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TRANSNATIONAL SHIPMENTS OF NUCLEAR MATERIALS BY SEA: DO CURRENT SAFEGUARDS PROVIDE COASTAL STATES A RIGHT TO DENY INNOCENT PASSAGE?

DAVID B. DIXON*

I. INTRODUCTION

The maritime transport of nuclear materials has created a conflict between two international law regimes: the United Nations International Law of the Sea[1] (UNCLOS), and the developing customary law of the "precautionary principle" in international environmental law. This conflict became apparent in recent years when several coastal states denied passage to ships transporting

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1. United Nations Convention on the Law of the Sea, Dec. 10, 1982, 1833 U.N.T.S 397 (entered into force Nov. 16, 1994), *available at* http://www.un.org/depts/los/convention_agreements/texts/unclos/closindx.htm [hereinafter UNCLOS].

nuclear materials arguing the shipments posed an environmental threat. This conflict has raised an issue which is currently unresolved: Do coastal states have a right to prohibit innocent passage to ships carrying nuclear materials if these ships fail to fulfill the requirements of the precautionary principle?

This paper will begin by examining the legitimate concerns of both shipping and coastal states by describing several of the recent controversies in the transnational shipment of nuclear materials leading to the current international legal dispute. Part Three will discuss the international legal basis for the precautionary principle and its several manifestations in both hard and soft law documents. The safeguards regime for ocean shipments of nuclear materials will be explored in Part Four. Part Five will explore the provisions of UNCLOS relating to innocent passage and environmental protection to decipher whether coastal States have a right to deny innocent passage to shipments of nuclear materials, and if so when. Lastly, Part Six will discuss several recommendations of how best to resolve this real and doctrinal conflict between states shipping nuclear materials and coastal states denying passage. The paper concludes by finding the current nuclear safeguard regime does not require shipping states to provide notice to or authorization from transit states, therefore coastal states have no legal basis to deny innocent passage. This safeguard regime, however, is evolving and may adopt a precautionary approach in the future.

II. RECENT CONTROVERSIES IN MARITIME SHIPPING OF NUCLEAR MATERIAL

The transnational shipment of nuclear materials by sea has encountered much resistance from coastal states and environmental organizations over the past decade. The controversy began in 1992 when Japan, France and England began conducting secret shipments of large quantities of nuclear material.[2] Once news of these shipments was leaked to the public, many coastal states along possible shipping routes protested the possibility of nuclear materials passing through their coastal waters without their knowledge or approval. Some states refused these shipments the right of innocent passage through their territorial waters, seemingly in violation of the UNCLOS.[3] A few states even prohibited

2. *See* Jon M. Van Dyke, *Sea Shipment of Japanese Plutonium under International Law*, 24 OCEAN DEV. & INT'L L. 399, 399-400 (1993).

3. *See infra* Part 5.

the passage of these ships through their Exclusive Economic Zones (EEZs), an area extending 200 miles off of their shores.[4] These coastal states have claimed a right to deny innocent passage because the existing safeguards regime for ocean shipments of nuclear material do not comply with the requirements of the "precautionary principle," a relatively recent doctrine of international environmental law.[5]

These controversies are not merely the result of the conflicting international law doctrines of innocent passage and the precautionary principle, but are in essence conflicting views of national security of shipping and coastal states. The shipping states have a security interest in maintaining secrecy for shipments of nuclear materials and have codified these concerns in international agreements.[6] If the itineraries of these shipments were to be publicized, they fear the ships would be more susceptible to terrorist or pirate attack; potentially allowing nuclear materials to get onto the black market and/or be used in making a "dirty bomb," or that they could be victim to a U.S.S. Cole-type terrorist attack.[7] On the other hand, coastal states have security interests based on environmental concerns that have also been recognized in international agreements.[8] An attack, wreck, or sinking of a ship carrying nuclear material in a coastal state's waters could have catastrophic effects on their coastal environment and industries; potentially

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4. *See* UNCLOS, *supra* note 1, art. 57.

5. *See infra* Part 3.

6. *See* Convention on the Physical Protection of Nuclear Material, art.6, Oct. 26, 1979, 18 I.L.M. 1419 (entered into force Feb. 8, 1987), *available at* http://f40.iaea.org/worldatom/Documents/Infcircs/Others/inf274r1.shtml [hereinafter Physical Protection Convention]; *see also* THE PHYSICAL PROTECTION OF NUCLEAR MATERIALS AND NUCLEAR FACILITIES, INFORMATION CIRCULAR, INTERNATIONAL ATOMIC ENERGY AGENCY, §§ 8.1.2(f)-8.1.3, IAEA Doc. INFCIRC/225/Rev.4 (Corrected) (1998), *available at* http://www.iaea.org/Publications/Documents/Infcircs/1999/infcirc225r4c/rev4_content.html [hereinafter IAEA Information Circular 225].

7. *See* Physical Protection Convention, *supra* note 6, art. 6(2); IAEA Information Circular 225, *supra* note 6, §§ 8.1.1, 8.1.2.

8. *See* Bamako Convention on the Ban of The Import Into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes Within Africa, Jan. 29, 1991, 30 I.L.M. 773 (1991), *available at* http://www.ecolex.org/ecolex/en/treaties/treaties_fulltext.php?docnr=3025&language=en [hereinafter Bamako Convention]; Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, arts. 4(2)(f)&(h), Mar. 22, 1989, UNEP Doc. I G.80/3 (1989), 28 I.L.M. 657 (1989) [hereinafter Basel Convention]; Convention to Ban the Importation into Forum Island Countries of Hazardous and Radioactive Wastes and to Control the Transboundary Movement and Management of Hazardous Wastes Within the South Pacific Region, Waigani, Sept. 16, 1995, 2001 Austl. T.S. No. 17, *available at* http://www.ban.org/library/waigani_treaty.html [hereinafter Waigani Convention]; CODE OF PRACTICE ON THE INTERNATIONAL TRANSBOUNDARY MOVEMENT OF RADIOACTIVE WASTE, INFORMATION CIRCULAR, INTERNATIONAL ATOMIC ENERGY AGENCY, sec. 3, IAEA Doc. INFCIRC/386 (1990), *available at* http://www.globelaw.com/Nukes/iaeacod.htm.

devastating their economy, largely based on coastal resources, and crippling the health and welfare of its people.[9]

In order to demonstrate the context of this controversy, this section will provide a summary of some of the most notorious events in the transnational shipments of nuclear material by sea. In particular it will highlight nuclear shipments where coastal states have prohibited innocent passage because of environmental concerns. It will also shed light on incidents where problems in shipping of nuclear materials have given coastal states legitimate reason to have safety concerns.

