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**Regime Lessons from Ocean Dumping of  
Radioactive Waste**

by

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**Abstract:**

Standard explanations for international environmental regime change do not account for the 1993 ban by states on ocean dumping of radioactive waste. This significant development was in large part caused by a transnational coalition of small states and environmental non-governmental organizations. The 1993 global ban reflected international public opinion on this international issue, but was at odds with the views of the scientific community and had long been resisted by powerful states. The global regime regulating ocean dumping set norms and standards for dumping of radioactive waste against which individual countries' ocean dumping policies were compared and judged by other countries, environmental non-governmental organizations and the public. The global dumping regime significantly raised the political costs of non-compliance and states disregarding regime rules became subject to domestic and international criticism and scorn, and subsequently pressure to act.

## Regime Lessons from Ocean Dumping of Radioactive Waste

On November 12, 1993 thirty-seven nations voted to permanently ban ocean dumping of low-level radioactive waste, a practice commonly known as radwaste disposal. This was nothing less than a historic step to protect the oceans. Characteristically, an adviser to the environmental group Greenpeace International called the vote 'a major step forward by the world community in making a commitment to protect the world's seas'.<sup>1</sup> Beginning as early as 1946 and until 1972, radwaste disposal was practiced by nations without any effective international control. In 1972, eighty governments reached an agreement on the so-called London Convention (LC) regulating ocean dumping of all wastes, radioactive wastes included, and the global dumping regime entered into force in 1975.<sup>2</sup> But the regime did not prohibit radwaste disposal, and western European governments continued their dumping operations. In the early 1980s, Japan planned to commence ocean dumping of radwaste in the Pacific Ocean, reversing the trend towards controlling and perhaps reducing radioactive pollution within the global dumping regime.<sup>3</sup> At the same time, the United States, who had stopped radwaste disposal in 1970, indicated that it would resume such dumping.<sup>4</sup>

The permanent, legally binding, radwaste disposal ban, a decision taken

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<sup>1</sup> 'Nuclear Dumping Ban Voted', *The Washington Post*, 13 November, 1993.

<sup>2</sup> The Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter. Signed in London on 13th November 1972, entered into force on 30th August 1975. *International Legal Materials* 11 (November 1972), 1291-1314. In 1992, governments decided to rename the London Dumping Convention (LDC) to instead the London Convention (LC) since they feared that the convention otherwise could be understood as sanctioning ocean dumping.

<sup>3</sup> 'Japan Plans to Begin Ocean Disposal', *Nuclear News*, November 1980, 20.

<sup>4</sup> Luther J. Carter, 'Navy Considers Scuttling Old Nuclear Subs', *Science*, 26 September 1980, 209, 1495-97. Colin Norman, 'US Considers Ocean Dumping of Radwastes', *Science*, 5 March 1982, 215, 1217-19.

The permanent, legally binding, radwaste disposal ban, a decision taken by the 1993 annual LC meeting, marks the culmination of international attempts to prohibit such dumping which started when the members of the global dumping regime in 1983 imposed a moratorium on radwaste disposal. The moratorium brought an effective stop to European and Japanese dumping plans. However, this first successful international attempt to halt the practice of waste disposal was strongly opposed by nations supporting ocean dumping low-level radioactive waste, especially the United States, Britain and France. Although widely hailed as a significant environmental victory, the 1983 moratorium was only a *de facto* - but not a *de jure* - global radwaste disposal ban: it was not in a legal sense binding on governments. But the number of nations supporting radwaste disposal decreased after 1983. The 1993 LC radwaste disposal ban signifies that for the first time ever nations today agree on an international radwaste disposal policy for the oceans.

Viewed from a regime analysis perspective, the nuclear dumping ban is evidence of a recent dramatic change of the global dumping regime itself.<sup>5</sup> The emphasis of the regime was originally on regulation, but it has now shifted to precaution and prevention. Surprisingly, from the viewpoint of dominant international regime theory, this analysis shows that a transnational coalition of small states and environmental non-governmental organizations (NGOs) significantly influenced the regime change process. A group of powerful states - Britain and France and until very recently the United States and Japan - unsuccessfully resisted regime change. To a large degree they all had insufficient land-based waste disposal facilities for low-level radioactive waste.<sup>6</sup>

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<sup>5</sup> For the definition of regime change, see Stephen Krasner 'Structural Causes and Regime Consequences: Regimes as Intervening Variables' in Krasner, ed., *International Regimes* (Cornell University Press: Ithaca and London, 1983), 3-4.

<sup>6</sup> For Britain, see Duncan Campbell and Patrick Forbes, '£100 Million to be Made as Nuclear Waste Dumpers Scramble to Get Rich Quick', *New Statesman*, 18 October 1985; Simon Hadlington, 'UK Nuclear Waste Strategists Still Facing Public Suspicion', *Nature* 333 (2 June 1988), 38; Christine McGourty 'UK Public Says 'No, Thanks' to Nuclear Waste', *Nature* 336 (1 December 1988), 415. Recently, public protests in Japan against radioactive waste disposal and planned nuclear processing plants have intensified. See Michal Crodd, 'Japans's Nuclear

## Radwaste Disposal and International Regime Theory

Scholars have until now been focussing mostly on regime formation processes, and international regime change has not been subject to systematic study.<sup>7</sup> Dominant international regime theories have explained regime change processes as being conditioned either by changes in the underlying power distribution among states, in short Realism, or by changes in the knowledge and perception of decision-makers, in short the Reflectivist approach.<sup>8</sup>

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Industry Tries to Rescue Its Image', *New Scientist*, 24/31 December 1988, 8; Charles Smith 'Electoral Fallout. Row over Reprocessing Nuclear Waste Widens', *Far Eastern Economic Review*, 26 October 1989, 12-13'; 'Japan's Green Tinge', *The Economist*, February 2, 1991; 'Japan. Plutonium Politics', *The Economist*, October 5, 1991; David Singer 'Tokyo Cautioned on Nuclear Storage', *International Herald Tribune*, April 14, 1992. For the United States, 'Nuclear Gridlock', *The Economist*, January 18, 1992, 42-43; Jorge Contreras, 'In the Village Square: Risk Misperception and Decisionmaking in the Regulation of Low-Level Radioactive Waste', *Ecology Law Quarterly* 19, 511-12. France had few problems finding land-based disposal facilities, but still wished to keep the 'ocean option' open. For studies of aspects of nuclear waste disposal, see E. William Colglazier, Jr., ed., *The Politics of Nuclear Waste* (New York: Pergamon Press, 1982); Gene I. Rochlin, *Plutonium, Power, and Politics: International Arrangements for the Disposition of the Spent Nuclear Fuel* (Berkeley: University of California Press, 1979); Charles A. Walker, Leroy C. Gould, and Edward J. Woodhouse, eds., *Too Hot To Handle? Social and Policy Issues in the Management of Radioactive Wastes* (New Haven, CT: Yale University Press, 1983); and Frans Berkhout, *Radioactive Waste: Politics and Technology* (London: Routledge, 1991).

<sup>7</sup> Students of international environmental regimes can be divided into (Neo)Realists, Institutionalists, and Reflectivists. See Peter Haas, 'Epistemic Communities and the Dynamics of International Environmental Co-Operation', in Volker Rittberger and Peter Meyers., eds., *Regime Theory and International Relations* (Oxford: Clarendon Press, 1993), 168-201. Institutionalists, especially those who advocate the interest-based hypothesis, so far have focussed only on regime formation processes. See Oran R. Young and Gail Osherenko, eds., *Polar Politics: Creating International Environmental Regimes* (Ithaca and London: Cornell University Press, 1993). See also footnote (8) below.

<sup>8</sup> Students of international politics are often categorized as either Realists or Reflectivists. See Robert O. Keohane, 'International Institutions: Two Approaches', *International Studies Quarterly* 32 (December 1988), 379-96. Joseph S. Nye, Jr., however, distinguishes between neorealism and neoliberalism. See 'Neorealism and Neoliberalism', *World Politics* 40 (January 1988), 235-51. Realists emphasize anarchy in international society, states as the principal actors, and pursuit of power as the primary objective of states. Major Realist works include E.H. Carr, *The Twenty Years' Crisis 1919-1939: An Introduction to the Study of International Relations* (New York: Harper Torchbooks, 1964); Hans J. Morgenthau, *Politics Among Nations: The Struggle for Power and Peace* (New York: Knopf, 1973); Raymond Aron, *Peace and War: A Theory of International Relations*, trans. Richard Howard and Annette Baker Fox (New York: Doubleday, 1966); Kenneth N. Waltz, *Man, the State, and War: A Theoretical Analysis* (New York: Columbia University Press, 1954); and Robert Gilpin, *War and Change in World Politics*

Realists claim that global cooperation on environmental protection necessarily is severely constrained by the structure of international politics. International rules, institutions and patterns of cooperation might develop, but will achieve very little.<sup>9</sup>

Because of anarchy, i.e. the lack of common government to enforce rules, states cooperate only when it is in their interest. States cannot be forced to act against their self-interests. International principles, norms, rules, and decision-making procedures guiding behavior within particular issues-areas are non-mandatory and volatile. Moreover, they change with redistribution in the underlying power capabilities.<sup>10</sup> Information distribution and monitoring are occasionally well developed within international regimes, but centralized enforcement is as a rule lacking.

For Realists, once created, the global dumping regime would be critically dependent on continued support of the hegemon, the United States.<sup>11</sup> Declining American leadership would eventually lead to regime collapse because states would follow their own individual interests. Realists also suspect that dumper

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(Cambridge: Cambridge University Press, 1981). Reflectivists, like their predecessors inspired by functionalism and neofunctionalism, stress the impact of domestic society on international society, interdependence, and international institutions. Major Reflectivist works include Karl Deutsch, et.al., *Political Community and the North Atlantic Area* (Princeton University Press, 1957); Ernst B. Haas, *The Uniting of Europe* (Stanford University Press, 1956). For the classical outline of functionalistic international theory, see David Mitrany, *A Working Peace System* (Chicago: Quadrangle, 1966). Ernst Haas has frequently examined the cognitive and philosophical foundation of international cooperation. See 'Why Collaborate? Issue-Linkage and International Regimes', *World Politics* 32 (April 1980), 357-405, and *When Knowledge is Power: Three Models of Change in International Organizations* (Berkeley: University of California Press, 1990).

<sup>9</sup> See, for example, Kenneth N. Waltz 'Reflections on *Theory of International Politics: A Response to My Critics*', in Robert O. Keohane, ed., *Neorealism and Its Critics* (New York: Columbia University Press, 1986), 336.

<sup>10</sup> Stephen D. Krasner, 'Structural Causes and Regime Consequences: Regimes as Intervening Variables', in Stephen Krasner, ed., *International Regimes*, 7.

<sup>11</sup> For the hegemonic leadership theory, see Robert O. Keohane, 'The Theory of Hegemonic Stability and Changes in International Economic Regimes, 1967-1977', in Ole R. Holsti, Randolph M. Siverson and Alexander L. George, eds., *Changes in the International System* (Boulder, Col.: Westview, 1980), 131-62.

nations would fiercely resist other states' attempts to circumscribe their regulatory autonomy with respect to disposal of radioactive waste in the oceans. Because regulation of radwaste disposal also raises security and energy independence concerns, nuclear nations would try to exclude regulation of radwaste from the scope of the regime.<sup>12</sup> In short, from the Realist viewpoint, it is unlikely that global regulation of radwaste disposal would be established, and termination of disposal of radioactive waste is even more unlikely.

According to Reflective scholars, scientists and technical experts play a key role in international environmental policy-making and in cooperation on other technical and scientific issues as well.<sup>13</sup> Scientists participate because of a need for expertise, and the high uncertainties which often surround global environmental issues reinforce the need for policy advice by scientists, which probably increase their influence.

Epistemic community theorists will predict that the global dumping regime will be masterminded and spearheaded by an ecological epistemic community, the legitimate scientific authority with claim to policy relevant knowledge.<sup>14</sup> Staffing international organizations as well as national environmental administrations involved in regulating ocean dumping, an ecological epistemic community will persuade and pressure decision-makers to establish and enforce stringent ocean dumping controls reflecting the epistemic community's view of this environmental problem and its appropriate solutions.

Epistemic community theorists will also predict that the strength of the

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<sup>12</sup> For example, in April 1977, the Carter administration decide to defer commercial reprocessing of nuclear waste indefinitely because of the feared risk of proliferation of nuclear weapons. See Paul F. Power, 'The Carter Anti-Plutonium Policy', *Energy Policy* (September 1979), 215-31.

<sup>13</sup> Peter M. Haas, 'Introduction: Epistemic Communities and International Policy Coordination', *International Organization* 46 (Winter 1992), 1-35.

<sup>14</sup> For the ecological epistemic community model, see Peter M. Haas 'Do Regimes Matter? Epistemic Communities and Mediterranean Pollution Control'. See also by Peter M. Haas, *Saving the Mediterranean* (New York: Columbia University Press, 1990); 'Obtaining International Environmental Protection Through Epistemic Consensus', *Millennium* 19 (Winter 1990), 347-64; and 'Banning Chlorofluorocarbons: Epistemic Community Efforts to Protect Stratospheric Ozone', *International Organization* 46 (Winter 1992), 187-224.

global dumping regime will vary with the ecological epistemic community's influence on domestic policy-making. Countries with strong representation of the ecological epistemic community, i.e. broad access to national decision-makers, will be the most active supporters of international commitments and the most successful in national compliance. Countries with weak representation of the ecological epistemic community will be less supportive of international commitments and will adopt weaker domestic ocean dumping controls.

