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THE IAEA'S RESPONSIBILITIES IN CONNECTION  
WITH THE DUMPING AT SEA OF RADIOACTIVE WASTES

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I. INTRODUCTION

The dumping at sea of solid low-level radioactive wastes was first carried out in the United States of America in 1946. In 1960 the USA took steps to provide land burial services, and sea dumping operations were discontinued in 1970.

Packaged low-level radioactive wastes were disposed of into the North East Atlantic Ocean by the United Kingdom in 1949 and subsequent years. The first multinational dumping operation involving radioactive wastes from several Western European countries took place in 1967, under the auspices of the Nuclear Energy Agency of the Organisation for Economic Co-operation and Development (NEA/OECD).

The need for internationally acceptable standards and regulations for preventing pollution of the sea by radioactive materials was recognized by the first United Nations Conference on the Law of the Sea in 1958 which adopted the Geneva Convention on the High Seas. Article 25 of the Convention provides that:

"1. Every State shall take measures to prevent pollution of the seas from the dumping of radioactive waste, taking into account any standards and regulations which may be

\* The views expressed are those of the author. They do not necessarily reflect the views of the IAEA.

formulated by the competent international organizations.

2. All States shall cooperate with the competent international organizations in taking measures for the prevention of pollution of the seas or air space above, resulting from any activities with radioactive materials or other harmful agents."

The Conference further recognized in a resolution "the need for international action" in this field and recommended that the International Atomic Energy Agency (IAEA), along with other organizations -

"pursue whatever studies and take whatever action is necessary to assist States in controlling the discharge or release of radioactive materials to the sea, in promulgating standards, and in drawing up internationally acceptable regulations to prevent pollution of the sea by radioactive materials in amounts which would adversely affect man and his marine resources."

The IAEA immediately responded in 1958 in convening an expert panel whose report (the Brynielsson report), published in 1961 <sup>1/</sup>, set out the principles, criteria and conditions to be taken into account and recommended measures to ensure that sea disposal of radioactive waste would not result in unacceptable risk to man. The report stresses that such recommendations should be read on the understanding that they would be subject to changes in the light of increased scientific knowledge.

Subsequently, in particular during the period 1967-72, the IAEA held numerous technical meetings and issued advisory materials covering a wide range of issues connected with sea dumping of radioactive wastes such as standardization of waste categories, methods of surveying and monitoring marine radioactivity, reference methods for marine radioactivity studies, procedures for establishing limits for radionuclides in the sea, nuclear techniques in environmental pollution, radioactive contamination of the marine environment, tracer techniques in sediment transport.

## II. INTERNATIONAL LAW OF RELEVANCE TO SEA DUMPING OF WASTES

The past two decades have seen a continuing endeavour by the international community to ensure cleaner oceans, preservation and safe exploitation of marine resources, with increasing emphasis on protection of the marine environment. In this context, radioactive wastes have been the object of greater attention than any other marine pollutant, except oil discharged from vessels. International efforts to prevent marine pollution first entailed the restriction of discharges from ships since shipping is essentially international in character and, therefore, amenable to international action. Thus control over operational discharges from vessels has been established under the International Convention on Pollution of the Sea by Oil since 1954.

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<sup>1/</sup> Radioactive Waste Disposal into the Sea,  
IAEA Safety Series No.5, 1961.

The United Nations Conference on the Human Environment, held in Stockholm in June 1972, expressed special concern about international measures to control marine pollution and the need to preserve the resources of the sea. In response to a resolution of the Conference, the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (the London Dumping Convention) was adopted by an intergovernmental conference in London in November 1972 2/. The Convention provides for a dual basic undertaking by the Contracting Parties, namely -

- (a) to promote effective control of all sources of pollution of the marine environment, and
- (b) to take, individually and collectively, effective measures for preventing marine pollution caused by the dumping of wastes.

The Convention covers all marine waters extending beyond the limits of national jurisdictions; it regulates "any deliberate disposal at sea of wastes or other matter from vessels, aircraft, platforms or other man-made structures at sea", and any deliberate disposal at sea of such vessels, aircraft, platforms or structures. Pollution resulting from the normal operation of vessels, aircraft, etc. or directly arising from the exploration and exploitation of sea-bed mineral resources is excluded from the scope of the Convention as well as pollution from land-based sources through rivers, coastal or submarine pipelines.

The dumping at sea of any kind of waste is thus governed at the international level by the London Dumping Convention which entered into force on 30 August 1975. As of January 1983, 52 States are Parties to it 3/.