A. Prohibition of Innocent Passage

In 1992, the voyage of the *Akatsuki Maru* from France to Japan, carrying 1.7 tons of plutonium, was the first large shipment of nuclear materials to meet substantial resistance from coastal states.[10] Despite the fact the route of the voyage was kept secret, many countries on the potential route publicly prohibited the ship from taking a route through their waters, including Argentina, Chile, Portugal, South Africa, and Malaysia.[11] Furthermore, soon before the voyage the Caribbean island nations adopted the Declaration on Shipments of Plutonium, banning passage of all shipments of nuclear materials through the Caribbean Sea and making the region a "nuclear-free zone."[12]

Despite the fact that Japan publicly stated the actions of these countries were contrary to international law, the *Akatsuki Maru* nevertheless stayed outside the EEZs of all protesting states except for a few Pacific island nations.[13] The environmental organization Greenpeace also organized large demonstrations at both the French and Japanese ports sparking violent clashes between authorities and protesters. A Greenpeace ship also followed the *Akatsuki Maru* for much of its voyage, and was at one point rammed

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9. *See* Jon M. Van Dyke, *The Legal Regime Governing Sea Transport of Ultrahazardous Radioactive Materials*, 33 OCEAN DEV. & INT'L L. 77, 80 (2002) [hereinafter Van Dyke, *Regime*].

10. *Plutonium Shipment Leaves France for Japan*, N.Y. TIMES, Nov. 8, 1992, at 6.

11. *Id. See also* Ruth Youngblood, *Japan Secrecy over Plutonium Shipment Sparks Outcry*, UNITED PRESS INT'L, Sept. 28, 1992; *Lisbon Asks Tokyo to Keep Akatsuki Maru Away*, KYODO NEWS AGENCY, Nov. 10, 1992.

12. *See* Barbara Kwiatkowska & Alfred Soons, *Plutonium Shipments—A Supplement*, 25 OCEAN DEV. & INT'L L. 419, 424-25 (1994) (citing Press Release, Caribbean Community (CARICOM), Press Release No. 89/1992).

13. *See* Plutonium Ship to Pass West of Hawaii, HONOLULU STAR-BULLETIN, Dec. 7, 1992, at 1, col. 1 [hereinafter *Plutonium Ship*]; Colin Nickerson, *Japan's Plutonium Ship Ends Voyage*, BOSTON GLOBE, Jan. 5, 1993, at 1 [hereinafter Nickerson, *Japan's Plutonium*].

by a Japanese patrol boat.[14] After this voyage, the Japanese announced that they planned to ship at least another thirty tons of plutonium in the coming years.[15]

In 1995, the British vessel *Pacific Pintail* met even more dramatic protest before its voyage from France to Japan carrying twenty-eight logs of high-level vitrified nuclear waste in glass blocks.[16] Along with the Caribbean states that had already established a nuclear free-policy, Antigua, Barbuda, Colombia, the Dominican Republic, Puerto Rico and Uruguay refused to allow the shipment through their territorial waters.[17] Furthermore, Brazil, Argentina, Chile, South Africa, Nauru and Kiribati expressly prohibited the ship's passage through their EEZs.[18] Due to the protest of the Latin American and Caribbean states, the *Pacific Pintail* abandoned its preferred route through the Panama Canal and charted a course around Cape Horn to avoid the waters of protesting states.[19]

When passing Cape Horn, however, thirty-foot seas and sixty mile-per-hour winds forced the captain to find calmer waters within Chile's EEZ.[20] The Chilean Navy and Air Force had been tracking the progress of the *Pacific Pintail*, and once it had entered Chile's EEZ, the Chilean authorities demanded that the ship leave their waters immediately.[21] A Chilean Navy frigate and aircraft intercepted the ship and threatened it with military action if it did not change course.[22] Once it became apparent that armed force

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14. *Plutonium Ship*, *supra* note 13, at 1, col. 1; Nickerson, *Japan's Plutonium*, *supra* note 13, at 1. *See* Andrew Bell, *Greenpeace Vessel Hit by Japanese*, THE GUARDIAN (London), Nov. 9, 1992, at 7.

15. Nickerson, *Japan's Plutonium*, *supra* note 13, at 1.

16. Denholm Barnetson, *Nuclear Waste Shipment Leaves France*, UNITED PRESS INT'L [Paris], Feb. 23, 1995.

17. *Id.*

18. Jon M. Van Dyke, *Applying the Precautionary Principle to Ocean Shipments of Radioactive Materials*, 27 OCEAN DEV. & INT'L L. 379, 380-83 (1996) [hereinafter Van Dyke, *Applying*].

19. *Atomic Ship Breaks Ban, Enters Brazil Waters—Greenpeace*, REUTERS NEWS SERVICE, Mar. 7, 1995; *Plutonium Ship Will Not Go Through Panama Canal*, DEUTSCHE PRESSE-AGENTUR, Mar. 7, 1995.

20. *Nuclear Ship Braves Stormy Seas, Defies Chile Ban*, REUTERS NEWS SERVICE, Mar. 20, 1995.

21. Helen R. MacLeod, *UK Could Be Liable If Chile Takes Warlike Action Vs. Ship*, THE JOURNAL OF COMMERCE, Mar. 21, 1995, at 7A.