As the analysis below illustrates, none of the current regime theories can satisfactorily explain the case of global regulation of radwaste disposal. To improve current regime analysis, the article finally concludes that environmental non-governmental organizations (NGOs), domestic politics and international public opinion should be included in the analysis of international regimes for international environmental issue-areas.

### **Ocean Dumping of Low-Level Radioactive Waste**

Since the early 1920s, it has been recognized by experts that radioactive materials can have detrimental effects on human beings and the environment.<sup>15</sup> Even low-level radioactive wastes, the least hazardous form of radioactive waste, must therefore be kept isolated.<sup>16</sup> In the United States, low-level

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<sup>15</sup> See Ralph E. Lapp, *The Radiation Controversy* (Greenwich, Conn.: Reddy Communications, 1979).

<sup>16</sup> Alpha, beta, and gamma rays are collectively called ionizing radiation. Radioactivity is a nuclear phenomenon and it does not depend in any way on chemical or physical changes that an atom may undergo. When an alpha, beta, or gamma ray enters matter, energy is transferred to the material through collisions with the atoms in the matter. If the material is sufficiently thin or if the radiation has a high energy, the particle can pass completely through the material, losing only a portion of its original energy; otherwise, the particle will be absorbed within the material and will lose all its energy through ionization. Ionization gives rise to chemical reactions and to a general heating of the material.

Alpha particles are only capable of travelling a few inches in air and are stopped by a sheet of paper or intact skin. On the other hand, if alpha-emitting elements are taken internally, they are highly toxic. Alpha particles produce more deleterious biological effects than the lightly ionizing radiation associated with beta, gamma, or X-radiation. Although the



radioactive waste is defined as radioactive waste that is not high-level waste, spent nuclear fuel, or special radioactive by-product material. Typical wastes include protective clothing, filters, solidified liquids, scintillation wastes, animal carcasses, laboratory trash, contaminated soil, activated metals, and failed equipment<sup>17</sup>. Low-level radioactive wastes can be generated by industries such as hospitals; medical, educational or research institutions; private or government laboratories; or facilities forming part of the nuclear fuel cycle (e.g. nuclear power plants, fuel fabrication plants).<sup>18</sup>

From 1946 through 1970 the United States Atomic Energy Commission (AEC) allowed disposal of low-level radioactive wastes in the ocean at AEC-licensed sites.<sup>19</sup> Drums containing low-level radioactive materials were dumped from ships into the ocean. The wastes were mainly disposed of in three sites in the Atlantic, off New Jersey and Massachusetts, and one site in the Pacific Ocean, off San Francisco. More than ninety percent of all radioactive waste

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beta particles have a range greater than alpha particles, they can be stopped by relatively thin layers of water, glass, or metal. The range of beta particles in tissue is great enough, however, to cause burns when the skin is exposed. Beta-active isotopes that may become fixed in the body are highly toxic. Gamma rays penetrate a relatively great thickness of matter before being absorbed. Because of the penetrating nature of gamma radiation, overexposure of the body to it results in deep-seated organic damage. Of the three types of radiation from radioactive substances, gamma radiation is by far the most serious external hazard and is the one that requires heavy shielding and remotely controlled operations.

The curie (Ci) is a unit frequently used as a measure of the amount of radioactive material. It is defined as the amount of radioactive material that will produce 37 billion disintegrations ( $3.7 \times 10^{10}$ ) per second. This is approximately the number of disintegrations per second in 1 g of radium. A more up-to-date unit is the Becquerel (Bq), which is the amount of radioactive material that produces one atomic disintegration per second.

<sup>17</sup> Quoted from Don M. Berkovitz, 'Waste Wars: Did Congress 'Nuke' State Sovereignty in the Low-Level Radioactive Waste Policy Amendments Act of 1985?', *Harvard Environmental Law Review* 11 (1987), 440.

<sup>18</sup> For a good recent layman introduction to the scientific and technical aspects of radiation, see Jorge Contreras, 'In the Village Square: Risk Misperception and Decisionmaking in the Regulation of Low-Level Radioactive Waste', *Ecology Law Quarterly* 19 (1992), 484-94.

<sup>19</sup> See A.A. Hagen, 'History of Low-Level Radioactive Waste Disposal in the Sea', in P. Kilho Park, Dana R. Kester, Iver W. Duedall and Bostwick H. Ketchum, eds., *Wastes in the Ocean. Volume 3: Radioactive Wastes and the Ocean* (New York: John Wiley and Sons, 1983), 47-64. See also W.F. Holcomb, 'A History of Ocean Disposal of Packaged Low-Level Radioactive Waste', *23 Nuclear Safety* (March-April 1982), 183-97.

packages and ninety-five percent of the estimated radioactivity dumped were placed in these four sites.

The largest quantity of radioactive wastes was dumped between 1946 and 1962. Responding to strong public protests in several states, the AEC imposed a moratorium on the issuance of new licenses for dumping in 1960.<sup>20</sup> The AEC turned instead to land-burial, which also entailed relatively lower costs compared to ocean disposal.<sup>21</sup> A very limited number of dumpings took place after 1963, and dumping was stopped in 1970. Although U.S. ocean dumping regulation, formally the Marine Protection, Research and Sanctuaries Act of 1972, does not expressly ban such activity, radwaste disposal clearly would be against the spirit in the act.<sup>22</sup>

Apart from a few years, Britain was annually dumping radioactive materials in various parts of the Atlantic Ocean from 1949 through 1982. Belgium, the Netherlands and Switzerland also participated in a series of dumping operations starting in 1969, while other European countries such as Sweden, Italy, the former Federal Republic of Germany and France conducted radioactive waste dumping only in 1967 and 1969.

Other parts of the world's oceans have also received radioactive materials. From 1968 through 1972 the Republic of Korea dumped radioactive materials in the Sea of Japan, while Japan from 1955 through 1969 was dumping in the Pacific Ocean.<sup>23</sup> Probably of much greater environmental significance, however, is the recent disclosure by Russia that the former Soviet Union has been

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<sup>20</sup> George T. Mazuzan and J. Samuel Walker, *Controlling the Atom: The Beginnings of Nuclear Regulation 1946-62* (Berkeley: University of California Press, 1985), 304-345.

<sup>21</sup> Contributing to the high costs were containers, transportation to the dock, and transportation to disposal point in the ocean. See Conrad P. Straub, *Low-Level Radioactive Wastes. Their Handling, Treatment, and Disposal* (United States Atomic Energy Commission, 1964), 326.

<sup>22</sup> Marine Protection, Research and Sanctuaries Act of 1972. 33 U.S.C. §§ 1401 *et seq.*

<sup>23</sup> Report of the Expanded Panel Meeting, 'Report of the Intersessional Activities Relating to the Disposal of Radioactive Wastes at Sea, Including the Final Report of the Scientific Review', *LDC 9/4, Annex 2*, 24 June 1985, 112-13.

dumping radioactive materials in the Sea of Japan since 1959.<sup>24</sup> Radwaste disposal thus has often been conducted in secrecy and knowledge hereof might remain uncertain also in the future. It is likely that we will never know with complete certainty how much and what kinds of radioactive materials have been dumped by who, when and where.

### **International Regulation Before 1972**

International efforts to control dumping of radioactive materials date back to the 1958 United Nations Law of the Sea Conference (UNCLOS) which adopted a resolution stating that 'Every State shall take measures to prevent pollution of the seas from dumping of radioactive waste, taking into account any standards and regulations which may be formulated by the competent international organizations'.<sup>25</sup> The conference resolution, which did not have the force of a treaty, further recommended that the International Atomic Energy Agency (IAEA), an organization of the United Nations which promotes the peaceful use of nuclear power, undertake studies of technical and scientific problems regarding radioactive waste disposal in the ocean.

This resolution was a compromise between those states engaged in such practices, who actively lobbied for its deletion, and other states (especially the then Soviet Union) who favored a complete prohibition of nuclear waste dumping, and it had no great effect. Although states pledged to cooperate and take relevant 'measures', neither the precise nature of these measures nor any minimum standards were specified. 'In essence, the conference produced no community policy at all'.<sup>26</sup>

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<sup>24</sup> Asger Røjle, 'Rusland Dumper Atomaffald', *Politiken*, 18 November, 1993.

<sup>25</sup> UN Convention on the High Seas, Geneva, Article 25, para. 1.

<sup>26</sup> Alton Frye, *The Hazards of Atomic Wastes: Perspectives and Proposals on Oceanic Disposal* (Washington, D.C.: Public Affairs Press, 1962), 29.

Starting in 1967, a voluntary mechanism set up by the Nuclear Energy Agency (NEA) of the Organization for Economic Development and Cooperation (OECD) provided guidelines and undertook supervisory responsibility for disposal of low-level wastes by NEA member countries.<sup>27</sup> That same year the first NEA-supervised international nuclear waste dumping operation was carried out at a depth of 5000 meters in the eastern Atlantic Ocean. The primary objectives of OECD/NEA were 'to develop, at the international level, a safe and economic method for ocean disposal and to demonstrate this by a joint experimental disposal operation involving several member countries'.<sup>28</sup> Belgium, France, Federal Republic of Germany, the Netherlands, and Britain supplied some 35,000 containers of wastes weighing nearly 11,000 tonnes. As mentioned already, the primary dumpers were Belgium, the Netherlands, Switzerland, and Britain and they participated in a series of coordinated dumping operations which took place in 1967, 1969 and each year from 1971 to 1982. France, Italy, Sweden, and the Federal Republic of Germany only participated in the first two dumping operations. The regionally coordinated dumpings called for agreement on dumpsite selection, package design for the waste material, facilities available on the dumping vessel, and duties of escorting officers.<sup>29</sup> The waste came mostly from national research centers, though in later years low-level wastes from nuclear power plants were included.<sup>30</sup>

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<sup>27</sup> W.F. Holcomb 'A History of Ocean Disposal of Packaged Low-level Radioactive Waste', 184.

<sup>28</sup> 'Radioactive Waste Disposal Operation Into the Atlantic - 1967'. European Nuclear Energy Agency. Organization for Cooperation and Development. 1968. Quoted from Robert S. Dyer 'Sea Disposal of Nuclear Waste: A Brief History', in Thomas C. Jackson, ed., *Nuclear Waste Management: The Ocean Alternative* (New York: Pergamon Press, 1982), 12.

<sup>29</sup> Alan Preston 'Deep-Sea Disposal of Radioactive Wastes', 115.

<sup>30</sup> The principal sources were wastes from nuclear power plant operations, other nuclear fuel cycle operations, including fuel fabrication and reprocessing, radionuclides used in medicine, research and industry and from the decontamination and dismantling of redundant plants and equipment. IMO Document. 'Report of Intersessional Activities Relating to the Disposal of Radioactive Wastes at Sea, Including the Final Report of the Scientific Review Report of the Expanded Panel Meeting', Annex 2, 73.

## **The 1972 London Convention: Emphasis on Regulation and Scientific Expertise**

Since the mid-1960s dumping of nerve gas and other toxic materials focussed international attention on the problem of uncontrolled ocean dumping. For example, the Dutch ship *Stella Maris* was in 1971 forced by public outcry and political pressure to return home without emptying its cargo of 650 tonnes of chlorinated hydrocarbons off the Norwegian coast.<sup>31</sup> In the United States, Lake Erie was reported to be 'dead' and was, according to environmentalists and mass media, an environmental catastrophe caused by excessive dumping of industrial waste.<sup>32</sup> In 1972, Sweden and the United States enacted domestic ocean dumping legislation. Internationally, two ocean dumping conventions, the so-called Oslo Convention covering the North-East Atlantic and the London Convention, were agreed to by governments also in 1972.

The global dumping regime prohibits dumping of radioactive and other wastes without a permit. Governments are responsible for issuing permits to dumpers under their jurisdiction, and for determining that required conditions are fulfilled. Members must report the quantity and nature of the material dumped to a secretariat, which then reports this information to the other members of the regime. However, it is the global dumping regime that determines the criteria for issuing radwaste dumping permits - in essence the regime's regulatory policy on radioactive waste disposal - and dumping criteria are regularly reviewed by the members. This takes place at the London headquarters of the International Maritime Organization (IMO), an agency of the United Nations which facilitates international cooperation on technical

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<sup>31</sup> See Martin W. Holdgate, 'Twenty Years On: Some Reflections on the Convention on the Dumping of Wastes and Other Matter', a speech delivered at the 20th Anniversary LC Conference of Parties on 9 November 1992. Holdgate chaired the conference that negotiated the LC from October 30 to November 13, 1972, in London.

<sup>32</sup> See, for example, 'The Ravaged Environment', *Newsweek*, 26 January 1970, 31-32. See also Melvin J. Grayson and Thomas R. Shepard, *The Disaster Lobby: Prophets of Ecological Doom and Other Absurdities* (Chicago: Follett, 1973), 78-80.

matters affecting international shipping, and which serves as regime secretariat.

