The Oceans in the Nuclear Age

Legacies and Risks

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CHAPTER NINE

OCEAN TRANSPORT OF RADIOACTIVE FUEL AND WASTE

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I. The Problem

The shipments of large cargoes of highly radioactive or radiotoxic nuclear materials between Europe and Japan have raised a new challenge to the balance created in the Law of the Sea Convention1 between navigational freedoms and the protection of coastal communities, coastal resources and the marine environment. This new era of ultra-hazardous cargoes is usually said to have begun in November 1992, when Japan shipped 2200 pounds (one metric ton) of plutonium in a refitted freighter called the Akatsuki Maru from France to Japan, going around the Cape of Good Hope in Africa and then south of Australia before turning north to traverse the Pacific to Japan.2 In February 1995, the British vessel Pacific Pintail carried twenty-eight canisters of high-level vitrified nuclear waste (HLW) in glass blocks, each weighing one thousand pounds, going around Cape Horn at the tip of South America and then across the Pacific. In early 1997, the British vessel Pacific Teal carried forty such canisters, going around Africa and then up through the Tasman Sea. In January 1998, the British vessel Pacific Swan carried sixty HLW canisters, going through the Caribbean and then through the Panama Canal. The Pacific Swan made a similar voyage in March 1999, carrying forty canisters of HLW through the Mona Passage (between Puerto Rico and the Dominican Republic) and then through the Panama Canal.

* Some of the material in this section is adapted and updated from Jon M. Van Dyke, "The Legal Regime Governing Sea Transport of Ultra-hazardous Radioactive Materials," 33 Ocean Dev. & Int'l L. 77 (2002).


From July 21 to September 27, 1999, the Pacific Pintail and the Pacific Teal traveled from France to Japan carrying 446 kilograms of weapons-usable plutonium contained in forty mixed plutonium/uranium oxide (MOX) fuel elements. This transport was routed around the Cape of Good Hope in South Africa, across the southern Indian Ocean, and then up through the Tasman Sea and the western Pacific Islands to Japan. Because each vessel was armed with three 30 mm cannons (with a ten kilometer range), assault rifles, shotguns, hand weapons, body armor, gas masks and a high-speed armed boat staffed by thirteen United Kingdom Atomic Energy Authority officers, they were deemed to be providing armed escort for each other (although it is hard to imagine that a vessel carrying the MOX fuel could effectively protect another vessel by chasing after or interfering with an attack by a terrorist vessel). The ships "adhered to a request by the [South African] government to stay out of South Africa's territorial waters and its larger marine Exclusive Economic Zone (EEZ)." One crew member suffered a damaged collarbone and a head injury when he fell during heavy seas in the South Indian Ocean and was airlifted by helicopter to Australia on August 28, 1999.

The Pacific Swan left Cherbourg, France on December 29, 1999, carrying 104 containers of vitrified high-level waste, and traveled through the Caribbean Sea and Panama Canal on its way to Japan. A year later, the Pacific Swan again made the journey, this time with the largest cargo of nuclear waste ever carried—192 canisters of high-level wastes—and this time traveling around Cape Horn at the tip of South America, arriving in Japan in February 2001. Almost simultaneously, the Pacific Pintail and the Pacific Teal went around the world the other way, around the Cape of Good Hope at the tip of Africa, carrying 230 kilograms of plutonium and four tons of uranium contained in twenty-eight MOX fuel assemblies. None of this vast amount of weapons-usable MOX

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3 "Japan Arms Nuclear Transport Vessels to Deter Terrorist Attacks," Jane's Intelligence Review, vol. 11, no. 8, August 1, 1999.
fuel has yet been used in any Japanese reactor, and it remains in storage at the reactor site.

A shipment of five casks holding 124 canisters of vitrified nuclear waste departed from Cherbourg, France on the Pacific Sandpiper on February 17, 2005, arriving in Rokkasho, Aomori Prefecture, Japan two months later.\(^9\) This shipment (the tenth since 1995) contained the waste that remained after the spent fuel from six Japanese electric power companies had been reprocessed in La Hague, France, into MOX fuel.

A coherent regime to address the risks created by these shipments is required because these transports are likely to continue and to increase in coming years. In June 2008, it was announced that Mitsui Engineering in Japan had delivered to Britain the 450-ton Pacific Heron, a new vessel for the transport of these ultrahazardous radioactive cargoes at a cost of some 90,000,000 British pounds sterling, and that two similar vessels were scheduled for delivery by 2011.\(^10\) President George W. Bush said in his State of the Union Address on January 31, 2006 that nuclear energy should meet half of U.S. energy requirements by 2025;\(^11\) to encourage the development of nuclear energy generally, he considered the idea of leasing nuclear fuel to foreign nations, bringing back their spent fuel to the United States for reprocessing, and shipping the new reprocessed fuel back to them.\(^12\) If such a plan were implemented, it would have lead to nuclear-laden ships criss-crossing the world’s oceans almost continuously.