22. A. Suva, *Nuclear Ship Chase - Chilean Navy Forces Pintail Out of Waters*, THE HOBART MERCURY, Mar. 22, 1995 [hereinafter A. Suva, *Nuclear Ship Chase*]. The article cites a transcript of the radio exchange between the Chilean frigate and the captain of the *Pacific Pintail*:

> Chilean Frigate: *Pacific Pintail*, you could be 'exposed to the use of weapons against you from navy vessels or air [planes] of the Chilean Navy.'
>
> *Pacific Pintail*: 'I hear your message and with the nature of our cargo I would not think that is a very sensible thing to do, to use arms . . . .'

Id.

was not prudent against a vessel carrying nuclear waste, the frigate then threatened to interfere with the ship's navigation by throwing ropes into the water to wrap around its propeller.[23] The captain of the *Pacific Pintail* conceded to the demand and returned to the high seas despite the grave risk posed by the rough waters.[24] When addressing the legal principles for its actions against the *Pacific Pintail*, the Chilean Maritime Authority cited the precautionary principle and declared that the duty to protect the marine environment took precedence over the right of innocent passage.[25]

B. Legitimate Safety Concerns of Coastal States

Despite the fact that the practice of transnational shipment of nuclear materials by sea has never resulted in an accident or incident with radiological consequences causing serious harm to the environment,[26] there is evidence that coastal states have legitimate safety concerns from these shipments. Three incidents in particular have put into question the safety of these shipments, including: 1) the lack of response of shipping states to the sinking of a vessel containing nuclear material; 2) the unauthorized boarding of a ship containing nuclear material; and 3) the falsification of safety records of a nuclear material shipment.

1. *Responses to Sinking*

In 1997, the *MSC Carla*, a twenty-five-year-old Panamanian-flagged cargo vessel on a voyage from France to the United States, broke in two in thirty-foot seas, seventy nautical miles off the coast of the Azores.[27] The forepart of the ship sank to a depth of 3000 meters, carrying eleven tons of cesium, having a total radioactivity of 330 terabecquerels.[28] As a comparison, the Chernobyl explosion

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23. A. Suva, *Nuclear Ship Chase*, *supra* note 22. *See N-Waste Ship Forced Out of Chile's Waters*, THE ADVERTISER, Mar. 22, 1995.

24. Suva, *supra* note 22.

25. Van Dyke, *Applying*, *supra* note 18, at 387 (citing Chilean Maritime Authority Res. 12600/76, General Directory for the Maritime Territory and Merchant Marine (Mar. 16, 1995)).

26. *See* Raul A. F. Pedrozo, *Transport of Nuclear Cargoes by Sea*, 28 J. MAR. L. & COM. 207, 236 (1997).

27. *Radioactive Materials on Broken Ship in Atlantic*, REUTERS NEWS SERVICE, Nov. 28, 1997.

28. G. Sert, *The Recovery Radioactive Sources after a Shipwreck: The Case of the Mont-Louis Cargo and the Implications of the M.S.C. Carla*, 3-5 (presented at the 42nd Regular Session of the IAEA General Conference in Sept. 1998), *available at* http://f40.iaea.org/worldatom/About/GC/GC42/sciprog/gc42-scifor-8.pdf [hereinafter Sert]. *See* IAEA, *Inventory of accidents and losses at sea involving radioactive material* at 20-21, IAEA Doc. TECDOC-

released 4800 terabecquerels of caesium into the atmosphere.[29] Neither the French nor the U.S. attempted to salvage these materials because of their depth, and because it was determined the potential for damage from a radiation leak was "negligible."[30] The United Kingdom's Ministry of the Environment stated that though corrosion of the stainless steel cylinders containing the cesium will gradually wash the radioactive materials into the environment, because of the depth, the contamination would be "horizontal" and should not affect the commercial species of fish.[31]

2. *Boarding*

In 1998, the British-flagged vessel, *Pacific Swan,* the sister ship to the *Pacific Pintail,* was boarded by members of Greenpeace in the Panama Canal.[32] In the darkness of the early morning, activists pulled a boat alongside the vessel and used ropes to climb onto the bow.[33] Once on board, they then hoisted a banner with the words "No Plutonium" from the mast and chained themselves to the ship.[34] At the time of the boarding, the ship was carrying thirty tons of Mix-Oxide fuel (MOX), having enough plutonium to make sixty nuclear bombs.[35] Greenpeace stated the purpose of this demonstration was to protest the shipment of nuclear materials and to raise awareness of the threat these shipments pose to the people and environment of Panama and Central America.[36] Despite its intent, the demonstration has proven that transboundary shipments of nuclear materials by sea are vulnerable to pirate or terrorist attacks.[37] One can only imagine the devastation that could have occurred to the region if the boat that pulled alongside

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1243 (Sept. 2001), *available at* http://www-pub.iaea.org/MTCD/publications/PDF/te_1242_prn.pdf; *see also* Press Release, Nuclear Information Service, Ship Sinks with 11 Tons of Caesium (Dec. 7, 1997), *available at* http://www.n-base.org.uk/public/briefing/90_99/brief110.htm [hereinafter Nuclear Information Service].

29. Press Release, Greenpeace, Ship Involved in Nuke Accident to be Towed to Spanish Port (Dec. 19, 1997), *available at* http://archive.greenpeace.org/majordomo/index-press-releases/1997/msg00514.html.

30. Sert, *supra* note 28, at 3.

31. Nuclear Information Service, *supra* note 28.

32. Press Release, Greenpeace, Nuclear Waste Shipment Enters Panama Canal Flying Greenpeace Banner—Stop Plutonium! (Feb. 6, 1998), *available at* http://archive.greenpeace.org/pressreleases/nuctrans/1998feb62.html [hereinafter Greenpeace].

33. Kevin G. Hall & Jon Mitchell, *Pana-mayhem,* THE JOURNAL OF COMMERCE, Mar. 6, 1998, at 2B [hereinafter Hall & Mitchell, *Pana-mayhem*].