Perhaps surprisingly, the initiatives to establish the global dumping regime were not backed by scientific evidence showing that ocean dumping was causing significant harm to the marine environment. The U.S. Council on Environmental Quality report *Ocean Dumping. A National Policy*, which recommended establishing domestic legislation in the United States as well as international regulation, acknowledged that existing knowledge of ocean pollution was at best rudimentary or, in fact, did not exist. Further, according to the report, it was impossible to distinguish the effects of ocean dumping from the broader issue of ocean pollution.<sup>33</sup> More generally, Dr. R.B. Clark, British scientist and editor of *Marine Pollution Bulletin*, described in 1971 the state-of-the-art in marine pollution research as follows: 'Most knowledge of the biological consequences of marine pollution is derived from studies in temperate waters. Information about these environments is woefully inadequate, but it is encyclopedic compared to what we know about even the basic ecology of Arctic and tropical waters, let alone the consequences of effluent disposal and accidental pollution in them'.<sup>34</sup>

But the lack of scientific evidence did not dampen national and international concerns about uncontrolled ocean dumping. As an U.S. marine scientific community insider noted around the same time: 'There unfolded an awareness that waste of national origin dumped at sea may be distributed globally. While such threats were not regarded as immediate or of crisis proportions, the pervasiveness of the fluid media potentially exposed all nations to the same risks and uncertainty. So whatever the geopolitical and geoeconomic considerations in debate, no matter how parochial the arguments, participants came to recognize that all questions shared a central core of scientific, technical, and economic facts not constrained by political or

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<sup>33</sup> *Ocean Dumping. A National Policy* A Report to the President prepared by the Council on Environmental Quality. October 1970, 18.

<sup>34</sup> Quoted in Michael Harwood, 'We Are Killing the Sea Around Us', *The New York Times Magazine*, October 24, 1971.

institutional boundaries or ideology'.<sup>35</sup> Thus, a new international view on the issue emerged around 1970 and many countries, especially developed ones, redefined their interests accordingly.<sup>36</sup>

Assembled in London in November 1972 at the fifth meeting on a global dumping regime, nations finally agreed on a treaty text.<sup>37</sup> The prevalent view on marine pollution control among nations was rather permissive. Accordingly, ocean dumping is permitted under the treaty as long as the capacity of the ocean to safely assimilate wastes is not overburdened and the ocean therefore is not harmed.<sup>38</sup> It was furthermore decided that the IAEA should determine which radioactive materials were unsuitable for ocean dumping and make recommendations on the disposal of other radioactive wastes. The IAEA should

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<sup>35</sup> Edward Wenk, Jr., *The Politics of the Ocean* (Seattle: University of Washington Press, 1972), 425.

<sup>36</sup> In the early 1970s, the developing countries were much less concerned about the environment than the developed countries. Many developing countries in addition feared that environmental concerns would interfere with their development needs. See 'Founex Report on Development and Environment', *International Conciliation* (January 1972).

<sup>37</sup> For a detailed account of the LC negotiations, see Lasse Ringius 'Radwaste Disposal and the Global Ocean Dumping Convention: The Politics of International Environmental Regimes', Ph.D. diss, the European University Institute, Florence, Italy, 1992.

<sup>38</sup> According to one of the treaty preambles: 'Recognizing that the capacity of the sea to assimilate wastes and render them harmless, and its ability to regenerate natural resources, is not unlimited'.

Ocean scientists presume the existence of a certain identifiable assimilative capacity (also referred to as the environmental, accommodative, or absorptive capacity) of the oceans. This concept relies on the capacity of the oceans to absorb and neutralize pollutants. It follows that as long as this assimilative capacity is not exceeded, the marine environment will clean itself. Consequently, pollution occurs when a certain marine capacity is exposed to pollutants which exceed the upper level or capacity of assimilation of contamination. In this definition room is given to a certain legitimate use of the waste disposal capacity of the oceans, as long as the regeneration of the ocean resources is not prevented. In 1979, a group of ocean scientists reached agreement on a consensus definition, which later has been more widely accepted, which defines this capacity as 'the amount of materials that could be contained within a body of seawater without producing unacceptable biological impacts'. It is therefore necessary to consider specific conditions like the mixing capacity, length of turnover time (it takes, for example, 50 years for the water in the Baltic Sea to be renewed), stratification of water, temperatures and the level of biological activity when defining the assimilative capacity of a certain region. For definitions of assimilative capacity, including the one above, see A.R.D. Stebbing, 'Environmental Capacity and the Precautionary Principle', *Marine Pollution Bulletin* 24, 287-95. Used by professionals the word contamination signifies what is less than clean but not quite polluted.

also make recommendations with regard to selection of a dumping site, packaging for dumping, approval of the ship and its equipment, escorting officers and record keeping. In setting radiation protection standards, the IAEA was to rely on the recommendations of the International Commission on Radiological Protection (ICRP), an international non-governmental scientific organization of professional radiologists.

The decision to include regulation of radioactive waste disposal under the global ocean dumping regime was a compromise solution between dumpers and non-dumpers. Some developed countries wished together with the developing countries to include radwaste disposal, whereas especially the United States and Britain preferred that the IAEA continued regulating radwaste disposal. In the compromise solution, high-level radioactive wastes were put on the so-called black list, the list of substances that were prohibited to dump, whereas low-level radioactive wastes were on the grey list containing those substances that were allowed to be dumped only when specified conditions were observed by dumpers.

The drafters of the LC recognized that scientific knowledge was 'quite deficient', and they agreed to annex a black and a grey list to the convention.<sup>39</sup> The lists were understood by nations as a flexible arrangement to be revised as new scientific knowledge about pollutants in the marine environment developed, and changes in the lists should be based on scientific or technical considerations. It should, therefore, come as no surprise, as a participant of early scientific working groups later noted, that 'there can be little doubt that some of the substances were included [in the black and grey lists] on the basis of very little scientific evidence'.<sup>40</sup> Attaching the black and grey lists to the treaty text was proposed by the Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP), an expert group established by several specialized agencies of the

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<sup>39</sup> Charles F. Lettow, 'The Control of Marine Pollution', in Erica L. Dolgin and Thomas G.P. Guilbert, eds., *Federal Environmental Law* (St. Paul, Minn.: West Publishing Company, 1974), 665.

<sup>40</sup> M.G. Norton 'The Oslo and London Dumping Conventions', *Marine Pollution Bulletin* 12 (1981), 147.



United Nations in 1969, and by lawyers from United Nations Food and Agriculture Organization (FAO).<sup>41</sup>

As already mentioned, Britain, Switzerland, Belgium and the Netherlands continued radwaste disposal throughout the 1970s, causing concern to members of the regime. Moreover, Japan was in 1979 planning to dump 5,000 to 10,000 drums of low-level radioactive waste at a site north of the Mariana Islands in the North Pacific.<sup>42</sup> The dumping would be expanded to up to 100,000 curies a year after the Japanese government had verified the safety of its experimental program. Japan wished, furthermore, to become a member of the regime, presumably because LC membership could lend legitimacy to the Japanese dumping plans. But the Japanese plans caused an uproar in the Pacific region and, in response to the protests, were temporarily deferred in early 1981. At later LC meetings representatives of the Japanese government nonetheless described Japan's lack of suitable land-based disposal facilities for radioactive waste as grounds for their interest in ocean disposal.

Another significant development was underway in the United States. Starting in 1980, the United States Environmental Protection Agency (EPA) was revising existing regulation so that thousands of tons of slightly contaminated soil left from the World War II Manhattan Project and more than 100 retired nuclear submarines, each representing more than 50,000 curies of radioactive waste, could be dumped at sea.<sup>43</sup> The American public was increasingly opposing radioactive waste disposal on land and disposal in the

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<sup>41</sup> A study proposing annexing technical lists to a diplomatic treaty was presented during the preparations for the 1972 United Nations Conference on the Human Environment. The study was later published by Paolo Contini and Peter H. Sand 'Methods to Expedite Environment Protection: International Ecostandards', *The American Journal of International Law* 66 (1972), 37-59.

<sup>42</sup> See Jon M. Van Dyke, 'Ocean Disposal of Nuclear Wastes', *Marine Policy*, April 1988, 82-95.

<sup>43</sup> Luther J. Carter, 'Navy Considers Scuttling Old Nuclear Subs', *op.cit.*, and Colin Norman, 'US Considers Ocean Dumping of Radwastes', *op.cit.*.

ocean consequently appeared more attractive.<sup>44</sup> But environmental groups and their allies in Congress succeeded in December 1982 to establish a low-level radioactive waste moratorium, and ocean dumping of radioactive waste was not resumed.<sup>45</sup>

Adding momentum to the international opposition against radwaste disposal, Japan and the United States started a joint program in November 1980 to study the possibilities for interim storage of high-level radioactive waste on Palmyra Island, an isolated Pacific island located approximately 1000 miles south of Honolulu.<sup>46</sup> In addition to its suitable geology and other properties, it was hoped that such a remote storage site for high-level radioactive waste would not arouse public protests.<sup>47</sup> Intended to avoid reprocessing (a process in which the valuable uranium and plutonium are recovered from 'spent' fuel rods), which entails the danger of proliferation of nuclear weapons, the proposal envisaged that up to 10,000 tons of high-level radioactive waste, delivered by Japan, Korea and Taiwan, would be stored for 30 years and then moved to a permanent storage site. Although the plan only involved storage of high-level radioactive waste on land, it added momentum to Pacific protests against radwaste disposal.<sup>48</sup> The proposal confirmed widespread beliefs in the region, in the words of a lawyer acting as council to the people of Bikini, 'that the United

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<sup>44</sup> Robert S. Dyer, 'Sea Disposal of Nuclear Waste: A Brief History', in Thomas C. Jackson, ed., *Nuclear Waste Management* (New York: Pergamon Press, 1981), 11.

<sup>45</sup> 'House Backs Moratorium on Ocean Dumping', *New York Times*, 21 September, 1982. 'Ocean Dumping', *Congressional Quarterly. Weekly Report*, vol. 40, no. 52, 25 December 1982, 3138.

<sup>46</sup> George C. Wilson 'Tiny Pacific Isle of Palmyra Targeted as Nuclear Dump', *Washington Post*, August 18, 1979. James B. Branch 'The Waste Bin: Nuclear Waste Dumping and Storage in the Pacific', *AMBIO* 13 (1984), 328. John Edwards 'The Fuel Nobody Wants', *Far Eastern Economic Review*, August 8, 1980.

<sup>47</sup> See Walter Sullivan 'Nuclear Waste Disposal: Bold Innovations Abroad Instructive for U.S.', *New York Times*, August 31, 1982; Gerald Bourke 'Europeans Seek Answers to Nuclear Waste Buildup', *Chemical Engineering* 90 (February 7, 1983), 25-26.

<sup>48</sup> George C. Wilson, 'Plan for Storing Nuclear Wastes on Pacific Atoll Strongly Protested', *Washington Post*, August 23, 1979.

States continues to treat the Pacific islands as its back-yard dumping grounds, disregarding the interests and legitimate rights of their inhabitants'.<sup>49</sup> Atom bombs tests in the Pacific, which began in 1946, had thus caused the development of very strong regional resentment towards nuclear tests and disposal of radioactive materials.<sup>50</sup>

Towards the end of the 1970s protests were increasing in Europe against the annual dumping of radioactive waste. Beginning in 1978, the international environmental group, Greenpeace International, was protesting against ocean dumping by placing their dinghies underneath the platforms of the dumper ships. The Greenpeace campaign attracted the attention of the international media and, within the course of a few years, the campaign had focussed international public opinion on radwaste disposal. In 1982, 'the issue of the annual dump was developed into an international scandal' by Greenpeace.<sup>51</sup>

In this climate of changing public opinion, the Netherlands withdrew in 1982 from the international dumping operations in the Atlantic. 'This ministry is convinced that ocean-dumping is a safe disposal for wastes', explained a spokesman for the Dutch Ministry of Public Health and the Environment. 'But it's clear that our society does not want ocean-dumping'.<sup>52</sup> The Greenpeace campaign also led Spanish fishermen and local politicians to protest against dumping in the Atlantic Ocean off the Spanish coast. In 1983, the Spanish government proposed a permanent radioactive waste ban within the global dumping regime.

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<sup>49</sup> Jonathan M. Weisgall, 'The Nuclear Nomads of Bikini', *Foreign Policy* 39 (1980), 97.

<sup>50</sup> Jon Van Dyke, Kirk R. Smith, and Suliana Siwatibau 'Nuclear Activities and the Pacific Islanders', *Energy* 9 (1984), 733-50.

<sup>51</sup> Fred Pearce, *Green Warriors. The People and the Politics Behind the Environmental Revolution* (London: The Bodley Head, 1991), 54.

<sup>52</sup> 'Dutch to Stop Dumping Nuclear Wastes at Sea', *The New York Times*, 23 September 1982.

### **The 1983 Radwaste Disposal Moratorium**

A significant number of the governments attending the seventh consultative meeting of the global dumping regime, held in February 1983 at IMO headquarters in London, were unwilling to let dumping of low-level radioactive waste at sea continue. Some governments were in favor of stopping dumping immediately, others would rather phase out dumping. Banning radwaste disposal required, however, that the grey and black lists to the London Convention, already mentioned, be amended. In accordance with the LC, low-level radioactive waste would have to be moved from the grey list to the black list. The convention stipulated, furthermore, that any amendment to the black and grey lists 'will be based on scientific or technical considerations'.<sup>53</sup> Those governments seeking to halt radwaste disposal would consequently have to present scientific and technical evidence proving that such practice was harmful and should be banned under the convention.<sup>54</sup>

By 1983, the two Pacific islands Kiribati and Nauru had become members of the global dumping regime in the hope that the convention could be amended to ban all forms of radioactive waste disposal at sea.<sup>55</sup> Nauru, represented by an American anti-nuclear campaigner, biology professor Jackson Davis from the University of California, proposed an immediate global ban on radwaste disposal.<sup>56</sup> Being heavily dependent on marine resources, fish being one of the two staple foods and an important economic resource, Kiribati and Nauru feared

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<sup>53</sup> Article 15 (2).