The Convention encourages international and regional co-operation in the development of procedures to protect the marine environment in a given geographical area and in the field of monitoring and scientific research. Co-operation with the Parties to regional conventions to develop harmonized procedures for application under different conventions with similar objectives is one key goal of the London Dumping Convention.

Starting with the Oslo Convention of 1972 for the Prevention of Marine Pollution by Dumping from Ships and Aircraft (effective since 1974), various international agreements have been adopted in the past decade to apply to specific regional seas 4/. For instance, as in the case of the Oslo Convention, the Paris Convention of 1974 for the Prevention of Marine Pollution from Land-Based Sources (effective since 1978) is aimed at protecting the marine environment in the seas surrounding Europe. Neither

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2/ The text of the Convention has been reproduced in IAEA document INFCIRC/205.

3/ See the list of Contracting Parties in Annex A.

4/ A list of regional conventions is provided in Annex B.

Convention, however, contains specific provisions concerning radioactive materials and, in this regard, both Conventions require concerted action within, and advice to be provided by, competent international organizations.

Environmental protection of the Mediterranean Sea is governed by the Barcelona Convention of 1976 (effective since 1978) and that of the Baltic Sea by the Helsinki Convention of 1974 (effective since 1980). Under the Barcelona Convention and both of its Protocols, disposal of radioactive wastes is prohibited. The Helsinki Convention also forbids dumping of such materials, unless they are in insignificant quantities and concentrations in dredged materials.

The establishment in 1977 of the OECD/NEA Multilateral Consultation and Surveillance Mechanism for Sea Dumping of Radioactive Waste was aimed at furthering the objectives of the London Dumping Convention in strengthening the regional co-operation established within that organization for the effective application of measures to protect the marine environment and public health in relation to sea dumping of radioactive materials. It also formalized a ten-year effort by NEA in assessing the standards, guidelines and recommended practices and procedures that have been developed and applied to such activities.

With the adoption on 30 April 1982 of the United Nations Convention on the Law of the Sea by 130 States (subsequently opened for signature at Montego Bay in Jamaica on 10 December 1982), a global guide for State behaviour in the world's oceans is henceforth available that deals with almost every human use of the oceans—navigation and overflight, resource exploration and exploitation, conservation and pollution, fishing and shipping.

Under Part XII of the Convention relating to Protection and Preservation of the Marine Environment, States are required to use "the best practical means at their disposal" to prevent and control marine pollution from any source. They are to co-operate globally and regionally, notify one another of imminent or actual damage, and develop contingency plans against pollution. Technical assistance, monitoring and environmental assessment will be promoted. International rules and national legislation will be devised to prevent, reduce and control pollution of the marine environment from land-based sources and activities in the oceans and sea-bed, including dumping. States will be liable for damage caused by violation of their international obligations to combat marine pollution. Obligations under other conventions on the protection and preservation of the marine environment, however, will not be affected by the new Convention.

### III. THE ROLE OF THE IAEA UNDER THE LONDON DUMPING CONVENTION

For the purpose of preventing marine pollution caused by dumping, the London Dumping Convention establishes three categories of materials:

- those which are prohibited from dumping, listed in Annex I to the Convention;

- those which require a prior special permit for dumping, listed in Annex II to the Convention; and
- other wastes or matter requiring only a general permit for dumping.

The criteria, conditions and considerations to govern the issue of any dumping permit by the competent national authority are set forth in Annex III to the Convention.

With respect to radioactive wastes or other radioactive materials, the Convention has entrusted the IAEA with the responsibilities of

- defining high-level radioactive wastes or matters unsuitable for dumping at sea (Annex I to the Convention, paragraph 6); and
- establishing criteria, limits and recommendations to be taken fully into account by the Contracting Parties in issuing permits for the dumping at sea of other radioactive wastes or matters (Annex II to the Convention, paragraph D).

The IAEA Definition and Recommendations for the purposes of the London Convention were first established in 1974 and subsequently revised in 1978 <sup>5/</sup>. They were accepted by the Consultative Meetings of Contracting Parties to the Convention in 1976 and 1978 respectively for the implementation of the Convention with regard to the control of radioactive waste dumping at sea. Accordingly, any dumping operation involving radioactive wastes that is planned to be carried out by a Contracting State is subject to a special permit for the issuance of which the national authority concerned has to comply with the requirements of the Convention and to abide by the IAEA Definition and Recommendations. The Convention, moreover, requires notification to the International Maritime Organization (IMO) - which performs Secretariat duties under the Convention - of any dumping permit issued by the competent national authorities. The particulars of such permits are in turn circulated by IMO to all Contracting Parties for information.