34. *Id.*

35. *See* Earl Lane, *Activists: Atomic Waste to be Shipped,* NEWSDAY, Jan. 15, 1998, at A19; *see also* Robert Whymant, *Nuclear Fuel Arrives in Japan,* THE TIMES (London), Sept. 28, 1999, at 16.

36. Greenpeace, *supra* note 32.

37. Hall & Mitchell, *Pana-mayhem, supra* note 33.

the *Pacific Swan* had been controlled by al Qa'ida terrorists, such as the boat used to attack the U.S.S. Cole, instead of Greenpeace activists.

3. *Falsified safety inspection record*

In 1999, it was revealed that British Nuclear Fuels (BNFL), the company that owns five nuclear transport ships including the *Pacific Pintail* and *Pacific Swan,* falsified cargo safety inspection records on at least ten lots of MOX containers being shipped to Japan.[38] BNFL explained that the records were falsified in order to "save time."[39] After the questionable shipment of MOX arrived in Japan, the Japanese authorities discovered the inconsistencies and demanded the British to take the materials back.[40] The MOX was then returned to the UK, which agreed to pay Japan 6.4 billion yen (approximately sixty million dollars) for damages incurred due to the falsification.[41] Now that shipping states have demonstrated that nuclear material safety inspection records can be falsified, coastal states could be justified in refusing passage to these shipments for not having adequate assurances that nuclear materials on board have been properly examined and authorized for shipping by competent inspectors.

III. THE "PRECAUTIONARY PRINCIPLE" IN INTERNATIONAL LAW

Several scholars, most notably Jon Van Dyke of the University of Hawaii, claim that customary international law includes a "precautionary principle" which is applicable to shipments of nuclear materials.[42] The precautionary principle is based on the maxim *sic utere tuo ut alienum non laedas* ("use what is yours so as not to harm what is others").[43] Under the precautionary principle, shipping states have a duty to take several steps before shipments of

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38. *Inspectors Sent in as Sellafield Admits to Serious Safety Lapses,* THE INDEPENDENT (London), Sept. 14, 1999, at 1.

39. *BNFL Waited 4 Days Before Telling of MOX Error,* KYODO NEWS SERVICE, Sep. 15, 1999, *available at* www.lexis.com/research/retrieve?_m=d0495f31ed263fbb7177d5cd854dea4&doc.

40. Alan Cowell, *Nuclear Plant in Britain Admits Sabotage,* N.Y. TIMES, March 27, 2000, at A8.

41. Hideyuki Ba, *Japan's Plutonium Policy and MOX Program Full of Contradictions,* NUKE INFO TOKYO, Sept./Oct. 2000, at 1.

42. *See* Van Dyke, *Applying, supra* note 18. *But see* Eugene R. Fidell, *Maritime Transportation of Plutonium and Spent Nuclear Fuel,* 31 INT'L LAW 757 (1997) [hereinafter Fidell, *Maritime Transportation*].

43. *See* Jason L. Gudofsky, *Transboundary Shipments of Hazardous Waste for Recycling and Recovery Operations,* 34 STAN. J. INT'L L. 219, 221 (1998).

nuclear materials may be undertaken. These include, *inter alia*: the duty to prepare an environmental impact assessment; the duty to notify transit states of shipments in order for them to prepare contingency plans in case of an accident or emergency; the duty to consult with transit states to jointly develop such contingency plans; and the duty to mitigate all reasonably foreseeable damages.[44] This paper will for the most part limit the discussion of the precautionary principle to the duty of notification for nuclear material shipping states and the implied or explicit subsidiary rights of transit states to either give or withhold prior authorization for these shipments after notification.

Van Dyke asserts that the precautionary principle allows transit states to require notification, before such shipments can pass through their territorial seas or EEZs, and that these states can suspend the right of innocent passage to these shipments.[45] He further asserts that international conventions and declarations, as well as the practice of states, provide evidence that the precautionary principle is currently customary international law.[46] Several states have incorporated this principle into their laws, either requiring prior notification or prior authorization before passage of ships carrying nuclear materials is permitted, or prohibiting their passage altogether.[47] Therefore, it is necessary to discuss the development of the precautionary principle in order to understand its status under international law with relation to the right of innocent passage.

A. Codification of the Precautionary Principle

1. Hard Law: International and Regional Conventions

Though the origin of the precautionary principle can be traced to various international agreements,[48] including UNCLOS,[49] the

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44. Van Dyke, *Applying*, *supra* note 18, at 381-83.

45. *Id.* at 384-85.

46. *Id.* at 379. *But see* Fidell, *Maritime Transportation*, *supra* note 42, at 757 et seq.

47. Kari Hakapaa & Erik Jaap Molenaar, *Innocent Passage-Past and Present*, 23 MARINE POLICY 131, 142 (1999). *See also* Laura Pineschi, *The Transit of Ships Carrying Hazardous Wastes through Foreign Coastal Zones*, in INTERNATIONAL RESPONSIBILITY FOR ENVIRONMENTAL HARM 299, 312-13 (F. Francioni & Tullio Scovazzi eds., 1991) (Seven countries requiring prior notification: Canada, Djibouti, Libya, Malta, Pakistan, Portugal and the United Arab Emirates; eight countries require prior authorization: Egypt, Guinea, Iran, Malaysia, Oman, Saudi Arabia, Turkey and Yemen; and six countries prohibit passage altogether: Argentina, Haiti, Ivory Coast, Nigeria, The Philippines and Venezuela).