These shipments of ultrahazardous radioactive cargoes present risks of a magnitude totally different from any previous ocean cargoes. Each of the nuclear waste canisters contains 17,000 TBq in beta-gamma activity.\(^13\) The Pacific Swan, for instance, carried a staggering 96,000,000 curies of radioactivity when it traveled around Cape Horn in January 2001. The MOX fuel on the 1999 and 2001 shipments of the Pacific Teal and Pacific Pintail could be easily converted to provide the materials

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\(^10\) “There’s a Heron on the Horizon,” NorthWest Evening Mail, June 13, 2008.


needed to build dozens of nuclear weapons.\(^{14}\) These long-lived, highly radioactive and radiotoxic nuclear materials could endanger large coastal populations or produce wide-spread, long-term radioactive contamination of the marine environment. They are extremely difficult to handle, and the equipment necessary to salvage them in the event of an accident has not yet been developed.\(^{15}\) British representatives have acknowledged that in the event of a vessel sinking “it is quite apparent that recovery from some places would not be possible.”\(^{16}\)

But a sinking may not be the most dangerous foreseeable event. If a vessel carrying such a cargo collided with another vessel, causing an intensely hot and long-lasting shipboard fire, then radioactive particles could become airborne, putting all nearby lifeforms in grave danger of catastrophic health impacts. In addition, these cargoes might become a tempting target for terrorists, because an attack on a vessel carrying these cargoes near a populated coastal area could release radionuclides causing significant damage, similar to the detonation of a “dirty bomb.”

These cargoes are not, therefore, just another “dangerous good.” They are truly “ultrahazardous,” and require a focused and comprehensive legal regime designed to internalize the real costs of the shipments, and to ensure that the risks they create are not transferred from those that benefit from these shipments to those who gain nothing from them.

II. The Protests

Many affected states in many parts of the world have protested these shipments. In 1992, for instance, South Africa and Portugal explicitly

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\(^{15}\) Although the odds of any given ship sinking are small, vessels sink regularly, and frequently are irretrievable. In December 1997, for instance, the *MSC Carla* sank near the Azores in the Atlantic carrying radioactive cesium destined for medical purposes, but retrieval was not attempted.

requested that Japan's shipment of plutonium stay out of their EEZs;\textsuperscript{17} in response to an inquiry from Australia, Japan stated that "in principle" the ship would stay outside the 200-nautical-mile zone of all nations.\textsuperscript{18} Also in 1992, the Heads of Government of the Caribbean Community (CARICOM) issued a strong statement that "shipment of plutonium and other radioactive or hazardous materials should not traverse the Caribbean Sea."\textsuperscript{19}

In 1995, Brazil, Argentina, Chile, South Africa, Nauru, and Kiribati all expressly banned the British nuclear cargo ship \textit{Pacific Pintail} from their EEZs and Chile sent its ships and aircraft to force the ship out of its EEZ.\textsuperscript{20} A number of Caribbean countries insisted again that the radioactive materials not be transported at all through the Caribbean Sea.\textsuperscript{21} Among the countries that specifically prohibited the \textit{Pacific Pintail} from passing through their territorial seas were Antigua and Barbuda,\textsuperscript{22} Colombia,\textsuperscript{23} the Dominican Republic\textsuperscript{24} and Puerto Rico.\textsuperscript{25} Similarly, in January 1998, the Organization of Eastern Caribbean States issued a


\textsuperscript{18} Statement of Toichi Sakata, Director of the Japanese Science and Technology Agency's Nuclear Fuel Division, to participants in the Asia-Pacific Forum on Sea Shipments of Japanese Plutonium, Tokyo (October 6, 1992).


\textsuperscript{20} See Van Dyke, "Applying the Precautionary Principle," \textit{supra} note 17, at pp. 386-87.

\textsuperscript{21} See, e.g., News Release issued by Owen S. Arthur, Chair of CARICOM and Prime Minister of Barbados, December 23, 1994; statement issued by Brian Alleyne, Minister for External Affairs, Commonwealth of Dominica, January 19, 1995; statements issued by the Conseil General of Martinique and the Conseil Municipal of Fort de France (capital of Martinique), January 24, 1995; press release issued by Jamaica Ministry of Environment and Housing, February 13, 1995; letter from G.F. Croes, Minister-President of Aruba, to H. Van Mierlo, Dutch Minister of Foreign Affairs, January 27, 1995.

\textsuperscript{22} Press release issued by the Ministry of Foreign Affairs, Government of Antigua and Barbuda, December 22, 1994.

\textsuperscript{23} Statement issued by Colombian Ministry of Foreign Affairs, March 2, 1995, stating that the "introduction into the national territory of nuclear waste and toxic wastes" is prohibited under the terms of the national constitution.

\textsuperscript{24} Statement of Dominican Republic Vice President, Jacinto Paynando, head of the government's Environmental Commission, January 20, 1995; statement of Dominican Republic President Joaquin Balaguer, February 10, 1995.

\textsuperscript{25} Statement issued by Puerto Rico's Secretary of Natural and Environmental Resources, December 28, 1994.
statement calling on "the countries involved in the shipment of plutonium wastes through the Caribbean region to stop these shipments forthwith." The government of Antigua and Barbuda released its own statement denouncing these shipments, saying that they threaten "the very survival" of the Caribbean and its ecosystem and noting that the region had no contingency plan to deal with an accident, which could "have catastrophic effects" on the region. The Bahamas similarly issued a statement "categorically and unconditionally" opposing the shipment.

