operational procedures, including dumping method and general indications on the ship to be used.

A second notification to NEA has to be made not later than three months before the operation is scheduled to take place according to the following format:

- Latest information available on quantities of waste to be dumped;

- A statement that the waste packages as a minimum conform to the current NEA Guidelines for Sea Dumping Packages of Radioactive Waste;
- Characteristics of the dumping ship and a statement that as a minimum it meets the requirements set out in the NEA Recommended Operational Procedures for Sea Dumping of Radioactive Waste(3);
- Name and qualification of the national Escorting Officer responsible for supervising the operation;
- Timetable of operation;
- Information on contracts on third party liability.

Consultation Phase

Upon receipt of notifications, the NEA Secretariat circulates the information provided to all participating countries, together with comments and observations relating the proposed operation to the provisions of the London Convention, the IAEA Definition and Recommendations and NEA standards, guidelines, recommended practices and procedures. Comments by participating countries are transmitted to the country carrying out the operation and will appear in the final report to the Steering Committee for Nuclear Energy.

The NEA Secretariat may on its own initiative, or must upon request by any participating country, seek the advice of an ad hoc international group of specialists or of one of the competent committees of NEA or other bodies of OECD. Such advice must be sought for example in the event that:

- A new site is proposed;
- The proposed site is not or is no longer considered suitable by NEA;
- It is planned to use new waste conditioning methods or types of container not previously recognised by NEA as suitable for sea dumping;
- It is planned to use a ship having characteristics not previously recognised by NEA as suitable for sea dumping and of relevance to the safety of the operation;
- Or in such other cases as may be determined by the Steering Committee for Nuclear Energy in the light of the experience gained.

This procedure must be initiated in sufficient time to enable the advice to be formulated not later than

two months before the operation is scheduled to take place. The NEA Secretariat then informs all participating countries of the advice obtained. The country intending to carry out the operation should take account of this advice and inform NEA of the decision taken, giving the reasons, which will appear in the final report of the operation to be submitted to the Steering Committee for Nuclear Energy. In practice, due to the fact that all standards, procedures and the site evaluation have been established in co-operation, comments made during the consultation phase have so far been very limited.

Surveillance Phase

For each operation carried out under the Mechanism, the Director-General of NEA appoints a Representative who reports to him. The NEA Representative must be an experienced health physicist fully conversant with the design and construction of all approved types of container. He acts as an international official and should not be in charge of the interests of a given country. He should not be a national of the country carrying out the operation. His duties and rights are defined as follows:

Before the operation the NEA Representative is present when the radioactive wastes arrive at the dockside in order to:

- verify that a special dumping permit has been issued by the national authority;
- verify that the quantities, types of wastes and design of containers are in accordance with the information provided by the national authority and the NEA guidelines.

During the operation the NEA Representative:

- must be satisfied that the dumping is carried out within the specified area;
- verifies that adequate surveillance of the dumping is possible and that the operation proceeds in accordance with established procedures;
- verifies that no significant radiation hazard to the crew takes place;
- must be prepared to assist the national Escorting Officer in fulfilling his duty, particularly in an emergency situation.

After completion of the operation, the NEA Representative:

- in the case of contamination, verifies that the ship is decontaminated;
- makes an immediate oral report to the NEA Secretariat on the operation and prepares a detailed written report to the Director-General of NEA.

In order to be able to fulfil his task the NEA Representative, as well as the national Escorting Officer, must be supplied with a set of documents and certificates necessary for the application of the NEA recommended Operational Procedures, i.e.:

- Dumping permit granted by the national authorities;
- Statement of conformity of waste packages with the current NEA guidelines;
- Certificate that materials to be dumped have been prepared in accordance with the NEA standards;
- Inventory of waste packages;
- Statement of conformity of the ship with the NEA criteria;
- Certificate of adequacy of the ship's lifting equipment and of the dockside lifting equipment.

In the case of abnormal events or observations, the NEA Representative will, in accordance with his duties and rights, make suggestions or representations to the national Escorting Officer. They should try to reach agreement on the action to be taken. In case of disagreement, the national Escorting Officer shall be requested to suspend the operation and the NEA Representative shall report immediately to the Director-General of NEA by the quickest available means. The Director-General of NEA shall consult the competent national authorities. If no mutually acceptable solution is found and the competent national authorities decide to authorise continuation of the operation, the circumstances shall be reported by the NEA Secretariat to the Steering Committee for Nuclear Energy.

The above procedure looks very formal but experience has shown that national Escorting Officers and NEA Representatives fulfil their respective duties with a good spirit of co-operation and high professional competence. No important incident relative to the safety of the operation, as for example extensive contamination of the ship, has been reported so far. The detailed reports prepared by the NEA Representatives

provide a valuable source of information and practical experience to improve the safety of future operations, and are therefore communicated to all concerned countries.

SITE ASSESSMENT AND GUIDELINES

NEA is requested under the Mechanism to assess the suitability of dumping sites proposed by participating countries and to keep under review those previously considered suitable. Since 1974, radioactive waste sea dumping operations undertaken by participating countries have been carried out in a single site located in the North-East Atlantic region. To fulfil the objectives of the Mechanism, an international group of oceanographic and radiation protection experts reviewed, in 1979, the continued suitability of the dumping site taking into account the relevant provisions of the London Convention and the IAEA Definition and Recommendations for the purpose of the Convention. The experts considered the oceanographic, biological and sedimentological aspects of the site, its tectonic activity, its potential seabed resources as well as the position of undersea cables and traffic densities in the region. The group also checked point by point the compliance of the site with the relevant provisions of the London Convention and the IAEA Definition and Recommendations. The NEA Steering Committee for Nuclear Energy confirmed in April 1980 that, on the basis of the review, the existing site was suitable for continued dumping of radioactive waste for the next five years at annual rates comparable to those reached in the past. The presently-used dumping area is located within ten nautical miles north and south of 46°00'N (45°50'N-46°10'N) and 16°00'W-17°30'W. Its area is about 4×10^3 km². The distance to the nearest land (Irish or Spanish coast) is over 700 km and the continental shelf is more than 500 km away from the site. The average depth of the site is about 4,400 m. Details of the amounts dumped so far are given in the Table attached(4).