48. *See* David Freestone & Ellen Hey, *Origins and Development of the Precautionary Principle*, *in* THE PRECAUTIONARY PRINCIPLE IN INTERNATIONAL LAW: THE CHALLENGE OF IMPLEMENTATION 5 & n. 15 (David Freeston & Ellen Hey eds., 1996) (suggesting that the precautionary principle was first formulated as a concept in 1987 in the Declaration of the

1989 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention) has nevertheless been generally recognized as the first international convention codifying the precautionary principle for the prevention of pollution.[50] The Basel Convention provides state parties with a basis for denial of passage of hazardous waste shipments if there has not been notification provided by the shipping state and prior authorization for the shipment by transit states.[51] Van Dyke cites the Basel Convention as the primary basis for states to be able to require notification and prior consent of shipments of radioactive materials by sea.[52]

There is, however, a major flaw in this reasoning. The Basel Convention does not apply to nuclear cargoes covered by other international agreements.[53] Therefore, with regard to the shipment of nuclear materials, the Basel Convention is preempted by two international conventions, neither of which have requirements for notification or prior authorization: the International Maritime Organization's (IMO's) 1993 Code for the Safe Carriage of Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes in Flasks on Board Ships[54] (INF Code), amended to the

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Second International North Sea Conference on the Protection of the North Sea (London Convention)); *see also* James E. Hickey, Jr. & Vern R. Walker, *Refining the Precautionary Principle in International Environmental Law*, 14 VA. ENVTL. L.J. 423 (1995). *But see* Philippe Sands, *The "Greening" of International Law: Emerging Principles and Rules*, 1 IND. J. GLOBAL LEGAL STUD. 293, 298, 300-02 & n. 17 (1994) (suggesting much earlier origins, dating back to the 1969 Oil Pollution Intervention Convention, and the 1970 commercial whaling moratorium proposals).

49. Van Dyke, *Regime*, *supra* note 9, at 90. Van Dyke argues that UNCLOS article 221(1) is in fact a codification of the precautionary principle. This article authorizes state parties:

> to take and enforce measures beyond the territorial sea proportionate to the actual or threatened damage to protect their coastline or related interests, including fishing, from pollution or threat of pollution following upon a maritime casualty or acts relating to such a casualty, which may reasonably be expected to result in major harmful consequences.

Id.

The "acts relating to such a casualty" language has given Van Dyke reason to believe that this language was intended to give states the right to deny passage to ships carrying ultra hazardous materials contrary to the requirements of the precautionary principle. *Id.*

50. *See* Basel Convention, *supra* note 8.

51. *Id.* art. 4(2)(f) & (h).

52. *See* Van Dyke, *Applying*, *supra* note 18, at 382. *See* Van Dyke, *Regime*, *supra* note 9, at note 66.

53. Basel Convention, *supra* note 8, art. 1(3).

54. Code for the Safe Carriage of Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes in Flasks on Board Ships, Res. 748, IMO, 18th Sess. (Nov. 4, 1993),*available at* http://www.admiraltylawguide.com/conven/infcode1999.html [hereinafter INF Code].

International Convention for the Safety of Life at Sea[55] (SOLAS) in 1999, and; the 1973 London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter.[56]

The precautionary principle has also been incorporated into two regional conventions: the Organization of African Unity's 1991 Bamako Convention[57] and the 1995 Waigani Convention[58] between the Pacific island nations. Like the Basel Convention, both of these regional conventions require an exporting state to get prior written consent from a transit state party before passage of nuclear materials through their waters is deemed legal.[59] These conventions, however, are different with regard to how they treat the transport of nuclear materials. The Bamako Convention explicitly includes the transport of nuclear materials within its scope of obligations.[60] The Waigani Convention, however, only addresses radioactive materials with regard to invoking a total ban on their import, export, and dumping within the treaty area.[61] The convention also advises member states to adopt the regulations found in the International Atomic Energy Agency (IAEA) Code of Practice on the International Transboundary Movement of Radioactive Wastes, which will be discussed in the next section.[62] The acceptance of these treaties by their member states does demonstrate state practice accepted as law. The small number of states involved, however, does not rise to the level of *opinio juris*.[63]

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55. International Convention for the Safety of Life at Sea (SOLAS), Nov. 1, 1974, as amended in 1981 and 1983 with the 1978 SOLAS Protocal, 32 UST 47, TIAS 9700, 14 I.L.M. 959 (1975), *available at* http://www.imo.org/Conventions/contents.asp?topic_id=257&doc_id=647 (the IMO's Marine Science Committee and Marine Environment Protection Committee formally decided to add the INF Code to this treaty in May 1999, taking effect in 2001) [hereinafter SOLAS].

56. Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matters, Dec. 29, 1972, [1975], 26 U.S.T. 2403, T.I.A.S. No. 8165, reprinted in 11 I.L.M. 1291, 1294.

57. *See* Bamako Convention, *supra* note 8.

58. *See* Waigani Convention, *supra* note 8.

59. Bamako Convention, *supra* note 8, art. 6; Waigani Convention, *supra* note 8, art. 6.3.

60. Bamako Convention, *supra* note 8, art. 2.2.

61. Waigani Convention, *supra* note 8, arts. 4.1 & 4.3.

62. Waigani Convention, *supra* note 8, art. 4.5(a).

63. *Id.* As of June 2004, twenty-one countries had become parties to the Bamako Convention through either ratification or accession: Benin, Cameroon, Comoros, Democratic Republic of Congo, Republic of Congo, Côte d'Ivoire, Egypt, Ethiopia, Gambia, Libyan Arab Jamahiriya, Mali, Mauritius, Mozambique, Niger, Senegal, Sudan, United Republic of Tanzania, Togo, Tunisia, Uganda, Zimbabwe. *See* Basel Convention Regional Centre Pretoria, Status of Ratifications, at http://www.baselpretoria.org.za/ratifications.htm (last visited Nov. 11, 2005). As of December 2002, ten parties had ratified the Waigani Convention: Australia, Cook Islands, Federated States of Micronesia, Kirribati, Papua New Guinea, Samoa, Solomon Island and Tuvalu. *See* Australian Department of Environment and Heratige, International Hazardous Waste Conventions, at http://www.deh.gov.au/settlements/chemicals/hazardous-waste/conventions.html (last visited Nov. 10, 2005).