A review of radioactive dumping activities carried out during the last ten years shows that the quantities dumped are a small fraction of the quantity given in the IAEA Definition, which is based on an upper limit of exposure to a critical population according to the recommendations of the International Commission on Radiological Protection (ICRP). Concentrations below that specified in the Definition are not, however, necessarily acceptable for dumping because the IAEA Recommendations require that a special permit should be based on an environmental assessment and optimization procedure in which the resulting collective radiation doses are kept as low as reasonably achievable, economic and social factors being taken into account. Consideration should also be given

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<sup>5/</sup> Respectively reproduced in IAEA documents INFCIRC/205/Add.1 and INFCIRC/205/Add.1/Rev.1.

to whether there is a need for sea dumping rather than disposal on land within national jurisdiction.

The IAEA Recommendations set out requirements for site selection, monitoring and assessment, environmental evaluation of specific dumping applications and of total dumping, waste packaging and operational control of dumping. The underlying safety philosophy is that of continued isolation and containment of radioactive wastes after descent to the sea-bed, through the use of suitable packaging, in order to minimize the release of radioactivity, thereby preventing unnecessary contamination of the marine environment.

The Definition and Recommendations are kept under continuing review in order to refine and strengthen them; the pending revision is expected to be completed by 1985. This work has been and continues to be carried out in close collaboration with IMO, the United Nations Environment Programme (UNEP) and the OECD/NEA, with the advice of the Joint Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP) - which is an advisory body consisting of experts nominated by eight sponsoring organizations of the United Nations system (FAO, IAEA, IMO, UN, UNEP, UNESCO, WHO and WMO).

It should be stressed that the IAEA Recommendations are not to be construed as encouraging in any way the dumping at sea of radioactive wastes or as precluding the prohibition of such dumping or the adoption of more restrictive requirements by any Party to the London Dumping Convention insofar as that Party is concerned 6/.

It is further to be noted that the IAEA has not been vested with any supervisory or control function over dumping operations carried out within the scope of the Convention - though suggestions to this end have been made at recent Consultative Meetings of Contracting Parties.

In response to requests of the Contracting Parties, supplementary guidelines are being prepared for the environmental assessment of sea dumping of radioactive wastes, together with factors to be considered in justifying sea dumping versus land-based alternatives. Concepts for defining de minimis levels of radioactivity for wastes which may be dumped under a general permit pursuant to the Convention - such as non-hazardous wastes - are also being developed. A review of improved oceanographic models has been made within GESAMP, at the IAEA's request, and it will be taken into account for a revision of the Definition of radioactive wastes unsuitable for dumping into the deep ocean. Supporting research on the behaviour of radionuclides in the marine environment is also being carried out at the IAEA Laboratory in Monaco.

The 1961 publication on "Radioactive Waste Disposal into the Sea" has been revised in 1980-81 to be issued anew in the Safety Series in order to reflect the major changes in safety philosophy, radiological protection, marine sciences and international law that have occurred over the past 20 years. The purpose of the new

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6/ See Articles IV.3 and VI.3 of the London Dumping Convention.

document is to update the information on which decisions may be made by competent national authorities with respect to sea dumping of radioactive wastes, but on the understanding that the use of such information and of the conclusions derived therefrom should be considered in the context of changes in both knowledge and practices that occur subsequent to the completion of that document in 1981.

In this connection it should be noted that, independently of its responsibilities under the London Dumping Convention, the IAEA has been concerned with radioactive waste management since its inception. Its programme in this area has from the beginning given due attention to the preparation of guidance on the control of radioactive waste disposal into the sea. The current programme, started in 1977 to last until 1990, addresses all aspects of the industrial use of nuclear power: technology of handling and treatment of wastes, underground disposal, environmental aspects of nuclear energy, including sea dumping of wastes. Systematic reviews have been made and various publications have been issued or are being prepared concerning these aspects, including guidelines on the safe underground disposal of wastes in shallow ground, rock cavities or deep geological repositories. The environmental part of this programme is concerned with the assessment of radiological and non-radiological consequences of discharges from nuclear facilities, including de minimis concepts in waste disposal and environmental models and data for radionuclide release 7/.

#### IV. THE OECD/NEA MULTILATERAL CONSULTATION AND SURVEILLANCE MECHANISM

With respect to past dumping operations carried out under the auspices of NEA, the latter provided two distinct services, a regional framework for technical co-operation between interested Member countries of the OECD at the planning stage and a voluntary multinational surveillance system to ensure that dumping operations were carried out in accordance with approved arrangements.