<sup>54</sup> The convention puts the onus of proof on those wanting to halt pollution. See Article 1.

<sup>55</sup> Jon Van Dyke et.al. 'Nuclear Activities and the Pacific Islanders', 743. Other Pacific Basin nations, like Fiji, had chosen not to do so because they considered the Convention too lenient as demonstrated by Japan's claim that its proposed dumping was in accord with the convention. Kiribati - formerly the Gilbert islands, which gained independence from Britain in 1979 - became a member of the London Dumping Convention on June 11, 1982; Nauru - a former United Nations trust territory that became independent on 1968 - became a member on August 25, 1982.

<sup>56</sup> For the meeting discussion, see 'Report of the Seventh Consultative Meeting', *LDC Document 7/12*, 9 March 1983, 19-30.

that radioactive waste endangered the marine environment and presented scientific evidence in support of their claim. Their report claimed that radioactivity had leaked from old drums into the marine environment and had entered into the oceanic food chain, that existing knowledge of behavior of radioactivity in the ocean was based on incorrect and uncertain theoretical models, and finally that experts disagreed on low-level radiation hazards.<sup>57</sup>

The Nordic states - Denmark, Finland, Iceland, Norway and Sweden - proposed a ban on dumping to start in 1990. They agreed in principle with the proposal of Kiribati and Nauru but wished to give dumper nations time to develop land-based alternatives. In the intermediate period, dumping should be more strictly controlled and the amount of waste should not exceed the present level. Furthermore, only existing dump sites should be used, and no new dumpers should be allowed. The Marine Pollution Division of the Danish National Agency of Environmental Protection (NAEP) formulated the Danish policy but failed to win Nordic support for the Nauru and Kiribati proposal. Danish scientists, who like their international peers considered the risks of dumping low-level radioactive waste to be very low, were not consulted. Two of the Danish government officials later joined Greenpeace.

The Spanish delegation told the consultative meeting that dumping in the North Atlantic Ocean was a cause of great domestic public concern. Spain considered that the effects on human health and long-term consequences of dumping were the subject of scientific controversy and proposed suspension of dumping operations until the necessary research and evaluation were completed.

The delegation from Ireland, one of the countries nearest the dump site then in use, was opposed, in principle, to the dumping of radioactive wastes at sea and supported the Nordic proposal. The Irish government was 'coming under increasing domestic pressure from a public opinion which was not

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<sup>57</sup> 'Evaluation of Oceanic Radioactive Dumping Programmes. Submitted jointly by Kiribati and Nauru', *IMO document LDC7/INF.2*, 23 September 1982.

convinced that dumping did not constitute a hazard'.<sup>58</sup> Ireland maintained that governments wishing to dump had the responsibility to demonstrate that dumping was safe.

The British delegation replied that the documents submitted by Kiribati and Nauru did not provide the scientific and technical basis required for amendment of the convention. The convention should consequently not be amended. The delegation was of the opinion that the onus of proof that dumping was unsafe rested with those proposing to change the convention. Britain failed, however, to get broad support for this view.<sup>59</sup> Switzerland fully supported the British position.

Also the United States supported the British position, stressing that a change of the convention to ban radwaste disposal should be based on sound scientific evidence of adverse health effects and damages to the marine environment. Dr. Charles D. Hollister from Woods Hole Oceanographic Institute, Massachusetts, one of America's most respected marine research centers, concluded that 'the Davis paper is clearly not the balanced scientific evaluation claimed by the authors and thus it is my recommendation that no amendments to the London Dumping Convention be considered until such an evaluation is completed'.<sup>60</sup>

The Netherlands delegation explained to the meeting that it was looking for possibilities to avoid dumping from 1983 and intended to store waste on

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<sup>58</sup> 'Report of the Seventh Consultative Meeting', 22-23.

<sup>59</sup> Rob Edwards 'Wasting the Ocean', *New Statesman*, 1 July 1983, 6.

<sup>60</sup> *The Dumping of Radioactive Wastes at Sea: Activities Related to the Sea Disposal of Radioactive Wastes. Critical Studies and Comments to the Report 'Evaluation of Oceanic Radioactive Dumping Programmes. Submitted by France'*, LDC document 8/5 9 December 1983, Annex 1. Dr. Hollister claimed that his scientific work on the geological effects of deep sea currents was misinterpreted by Davis et al. Dr. Hollister was one of the chief U.S. spokespersons of sub-seabed disposal of high-level radioactive wastes. For one of Hollister's many publications, see K.R. Hinga, G. Ross Heath, D. Richard Anderson, and Charles D. Hollister 'Disposal of High-Level Radioactive Wastes by Burial in the Sea Floor', *Environmental Science Technology* 16 (1982), 28A-37A. For Hollister's involvement in this issue, see Edward L. Miles, Kai N. Lee and Elaine M. Carlin, *Nuclear Waste Disposal under the Seabed: Assessing the Policy Issues* (California: University of California, 1985).

land. Due to difficulties in finding suitable disposal alternatives, dumping in 1983 could perhaps not be avoided. Japan believed that sea disposal of radioactive wastes would not adversely affect the marine environment when international regulations, which presently rested on firm scientific basis, were followed. The Japanese government therefore strongly opposed proposals for prohibiting sea disposal.

During informal negotiations among the various delegations it became clear that the proposal to amend the convention would not receive support by a sufficient number of governments. Agreement was reached, however, that the scientific basis of the proposal by Nauru and Kiribati should be reviewed by an expert group. The results of such a study should be discussed in 1985, at which time further action should be taken.

Spain then proposed a moratorium resolution - according to LC, resolutions require a simple majority - which meant a suspension of all dumping at sea pending completion of such an expert group study of effects of dumping of low-level radioactive waste on the marine environment and human health. In a subsequent roll call vote, which the United States and Britain failed to block <sup>61</sup>, 19 countries - Spain, Portugal, the Nordic countries, Ireland, Canada and almost all developing countries - voted in favor of the Spanish proposal.<sup>62</sup> The sponsors of the moratorium resolution easily persuaded developing countries - none of the few developing countries producing radioactive waste conduct ocean dumping - to support the moratorium. The group of countries considering or involved in dumping - Japan, the Netherlands, South Africa, Switzerland, Britain and the United States - voted against the resolution. Five countries - Brazil, France, Federal Republic of Germany, Greece and the Soviet

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<sup>61</sup> Clifton E. Curtis 'Ocean Dumping Nations Vote Radwaste Suspension', *Oceanus* 26 (1983), 76-77. See also Clifton E. Curtis 'Radwaste Dumping Delayed. An International Moratorium Keeps Nuclear Wastes at Bay', *Oceans* 16 (1983), 22-23. See also 'London Dumping Convention - 7th Consultative Meeting', *Environmental Policy and Law* 10 (1983), 83-85.

<sup>62</sup> Countries voting in favor of the Spanish resolution were Argentina, Canada, Chile, Denmark, Finland, Iceland, Ireland, Kiribati, Mexico, Morocco, Nauru, New Zealand, Nigeria, Norway, Papua New Guinea, Philippines, Portugal, Spain, and Sweden.

Union - abstained. While the moratorium resolution was not legally binding on governments, several delegations indicated that it was morally binding. The nuclear industry, among others, thus expected that continued ocean dumping would 'result in a substantial political storm'.<sup>63</sup>

Very significantly, Britain immediately indicated it would not be bound by the decision.<sup>64</sup> Britain planned to dump 3500 tonnes low-level radioactive waste, representing more than 1500 curies of alpha radiation and some 150,000 curies of beta and gamma radiation in the Atlantic Ocean.<sup>65</sup> The Swiss delegation also expressed the view that Switzerland did not feel bound by the resolution. Switzerland intended to dispose of relatively small amounts, but would stop dumping in 1984.<sup>66</sup> Netherlands explained it had difficulties disposing of low-level radioactive waste on land and therefore might have to carry out dumping in the summer 1983. It became clear subsequently that the French government intended to participate in the 1984 dumping operation.<sup>67</sup>

The United States explained that its vote reflected its concern that decisions whether to dump should be taken on the basis of scientific and technical evidence. Because of its attempt to keep the resolution from coming to a vote, however, many delegations and environmental NGOs doubted whether that was the true reason.<sup>68</sup>

As often happens in international negotiations, the United States delegation did not reveal its real concerns. Importantly, the administration did not welcome the legislation on radwaste disposal passed by Congress in 1982.

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<sup>63</sup> 'A Call for a Two-Year Halt on Ocean Disposal', *Nuclear News*, March 1983, 120.

<sup>64</sup> Pearce Wright 'Britain Defies Ban on Dumping Waste', *The Times*, February 18, 1983.

<sup>65</sup> Fred Pearce 'Seamen Pull the Plug on Radioactive Dumping', *New Scientist*, June 30, 1983.

<sup>66</sup> Rob Edwards 'Wasting the Ocean', *New Statesman* 1 July 1983, 6.

<sup>67</sup> 'Ocean Disposal Operations to Continue', *Nuclear News*, July 1983, 50.

<sup>68</sup> For governments and environmental NGOs' doubts about the U.S. reasoning, see Clifton Curtis 'Radwaste Dumping Delayed. An International Moratorium Keeps Nuclear Wastes at Bay', *Oceans* 16 (1983), 22-23.



The U.S. Navy was still faced with the problem of disposing of its retired nuclear submarines and preferred to keep the option of ocean disposal open. Moreover, the U.S. marine scientific community generally did not support an unqualified ban on ocean dumping of waste, radioactive wastes included; U.S. legislators and the public, it was felt, exaggerated the risks involved in ocean dumping. A report released in 1984 by the National Advisory Committee on Oceans and Atmosphere (NACOA), co-written with the National Oceanic and Atmospheric Administration (NOAA), recommended that Congress and the administration revise the policy of excluding the use of the ocean for low-level radioactive waste disposal. Ocean disposal should not, however, start before the needed research efforts and monitoring of the fate and effects of disposal were established.<sup>69</sup> In the view of the U.S. marine scientific community, an international ban on ocean dumping would instead be similar to 'doing the same mistake twice'.<sup>70</sup> To the surprise of members of the global dumping regime, the United States' foreign policy on radwaste disposal, which is the domain of the executive branch of government, consequently was not identical to domestic policy.

To prevent the scheduled European dumping, Greenpeace at this point set out to broaden opposition against nuclear ocean dumping. Greenpeace took contact with the National Union of Seamen (NUS), the British seamen's organization, hoping that the union would boycott the dumping planned for summer 1983.<sup>71</sup> The initiative was successful. In March 1983, the British seamen, concerned primarily about their safety when handling the waste,

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<sup>69</sup> National Advisory Committee on Oceans and Atmosphere '*Nuclear Waste Management and the Use of the Sea: A Special Report to the President and the Congress*'.

<sup>70</sup> Bryan C. Wood-Thomas, environmental scientist, Marine Policy Programs, Office of International Activities, U.S. EPA. Interviewed August 29, 1991, Washington, D.C., and London, November 27, 1991. Confirmed by U.S. source who has asked to remain anonymous.

<sup>71</sup> Fred Pearce, *Green Warriors*, 55. Herb Short 'Sea Burial of Radwaste: Still Drowned in Debate', *Chemical Engineering*, March 5, 1984, 14-18.

passed a resolution in favor of halting ocean dumping of radioactive materials.<sup>72</sup> One month later, the opposition was further strengthened when the Transport and General Workers' Union (TWGU), the train drivers' union (ASLEF), and the National Union of Railwaymen (NUR), at a meeting organized by Greenpeace, agreed on an attempt to halt ocean dumping of radioactive waste.<sup>73</sup> In June of the same year, the British seamen announced a ban on handling the waste. The seamen refused to crew a 'Greenpeace-proof' ship - the ship had been fitted with a hole in the hull through which drums of waste could be dropped without being interfered with by Greenpeace - which had been chartered by Britain, Belgium and Switzerland to carry out dumping.<sup>74</sup> The TWGU and the ASLEF similarly called on their members not to handle or transport the waste. Transport union boycotts were also adopted in Switzerland and Belgium.<sup>75</sup>

Furthermore, if the British government, as the unions expected, let the armed forces carry out the dumping, an armada of protest vessels was expected to sail from Spain to converge on the dumping site. 'We understand there are already plans for quite a lot of vessels to leave Spain', explained an executive officer of TGWU, 'and we would hopefully form part of that armada'.<sup>76</sup> In February and July 1983, Spanish 'Friends of the Earth', ecologists and left-wing protestors demonstrated before the British Embassy in Madrid in protest against the plan to dump. In July, more than 150 British flags were burnt in several towns and cities in Galicia, and in one city Mrs. Thatcher was burnt in

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<sup>72</sup> 'Four Unions Back Ban on A-Waste Dumping', April 7, 1983.