2. *Soft law: resolutions, declarations, agendas, and draft articles*

In 1990, the IAEA drafted a Code of Practice on the International Transboundary Movement of Radioactive Waste that incorporated aspects of the precautionary principle, including notice and prior authorization requirements for shipments of nuclear material.[64] This code makes bold statements with regard to coastal state's rights to suspend innocent passage, including:

> It is the sovereign right of every State to prohibit the movement of radioactive waste into, from or through its territory. Every state should take the appropriate steps necessary to ensure that, subject to the relevant norms of international law, the international transboundary movement of radioactive waste takes place only with the prior notification and consent of the sending, receiving and transit States in accordance with their respective laws and regulations.[65]

This language, however, is qualified earlier in the code where it states that the code is "advisory"[66] and by a footnote that provides "[n]othing in this Code prejudices or affects in any way the exercise by ships and aircraft of all States of maritime and air navigation . . . in the 1982 United Nations Convention on the Law of the Sea, and under other relevant international legal instruments."[67]

It is important to note the specialized agency that regulates safety of transport of nuclear materials by sea under UNCLOS is the IMO, not the IAEA. In regulating shipments of nuclear materials by sea, the IMO does incorporate IAEA conventions and most of their regulations. The IMO, however, has not incorporated the IAEA Code of Practice on the International Transboundary Movement of Radioactive Waste, but instead follows the INF Code to regulate nuclear shipments by sea.

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64. IAEA: General Conference Resolution on Code of Practice on the International Transboundary Movement of Radioactive Waste, Sept. 21, 1990, *reprinted in* 30 I.L.M. 556 (1991), *available at* http://www.globelaw.com/Nukes/iaeacod.htm (provision numbers omitted).

65. *Id.* at 563.

66. *Id.* at 562.

67. *Id.* n.2.

Many believe that the genesis of the precautionary principle as an international custom began at the 1992 United Nations Conference on Environment and Development held in Rio de Janeiro.[68] The Rio conference indeed was a groundbreaking event for the advancement of the precautionary principle. There, 172 state participants[69] unanimously agreed to a Declaration on Environment and Development with an implementation agenda, Agenda 21, to put into action the Declaration's principles.[70] The Rio Declaration's principles set out a framework for economic development and environmental protection that states are called upon to adopt into their domestic legislation. Principle 15 of the Rio Declaration calls for the use of a "precautionary approach" where there are "threats" to the environment, stating:

> In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.[71]

Agenda 21 further provides more specific policy recommendations with regard to taking precautionary approaches to "prevent" degradation of the marine environment:

> States, in accordance with the provisions of the United Nations Convention on the Law of the Sea on protection and preservation of the marine environment, commit themselves, in accordance with their policies, priorities and resources, to prevent, reduce and control degradation of the marine environment so as to maintain and improve its life-support and productive capacities. To this end, it is necessary to:

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68. United Nations Conference on Environment and Development, G.A. Res. 228, U.N. GAOR, 44th Sess., Supp. No. 49, U.N. Doc. A/44/49 (Dec. 22,1989).

69. United Nations Earth Summit, UN Conference on Environment and Development (1992), http://www.un.org/geninfo/bp/enviro.html (last visited Nov. 11, 2005).

70. United Nations Conference on Environment and Development: Rio Declaration on Environment and Development, U.N. Doc. A/CONF.151/5/Rev. 1 (1992), *reprinted in* 31 I.L.M. 874 (1992), *available at* http://www.unesco.org/education/information/nfsunesco/pdf/RIO_E.PDF [hereinafter Rio Declaration]; United Nations Conference on Environment and Development, Agenda 21, ch. 17.22(a), U.N. Doc. A/CONF.151/PC/100/Add. 1 (1992), *available at* http://www.unep.org/Documents/Default.asp?DocumentID=52 [hereinafter Agenda 21].

71. Rio Declaration, *supra* note 70, at 879.

> . . . [a]pply preventive, precautionary and anticipatory approaches so as to avoid degradation of the marine environment, as well as to reduce the risk of long-term or irreversible adverse effects upon it.[72]

Furthermore, the International Law Commission (ILC) has included the precautionary principle in its 2001 Draft Articles on the Prevention of Transboundary Harm from Hazardous Activities.[73] The Draft Articles have requirements for prior authorization,[74] risk assessments,[75] notification,[76] and consultation.[77] It is important to note, however, that the Draft Articles also have a provision for withholding information for "national security" reasons.[78] This later provision quite possibly will be an opt-out provision for countries transporting nuclear materials that have steadfastly maintained that their shipments require secrecy for security reasons.[79] Since one of the ILC's main duties is to codify customary international law,[80] the existence of these draft articles reinforces the claim that the precautionary principle is in fact international custom. Due to the relative novelty of the transport of nuclear materials, however, these draft articles most likely are a representation of the ILC's other mandate: to progressively develop international law.[81]

Though the above agreements are a significant step towards the development of an international customary law of precaution, they are not binding international law since they are not in the form of a convention or treaty. Despite the fact that conference declarations, agendas and recommendations are not binding international law, they are "soft-law." They are agreements made by the conference participants or international organizations that encourage countries to work in good faith towards the implementation of the goals of the agreements.

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72. Agenda 21, *supra* note 70, ch. 17.22(a).

73. Draft Articles on the Prevention of Transboundary Harm from Hazardous Activities, Report of the Int'l Law Comm., U.N. GAOR, 56th Sess., Supp. No. 10, U.N. Doc. A/56/10, chp.V.E.1 (Sept. 25, 2001), *available at* http://untreaty.un.org/ilc/texts/instruments/english/draft%20articles/9_7_2001.pdf [hereinafter Draft Articles].

74. *Id.* art 6.

75. *Id.* art 7.

76. *Id.* art 8.

77. *Id.* art. 9.

78. *Id.* art. 14.

79. *See supra* text accompanying notes 6 and 7.

80. Statute of the International Law Commission, arts. 1 & 15, G.A. Res. 174(II), 2 U.N. GAOR (Res.) at 296, U.N. Doc. A/519 (Nov. 21, 1947).