After the entry into force of the London Dumping Convention and in view of the interest of a number of OECD Member countries for a continuation of the NEA's role in regard to sea dumping activities, the OECD Council in 1977 established a Multilateral Consultation and Surveillance Mechanism for Sea Dumping of Radioactive Waste. The purpose of this arrangement was to reinforce international co-operation in the development of standards and procedures for protecting the marine environment against pollution caused by the disposal at sea of radioactive materials. The OECD Mechanism is thus consistent with the objectives of the London Dumping Convention and its implementation follows the Convention's requirements and the IAEA Recommendations.

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7/ See "The IAEA's Work in the Field of Radioactive Waste Management" in IAEA document GC(XXVII)/INF/214: "The International Conference on Radioactive Waste Management".

The Mechanism involves:

- (a) the establishment and updating of standards, guidelines, recommended practices and procedures for the safe dumping of radioactive wastes at sea as well as assessments of dumping sites and related environmental aspects;
- (b) procedures for notification and consultation among participating countries on the conditions to govern dumping operations;
- (c) international surveillance of dumping operations by NEA-appointed representatives;
- (d) recording of the operations carried out and reporting to the NEA Steering Committee, the OECD Environment Committee and the IMO.

The role of NEA is to ensure proper administration of this Mechanism. The NEA guidelines on sea-disposal packages for radioactive wastes, first published in 1974, were revised in 1978. The NEA also carried out in 1979-1980 a review of the suitability of the current dumping site in the North-East Atlantic Ocean. In order to permit a better assessment of the potential radiation doses to man from sea dumping of radioactive wastes, a research and environmental surveillance programme was initiated in 1981, with the participation of several Member countries and the International Laboratory of Marine Radioactivity of the IAEA in Monaco.

#### V. CONCLUDING REMARKS

There is an increasing concern of a growing body of public opinion and on the part of many governments with regard to the dumping at sea of radioactive wastes. This was reflected, in particular, in a resolution adopted by the last Consultative Meeting of Contracting Parties to the London Dumping Convention in February this year, calling for the suspension of all dumping operations pending a review to be carried out by an expert meeting, under the auspices of the Contracting Parties, of the scientific and technical considerations related to the dumping of radioactive wastes.

On the whole, the long-term health and safety implications of radioactive waste disposal are a subject of considerable concern. Therefore, a clear formulation of the related safety goals and technical criteria and a demonstration that these goals and criteria can be met are essential for gaining general understanding and acceptance. The future growth of nuclear power as an energy source and its acceptance depend, to a large extent, on providing evidence that radioactive wastes can be handled and disposed of safely. In this regard, international co-operation through the continuing search for improvements in safety approaches and international consensus on acceptable practices or alternative methods being used or devised are indispensable. For what could be scientifically justified may not be either politically or socially acceptable in view of increased public concern for better protection of the world's environment and resources.

In this context, it may be stressed that the IAEA, in carrying out the responsibilities entrusted to it by way of an international convention regulating waste dumping world-wide, should not be regarded as encouraging in any way sea dumping activities. Nonetheless, its recommendations in this respect - which remain subject to a continuing refining process - provide an acceptable assurance that ocean disposal of low-level radioactive wastes in compliance therewith should involve no unacceptable degree of hazard to human health, harm to living resources and marine life, damage to amenities or interference with other legitimate uses of the sea.

In conclusion, it may be recalled that ten years ago, the first expert group which assisted the IAEA in the elaboration of the initial Recommendations for the purposes of the London Dumping Convention stressed in the submission of their report, among other things, that:

- in the years to come, it is likely that the oceans and the sea-beds will be used on an increasing scale to obtain the mineral and food resources needed by mankind; and thus
- man depends upon both the sea and the land and must protect both.

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ANNEX A

LIST OF CONTRACTING PARTIES TO THE  
CONVENTION ON THE PREVENTION OF MARINE POLLUTION BY  
DUMPING OF WASTES AND OTHER MATTER  
(Status as of January 1983)