In March 1999, the leaders of the CARICOM agreed upon another strong statement at their meeting in Suriname, noting the "catastrophic consequences of any accident for their peoples and the ecological systems of the Caribbean Sea," and stating that they "totally reject" the continued use of the Caribbean "as a transit for such nuclear materials." Twenty-five nations of the wider-Caribbean similarly issued a declaration "rejecting" these transports from their region at the April 1999 Heads of State Meeting of the Association of Caribbean States (ACS). And on July 16, 1999, when they thought the Pacific Teal/Pacific Pintail MOX shipment would be coming through the Caribbean, the CARICOM Heads of Government issued a statement reiterating "their unwavering opposition and that of the people of the Caribbean to this blatant and persistent misuse of the Caribbean Sea for the transshipment of highly toxic nuclear material." The statement concluded by saying that the "Heads of Government have vowed to take all necessary steps to protect their people and the fragile ecology of the Caribbean Sea from this highly dangerous threat."

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26 Press release issued in St. Lucia, January 15–16, 1998. The Organization of Eastern Caribbean States includes Antigua and Barbuda, Dominica, Grenada, St. Kitts and Nevis, St. Lucia, and Montserrat, with Anguilla and British Virgin Islands as observers.
31 Ibid.
CARICOM explained in its statement to the 2004 Prepcom of the Nuclear Proliferation Treaty that:

in addition to the provision of information regarding the shipment of radioactive materials, CARICOM States continue to call for the establishment of a comprehensive regulatory framework to promote State responsibility with respect to disclosure, prior informed consent, liability and compensation in the event of accidents. While we appreciate the steps undertaken by States to prevent the likelihood of accidents, we cannot overstate the damage that would be done to the ecosystems of our countries, and the potentially catastrophic impact on our vulnerable economies should an accident occur.\textsuperscript{32}

At the 2005 Review Conference of the Nuclear Proliferation Treaty, CARICOM introduced a proposal for the Conference's Committee III, calling for a comprehensive international regime that would provide for the full protection of en-route states and that would ensure that shipping states observe strict international standards of safety and security.\textsuperscript{33} These standards would include:

a. the principle of prior informed consent;
b. provision for consultation between shipping states and affected coastal states before shipments to address routing and contingency response plans;
c. provision for the preparation by shipping states of comprehensive environmental impact assessments before shipments;
d. provision of guarantees by shipping states for the salvage of cargo in the event of accidents; and
e. provision of a liability regime that includes full indemnification for damage resulting from accidental or deliberate events.\textsuperscript{34}

Pacific Island nations have also vigorously protested these shipments.\textsuperscript{35} At the meeting of the South Pacific Forum in October 1999, for instance, the Pacific Island leaders expressed their concern and called specifically for a compensation regime to be established that would provide compensation for any economic losses that the tourism and fishing industries in the islands might suffer as a result of an accident “even if

\textsuperscript{32} Statement by CARICOM, presented by the Bahamas to the Nuclear Proliferation Treaty Prepcom 2004 (New York, April 26, 2004).
\textsuperscript{33} Article IV—Peaceful Uses of Nuclear Energy Transport of Nuclear Materials at Sea (NPT/CONF.2005/MC.III/CRP.1, May 20, 2005).
\textsuperscript{34} Ibid.
\textsuperscript{35} See listing of protests in Van Dyke, “Applying the Precautionary Principle,” supra note 17, at p. 386.
there is no actual environmental damage caused. This communiqué also urged members to work within the International Maritime Organization (IMO) and the International Atomic Energy Agency (IAEA) to develop "a strong regime of prior notification to, and consultation with, coastal states on planned shipments of radioactive materials and MOX fuel (consistent with security requirements), the development of a regime for the preparation of Environmental Impact Statements and Emergency Response Plans." New Zealand has taken a lead in protesting these shipments, arguing that they should not be permitted through New Zealand's EEZ because of the "precautionary principle" enshrined in the Rio Declaration," and that "there should be recognition in international law of the right of potentially affected coastal states to prior notification, and, ideally, prior informed consent for shipments of nuclear material."

At the meeting of the Pacific Islands Forum in August 2004, the independent island states of the Pacific sought to develop a region-specific environmental impact assessment of nuclear shipments and restated their concerns about a possible economic loss after an incident involving a nuclear shipment that did not result in a release of measurable radioactivity but nonetheless caused fears that led to declines in the tourism and fishery industries. These small island states have long been concerned about the possibility of economic losses to their fragile tourism and fishing interests which may follow from a nuclear incident or accident in the region, regardless of actual contamination, thus leaving coastal States without compensation. The Permanent Representative of the Federated States of Micronesia, Masao Nakayama, stated at the United Nations in November 2004 that:

[...]he continued shipment of plutonium and radioactive wastes through our Exclusive Economic Zones remains of great concern. Our Pacific Ocean is a vital breadbasket for the entire planet. Any transshipment accident could have a serious impact on the livelihood of our peoples, 

36 Thirteenth South Pacific Forum, Forum Communiqué, § 31 (Koror, Palau, October 3–5, 1999).
37 Ibid., at § 33.
our economies, and would be felt far beyond our shores, for many generations to come.\textsuperscript{40}