81. *Id.*

Countries therefore are at liberty to enact the principles into their domestic laws, thus making them binding within their own jurisdictions. If parties to these agreements ignore their obligations, however, there is no penalty for a breach of a soft-law regime. Furthermore, these agreements by themselves are not evidence of an international custom since they are not legally binding. International customary law can only be found when there is a general practice of states *accepted as law*.[82] Though the precautionary principle may not currently represent international customary law, it seems to be an area of "developing custom."[83]

IV. SAFEGUARDS FOR MARITIME SHIPPING OF NUCLEAR MATERIALS

The current safeguard regime for transporting nuclear materials onboard ships is derived from a matrix of treaties and regulations developed and administered by the IAEA and IMO.

A. IAEA Safeguards

IAEA instruments cover the security of nuclear cargoes and the safety of packages containing nuclear materials.[84] The origin of the IAEA's nuclear safeguard regime is found in article 3 of the 1968 Treaty on the Non-Proliferation of Nuclear Weapons (NPT).[85] Article 3 requires each state party "to accept safeguards, as set forth in an agreement to be negotiated and concluded with the . . . [IAEA's] safeguards system . . . ."[86]

Though NPT article 3 generally contemplates bilateral inspection and confirmation agreements, it also requires compliance with multilateral safeguard agreements. The 1979 Convention on Physical Protection of Nuclear Material imposes the duty to safe-

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82. North Sea Continental Shelf (F.R.G./Den.; F.R.G./Neth.), 1969 I.C.J. 3, para.77 (Feb. 20, 1969); Statute of the International Court of Justice, 59 Stat. 1031, T.S. No. 993, 3 Bevans 1153, art. 38(1)(b).

83. *See generally* John M. Macdonald, *Appreciating the Precautionary Principle as an Ethical Evolution in Ocean Management*, 26 OCEAN DEV. & INT'L L. 255, 255-56, 262-263 (1995).

84. Alan E. Boyle, *Nuclear Energy and International Law: An Environmental Perspective*, 30 BRIT. Y.B. INT'L L. 257, 261-66 (1989) (discussing IAEA's function to ensure health and safety in every aspect of the use of nuclear energy) [hereinafter Boyle, *Nuclear Energy*].

85. Treaty on the Non-Proliferation of Nuclear Weapons, art. 3, July 1, 1968, 21 U.S.T. 483, 729 U.N.T.S. 169 (entered into force Mar. 5, 1970), *available at* http://www.un.org/events/npt2005/npttreaty.html.

86. *Id.* art. 3(1). Though article 3 only explicitly requires non-nuclear-weapon State Parties to submit to safeguard agreements, all five nuclear-weapon State Parties have voluntary submitted to these agreements. *Id.*

guard radioactive materials loaded on vessels.[87] Article 3 of the physical protection convention provides:

> Each State Party shall take appropriate steps . . . consistent with international law to ensure as far as practicable that, during international nuclear transport . . . on board a ship or aircraft under its jurisdiction insofar as such ship or aircraft is engaged in the transport to or from that State, is protected at the levels described in Annex I.[88]

Annex I provides requirements for physical protection of Category I[89] nuclear material during transport. These include:

> [P]rior arrangements among sender, receiver, and carrier, and prior agreement between natural or legal persons subject to the jurisdiction and regulation of exporting and importing States, specifying time, place and procedures for transferring transport responsibility; . . . [shipment must be] under constant surveillance by escorts and under conditions which assure close communication with appropriate response forces.[90]

The physical protection convention, however, does not require prior notification to or authorization from transit states during their voyage. Article 6 provides that "States Parties shall not be required by this Convention to provide any information which they are not permitted to communicate pursuant to national law or which would jeopardize the security of the State concerned or the physical protection of nuclear material."[91]

Another IAEA convention that touches the issue of safeguards for transport of nuclear materials is the 1997 Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.[92] Providing the only guidance on the subject, article 27 of the convention provides: "transboundary

87. Physical Protection Convention, *supra* note 6.

88. *Id.* art. 3.

89. *Id.* Category I nuclear materials are defined as 2 kg or more of Plutonium, 5 kg or more of Uranium-235, or 2 kg or more Uranium-233. *Id.* Annex II.

90. *Id.* Annex I, 2(a), (b).

91. *Id.* art. 6(2).

92. Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, Dec. 24, 1997, *available at* http://www.iaea.org/Publications/Documents/Infcircs/1997/infcirc546.pdf.

movement through States of transit shall be subject to those international obligations which are relevant to the particular modes of transport utilized."[93]

In addition to the above conventions, the IAEA also provides non-mandatory recommendations for the safeguarding of transboundary shipments of nuclear material. The first of these is the above-mentioned IAEA Code of Practice on the International Transboundary Movement of Radioactive Waste.[94] Though this code provides that every state has the right to deny passage to shipments of nuclear materials, it later states that the code is subject to the rules of the UNCLOS and customary international law.[95] As discussed above in Section Three, these two statements are mutually exclusive.

Lastly, IAEA Regulations for the Safe Transport of Radioactive Material provide detailed standards for packaging and shipping requirements in the transportation of radioactive materials.[96] It establishes a complicated bilateral and multilateral approval system to determine which shipments of nuclear materials require prior authorization from transport states.[97] Though these regulations do require prior notification and authorization for shipments of fissile material over a specified indexed amount, the standards for ocean shipments are much less strict than land shipments,[98] and have many exceptions including the common national security exception.[99]

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93. *Id.* art. 27(1)(ii).

94. Int'l Atomic Energy Agency Code of Practice on the International Transboundary Movement of Radioactive Waste, IAEA Res. GC(XXXIV)/RES/530 (Nov. 13, 1990), *available at* http://www.iaea.org/Publications/Documents/Infcircs/Others/inf386.shtml (last visited Nov. 22, 2005) [hereinafter IAEA Code of Practice] (providing "[i]t is the sovereign right of every State to prohibit the movement of radioactive waste into from or through its territory. " 3. Basic Principles, International Transboundary Movement (1).).