<sup>73</sup> Ibid. and Tony Samstag 'Unions Act to Block Nuclear Dumping', *The Times*, April 7, 1983.

<sup>74</sup> Fred Pearce 'Seamen Pull The Plug on Radioactive Dumping', *New Scientist* 30 June 1983, 924. Many described the ship as 'Greenpeace-proof'. See, for example, Tony Samstag 'Unions Act to Block Nuclear Dumping', *The Times*, April 7, 1983.

<sup>75</sup> C.E. Curtis 'Radwaste Disposal Risks Assessed at LDC Meeting', *Oceanus* 27 (1984), 68.

<sup>76</sup> John Ardill 'Unions to Block Dumping of Nuclear Waste in Atlantic', *The Guardian*, June 18, 1983.

effigy.<sup>77</sup>

In September, the British opposition was further strengthened when the seamen's union won backing from the Trade Unions Congress (TUC) for a motion condemning the use of the world's oceans as a dumping ground for nuclear waste and demanding that development of land-based disposal facilities be accelerated.<sup>78</sup> The Union Congress furthermore urged the British government to comply with the decision made at the February meeting of the global dumping regime.<sup>79</sup> At the end of August 1983, the British government announced that it had given up its dumping plans, together with the Belgian and the Swiss governments.<sup>80</sup> On the eve of the 1985 meeting of the members of the global dumping regime, the general secretary of TUC and the British seamen reiterated their opposition to any British plans to resume dumping.<sup>81</sup> The International Transport Unions Federation, in addition, was 'putting its full weight behind a ban and could force dumping nations to toe the line'.<sup>82</sup>

The eighth consultative meeting of the global dumping regime, taking place in February 1984, agreed on a more precise structuring of the review of effects of dumping of low-level radioactive waste on the marine environment and

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<sup>77</sup> Pearce Wright 'Protesters Attack Nuclear Dumping', *The Times*, February 15, 1983. Harry Debelius 'Spaniards Pelt British Embassy', *The Times*, July 12, 1983.

<sup>78</sup> The position of the seamen was that 'radioactive waste should not be dumped irretrievably but should be stored in above-ground, engineered facilities in a location acceptable to the local communities involved'. Tony Samstag 'Talks on Radioactive Dumping', *The Times*, September 23, 1985.

<sup>79</sup> The decision was carried by 7,150,000 votes to 2,764,000. 'Boycott of Nuclear Dumping at Sea', *The Times*, September 10, 1983. 'Slater Fears Nuclear Waste May be Dumped on Seabed in Submarine', *The Guardian*, September 10, 1983.

<sup>80</sup> Andrew Blowers, David Lowry, and Barry D. Solomon, *The International Politics of Nuclear Waste*, 82. For the fate of the radioactive waste, see U.K. House of Lords 'Nineteenth report', 1987-88, 261-62.

<sup>81</sup> A minor controversy between the four transport unions determined to stop the dumping and the TUC took place prior to the positions of the transport unions and the TUC being made public. Rob Edwards 'TUC Muffles Union Discord over Sea-Dumping of Nuclear Waste', *New Statesman*, September 6, 1985.

<sup>82</sup> Jane Dibblin 'Britain is in the Dock'.

human health.<sup>83</sup> It was decided that a panel of twenty-two international experts nominated by the International Council of Scientific Unions (ICSU), an UN-based advisory scientific body, and the IAEA should prepare a basic document which later would be examined by an expanded panel including experts from governments, international organizations and NGOs. This decision was a compromise between a group led by Britain, wanting the IAEA and the ICSU to select the experts to review the evidence and make recommendations for consideration at the next consultative meeting, and another group of governments, led by Canada and Nauru, which felt that experts reflecting different interests and regions should review the evidence and make recommendations.<sup>84</sup> The United States in particular insisted that the representatives from NGOs were indeed experts in the relevant fields.<sup>85</sup>

In their final report, which was completed in the spring of 1985, the experts did not make a recommendation on whether to amend the LC. Perhaps surprisingly, they judged that the question was not a wholly scientific-technical one. As the expert report said: 'The report does not endorse the dumping of radioactive waste at sea nor does it condemn it. In the view of the panel, such a decision could involve value judgements which go beyond consideration of the technical and scientific evidence'.<sup>86</sup> However, as to the risks of dumping, the experts concluded that 'the calculations show that any risk to individuals from the use of the [Atlantic] dump site is very low, both in relation to other common

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<sup>83</sup> For the meeting discussion, see IMO document 8/10 'Report of the Eighth Consultative Meeting', 8 March 1984, 17-33.

<sup>84</sup> Clifton E. Curtis 'Radwaste Disposal Risks Assessed at LDC Meeting' *Oceanus* 27 (1984).

<sup>85</sup> Invited experts should be knowledgeable in fields such as radiological protection, radiation biology, radioecology, radioactive waste management, marine mathematical modelling, marine biology, physical oceanography, marine geochemistry, marine ecology, and marine geology. For the discussion, see 'London Dumping Convention - 7th Consultative Meeting', 83-84.

<sup>86</sup> IMO. Expanded Panel on the Review of Scientific and Technical Considerations Relevant to the Proposal for the Amendment of the Annexes to the London Dumping Convention Related to the Dumping of Radioactive Wastes. 'Introduction of Report Prepared by the Panel of Experts. The Disposal of Low-Level Radioactive Waste at Sea. (Review of Scientific and Technical Considerations). Note by the Secretariat'. IMO Doc. LDC/PRAD.1/2/Add.2, 1 May 1985, 17.

radiation risks such as that from natural background radiation and to the risk that corresponds to any of the dose limits or upper bounds that would apply following current international radiation protection recommendations'.<sup>87</sup>

Within the expanded group of experts, with representatives from governments and, among other NGOs, Greenpeace, some representatives proposed to make a clear statement which could be used by the consultative meeting in reaching a final decision.<sup>88</sup> They suggested that 'no scientific or technical grounds could be found to prohibit the dumping at sea of all radioactive wastes, provided that dumping is carried out in accordance with internationally agreed procedures and controls'.<sup>89</sup> But a number of representatives opposed any such categorical statement. There was agreement on a compromise stating 'no scientific or technical grounds could be found to treat the option of sea dumping differently from other available options when applying internationally accepted principles of radioprotection to radioactive waste disposal'.<sup>90</sup> The British press, however, reported that 'all the parties who attended seem to come away with a different version of the result'.<sup>91</sup> The coming consultative meeting would consequently have to reconsider the moratorium without clear recommendations from its scientific advisers.

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<sup>87</sup> IMO. Expanded Panel on the Review of Scientific and Technical Considerations Relevant to the Proposal for the Amendment of the Annexes to the London Dumping Convention Related to the Dumping of Radioactive Wastes. *Introduction of Report Prepared by the Panel of Experts. Note by the Secretariat*. IMO Doc. LDC/PRAD.1/2, 12 April 1985, 136. On the question of deep sea fauna, 'the results so far indicate that there is no risk of significant damage to local populations ... at or near the North-East Atlantic dump site'. Ibid, 137. Upper bound signifies the maximum amount of total human irradiation permitted from a certain source.

<sup>88</sup> Since 1981 Greenpeace International has had status as observer at consultative meetings of the global dumping regime. The organization is allowed to make oral statements and submit written material. LDC document 6/12 *Report of the Sixth Consultative Meeting*, 3-4.

<sup>89</sup> IMO *Report of Intersessional Activities Relating to the Disposal of Radioactive Wastes at Sea, Including the Final Report of the Scientific Review*. IMO Doc. LDC 9/4, 24 June 1985, 25-27.

<sup>90</sup> Ibid.

<sup>91</sup> Paul Brown 'Britain Seeks Allies to Lift Nuclear Dumping Truce', *The Guardian*, September 21, 1985.

### **The 1985 LC Resolution**

The report of the expanded panel was the focus of the ninth consultative meeting of the global dumping regime, held in September 1985.<sup>92</sup> Governments reached very different conclusions from the findings of the report. Nauru, Spain, Denmark, Norway, Australia, New Zealand, Saint Lucia, Iceland, and Brazil found the report supported their fears about radioactive dumping. Several of them stressed that land disposal was safer, more controllable and more reversible than ocean disposal. Governments which were in the process of developing land-based alternatives, i.e. Finland, Sweden, the Netherlands and the Federal Republic of Germany, also opposed ocean dumping. Spain and Ireland explained that factors other than scientific and technical ones, for example availability of land-based disposal alternatives, also should be taken into account. Several of the governments opposing dumping, as well as international environmental organizations, stressed that available knowledge was insufficient for it to be modelled adequately and with a sufficient margin of safety. A representative of the scientific panel, however, objected that the scientific findings were being 'ignored, distorted or misinterpreted by some parties in unprofessional attempts to exaggerate the uncertainties'.<sup>93</sup>

Intense negotiations followed but did not result in agreement. Although Britain had hoped to avoid a vote altogether, a resolution co-sponsored by Spain and fifteen other states calling for an indefinite moratorium pending further considerations of the issues involved was then brought to a vote. The number of governments supporting a moratorium had grown, mostly because several developing countries had joined, to 25 governments; 6 governments, almost the

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<sup>92</sup> For the meeting discussion, see IMO document '*Report of the Ninth Consultative Meeting*', LDC 9/12, 18 October 1985, 16-41.

<sup>93</sup> IMO '*Report of Intersessional Activities Relating to the Disposal of Radioactive Wastes at Sea, Including the Final Report of the Scientific Review*', 22.

same that had been against the 1983 moratorium, opposed it; and 7 abstained.<sup>94</sup> Governments opposing the moratorium resolution protested fiercely against the vote. The British press reported 'UK threatens to withdraw from the convention', and 'the big nuclear nations, including the United States, had pointed out that they would have to reconsider their position if dumping was banned'.<sup>95</sup>

The resolution called for suspension of all ocean dumping of radioactive waste pending studies of the wider legal, social, economic and political aspects of resuming radwaste disposal. Hence the resolution was intended to broaden the regime's decision-making principle to include considerations other than scientific and technical ones. While the exact nature of such considerations were not clearly spelled out, future proposals to dump should be examined in the light of what international law said about liability, duty to cooperate, the oceans' legal status as a common heritage of mankind, and so forth. Economic considerations would, or could, include for example losses to the fishing industry.<sup>96</sup> Risks and costs of land disposal also had to be examined.

An examination would have to be made of whether it could be proven that radwaste disposal would not harm human health or cause significant damage to the marine environment. Most importantly, the resolution thus shifted the onus of proof to those interested in future dumping to demonstrate that no harm would be inflicted on the marine environment or humans. This decision, in

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<sup>94</sup> For the resolution were Australia, Brazil, Chile, Denmark, Dominican Republic, Finland, West Germany, Haiti, Honduras, Iceland, Ireland, Kiribati, Mexico, Nauru, Netherlands, New Zealand, Norway, Oman, Panama, Papua New Guinea, Philippines, St. Lucas, Spain, and Sweden. Abstentions: Argentina, France, South Africa, Switzerland, Britain and the United States. A few months later, Canada changed its negative vote to a yes. See *Report of the Ninth Consultative Meeting*, LDC 9/12, 18 October 1985.

<sup>95</sup> Paul Brown 'UK Threatens to Withdraw from Convention on Nuclear Dumping', *The Guardian*, September 25, 1985.

<sup>96</sup> In 1980, the Japanese market for sablefish collapsed after a photography of a sablefish swimming near drums of radwaste dumped in the Pacific Ocean off San Francisco was published in newspapers around the world. All orders for sablefish, not just ones from the U.S. West Coast, were cancelled. Kathrine Bishop, 'U.S. to Determine if Radioactive Waste in Pacific Presents Danger', *New York Times*, January 20, 1991.

particular, was a significant victory for those opposing radwaste disposal, and delegations considered that such proof could not be made.<sup>97</sup>

It should be noted that pro-dumping governments were not the only ones criticizing the 1985 resolution. In professional journals ocean scientists criticized the policy development regarding radwaste disposal within the global dumping regime. In a commentary entitled 'Science - A Time of Change?', one British scientist criticized the 1985 decision that 'in the final analysis, social and related factors may outweigh those of a purely scientific and technical nature'. However the terms of reference of the convention were to decide issues on the basis of science; the scientists have done a commendable job, but the unscientific demand of the resolution cannot be answered by scientists. There is no scientific evidence to indicate that the discharge of low level radioactive wastes to the sea, land or air is harmful to man'.<sup>98</sup> With regard to risk involved, a peer-reviewed study concluded that the risks from past radioactive ocean dumping in the North-East Atlantic were 'very low indeed', and that 'even if dumping rates over the next few years were ten times those in the recent past, the effects on humans and marine fauna would still be extremely small'. Thus, as the study also concluded, making a barely concealed reference to the moratorium on radwaste disposal, 'it is clear that there are no scientific or technical grounds for excluding sea dumping from consideration alongside other viable disposal options for radioactive wastes'.<sup>99</sup>

While a small number of governments restated their position on radioactive dumping at the tenth meeting within the regime, held in October 1986, the debate from the previous year was not reopened. The supporters of the moratorium stressed that especially economic and social factors of ocean

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<sup>97</sup> Paul Brown, 'Open-Ended Nuclear Dumping Ban: Britain Loses Strong Rearguard Action as Vote Switches Burden of Proof', *The Guardian*, September 27, 1985.