On the occasion of the February 2005 shipment of HLW from France to Japan, the Secretary-General of the Pacific Islands Forum\textsuperscript{41} said that the Forum was concerned about possible economic loss in the event of an incident involving a nuclear shipment, whether or not that incident results in a radioactive release. In response to news of the shipment, New Zealand reportedly asked that the shipment stay out of its EEZ.\textsuperscript{42} A series of meetings have been held between the shipping states (France, Japan and the United Kingdom) and the Pacific Island countries, which have involved primarily the restating of the positions of each side, without consensus. An important concession was made at the 2004 meeting, however, by a British official who said that the United Kingdom would provide "notification (vessel, cargo, route, timing of approach to and possible entry to EEZ) in advance to both the [Pacific Island] Forum Secretariat and coastal states past whose EEZs the vessel was passing."\textsuperscript{43}

South Africa has similarly registered regular protests about these shipments. In August 1999, the Regional Environment Minister for the Western Cape Province, Glen Adams, called for the shipments to end, saying: "Because the shipments are expected to continue for the foreseeable future, the risk incurred at no benefit to us will be a recurring risk. This is a risk that our province does not want to carry."\textsuperscript{44} The Indian Ocean country of Mauritius announced that the ships would

\textsuperscript{40} H.E. Ambassador Masao Nakayama, Permanent Representative of the Federated States of Micronesia to the United Nations, before the 59th United Nations General Assembly on Agenda Item 49: Oceans and the Law of the Sea (New York, November 17, 2004).

\textsuperscript{41} Pacific Islands Forum, "Forum Expresses Concern on Nuclear Shipments," (February 7, 2005).

\textsuperscript{42} 'NZ objects nuclear waste shipment through Tasman Sea,' OneNews, April 2, 1995.

\textsuperscript{43} Fifth Meeting on Liability and Compensation for the Transport of Radioactive Materials (Nadi, Fiji, 21–25 June 2004), Summary of Discussions with Shipping States, § 6. Despite this positive development, the Pacific Island countries remained concerned about the lack of a region specific environmental impact assessment, the failure of the shipping states to coordinate their contingency response preparedness plans with countries in the region, and the deep disagreement between the island and shipping states regarding the adequacy of the liability and compensation regimes and the measurement of damages. \textit{Ibid}.

\textsuperscript{44} Lovell, supra note 14.
not be allowed into their EEZ. Because of opposition in Korea, the 1999 shipment used the Tsuruga Strait instead of the Korean Strait. In August 1998 Argentina and Chile conducted joint naval exercises to prepare for a hypothetical accident in which a ship carrying ultrahazardous radioactive materials collided with an iceberg.

III. The San Onofre Nuclear Reactor

A defining moment in the tension between navigational freedom and the right of coastal states to restrict the movement of ships through their EEZs based on the nature of the ship and its cargo was the U.S. announcement on February 3, 2004 that it was abandoning its plan to ship the 770-ton decommissioned nuclear reactor from the San Onofre nuclear plant in Southern California around Cape Horn at the tip of South America to South Carolina for burial. This plan, which had previously been approved by the U.S. Department of Transportation despite conflicting views within the U.S. government, was to put the reactor on a barge that would make a ninety-day journey around South America. This journey would thus include the transiting of Drake’s Passage at the continent’s tip, which is one of the world’s most dangerous nautical passages, where gale force winds blow two hundred days each year. Although logic would have favored burial in California or in Hanford, Washington, or transporting the reactor across the United States by train, these options had all been rejected because of U.S. laws governing the disposal of nuclear wastes and because of liability concerns.

A. Chile’s Nuclear Safety Law

The first hurdle faced by the proposed shipment concerned Chile’s “Law for Nuclear Safety” which had been modified in October 2002 to

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require prior authorization for any transport of "nuclear substances" and "radioactive materials" through Chile's EEZs. The law explained that such authorization would be granted only if the transporter establishes that the shipment will "keep...the environment free of contamination" and only after information has been provided regarding the date and route of the shipment, the "characteristics of the load," and the "safety and contingency measures" that are being utilized.

The U.S. State Department had originally instructed Southern California Edison that it "should not apply for Chilean authorization for the passage because it was concerned that our doing so would set an unfavorable precedent for future shipments." Subsequently, however, the U.S. Department of Transportation indicated that it thought consultations with Chile would be logical because of the potential risks and the advantages of having emergency contingency plans in place. The Department of Transportation also urged Southern California Edison to develop more realistic plans for salvage in the case of a sinking.

These concerns must have resonated in the State Department because two weeks later the State Department said that "a number of significant issues" needed to be resolved before the reactor could be shipped, and stated specifically that Southern California Edison should consider another route around South America, explain in detail its salvage contingency plans and show that it has adequate liability insurance. Finally, however, the Department of Transportation did issue a permit

49 Chile's Law for Nuclear Safety, Law Number 18.302, art. 4, originally promulgated April 16, 1984, and amended pursuant to Law 19825 on October 1, 2002.
50 Ibid., art. 4(II).
52 Ibid., "Although we recognize that advance notification of coastal states is not required, we consider it to be an importatnt element in preparation for contingencies," Robert A. McGuire, the U.S. Department of Transportation associate administrator for hazardous materials, wrote in an October 17, 2003 letter. "It may be necessary to seek shelter in waters of a coastal state." McGuire's letter also noted that Southern California Edison had made no arrangements for emergency equipment, such as cranes, backup tugs or salvage vessels.
53 Ibid., (quoting McGuire's October 17, 2003 letter as saying: "Given that your transport is entirely over open ocean, your proposal to salvage only in water up to 300 feet appears insufficient.").
for the shipment on December 1, 2003. Southern California Edison said that "the ocean journey will be made in international shipping lanes hundreds of miles off the coast of Central and South America."55 It was never clear whether the vessel was going to try to avoid passing through Chile’s EEZ altogether by staying more than two hundred nautical miles from the Chilean coast.

