

INTERNATIONAL COOPERATION TO PROTECT THE MARINE ENVIRONMENT: THE CASE OF RADIOACTIVE WASTE DISPOSAL

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ABSTRACT

Since 1958 a number of international controls have been developed for dumping of radioactive wastes at sea. Increased dumping, discharge of reprocessing effluents, and potential ocean emplacement of high level wastes call for improved organizational and technical measures.

I. OCEAN DISPOSAL OF RADIOACTIVE WASTES: WASTE TYPES AND DISPOSAL METHODOLOGIES

Radioactive wastes arising from civilian nuclear power programs include liquid or gaseous effluents commonly discharged into rivers or coastal waters,¹ packaged wastes mostly comprised of solid materials that have been contaminated by radiation,² and spent nuclear fuel which can no longer sustain an economical fission reaction due to the buildup of fission products -- atomic fragments of the original fuel minerals³ -- and also contains nonfissionable transuranics -- heavy atoms formed by absorption of slow neutrons.⁴ Spent fuel could be considered a waste because of the safety and environmental hazards caused by these nuclides, but it can also be further processed chemically to remove fissionable uranium and plutonium and prepare it for further treatment as a waste,⁵ probably by vitrification -- conversion into an amalgam with glass.⁶ For other retained wastes, the primary question from the waste management point of view is to what extent they are contaminated by transuranics, in which case they are commonly referred to as "TRU" wastes;⁷ below some level of such contamination they would be considered "low level" wastes.⁸

Low level wastes were dumped at sea by licensees of the U.S. Atomic Energy Commission from 1946 to 1970, at several dump sites including the Farallon Islands, Massachusetts Bay, and offshore the mid-Atlantic states; the radioactivity dumped totalled approximately 94,630 curies, in nearly 90,000 containers.⁹ Low level waste dumping ceased in the U.S. upon adoption of stricter guidelines by the AEC;¹⁰ the Environmental Protection Agency (EPA) also took jurisdiction after 1972.¹¹ While dumping could have continued under the AEC and EPA regulations, it is thought that unfavorable findings by the Council on Environmental Quality¹² together with lower

costs of shallow burial on land combined to make justification of the practice difficult.¹³ EPA is, however, reportedly considering adopting new regulations in anticipation of future requests for authorization.¹⁴

Several Western European nations, especially the United Kingdom, allowed dumping in deep areas prior to 1967,¹⁵ and it has recently been revealed that dumping in shallow areas, near Tokyo Bay, was practiced in Japan from 1955 to 1969.¹⁶ After 1967, European operations were conducted jointly under the auspices of the Nuclear Energy Agency (NEA) of the Organization for Economic Cooperation and Development (OECD).¹⁷ Since 1977, members of the OECD can conduct unilateral activities only upon prior notification and consultation under the "multilateral consultation and surveillance mechanism" ("OECD mechanism") established by the OECD Council.¹⁸ European operations 1967 - 1979 total over one half million curies dumped, with yearly totals now approaching one hundred thousand.¹⁹ It has been reported that Japanese operations would commence with 5 - 10,000 drums and could total nearly a million in the decade.²⁰

Spent fuel or high level waste (hereinafter collectively "high level waste" except where otherwise noted) could also be stored or disposed of at ocean locations. Carter Administration officials announced plans to store spent fuel on a remote island²¹ and the U.S. Department of Energy has a program to assess the technical and environmental feasibility of disposing of high level waste by emplacing waste canisters in the sediments of the deep seabed.²² Several European nations are also considering ocean disposal options for high level waste, including emplacement on the deep seafloor²³ or on or in the continental shelf or islands;²⁴ continental shelf geological structures -- including salt deposits -- could be reached, for example, by drilling from artificial islands.²⁵

II. OCEAN DISPOSAL AND INTERNATIONAL LAW: TECHNICAL AND PROCEDURAL ISSUES

Radioactive wastes have been subject to greater international attention than any marine pollutant except oil from tankers.²⁶ The first United Nations Conference on the Law of the Sea (UNCLOS), although it was unable to reach a

consensus on the substantive legality of radioactive waste dumping or other activities resulting in radioactive pollution, adopted Article 15 of its 1958 Geneva Convention on the High Seas, calling for national measures and multilateral cooperation through international organizations to control such activities:²⁷

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 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.

UNCLOS I also, in a resolution, recognized "the need for international action in [this] field" and recommended that the International Atomic Energy Agency (IAEA), along with other organizations, undertake studies and other actions to assist states technically and formulate international standards and regulations.²⁸ The IAEA immediately responded by convening groups of experts to develop technical (the Brynielsson group) and legal (the Rousseau group) recommendations. The Rousseau group failed to reach agreement,²⁹ but the Brynielsson group concluded that high level waste dumping should be prohibited and low level waste dumping should be controlled and conducted only on a site-specific basis, with dumpsites to be restricted to areas with a depth greater than 2000 meters (m). The group also recommended development of administrative controls through actions in international organizations -- including certification and comprehensive registration of wastes, site designation, and adoption of operational procedures.³⁰

The legal effect of Article 25 of the High Seas Convention is not completely clear, with some commentators arguing that it represented the creation of a procedural obligation to cooperate to ensure that operations would be conducted safely³¹ and others that it was purely hortatory³² -- or even represented an international "recognition" of dumping.³³ If Article 25 is read in light of the general legal principle applicable to activities on the high seas -- "reasonable use" -- the argument that states must cooperate within international organizations, to resolve the outstanding technical (i.e. safety and environmental) issues with respect to radioactive waste disposal at sea suggests itself.³⁴ Although there is little positive evidence of acceptance by states of such a principle, the long history of international technical cooperation in this field supports the claim.³⁵