Guidelines for sea dumping packages of radioactive waste were published in 1974 as part of the rules and procedures adopted on a voluntary basis by NEA Member countries before the setting up of the Mechanism. These guidelines were revised in 1979 by an NEA group of experts to take account of improvements in waste conditioning and packaging technology and past operational experience(2). Full consideration has also been given to the requirements of the IAEA Revised Definition and Recommendations of 1978. The packages should be designed in such a way as to ensure:

- proper radiation protection of workers involved in the operation;

- containment of the waste during handling, transportation, descent to and impact upon the sea floor, and to minimise to the extent reasonably achievable subsequent release of radionuclides to the sea;
- the waste in the package should be either in a solid or in a solidified form and the overall specific gravity should not be less than 1.2.

The guidelines also include design and manufacture advice, radiological safety considerations and examples of several approved types of sea dumping package.

The Recommended Operational Procedures for Sea Dumping of Radioactive Waste, published in April 1979, refer to the organisation and control of operations⁽³⁾. They were established by a working party of representatives from Member countries participating in the Mechanism, in the light of past operational experience and taking into account the IAEA Definition and Recommendations for the purpose of the London Convention. These procedures are designed to ensure the safe disposal of radioactive waste in such a way that any radiation exposure is kept as low as reasonably achievable within designated dose limits, and that other risks are also adequately controlled. They describe in detailed practical terms all actions and measures to be taken at each step of the operation from the advance preparation to the loading phase, the navigational phase, the dumping phase and the post dumping phase. Criteria for the suitability of ships are also included.

SCIENTIFIC SUPPORT

On the occasion of the last review of the continued suitability of the dumping site for radioactive waste in the North-East Atlantic, it was recommended that for future assessment an effort should be made to increase the scientific data base relating to oceanographic and biological characteristics of the dumping area and, in particular, to develop a site specific model of the transfer of radionuclides in the marine environment which would permit a better assessment to be made of the potential radiation doses to man from dumping of radioactive waste. To fulfil these objectives a research and environmental surveillance programme related to sea disposal of radioactive waste has recently been set up with the participation of eleven Member countries and the International Laboratory for Marine Radioactivity of the IAEA in Monaco⁽⁵⁾.

The conceptual framework of the programme may be represented by a model which has three separate components: a release model, describing the release of radionuclides from the waste package; a marine model,

describing the marine environment; and a pathways model, describing the transport of radionuclides through food chains or other direct pathways to man. The research programme is focussed on those research areas which are directly relevant to the preparation of more site-specific assessments in the future and five task groups have recently been set up on:

- physical oceanography
- geochemistry
- biology
- model development
- radiological surveillance.

Many of the resources and investigations proposed to support this effort are already in place and being funded. However, only incomplete results may be expected by 1984 at the time of the next assessment of the suitability of the North-East Atlantic site.

CONCLUSIONS

Within the general legal framework of sea dumping of radioactive waste defined by the London Convention and the IAEA Definition and Recommendations, the NEA Mechanism provides an additional level of international co-operation. The Mechanism, which is based on more elaborate norms and guidelines, has resulted in a now well-established consultation among the OECD countries on all the details of dumping operations. Furthermore, it has promoted the acceptance of international surveillance of such operations. This high degree of co-operation has undoubtedly contributed to the care and sense of responsibility which characterises NEA-supervised operations and ensures their smooth running. The Mechanism is limited at this stage to OECD countries but it could be seen as a precedent and a model for international consultation and surveillance on any other geographical basis in the future.

WASTE DUMPED INTO THE SEA 1967-1981*

Year	Gross weight (tonnes)	Approximate Radioactivity in Curies		
		Alpha	Beta-gamma	Tritium
1967	10,900	250	7,600**	-
1969	9,180	500	22,000**	-
1971	3,970	630	11,200**	-
1972	4,130	680	21,600**	-
1973	4,350	740	12,600**	-
1974	2,270	420	-	100,000
1975	4,460	780	30,500	30,000
1976	6,770	880	32,500	21,000
1977	5,600	950	36,300	31,900
1978	8,040	1,100	43,000	36,600
1979	5,415	1,415	40,925	42,250
1980	8,391	1,853	83,092	98,135
1981	9,434	2,117***	79,195	74,371
Total	82,910	12,315	420,512	434,256

* Source: NEA Records

** including tritium

*** plus 60 Ci Ra-226 in 1981.

REFERENCES

- (1) Decision of the OECD Council establishing a Multilateral Consultation and Surveillance Mechanism for Sea Dumping of Radioactive Waste, OECD document C(77)115(Final), August 1977.
- (2) Guidelines for Sea Dumping Packages of Radioactive Waste, revised version, April 1979.
- (3) Recommended Operational Procedures for Sea Dumping of Radioactive Waste, NEA, April 1979.
- (4) Review of the Continued Suitability of the Dumping Site for Radioactive Waste in the North-East Atlantic, NEA, April 1980.
- (5) Research and Environmental Surveillance Programme Related to Sea Disposal of Radioactive Waste, NEA, 1981.

See also for a legal analysis of the Mechanism:

- (6) Pierre Strohl, Establishment of a multilateral consultation and surveillance Mechanism for sea dumping of radioactive waste, Proceedings of Nuclear Inter Jura 1977, Florence, Italy, 2-5 October 1977.