B. Argentina’s Court Decision

A second hurdle was presented by a January 2004 court decision in Argentina, which prohibited the passage of the reactor through Argentina’s EEZ.56 This decision issued by Argentine federal judge Jorge Pfleger cited the Basel Convention on the Control of Trans-Boundary Movements of Hazardous Wastes and Their Disposal57 as authorizing coastal countries to block such shipments.58 After this decision, Argentine officials warned that if the shipment passed through Argentina’s EEZ "the load will be intercepted by the military and escorted out of the nation’s territorial waters."59 This position was consistent with the declaration filed by Argentina when it ratified the Law of the Sea Convention that the transit by sea of vessels carrying highly radioactive substances would be duly regulated.60 This important Argentine court decision set the stage for a significant international incident if

58 For a discussion of the applicability of the Basel Convention to radioactive wastes, see Van Dyke, "Applying the Precautionary Principle," supra note 17, at pp. 383–85.
59 Weikel, supra note 56.

The Argentine Republic fully respects the right of free navigation as embodied in the Convention; however, it considers that the transit by sea of vessels carrying highly radioactive substances must be duly regulated.

The Argentine Government accepts the provisions on prevention of pollution of the marine environment contained in Part XII of the Convention, but considers that, in the light of events subsequent to the adoption of that international instrument, the measures to prevent, control and minimize the effects of the pollution of the sea by noxious and potentially dangerous substances and highly active radioactive substances must be supplemented and reinforced.
the shipment had taken place and had transited within two hundred nautical miles of Argentina's coast. The decision by the United States to abandon the effort to ship the reactor by sea, and thus to leave it in place in Southern California, avoided confrontations and also reinforced the view that countries can act to protect their coastal populations and coastal resources by preventing passage of particularly dangerous cargoes and unseaworthy ships through their coastal waters. 61

IV. United Nations Developments

The Declaration promulgated at the January 2005 United Nations meeting of Small Island Developing States (SIDS) contained the following important language:

Note that cessation of transport of radioactive materials through small island developing States regions is an ultimate desired goal of small island developing States and some other countries, and recognizes the right of freedom of navigation in accordance with international law. States should maintain dialogue and consultation, in particular under the aegis of the IAEA and IMO, with the aim of improving mutual understanding, confidence building and enhanced communications in relation to safe maritime transport of radioactive materials. States involved in the transport of such materials are urged to continue to engage in dialogue with Small Island Developing States and other states to address their concerns. These concerns include the further development and strengthening, within the appropriate fora, of international regulatory regimes to enhance safety, disclosure, liability, security and compensation in relation to such transport.62

61 U.S. courts have also recognized the unsettled nature of the legal regime governing shipments of ultrahazardous cargoes. When a citizen group challenged the March 1999 voyage of the Pacific Swan, carrying forty canisters of high-level nuclear wastes through the Mona Passage (between Puerto Rico and the Dominican Republic), the U.S. District Court wrote a strong opinion emphasizing the freedom of navigation, but the U.S. Court of Appeals for the First Circuit (while affirming the dismissal of the specific challenge by the citizen group) took care to say that "we disavow" the broad statements made by the District Court that the doctrine of innocent passage "meant that the United States could not exercise power over transport of nuclear waste even through its territorial waters." Manguezas por la Salud y el Ambiente v. United States. 198 F.3d 297, 305 n. 15 (1st Cir. 1999).

Identical language was also included in the Outcome Document agreed upon at the U.N. Millennium Summit in New York in September 2005 and in the resolution adopted by the U.N. General Assembly on "Oceans and the Law of the Sea" in November 2005.

V. EEZ Group 21

Under the auspices of Japan’s Ocean Policy Research Foundation (with funding from the Nippon Foundation), a group of fifteen experienced ocean law scholars and officials after a series of meetings prepared "Guidelines for Navigation and Overflight in the Exclusive Economic Zone" in September 2005 discussing these issues. Among the Guidelines adopted by this group were the following:

II. RIGHTS AND DUTIES OF THE COASTAL STATE
   a. A coastal State may, in accordance with international law, regulate navigation in its EEZ by ships carrying inherently dangerous or noxious substances in their cargo.

f. Military activities of a State in the EEZ of another State should not cause pollution or negatively affect the marine environment or marine living resources, including mammals. In particular, if prohibited by the laws of the coastal State, such activities in a coastal State's EEZ should not involve live weapons fire, underwater explosions or creation of sound waves and dangerous or radioactive materials that may directly or indirectly harm marine life or cause marine pollution.