The chief legal instrument applicable to ocean disposal of radioactive waste is the London Dumping Convention, in force since 1975.³⁶ Under the London Convention, dumping of high level waste at sea is prohibited³⁷ and dumping of all other radioactive waste requires issuance of special permits by the national authority³⁸ and is

subject to general considerations applicable to all dumping through Annex III of the Convention³⁹ and in addition to the recommendations of the IAEA.⁴⁰ (The IAEA is also authorized to establish a definition of high level wastes unsuitable for dumping at sea.)⁴¹ Current IAEA recommendations⁴² limit dumpsites to areas below 4000 m and under 50° latitude (to avoid biologically productive regions) and restrict the levels of radioactivity per mass, the total radioactivity dumped into an ocean basin, and the expected doses to exposed human populations. The recommendations also stress the importance of isolation and containment of dumped wastes and call for environmental assessments of each special permit -- which should, according to IAEA, be communicated by national authorities, along with their required notifications of permits issued under the Convention, to the Intergovernmental Maritime Consultative Organization (IMCO).⁴³

Operational control of dumping, for present and likely future dumpers, is achieved through the OECD mechanism, which establishes a structured prior notification and objection system of consultation. The OECD mechanism includes provision for the formation of expert panels on technical questions, including site suitability and environmental effects, and for presence of an NEA representative on board vessels conducting dumping operations, with power to suspend operations. Technical consultations are conducted within the NEA, which has issued guidelines on packaging⁴⁴ and operational procedures for dumping.⁴⁵

Although there has been considerable technical cooperation through IAEA and the OECD, important issues concerning low level waste dumping remain.⁴⁶ These include the necessity of transmitting environmental assessments to IMCO for each permit issued; the continued suitability of the NEA North Atlantic Dump Site and the design and implementation of a monitoring program for the site; the adequacy of current estimates of doses of radioactivity to man based on oceanographic and radiological models used by the IAEA; and the question of to what extent a strategy of isolation and containment should be pursued for low level wastes. In general, the United States and several other nations have taken rather conservative positions while the United Kingdom, the Netherlands, and Switzerland have opposed substantial further regulation.⁴⁷

III. OCEAN DISPOSAL AND INTERNATIONAL RELATIONS: ORGANIZATIONAL AND EQUITABLE CONSIDERATIONS

Regulation of disposal through the London Convention and OECD frameworks has focused on the dumping of low level waste. Effluent discharges are not controlled at the international level except to the extent that they might cause generally-recognized radiological dose limits to be exceeded. A non-governmental scientific organization, the International Commission on Radiological Protection, formulates such principles and related principles of protection.⁴⁸ (Within the European Community, consultations are required on all waste disposal

practices under the Euratom Treaty; there is an enforcement mechanism to ensure that radiation levels are kept within accepted limits and unsafe situations do not arise.)⁴⁹ Substantial expansion of commercial reprocessing operations -- especially in a single region -- or the amounts of low level radioactive wastes dumped at sea or the number of dumpers or sites would appear to require more detailed operational controls at the regional and global levels. If individual nations or a group of nations decide to authorize emplacement of high level waste at ocean locations, considerably improved control would be required, probably including detailed performance standards and pre-testing, operational supervision, and possibly international control of the entire operation.

The prospect of improved international controls linked to eventual reprocessing and high level waste disposal illuminates the connection between ocean disposal and organizational and equitable considerations arising from the general pattern of North-South relations and the international equity issues before UNCLOS III and under the Non-Proliferation Treaty in particular. Nuclear fuel reprocessing could result in significant contamination of the high seas and the coastal waters of other regional states.⁵⁰ Ocean disposal of high level wastes would involve operations on the high seas and probably establishment of repositories on or in the deep seabed; the primary risk in both cases would be to resources beyond national jurisdiction, although significant high level waste releases could ultimately affect the entire ocean, including coastal areas.⁵¹ The deep seabed has been declared part of the "common heritage of mankind" by several U.N. General Assembly resolutions⁵² and in the Draft Law of the Sea Convention under consideration at UNCLOS III.⁵³

The nations of the South could claim that use of the oceans for disposing of large amounts of radioactive waste would expose the international commons to actual or potential pollution without substantial compensating advantages to the South, due to its limited nuclear power capacity. The situation would be all the worse if the disposal, as in the case of discharged chemical or retained high level wastes from reprocessing, were of wastes arising directly from the "back end" of the nuclear fuel cycle -- to which nations of the South have been denied full access as a result of the attendant risks of nuclear weapons proliferation. In the case both of reprocessing facilities and high level waste repositories, however, locating such operations at ocean locations -- including remote islands for reprocessing and interim storage and nearby deep seabed areas for disposal -- could encourage⁵⁴ such equitable international solutions to the fuel cycle issues as multinational,⁵³ possibly regional,⁵⁴ fuel cycle centers. The extraterritoriality, remoteness, and potential collocation of such operations could have a range of physical, political, and safety advantages.⁵⁷

Continued and increased use of the oceans for disposal of radioactive wastes will result in serious international administrative, technical, and political problems. It is to be hoped that

the new administration in the United States will contribute as fully as possible to the international search for solutions.

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