	<u>Date of ratification or accession</u>	<u>Date of entry into force</u>
Afghanistan	2 April 1975	30 August 1975
Argentina	11 September 1979	11 October 1979
Brazil	26 July 1982	25 August 1982
Byelorussian SSR	29 January 1976	28 February 1976
Canada	13 November 1975	14 December 1975
Cape Verde	26 May 1977	25 June 1977
Chile	4 August 1977	3 September 1977
Cuba	1 December 1975	1 January 1976
Denmark <sup>1/</sup>	23 October 1974	30 August 1975
Dominican Republic	7 December 1973	30 August 1975
Finland	3 May 1979	2 June 1979
France	3 February 1977	5 March 1977
Gabon	5 February 1982	7 March 1982
German Democratic Republic	20 August 1976	19 September 1976
Germany, Federal Republic of	8 November 1977	8 December 1977
Greece	10 August 1981	9 September 1981
Guatemala	14 July 1975	30 August 1975
Haiti	28 August 1975	27 September 1975
Hungary	5 February 1976	6 March 1976
Iceland	24 May 1973	30 August 1975
Ireland	17 February 1982	19 March 1982
Japan	15 October 1980	14 November 1980
Jordan	11 November 1973	30 August 1975
Kenya	17 December 1975	16 January 1976
Kiribati	12 May 1982	11 June 1982
Libyan Arab Jamahiriya	22 November 1976	22 December 1976
Mexico	7 April 1975	30 August 1975
Monaco	16 May 1977	15 June 1977
Morocco	18 February 1977	20 March 1977
Nauru	26 July 1982	25 August 1982
Netherlands <sup>2/</sup>	2 December 1977	2 January 1978
New Zealand	30 April 1975	30 August 1975
Nigeria	19 March 1976	18 April 1976

<sup>1/</sup> Extended to be effective in respect of Faroe Islands from  
15 November 1976

<sup>2/</sup> Ratification by the Netherlands was declared to be effective  
in respect of the Netherlands Antilles

	<u>Date of ratification or accession</u>	<u>Date of entry into force</u>
Norway	4 April 1974	30 August 1975
Panama	31 July 1975	30 August 1975
Papua New Guinea	10 March 1980	9 April 1980
Philippines	10 August 1973	30 August 1975
Poland	23 January 1979	22 February 1979
Portugal	14 April 1978	14 May 1978
South Africa	7 August 1978	6 September 1978
Spain	31 July 1974	30 August 1975
Suriname	21 October 1980	20 November 1980
Sweden	21 February 1974	30 August 1975
Switzerland	31 July 1979	30 August 1979
Tunisia	13 April 1976	13 May 1976
Ukrainian SSR	5 February 1976	6 March 1976
United Arab Emirates	9 August 1974	30 August 1975
USSR	15 December 1975	14 January 1976
United Kingdom <sup>3/</sup>	17 November 1975	17 December 1975
United States	29 April 1974	30 August 1975
Yugoslavia	25 June 1976	25 July 1976
Zaire	16 September 1975	16 October 1975

<sup>3/</sup> Ratification by the United Kingdom was declared to be effective also in respect of:

	<u>Effective Date</u>
Bailiwick of Guernsey )	
Isle of Man )	
/Belize/* )	
Bermuda )	
British Indian Ocean Territory )	
British Virgin Islands )	
Cayman Islands )	
Falkland Islands and Dependencies )	
Hong Kong )	17 November 1976
Montserrat )	
Pitcairn )	
Henderson )	
Ducie and Oeno Islands )	
Saint Helena and Dependencies )	
/Seychelles/* )	
/Solomon Islands/* )	
Turks and Caicos Islands )	
/Tuvalu/* )	
United Kingdom Sovereign Base Areas )	
of Akrotiri and Dhekelia in the )	
Islands of Cyprus )	
Bailiwick of Jersey )	4 April 1976

\* Now an independent State

ANNEX B

REGIONAL AGREEMENTS OF RELEVANCE

- Convention on the Prevention of Marine Pollution by Dumping from Ships and Aircraft, 1972 (Oslo Convention)
- Convention on the Protection of the Marine Environment of the Baltic Sea Area, 1974 (Helsinki Convention)
- Convention for the Prevention of Marine Pollution from Land-Based Sources, 1974 (Paris Convention)
- Convention for the Protection of the Mediterranean Sea Against Pollution, 1976 (Barcelona Convention)
  - Protocol for the Prevention of Pollution of the Mediterranean Sea by Dumping from Ships and Aircraft, 1976
  - Protocol for the Protection of the Mediterranean Sea Against Pollution from Land-Based Sources, 1980
- Decision of the OECD Council establishing a Multilateral Consultation and Surveillance Mechanism for Sea Dumping of Radioactive Waste, 1977
- Kuwait Regional Convention for Co-operation on the Protection of the Marine Environment from Pollution, 1978 (Kuwait Convention)
- Convention for Co-operation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region, 1981 (Abidjan Convention)
- Convention for the Prevention of Marine Pollution in the Mediterranean Sea, 1981 (Athens Convention)
- Convention on the Protection and Development of the Marine Environment of the Wider Caribbean Region, 1983 (Cartagena Convention)