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65 EEZ Group 21, "Guidelines for Navigation and Overflight in the Exclusive Economic Zone," (Ocean Policy Research Foundation, Tokyo, September 16, 2005). The members of EEZ Group 21 were Masahiro Akiyama, Chair, Ocean Policy Research Foundation, Japan; Rear Admiral (Ret.) Kazunime Akimoto, Senior Researcher, Ocean Policy Research Foundation; Sam Bateman, University of Wollongong, Australia; Hasjim Djalal, Indonesian Maritime Council; Alberto A. Encioienda, Secretary-General, Maritime and Ocean Affairs Center, Department of Foreign Affairs, Philippines; Moritaka Hayashi, Waseda University, Japan; Ji Guoxing, Shanghai Jiao Tong University, China; Commander Kim Duk-ki, National Security Council, Republic of Korea; Pham Hao, Deputy Director General, Department of International Law and Treaties, Ministry of Foreign Affairs, Vietnam; Shigeki Sakamoto, Kobe University,
VI. The Inadequate Liability Regime

Article 235(3) of the Law of the Sea Convention requires states to:

co-operate in the implementation of international law relating to responsibility and liability for the assessment of and compensation for damage and the settlement of related disputes, as well as, where appropriate, development of criteria and procedures for payment of adequate compensation, such as compulsory insurance or compensation funds.

But the maritime and nuclear states have resisted developing a complete liability regime to govern nuclear shipments, and the existing treaties are inadequate and are not widely ratified. The Vienna and Paris Conventions, even as recently amended, remain hedged with exceptions; hence, incidents related to terrorist attacks and damages related to the marine environment and losses to the tourist and fishery industries are not likely to be covered by these treaties. The treaties do not identify any neutral tribunal for adjudication of claims, thus Pacific Island countries seeking to pursue a claim would have to file their claim in British court. Such an action would require hiring expensive British lawyers, paying high costs if they should lose, and subjecting their claims to the restrictive British law, which seems designed to protect the nuclear industry. Liability is limited by short statutes of limitations and by limits on the amount of damages that can be recovered. An example of an enlightened liability regime is the 1999 Austrian

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Japan: Rear Admiral (Ret.) O.P. Sharma, College of Naval Warfare, Mumbai, India; Alexander S. Skaridov, Russian State Humanitarian University, St. Petersburg, Russia; Mark J. Valencia, Maritime Policy Analyst, Kaneohe, Hawaii, USA; Jon M. Van Dyke, University of Hawaii, USA; and Judge Alexander Yankov, International Tribunal for the Law of the Sea, Hamburg, Germany.


67 See, e.g., Merlin v. British Nuclear Fuels, PLC, [1990] 2 QB 557, [1990] 3 All ER 711, [1990] 3 WLR 383 (rejecting a claim for loss resulting from contamination of a house from alpha-emitting radionuclides, even though the house had lost almost half its value because of the contamination, because the radionuclides caused no "physical" damage to the fabric of the property, and noting that "it is in the nature of nuclear installations that there will be some additional radionuclides present in the houses of the local population." The High Court also stated, in justifying its rejection of the claim, that "the presence of alpha emitting radionuclides in the human airways or digestive tracts or even in the bloodstream merely increases the risk of cancer to which everyone is exposed from both natural and artificial radioactive sources. They do not per se amount to injury.").
"Act on Civil Liability for Damages Caused by Radioactivity," which has generous definitions of damages, requires no sudden incident and has no limit on liability.

VII. Coastal State Regulation of Navigation in the Exclusive Economic Zone

The Law of the Sea Convention gives coastal states some authority to protect their coastal environment from vessel-based pollution, but state practice appears to have expanded this right since the disastrous breakup of the oil tanker Prestige off the coast of Spain in November 2002. Spain refused to permit the crippled tanker to come into a Spanish port for "safe haven," and then when the vessel was towed out into the open ocean it broke apart and the spillage of its cargo increased dramatically. After huge amounts of oil washed up along the beautiful and resource-rich coasts of Spain, Portugal, and France, the governments of France and Spain issued a decree that stated:

A. All oil tankers traveling through these two countries' EEZs will have to provide advance notice to the coastal countries about their cargo, destination, flag, and operators.

B. All single-hulled tankers more than fifteen years old traveling through the EEZs of Spain and France will be subject to spot inspections by coastal maritime authorities while in the adjacent EEZs and will be expelled from the EEZs if they are determined, after inspection, to be not seaworthy.

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90 Some of the material in this section is adapted and updated from Jon M. Van Dyke, "The Disappearing Right to Navigational Freedom in the Exclusive Economic Zone," 29 Marine Pol'y 107–21 (2005).

91 See, e.g., Law of the Sea Convention, supra note 1, at art. 220 (3)–(6).


Shortly after the Spanish-French decree, Portugal announced that it would take the same position on this issue. And then Morocco announced that single-hull oil tankers more than 15 years old carrying heavy fuel, tar, asphaltic bitumen or heavy crude oil would be subject to requirement that they provide prior notification and adhere to strict safety regulations.