<sup>98</sup> E.I. Hamilton 'Science - A Time of Change?', *Marine Pollution Bulletin* 17 (1986), 196-97.

<sup>99</sup> W.C. Camplin and M.D. Hill 'Sea Dumping of Solid Radioactive Waste: A New Assessment', *Radioactive Waste Management and the Nuclear Fuel Cycle* 7 (August 1986), 250-51.



dumping should be examined. No clear terms of reference for the coming studies were established, and governments could contribute studies on the various aspects on a voluntary basis. Scientific and technical aspects of radwaste disposal would be examined by one group under an Intergovernmental Panel of Experts on Radioactive Waste Disposal at Sea (IGPRAD), while other groups would consider legal and social aspects of resuming dumping. In 1993, after a series of meetings for which governments, and also NGOs at a later stage, had prepared studies and papers, IGPRAD presented the LC meeting with options for deciding on radwaste disposal.

### **The 1993 Radwaste Disposal Ban: Emphasis on Precaution**

After the mid-1980s, the international view on marine protection changed from being rather permissive to instead precautionary and preventive.<sup>100</sup> This development led to a change in the underlying principles and norms of the global dumping regime as well as a change in the scientific basis of regulation, and had obvious consequences for the radwaste disposal issue.<sup>101</sup> Domestic developments in the United States and Japan had in addition significant consequences for the international development of the issue.

A precautionary principle was unanimously adopted by the 1991 annual LC meeting. According to the precautionary principle adopted, 'preventive measures are taken when there is reason to believe that substances or energy introduced in the marine environment are likely to cause harm even when there is no conclusive evidence to prove a causal relation between inputs and their

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<sup>100</sup> A significant turning point was the adoption of the precautionary principle at the Second International Conference on the Protection of the North Sea. See Ministerial Declaration 'Second International Conference on the Protection of the North Sea' (London: 24-25 November 1987), 7.

<sup>101</sup> See Gerard Peet, 'London Dumping Convention: Obsolete or Effective?', *Marine Pollution Bulletin*, 22, 56-58, and Boyce Thorne-Miller, 'The LDC, the Precautionary Approach, and the Assessment of Wastes for Sea-Disposal', *Marine Pollution Bulletin*, 23, 335-39.

effects'.<sup>102</sup> Equally significant, the concept of the assimilative capacity was explicitly rejected as the scientific principle underlying ocean dumping regulation. Countries thus acknowledged that 'existing pollution control approaches under the London Dumping Convention have been strengthened by shifting the emphasis from a system of controlled dumping based on assumptions of the assimilative capacity of the oceans, to approaches based on precaution and prevention'.<sup>103</sup> By this decision, the emphasis was shifted from so-called dispose and dilute approaches to instead isolate and contain approaches. The rejection of the concept of assimilative capacity was a significant change in regulatory approach. Countries had earlier often been deadlocked because some, especially Britain, traditionally preferred regulation based on the assimilative capacity of the oceans, while others had preferred a more precautionary approach.<sup>104</sup> The scientific debate on the radwaste disposal issue did also to a significant degree revolve around the concept of the assimilative capacity.<sup>105</sup>

In July 1993, IGPRAD finalized its work regarding the three issues identified by the 1986 LC meeting: (1) the wider political, legal, economic and social aspects of radioactive waste dumping at sea; (2) the issue of comparative land-based options and the costs and risks associated with these options; and (3) the question of whether it could be proven that dumping of radioactive

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<sup>102</sup> *Report of the 14th Consultative Meeting*, LDC 14/16, Annex 2, 2, 30 December 1991. For a discussion of the precautionary principle, see Daniel Bodansky 'Scientific Uncertainty and the Precautionary Principle', in the September 1991 *Environment*; contributions on the topic by David C. Campell, Konrad von Moltke and Daniel Bodansky in the April 1992 *Environment*; and contributions by Sonja Boehmer-Christiansen and Robert Costanza in the January/February 1993 *Environment*.

<sup>103</sup> *Report of the 14th Consultative Meeting*, Annex 2, 1.

<sup>104</sup> For the weight attributed to the concept of assimilative capacity in Britain, see David Vogel, *National Styles of Regulation* (Ithaca: Cornell University Press, 1986). See also Sonja Boehmer-Christiansen, 'Environmental Quality Objectives versus Uniform Emission Standards', *International Journal of Estuarine and Coastal Law* (1990), Special Issue edited by D. Freestone and Tom Ijlstra, 139-49.

<sup>105</sup> See Alan B. Sielen, 'Sea Changes? Ocean Dumping and International Regulation', *Georgetown International Law Review* 1 (Spring 1988), 1-32.

wastes and other radioactive matter at sea would not harm human life and/or cause significant damage to the marine environment.

IGPRAD's final report listed seven policy options.<sup>106</sup> According to the so-called option 1, the moratorium on radwaste disposal would be lifted and dumping resumed according to the provisions of the LC and in accordance with IAEA recommendations. According to option 7, in contrast, the convention and the grey and black lists would be amended to include the prohibition of radwaste disposal. IGPRAD did not recommend any of the seven options in particular as this would have been outside the terms of reference for its work. However, the report included a 'Final and Comprehensive Statement' noting 'the growing awareness within the national and international communities that new and more effective measures are needed to protect the global marine environment'.<sup>107</sup> At the legal level, during the past twenty years 'a trend towards, first, restricting and controlling, second, prohibiting sea disposal of radioactive wastes on a regional basis' was acknowledged in the report.<sup>108</sup> Regarding the scientific and technical issues, it was noted that ocean disposal, in comparison with other disposal alternatives for radioactive waste, could result in transboundary transfer of radioactive materials and relative difficulties in monitoring and retrieval of ocean dumped radioactive waste packages. Obviously a compromise solution, it was concluded that 'the same internationally accepted principles of radiological protection apply equally to the scientific and technical assessment of all radioactive waste disposal options'.<sup>109</sup>

But judged by its initial ambition, namely creating 'a process of review and discussion, [through which] differences among countries would be narrowed and consensus could be sought in certain key areas', the IGPRAD-process was

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<sup>106</sup> *Report of the Sixth Meeting of the Inter-Governmental Panel of Experts on Radioactive Waste Disposal at Sea*, LC/IGPRAD 6/5, 31 August 1993, 49-50.

<sup>107</sup> *Ibid.*, 50.

<sup>108</sup> *Ibid.*, 50.

<sup>109</sup> *Ibid.*, 50.

no success.<sup>110</sup> After more than six years of deliberation the panel could not reach agreement on the risk associated with radwaste disposal. Furthermore, IGPRAD members did not even perceive the issue in a similar way. Many members were of the opinion that the risks from dumping at the North-East Atlantic dumpsite were 'smaller than the risks associated with exposures to naturally-occurring radionuclides and certain organic chemicals in the seafoods'. Simply put, man-made risks from past European dumping in the Atlantic were insignificant in comparison with natural risks. Other members emphasized instead the uncertainty of theoretical models and lack of knowledge of essential issues. They believed that no decision regarding radwaste disposal could be made given present knowledge. Similarly, many believed that ocean disposal should be included when conducting comparative risk assessments, whereas others wished to exclude ocean disposal *a priori* because of the transboundary nature of radwaste disposal and problems in monitoring and retrieval of radioactive waste dumped.<sup>111</sup>

Unsurprisingly, given apparent innocuous risks from nuclear dumping, GESAMP experts did not support changing the regime's radwaste disposal policy. Members of the scientific group emphasized that, despite the fact that existing knowledge was imperfect and uncertain, the consensus of the marine scientific community was that the risk from past dumping was 'exceedingly small'.<sup>112</sup> One GESAMP report described the policy development on the radwaste disposal issue as an example of 'lack of confidence in the regulatory process' when full environmental implications of emissions of wastes were not known.<sup>113</sup> Stressing the need for a holistic and multi-sectoral framework (i.e.

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<sup>110</sup> *Ibid.*, 12.

<sup>111</sup> *Ibid.*, 46-49.

<sup>112</sup> J. Mike Bowers and Chris J.R. Garrett 'Analysis of the Issues Related to Sea Dumping of Radioactive Wastes', *Marine Policy* April 1987, 118.

<sup>113</sup> *Global Strategies for Marine Environmental Protection*, GESAMP report no. 45 (IMO: London, 1991), 10.

land, air, and water) for the management of radioactive and other wastes, and that wastes were unavoidably produced despite clean technologies and recycling, and that radwaste disposal had not presented 'appreciable risks' to humans or the environment, GESAMP did not support banning radwaste disposal.<sup>114</sup> But the scientists had no political clout.

It was politically even more significant that in October of the same year, Greenpeace exposed a Russian warship dumping nearly 900 tonnes of liquid low-level radioactive waste into the Sea of Japan.<sup>115</sup> Japan had not been informed about the dumping. The Russian navy subsequently explained that Russia did not have the land capacity to store waste produced by the Russian nuclear-powered fleet. The dumping caused strong concern in Japan as it took place only a few days after President Boris Yeltsin had been on a visit to Japan and the two countries had signed an agreement to end nuclear contamination of the oceans. Also, it sparked widespread concern in Japan about the possible contamination of fish and other sea life.<sup>116</sup> However, responding to protests from Japan, South Korea, the United States and others, Russia cancelled plans to dump another cargo of 700 tonnes of radwaste into the Sea of Japan.<sup>117</sup> Immediately after the incident, Japan announced it would support a nuclear dumping ban at the 1993 LC meeting.<sup>118</sup>

In the fall of 1993, after an inter-departmental power struggle, a

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<sup>114</sup> *Can there be a common framework for managing radioactive and non-radioactive substances to protect the marine environment?*, GESAMP report no. 45, Addendum 1, (London: IMO, 1992).

<sup>115</sup> Asger Røjle 'Rusland dumper atomaffald', *Politiken*, 18 October, 1993, Fred Hiatt 'After Yeltsin Visit, Russia is Dumping A-Waste off Japan', *International Herald Tribune*, 18 October 1993.

<sup>116</sup> Irene Kunii, 'Japan Hails Russian Decision to Stop Nuclear Dumping', Reuter, October 21, 1993.

<sup>117</sup> 'Russians Plan More Dumping of A-Waste', *International Herald Tribune*, 20 October 1993; Asger Røjle, 'Rusland opgiver dumping', *Politiken*, 22 October, 1993; 'Russia Seeks Aid as It Suspends N-Waste Disposal Off Japan', *International Herald Tribune*, October 22, 1993.

<sup>118</sup> It in addition seems certain, as some interviewees also pointed out, that Japan did not want to be out of step with the rest of the international community on this issue.

significant reversal of U.S. foreign policy on radwaste disposal took place. In early November, the Clinton administration announced that it had decided to press for a legally binding, worldwide ban on the dumping of low-level radioactive waste at sea, a departure from the policy of previous administrations.<sup>119</sup> The decision, which was seen as a victory for Carol M. Browner, the administrator of the EPA, was taken after the issue of radwaste disposal had received prominent coverage in the media and after lobbying by politicians and environmentalists. The Defense Department unsuccessfully opposed the decision which it felt interfered with vital interests of the Navy.<sup>120</sup> Globally, the balance was shifting in favor of a nuclear dumping ban.

Already in July, at a Special Amendment Group meeting of the regime members, an announcement by Denmark that it would call for formal action at the upcoming LC meeting on an amendment to permanently ban radwaste disposal had been supported by more than twenty other governmental delegations. A number of governments submitted amendment proposals regarding radwaste disposal to the 1993 LC meeting. A draft resolution was prepared within a working group and later adopted by vote: thirty-seven countries voted for, none against, and five abstained: Belgium, China, France, the Russian Federation, and Britain.<sup>121</sup> Belgium explained later that, due to its small size and its population density, it did not wish to exclude any alternative solution to land-disposal. China explained that, since studies and assessments carried out by IAEA had not been completed, the ban could not take these results into account. China was not, however, in favor of ocean dumping.

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<sup>119</sup> David E. Pitt, 'U.S. to Press for Ban on Nuclear Dumping at Sea', *New York Times*, November 2, 1993.

<sup>120</sup> David E. Pitt, 'Pentagon Fights Wider Ocean-Dumping Ban', *New York Times*, 26 September, 1993.

<sup>121</sup> The following countries voted for the ban: Argentina, Australia, Brazil, Canada, Chile, Cyprus, Denmark, Egypt, Finland, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Malta, Mexico, Morocco, Nauru, the Netherlands, New Zealand, Nigeria, Norway, Oman, Papua New Guinea, Philippines, Poland, Portugal, Solomon Islands, South Africa, Spain, Sweden, Switzerland, Ukraine, United States, and Vanuatu. For the meeting, see *Report of the Sixteenth Consultative Meeting LC 16/14*, 15 December 1993.

France objected, in principle, to the ban, which it considered not to be based on objective scientific grounds. The Russian Federation explained that, due to insufficient land-based disposal facilities, it had hoped for a grace period until 31 December 1995. Since the LC meeting disagreed, the Russian Federation chose to abstain.