Also in the spring of 2003, the European Union banned large single-hulled tankers carrying heavy grade oil from coming into any European ports, and on April 3, 2003, the French National Assembly unanimously adopted a new law asserting the right to intercept ships out to a distance ninety miles from its Mediterranean coast that release polluting ballast waters and also imposing stricter controls on transient oil tankers. Captains of vessels violating these new French rules can be sentenced to up to four years in prison and fined up to $600,000. About this same time, Spain, France, and Portugal were joined by Belgium and the United Kingdom in submitting a petition to the International Maritime Organization (IMO) to declare virtually their entire EEZs to be a "particularly sensitive sea area" (PSSA) that would be completely off-limits for single-hulled oil tankers and other cargo vessels transporting dangerous cargoes. Acting upon the recommendation of its Marine Environmental Protection Committee (MEPC), the IMO Council granted this request in October 2004 and then established the West European Tanker Reporting System (WETREP), which had the effect of superceding the initiative of the European states that single-hulled tankers be prohibited altogether. This sequence of events initiated by five maritime countries to protect their own coastal resources can be viewed as a dramatic example of "state practice" restricting navigational freedom in order to protect the resources of the EEZ.

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73 Interview with Kristina Gjerde, Paris (November 12, 2003).
76 Ibid.
77 Ibid.
78 Interview with Kristina Gjerde, Paris (November 12, 2003).
80 Resolution MSC.190 (79) (IMO Doc. MN/Circ.242, 6 December 2004), http://www.imo.org. WETREP requires oil tankers of more than 600 tons deadweight to provide regular reports on their routing and cargo to adjacent coastal states.
Other examples of restrictions on navigational freedom in order to protect environmental resources include the U.S. proposal, which was approved by the IMO in December 1998, to establish a mandatory ship reporting system off the northeast and southeast coasts of the United States in order to protect the northern right whale from being hit by ships.\footnote{I. T. Rachel Cantry (U.S. Coast Guard), "The Coast Guard and Environmental Protection," 52:4 Naval War College Rev. 77 (Autumn 1999).} This whale species was hunted almost to extinction because of its oil, and it is now thought to be the rarest whale species in the world.\footnote{Ibid., at p. 78.} This new mandatory ship reporting area joins nine others that have been established by IMO to protect fragile environmental areas. The U.S. Department of Defense vigorously opposed the designation of the U.S. eastern coastal areas of the United States as mandatory ship reporting areas, because it "was concerned that although public ships—notably warships—were exempt under the NOAA proposal, to require civilian vessels to report would make it possible to determine (by elimination) which ships were military" and thereby "would erode navigational freedoms globally and endanger American lives."\footnote{Cantry, supra note 81, at p. 82 (quoting from a memorandum written by Rear Admiral John Hutson, February 18, 1998, which was quoted in John H. Boit, "U.S. Defense Department Says Whale Plan Threatens Security," Patriot Ledger (Quincy, Mass.), March 7, 1998).} The U.S. Coast Guard, however, supported this initiative, because of its mandate to enforce U.S. environmental laws, even though it recognized that this move might require the U.S. to support similar initiatives by other countries and might lead to the perception that "international law increasingly recognizes environmental protection as a justifiable reason to curtail freedom of navigation."\footnote{Cantry, supra note 81, at p. 85.}

VIII. Conclusion

Ratifying countries have lodged competing declarations to the Law of the Sea Convention under Article 310 on the issue of ultrahazardous nuclear transports. One group of mainly nonnuclear states considers that Articles 22 and 23 of the Convention presume the existence of international conventions regulating such transport and that, until such treaties are developed, coastal states can require prior notifica-
tion or even prior authorization for such shipments.\textsuperscript{85} Another group of mainly nuclear states emphasizes the right of free navigation and disputes the obligations of prior consent or even notification.\textsuperscript{86} Some of these declarations confuse the issues of prior notification and prior informed consent. These issues are distinguishable, and a particularly strong argument can be presented for prior notification and consultation where potential consequences for a coastal state’s environment are serious.\textsuperscript{87}

Although the Law of the Sea Convention confirms navigational freedoms, it also identifies a series of obligations imposed upon shipping states. These responsibilities include the duty to inform affected states of dangers\textsuperscript{88} and the duty to consult and cooperate regarding competing uses of maritime areas.\textsuperscript{89} The Convention gives specific meaning

\textsuperscript{85} For instance, Malaysia cited the inherent danger entailed in the passage of nuclear-powered vessels or vessels carrying nuclear material or other material of a similar nature and stated that the Malaysian Government:

with all of the above in mind, requires the aforesaid vessels to obtain prior authorization of passage before entering the territorial sea of Malaysia until such time as the international agreements referred to in article 23 are concluded and Malaysia becomes a party thereto. Under all circumstances, the flag State of such vessels shall assume all responsibility for any loss or damage resulting from the passage of such vessels within the territorial sea of Malaysia.


\textsuperscript{86} The United Kingdom stated that it considers that declarations and statements not in conformity with Articles 309 and 310 include “those which purport to require any form of notification or permission before warships or other ships exercise the right of innocent passage or freedom of navigation or which otherwise purport to limit navigational rights in ways not permitted by the Convention,” http://www.un.org (last visited July 27, 2008).

\textsuperscript{87} For a discussion of the national and regional requirements of notification prior to the shipment of hazardous materials through coastal areas, see Jon M. Van Dyke, “The Legal Regime Governing Sea Transport of Ultrahazardous Radioactive Materials,” 33 Ocean Dev. & Int’l L. 77 (2002), at pp. 85–86. Of particular note is the 1996 Protocol on the Prevention of Pollution of the Mediterranean Sea by Transboundary Movements of Hazardous Wastes and Their Disposal, Izmir, Turkey, October 1, 1996, art.6(4), www.unece.ch/seas/main/med/medhaz/html (requiring prior written consent by the transit state before hazardous wastes can be moved through its territorial sea) (this Protocol is not yet in force).

\textsuperscript{88} See, e.g., Corfu Channel Case (United Kingdom v. Albania), 1949 I.C.J. 4 (ruling that Albania had a duty to disclose the presence of mines in the Corfu Channel even if it was not responsible for placing the mines there); Case Concerning Military and Paramilitary Activities In and Against Nicaragua (Nicaragua v. United States), 1986 I.C.J. 4 (ruling that the United States violated international law by not notifying commercial shipping after it laid mines in Nicaragua’s harbors).

\textsuperscript{89} See, e.g., Lac Lanoux Arbitration, 24 I.L.R. 101, 128 (1957) (requiring France to consult in good faith with Spain over riparian rights); MOX Plant Case (United Kingdom v. Ireland), ITLOS, Order of December 3, 2001, § 82 (where the International Tribunal
to these responsibilities by requiring states to prepare and disseminate environmental assessments whenever they "have reasonable grounds for believing that planned activities under their jurisdiction or control may cause substantial pollution of or significant and harmful changes to the marine environment," to "develop and promote contingency plans for responding to pollution incidents in the marine environment," and to "co-operate in the...further development of international law relating to responsibility and liability for the assessment of and compensation for damage and the settlement of related disputes, as well as, where appropriate, development of criteria and procedures for payments of adequate compensation, such as compulsory insurance or compensation funds."

A sound liability and compensation regime is crucial, of course, for any commercial activity; and with regard to the shipments of ultrahazardous radioactive cargoes, the regime must include a strict liability standard, without limits on liability, a long statute of limitations, and a broad definition of damages that includes losses that result from perceived fears from an incident resulting in economic losses even if no measurable releases of radioactivity have been recorded. In addition, it must identify a neutral tribunal to adjudicate the claims, and must allow all relevant parties—including the shipper, the owner of the cargo, and relevant governments—to be joined as defendants. Finally,

for the Law of the Sea (ITLOS) confirmed that "the duty to cooperate is a fundamental principle in the prevention of pollution of the marine environment under Part XII of the Convention and general international law" and explained that this duty required the two countries to exchange information concerning the risks created by the plant, to monitor the effects of the plant on the marine environment, and to work together to reduce those risks; Case Concerning Land Reclamation by Singapore In and Around the Straits of Johor (Malaysia v. Singapore), ITLOS, Order of 8 October 2003 (explaining in paragraph 99 that "prudence and caution require that Malaysia and Singapore establish mechanisms for exchanging information and assessing the risks or effects of land reclamation works and devising ways to deal with them in the areas concerned" and issuing provisional measures requiring the countries to "exchange, on a regular basis, information on, and assess risks or effects of, Singapore's land reclamation works" and to establish an independent group of experts to study the project and propose measures "to deal with any adverse effects of such land reclamation" and oversee and facilitate such cooperation).

90 Law of the Sea Convention, supra note 1, at art. 206.
91 Ibid., at art. 199. To address the possible consequences of an incident involving a shipment of ultrahazardous radioactive cargoes, such contingency measures must include plans regarding ports that can be utilized to assist a stricken ship, tugboats that can be positioned for such a possibility, salvage strategies, and evacuation procedures for endangered coastal populations.
92 Ibid., at art. 235(3).
an adequate compensation fund must be established, comparable to the fund established for oil shipments.\textsuperscript{93}

The nations shipping ultrahazardous radioactive materials have not complied with these requirements. If they continue these shipments without undertaking these responsibilities, their actions will be in violation of the Law of the Sea Convention and general international law.

\textsuperscript{93} See supra text at notes 66–69. Many of these goals were affirmed by a resolution passed in September 2004 by the IAEA General Conference, which recalled that states have the obligation under international law to protect and preserve the maritime environment and (while reaffirming maritime and air navigation rights and freedoms) stressed the importance of international cooperation to enhance the safety of international navigation. Resolution GC(48)/RES/10, Measures to Strengthen International Cooperation in Nuclear, Radiation and Transport Safety and Waste Management, September 24, 2004, http://www.iaea.org/About/Policy/GC/GC48/Resolutions/res10 .pdf. The resolution again welcomed the practice “of some shipping States and operators of providing in a timely manner information and responses to relevant coastal States in advance of shipments for the purpose of addressing concerns regarding safety and security, including emergency preparedness,” and invited others to do so. This resolution recognized concerns about the potential for damages resulting from an accident or incident during the maritime transport of radioactive materials, including pollution of the marine environment, recognized the importance of having in place effective liability mechanisms, and stated that the principle of strict liability should apply in the event of nuclear damage arising from an accident or incident during the transport of radioactive materials. See also International Action Plan B. The resolution also stressed the need to take adequate measures to deter or defeat terrorist and other hostile or criminal actions directed against carriers of radioactive materials.