Much to the surprise of many regime members, all countries except the Russian Federation soon after the meeting informed the LC secretariat that they accepted the nuclear dumping ban.<sup>122</sup> The Russian Federation, however, made a declaration of non-acceptance.<sup>123</sup> As the case of Britain illustrated, the impact of international public opinion was an essential influence when governments agreed to accept the ban. Thus, Britain did not accept the ban because of the existence of scientific evidence proving that radwaste disposal was harmful to the marine environment or human health. Instead; 'the UK recognises', explained the British Minister of Agriculture, 'that the weight of international opinion on this matter means that such dumping is not, in any event, a practical proposition. We have, therefore, decided to accept the ban'.<sup>124</sup>

### **Findings From The Radwaste Disposal Case**

As initially pointed out, the 1993 LC ban on radwaste disposal is a historical step to protect the oceans. For the first time since this practice began in 1946, an international policy on radwaste disposal has been agreed upon by nations.

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<sup>122</sup> According to the LC's article 15 (2), amendments to this treaty will enter into force except for those countries that within 100 days make a declaration to the LC secretariat, i.e. IMO, that they do not accept the amendments at that time.

<sup>123</sup> IMO Briefing, 'Ban on Sea Dumping of Radioactive Wastes Takes Effect', *IMO/B1/94*, 21 February, 1994.

<sup>124</sup> Nicholas Schoon 'UK bows to ban on dumping N-waste at sea', *The Guardian*, 18 February, 1994.

The decision on the ban did not jeopardize the global dumping regime although it, in the words of the chief of the regime secretariat at IMO and a former LC conference chairman, was an issue 'of extreme importance to the operation of the LDC'.<sup>125</sup> Hence the global dumping regime has proved to be a very robust international institution.<sup>126</sup> Moreover, the permanent, legally binding, radwaste disposal ban is evidence of a recent dramatic change of the global dumping regime itself.

Dominant regime theories appear inadequate in the light of the case. The radwaste disposal case does not support the general claim made by Realists that environmental problems will not be solved if this means reduction of nations' freedom of action or their national welfare and influence. In 1972, nations agreed to establish an international dumping regime introducing the beginnings of global regulation. In 1993, the United States proposed a global ban although it thereby reduced its freedom of action. Even less explainable from the Realist perspective, while its advocates assume that regime development directly reflects the preferences of the hegemon, the development on the radwaste disposal issue was evidently not a result of hegemonic leadership provided by the United States: The United States' very recent support behind a global dumping ban, which most likely was a significant factor in getting international agreement, does not invalidate the conclusion regarding absence of hegemonic leadership. Even more unpredictable, powerful and influential nations supporting radwaste disposal were pressured to revise their policy. The case cannot be explained by Realists as they deny the influence of domestic politics, environmental NGOs, international public opinion and small states.

As pointed out earlier, regime analysts informed by a Reflectivist perspective pay special attention to the role of scientific experts and advisers, especially as they constitute so-called epistemic communities. But in the

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<sup>125</sup> Manfred Nauke and Geoffrey L. Holland, 'The Role and Development of Global Marine Conventions', *Mar. Pollut. Bull.*, 25, 75.

<sup>126</sup> For the robustness of institutions, see Kenneth A. Shepsle 'Studying Institutions. Some Lessons from the Rational Choice Approach', *Journal of Theoretical Politics* 1 (1989), 143.



radwaste disposal case determining the policy core of international policy, i.e. its embedded knowledge as well as its norms, standards, and beliefs, was not the exclusive domain of technical experts and scientists.<sup>127</sup> Unlike the cases examined by Reflectivist analysts, expert opinion and public opinion were not, figuratively speaking, on the same side of the issue.<sup>128</sup>

Expert advice, which was institutionalized in GESAMP, played a very little, if not insignificant, role in the policy development. Because of the political, social and other aspects involved, experts were apprehensive of becoming involved in the radwaste disposal issue. For example, GESAMP declined IGPRAD's request to develop operational definitions of such terms as harm, safety, proof and significance to be used in studies and assessments called for in the 1985 resolution on the grounds that such definitions, in addition to scientific aspects, involved non-scientific aspects outside the terms of reference of GESAMP.<sup>129</sup> It is evident furthermore that, because it based its expert advice

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<sup>127</sup> For the concept of policy core, see Giandomenico Majone, 'Research Programmes and Actions Programmes', in P. Wagner, et.al., eds., *Social Sciences and Modern States* (Cambridge, England: Cambridge University Press, 1991), 290-306.

<sup>128</sup> Reflectivist scholars tend to downplay the impact of public opinion. See Peter M. Haas, 'Do Regimes Matter? Epistemic Communities and Mediterranean Pollution Control', 377-403, and Peter M. Haas, 'Banning Chlorofluorocarbons: Epistemic Community Efforts to Protect Stratospheric Ozone', 187-224. Others, however, have reached different conclusions. See, for example, Baruch Boxer, 'Mediterranean Pollution: Problem and Response', 10 *Ocean Development and International Law Journal* (1982), 3/4, 315-56, and R. B. Clark, 'The Mediterranean, the Media, and the Public Interest', 20 *Marine Pollution Bulletin* (1989), 8, 369-72. Note also the conclusion of an epistemic community-inspired case study in international regulation of commercial whaling: 'Yet the epistemic community of conservation-minded cetologists only briefly enjoyed predominant influence over policy. Most of the time, the influence of cetologists was outweighed by that of other groups, the industry managers until the mid-1960s and the environmentalists after the mid-1970s'. M.J. Peterson, 'Whalers, Cetologists, Environmentalists, and the International Management of Whaling', 46 *International Organization* (Winter 1992), 182. Although reflectivist scholars claim the opposite, international environmental policy development may therefore to a significant degree be attributed to public opinion and the international environmental movement but much less to the influence of expert opinion. For the international environmental movement, see John McCormick, *Reclaiming Paradise: The Global Environmental Movement* (Bloomington: Indiana University Press, 1989).

<sup>129</sup> *Report of the Sixth Meeting of the Inter-Governmental Panel of Experts on Radioactive Waste Disposal at Sea*, 36. See also *The 15th Consultative Meeting of Contracting Parties to the London Dumping Convention: Annotations and Comments by Greenpeace International on the Agenda of the Meeting*, F-12.

on the concept of assimilative capacity, the expert group could not address concerns about radwaste disposal raised by many regime members.<sup>130</sup> Laudable or not, GESAMP's expert advice was not binding on governments who could ignore it if they wished. Expert advice was, therefore, only vaguely institutionalized into the regime.

The LC originally stipulates that global dumping regulation should be based only on technical or scientific considerations and thus makes certain that dumping regulations are based on the advice of marine scientists. At the level of principles and norms, however, the 1991 consultative meeting's decision to substitute the concept of assimilative capacity with the precautionary principle was a serious threat to marine scientists' role as policy experts within the global dumping regime. If the regulatory goal was to reduce waste discharges as much as possible, regulatory decisions would be concerned with choosing technologies that best met this goal. But marine scientists could not contribute to the realization of this goal.<sup>131</sup> Also for this reason, GESAMP pointed out that its approach to protection of the marine environment assumed the need for caution.<sup>132</sup> The expert group also did not endorse the precautionary principle as it found that the principle could not provide a scientific basis for marine pollution control.<sup>133</sup> At the level of specific pollutants, the 1993 radwaste

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<sup>130</sup> For the discussion among marine scientists of the concept of assimilative capacity, see A.R.D. Stebbing, 'Environmental Capacity and the Precautionary Principle', *op.cit.*. See also footnote (133).

<sup>131</sup> See R.B. Clark, editor of *Marine Pollution Bulletin*, 'Ocean Dumping', *Marine Pollution Bulletin* (June 1989), 295.

<sup>132</sup> *Can there be a common framework for managing radioactive and non-radioactive substances to protect the marine environment?*, *op.cit.*, 9.

<sup>133</sup> A long and heated debate on the concept(s) of the precautionary principle took place in the journal *Marine Pollution Bulletin* after John Gray, a leading member of GESAMP, in 1990 wrote that 'the precautionary principle is entirely an administrative and legislative matter and has nothing to do with science'. John S. Gray, 'Statistics and the Precautionary Principle', *Mar. Pollut. Bull.* 21, 174. See Paul Johnston and Mark Simmonds, (letter), *Mar. Pollut. Bull.* 21, 402; Alf B. Josefson, (letter), *Mar. Pollut. Bull.* 21, 598; John Lawrence and David Taylor, (letter), *Mar. Pollut. Bull.* 21, 598-99; J.S. Gray, (letter), *Mar. Pollut. Bull.* 21, 599-60; R.C. Earll, 'Commonsense and the Precautionary Principle - An Environmentalist's Perspective', *Mar. Pollut. Bull.* 24, 182-86; R.M. Peterman and M. M'Gonigle, 'Statistical Power Analysis and the

disposal ban however exemplifies that countries adopted regulations perceived as conforming with the precautionary principle but unsupported by their scientific advisers.

The case shows, therefore, that it is unlikely that politically salient international and global environmental issues only, or even predominantly, will be decided by scientists and technical experts. After environmental NGOs have succeeded to increase an issue's prominence, the role and influence of experts is often reduced and the public legitimacy of the issue is at stake. Reflectivist analysts overlook that governments will not for long champion policies that are justifiable on scientific and technical grounds but unacceptable to the general public. In this case, governments, environmental protection agencies and the public were unwilling to accept small risks with potentially large consequences and took non-scientific aspects into account as well.<sup>134</sup> It is also important that environmental protection agencies found that land disposal appeared to be less risky from the perspective of monitoring and retrieval than ocean disposal. Furthermore, as government agencies, they wished to compel society to find more effective ways of waste handling and waste reduction: As often pointed out by environmentalists, ocean dumping was an 'easy out'.

How does an international environmental issue become a prominent one? The case documents that international public opinion, defined as points in time at which public opinion on a particular issue is near-identical across a large number of countries, is one of the most effective political resources available to those seeking to shape and influence international environmental policy.<sup>135</sup> An

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Precautionary Principle', *Mar. Pollut. Bull.* 24, 231-34. Other scientists also criticized the principle. See Alex Milne, 'The Perils of Green Pessimism', *New Scientist*, 138:1877, 34-37.

<sup>134</sup> The risk-perception of environmental agencies is well-illustrated by a letter from Carol Browner, U.S. EPA administrator, to Warren Christopher, Secretary of State, recommending that the United States supported a prohibition on the sea disposal and seabed emplacement of all radioactive wastes: 'Years of research have failed to alleviate concerns about potential impacts of nuclear dumping on the marine environment'. Letter, July 2, 1993.

<sup>135</sup> This definition seems to capture well the following observation regarding the British seamen in 1983: 'The seamen can be condemned for taking the law into their own hands, but their action is only a symptom of an underlying public concern which is apparent world-wide

adept practitioner of public diplomacy, i.e. mobilizing public opinion as a sanction on stubborn negotiators and governments, Greenpeace played an essential catalytic role by focussing international public opinion on radwaste disposal and thereby forcing the issue onto the international agenda.<sup>136</sup> Greenpeace has also focussed the attention of the international public and mass media on whaling, sealing, nuclear testing and other 'environmental crimes'. 'We want to draw attention to something', explained a founder and chairman of Greenpeace in 1984. 'We use action and, once there's attention, we move into lobbying'.<sup>137</sup> At the same time, the Greenpeace campaign reflected widespread public concerns about radwaste disposal.<sup>138</sup>

The case also documents that environmental NGOs can effectively link domestic and international politics. Greenpeace's involvement of British trade unions in 1983 shows how an environmental NGO may successfully forge an

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and which stochastic assurances of safety have done little to assuage'. Andrew Cruickshank, 'Dumping in Deep Water?', *Nuclear Engineering International* 28 (September 1983), 13-14. Most international relations scholars would doubt that international public opinion can have an independent impact on international policy development. It should be noted, however, that the prominent game theoretician Anatol Rapoport has referred to world public opinion. See 'Introduction', in Carl von Clausewitz, *On War* (London: Penguin, 1968), 39. For a study of the historic origins and development of the concept, see Jurgen Habermas, *Strukturwandel der Öffentlichkeit: Untersuchungen zu einer Kategorie der bürgerlichen Gesellschaft* (Neuwied am Rhein-Berlin: Politika, 1965). See also Ferdinand Tonnies, *Community and Society*, trans. and ed. by Charles P. Loomis (New York: Harper and Row, 1957), 218-31. See also W. Philipps Davidson, 'Public Opinion', in David L. Sills, ed., *International Encyclopedia of the Social Sciences* (Library of Congress, 1968), 13, 188-96.

<sup>136</sup> Greenpeace performed the role of policy entrepreneurs observed in domestic politics studies. For a discussion of policy entrepreneurs, see John W. Kingdon, *Agendas, Alternatives, and Public Policies* (Boston: Little, Brown, 1984), 129-30, 188-93, and 214-15. For a different view of public diplomacy, see Victor A. Kremenyuk, 'The Emerging System of International Negotiation', in Kremenyuk, ed., *International Negotiation: Analysis, Approaches, Issues* (San Francisco: Jossey-Bass, 1991), 24. Others define public diplomacy to concern only the state and interstate relations. See Robert S. Fortner, *Public Diplomacy and International Politics* (Westport, Conn.; Praeger, 1994), 34-35.

<sup>137</sup> Jo Thomas, 'Greenpeace Aims at Headlines First', *International Herald Tribune*, 4 September, 1984, 2.

<sup>138</sup> The public's fear of radioactive matters is well-documented. See Spencer R. Weart, *Nuclear Fear: A History of Images* (Harvard University Press: Cambridge, Mass., 1988); Luther J. Carter, *Nuclear Imperatives and Public Trust* (Resources for the Future: Washington D.C., 1987).

alliance with domestic actors in order to pressure a recalcitrant government to comply with international environmental rules. This and other activities, such as Greenpeace patrolling the oceans on the look-out for dumper ships, indicates significant ways in which environmental NGOs can influence compliance and monitoring of international environmental agreements. As possessors of 'local knowledge', environmental NGOs are an important part of environmental governance on an international scale.<sup>139</sup> Current theories of international regimes unfortunately ignore that environmental NGOs play significant roles in international environmental protection.

Finally, the agreement on the radwaste disposal ban was influenced by the regime understood as an international institution in at least three important ways. First, it served as an institutional focal point for the governmental and non-governmental opposition to radwaste disposal. The existence of a global forum in which the issue could be debated from an environmental perspective was clearly advantageous for those that were opposed to radwaste disposal. The IAEA forum instead was a more closed group of states sharing an interest in protecting their nuclear energy programs. Governments and environmental NGOs were skillful in using this institutional opportunity to protest against radwaste disposal and present scientific and technical reports in support of halting such dumping.

Second, within the framework of the regime the international opposition to radwaste disposal at first adopted resolutions and later treaty amendments intended to halt such disposal. Due to a series of LC resolutions that gradually changed the legal substance of the global dumping regime in a more pro-

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<sup>139</sup> To give another example, Norwegian national politicians recently concluded with respect to Bellona, a Norwegian environmental NGO who monitors the nuclear waste situation in the north-western part of Russia: 'Bellona is a supplement and has shown that a voluntary organization enters environments and gets information which no public authority can do. For this reason, I believe in continuing the cooperation between private and public organizations'. (Author's translation). Quoted in Ole Mathismoen, 'Stortinget Roser Bellona', *Aftenposten*, 11 June, 1994. For the concept of governance, see James N. Rosenau, 'Governance, Order, and Change in World Politics', in James N. Rosenau and Ernst-Otto Czempiel, eds., *Governance without Government: Order and Change in World Politics* (Cambridge, New York: Cambridge University Press, 1992), 1-27.

environment and precautionary direction, radwaste disposal increasingly became legally controversial. Changes of the legal substance were made with respect to essential issues, namely the burden of proof regarding environmental damage, the underlying regulatory approach, and regulation under conditions of scientific uncertainty. Such a significant legal transformation affecting the regime's principles and norms as well as its rules and decision-making procedures required a global regime as its precondition.

Third, the regime established international behavioural norms and standards against which individual countries' ocean dumping policies could be compared and judged by other countries, environmental NGOs and the public. By setting behavioural norms and standards, the regime increased the pressure on laggard countries to adjust their policies to become more environmentally acceptable. Such norms and standards significantly raised the political costs of non-compliance. The drafters of the London Convention were fully aware of this and tried to talk advantage hereof. They agreed that an amendment of the annexes decided by two-thirds of those members present at a consultative meeting would apply to all members except those who made an official declaration rejecting it within 100 days after the decision had been taken because, in the words of one U.S. negotiator, 'it was felt that the procedure adopted would be useful, in that it requires a positive act of refusal, theoretically made more difficult by publicity and peer pressure to accept the proposed amendment'.<sup>140</sup>

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<sup>140</sup> Terry L. Leitzell, 'The Ocean Dumping Convention - A Hopeful Beginning', *San Diego Law Review*, 10 (May 1973), 3, 513.

## Conclusions

International regimes set norms and standards for acceptable behavior within particular international issue-areas.<sup>141</sup> Such norms and standards are laid down in convention texts and regime resolutions. Regime norms and standards reflect international public opinion to the extent it exists, but do not necessarily reflect concerns for economic effectiveness or consensus within scientific communities.<sup>142</sup> Because of international public opinion on an international issue-area, which may be more or less well-specified, some policies dealing with an international issue are politically feasible while others are not. Significant changes in international public opinion will be reflected in regime norms and standards. States disregarding regime standards and norms are subject to domestic and international criticism and scorn, and even powerful states may therefore choose to comply with regime norms and standards in order to avoid this.

Most regime theorists wrongly assume that states are rational actors only concerned about minimizing costs and maximizing benefits of international cooperation. International relations scholars evidently share the assumption that public opinion, very seldom mentioned in international regime literature, has no significant, independent impact on international cooperation to protect

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<sup>141</sup> I agree with Oran R. Young's view that international regimes are examples of social institutions. See Oran R. Young, *International Cooperation: Building Regimes for Natural Resources and the Environment* (Ithaca and London: Cornell University Press, 1989). See also the discussion of norms in Abram Chayes and Antonia Handler Chayes, 'On Compliance', *International Organization* (Spring 1993), 2, 184-87.

<sup>142</sup> A few general observations should be made as the significance of international public opinion is not well-understood. Some international issues, in particular those concerning the environment and human rights, are likely to be perceived in rather similar ways across countries. This is especially so with regard to problems that are perceived as being significant threats to humans and the environment. Issues of international political economy as well as international politics and security are less likely to be perceived in similar ways across countries, and international regime rules and standards will in those cases therefore not mirror international public opinion. Also important, in some international issue-areas regime norms and standards mirror an uneven distribution of power capabilities among states, not international public opinion.

global commons such as the oceans.<sup>143</sup> Also Reflectivist scholars minimize the role of public pressure, nationally and internationally, and the impact of public opinion.<sup>144</sup> The lack of attention to both public opinion and public pressure is a consequence of Realism's preoccupation with coercion and military power as the only available instruments of control and, at the same time, Reflectivist scholars' preoccupation with knowledge and perception. In the case of radwaste disposal, a transnational coalition of small states and environmental NGOs established regime rules constraining the behavior of a group of powerful states.

It is generally overlooked by regime analysts that ideas understood in a broader sense become embedded in societal norms and values and therefore also in foreign policies and international regimes. Consequently, changes in public ideas or stronger articulation of existing public ideas can under certain conditions influence international policy development.<sup>145</sup> It is self-evident that public diplomacy, whether exercised by individuals, environmental NGOs, or states, is crucially dependent on the availability of powerful public ideas.<sup>146</sup> Following this line of reasoning, the global dumping regime should rightly be understood as an institutionalization of considerable global concerns that emerged for the first time in the early 1970s about the possible impacts of dumping on the marine environment.<sup>147</sup>

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<sup>143</sup> See, for example, James N. Rosenau 'New Non-Land Resources as Global Issues', in Charles W. Kegley, Jr., and Eugene R. Wittkopf, eds., *The Global Agenda: Issues and Perspectives* (New York: Random House, 1984), 394.

<sup>144</sup> See Ernst B. Haas, *When Knowledge Is Power*, op.cit., 185.

<sup>145</sup> For an interesting collection of studies on aspects of public ideas, see Robert B. Reich, *The Power of Public Ideas* (Cambridge: Harvard University Press, 1990).

<sup>146</sup> The case of depletion of the stratospheric ozone layer illustrates how a state might employ public diplomacy. As the head of the U.S. delegation has described, the U.S. employed intense mass media coverage of the scientific theories and warnings over use of chlorofluorocarbons (CFCs) in order to build international public and governmental support for the Montreal Protocol. See Richard E. Benedick, *Ozone Diplomacy: New Directions in Safeguarding the Planet* (Cambridge: Harvard University Press, 1991), 56.

<sup>147</sup> For a discussion of the institutionalization of ideas and policy outcomes, see Judith Goldstein and Robert O. Keohane, 'Ideas and Foreign Policy: An Analytical Framework', in Goldstein and Keohane, eds., *Ideas and Foreign Policy: Beliefs, Institutions, and Political*



While both theories tested here exclude domestic level politics from regime analysis<sup>148</sup>, the case of radwaste disposal illustrates that domestic level developments must be included in order to explain regime development and compliance with international rules.<sup>149</sup> Regime analysts should also recognize that transnational actors, networks of experts and international organizations exist alongside interdependent states striving to protect their interests.<sup>150</sup> However, drawing a sharp distinction between the state and the international system seems of little analytical value in itself: regime analysts instead need to better understand the nature of domestic-international interactions and so-called two-level games.<sup>151</sup> Briefly returning to the issue of public opinion, while international public opinion in this case was an essential influence on international environmental policy development, better regime models should pay attention to how public opinion influences particular national styles of environmental policy-making, including public opinion's impact on foreign environmental policy.<sup>152</sup>

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*Change* (Ithaca: Cornell University Press 1993), 3-30.

<sup>148</sup> Scholars have repeatedly pointed to current international regime theories' neglect of domestic politics. See Susan Strange, 'Cave! hic dragones: A Critique of Regime Analysis', in Krasner, ed., *International Regimes*, 337-54, Stephan Haggard and Beth A. Simmons, *Theories of International Regimes*, *International Organization* 41 (Summer 1987), 491-517, and Helen Milner, *International Theories of Cooperation Among Nations*, *World Politics* 44 (April 1992), 466-96.

<sup>149</sup> For the various models of domestic politics used in theories of international cooperation, see Helen Milner, 'International Theories of Cooperation Among States', *op.cit.*, 494-95.

<sup>150</sup> Earlier studies of complex interdependence have emphasized the importance of international organizations and transnational actors. See Robert O. Keohane and Joseph S. Nye, 'Power and Interdependence Revisited', 41 *International Organization* (Autumn 1987), 725-53, which is reprinted in a revised version in Keohane and Nye, *Power and Interdependence* (Harper Collins 1989), 245-67.

<sup>151</sup> For a recent contribution, see Peter B. Evans, Harold K. Jacobson, and Robert D. Putnam, eds., *Double-Edged Diplomacy: International Bargaining and Domestic Politics* (Berkeley: University of California Press, 1993).

<sup>152</sup> Comparative studies show that the influence of public opinion on environmental policymaking varies significantly at the domestic level. See Lennart J. Lundqvist, *The Hare and the Tortoise* (Ann Arbor: The University of Michigan Press, 1980). See also David Vogel, *National Styles of Regulation*, *op.cit.*, and Vogel 'Representing Diffuse Interests in

Environmental NGOs are ignored in the theories examined here, but the case of radwaste disposal shows that their many roles in international environmental cooperation, which include raising concern and mobilizing public opinion, presenting scientific, technical and legal input, lobbying, involving concerned parties, and monitoring and exposing breaks with regime rules, should be examined in more detail. While states obviously play a central role in coping with international environmental problems, this case documents that states may be responding to rather than leading non-state actors such as environmental NGOs. Of course, private companies also play a significant role in international environmental management. Consequently, all relevant non-state actors should be included in future regime analysis.

Can this process of regime change be generalized? Two recent, prominent cases of international environmental cooperation confirm the essential role played by international public opinion. Thus, although international attempts to ban ozone depleting chloroflourocarbons (CFCs) started in the early 1980s, it was not until the discovery in 1985 of the ozone 'hole' that governments agreed on specific measures and timetables for reducing production and consumption of CFCs and halons in Montreal in 1987. The discovery proved scientific predictions and theories about stratospheric ozone depletion and, more importantly, had a tremendous impact on public opinion worldwide: 'As a powerful symbol of the potential impacts from stratospheric ozone depletion, the ozone hole galvanized world opinion, and thus influenced the outcome in Montreal'.<sup>153</sup> The Framework Convention on Climate Change was signed by more than 150 countries assembled at the United Nations Conference on Environment and Development in Rio in June 1992. Unlike the ozone case, the global warming issue had not moved from a growing scientific consensus that a problem existed to conclusive evidence of environmental damage. Mainly

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Environmental Policymaking', in R. Kent Weaver and Bert A. Rochman, eds., *Do Institutions Matter?* (Washington D.C.: Brookings Institution, 1993), 237-71.

<sup>153</sup> Peter M. Morrisette, 'The Evolution of Policy Responses to Stratospheric Ozone Depletion', *Natural Resources Journal* (Summer 1989), 29, 815.

because of U.S. resistance, this lack of evidence significantly slowed the pace of international negotiations on the global warming treaty, and led a negotiator to say: 'Pray for another hot summer in America' <sup>154</sup>. Global warming emerged as a political issue in the United States when American scientist Jim Hansen in the unusually hot summer of 1988 testified that the world was getting hotter probably as a result of increasing atmospheric levels of carbon dioxide and other greenhouse gases. <sup>155</sup> The high uncertainties characterizing the global warming phenomenon did not, however, severely reduce its political significance, and the issue continued to be subject to extensive public attention. <sup>156</sup>

Environmental problems often transcend national borders and most significant political institutions, ideas and actors similarly operate both at the domestic and the international level. Herein lies perhaps the biggest challenge for regime theory. The theories examined in this article only focus on some aspects of regimes. They artificially separate the domestic and the international levels, and interests and power are, equally artificially, seen as antithetical to ideas and knowledge. Better models should fit together, not separate, the processes and actors that contribute to international regime change.

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<sup>154</sup> 'Green Diplomacy', *The Economist*, June 16, 1990, 18.

<sup>155</sup> Karen Wright, 'Heating the Global Warming Debate', *The New York Times Magazine*, February 3, 1991, 24 ff.

<sup>156</sup> For an excellent analysis of the global warming case which in addition compares this case with the ozone case, see Eugene B. Skolnikoff, *The Elusive Transformation: Science, Technology and the Evolution of International Politics* (Princeton, New Jersey: Princeton University Press, 1993), 191-94.

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