95. *Id.* at n.2.

96. IAEA, REGULATIONS FOR THE SAFE TRANSPORT OF RADIOACTIVE MATERIAL, No. ST-1 (IAEA ed. 1996 ed.), *available at* http://www-pub.iaea.org/MTCD/publications/PDF/Pub1225_web.pdf.

97. *Id.* at 194-198.

98. *Id.* at 116-17. Paragraph 820(c) states:

> Multilateral approval shall be required for: . . . (c) the shipment of packages containing fissile materials . . . Excluded from this requirement shall be shipments by seagoing vessels, if the sum of the critical safety indexes does not exceed 50 for any hold, compartment or defined deck area and the distance of 6 m between groups of packages or overpacks.

Id.

99. *Id.* at 194-98.

B. IMO Safeguards

The IMO regulations that deal with the transport of ultra-hazardous materials on ocean going vessels are found in the International Maritime Dangerous Goods Code (IMDG Code).[100] Within the IMDG Code are regulations that specifically deal with the transport of nuclear materials: the INF Code.[101] Both of these codes are now mandatory and are found as amendments to the SOLAS convention.[102]

The INF Code incorporates many of the above IAEA regulations and provides mandatory safety regulations for the shipment of nuclear materials. Its primary concern is the packaging of radioactive materials and the construction, design, and staffing of the ships that transport them. The INF Code does not, however, address notification or approval of coastal states of shipments or emergency response plans, though these topics are being considered for adoption.[103] Several commentators have expressed concern that the INF Code's reliance on design and packaging safeguards are not sufficient for the dangers these cargos present to coastal states.[104]

V. UNITED NATIONS CONVENTION ON THE LAW OF THE SEA

With regard to all things related to the ocean, UNCLOS is nearly universally considered the controlling body of law. It is for this reason that the convention is often referred to as "the constitution for the oceans."[105] In this section, however, we will limit scope of the discussion to the laws regulating the right of innocent passage, including those specifically for ships transporting nuclear

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100. IMO, INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG) CODE pmbl. (2002), (including Amendment 31-02 of May 2002, which makes the IMDG Code mandatory except for certain recommendatory provisions).

101. INF Code, *supra* note 54.

102. SOLAS, *supra* note 55.

103. IMO, *Main Conclusions of the Second Session of the Joint IAEA/IMO/UNEP Working Group on the Safe Carriage of Irradiated Nuclear Fuel (INF) at Sea* (Apr. 26-30,1993), IMO Secretariat Note to the 62nd Sess. of the Maritime Safety Committee, Doc. MSC 62/16/1 (1993).

104. *See* Robert Nadelson, *After MOX: The Contemporary Shipment of Radioactive Substances in the Law of the Sea*, 15 INT'L J. MARINE & COASTAL L. 193, 244 (May 2000) [hereinafter Nadelson, *After MOX*]. *See also* Van Dyke, *Regime*, *supra* note 9, at 77, 84.

105. United Nations Open-ended Informal Consultative Process established by the General Assembly in its resolution 54/33 in order to facilitate the annual review by the Assembly of developments in ocean affairs, third meeting, ¶ 2, (New York, Apr. 8-15, 2002), *available at* http://www.un.org/Depts/los/consultative_process/3rdMeetingStatements.htm.

materials, and the coastal State's right to protect its marine environment.

To begin with, it is important to note that "innocent passage" is somewhat different than "freedom of navigation" as defined in article 87 (freedom of navigation on the high seas) and article 56 (freedom of navigation in the EEZ - which incorporates the definition of article 87).[106] Freedom of navigation on the high seas is one of the oldest and most fundamental principles of customary international law.[107] Ships on the high seas have exclusive control over their vessel and crew and thus their passage can not be suspended, except in certain limited circumstances where warships have the right to board vessels.[108]

The right to freedom of navigation in the EEZ becomes somewhat murky, however, since these ships "shall comply with the laws and regulations adopted by the coastal State . . . " with regard to environmental protection.[109] Therefore, within the EEZ there is somewhat of a jurisdictional conflict between a foreign-flagged vessel's freedom of navigation and a coastal state's environmental concerns. Article 59 states that these conflicts should be resolved through principles of equity.[110] Nonetheless, it is without question that the right of ships to exercise freedom of navigation within the EEZ is no less than their right to innocent passage within a coastal state's territorial waters. Thus, it is important to understand the law of innocent passage and circumstances when coastal states can deny this passage.

A. Innocent Passage

The right of innocent passage is articulated in article 17, which states, "[s]ubject to this Convention, ships of all States, whether coastal or land-locked, enjoy the right of innocent passage . . . . "[111] Article 19 defines "innocent passage" by stating that "[p]assage is innocent so long as it is not prejudicial to the peace, good order or

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106. UNCLOS, *supra* note 1, arts. 56.1(a), 87.

107. *See* IAN BROWNLIE, PRINCIPLES OF PUBLIC INTERNATIONAL LAW 191 (5th ed. 1998).

108. UNCLOS, *supra* note 1, arts. 92.1(a), 110.

109. *Id.* art. 58.3.

110. *Id.* art. 59.

111. *Id.* art. 17. Article 17 deals specifically with innocent passage in Territorial Seas. *Id.* Article 45 sets out that the right of innocent passage in international straits, where "[t]here shall be no suspension of innocent passage . . . . " *Id.* art. 45(2). Article 52 provides for the right of innocent passage in archipelagic states, but provides that these states can "suspend temporarily in specified areas of its archipelagic waters the innocent passage of foreign ships if such suspension is essential for the protection of its security . . . [but] only after having been duly published." *Id.* art. 52(2).

security of the coastal State."[112] Furthermore, article 24 clearly sets out that coastal states are not to hamper the right of innocent passage, providing coastal states "shall not . . . impose requirements on foreign ships which have the practical effect of denying or impairing the right of innocent passage; or . . . discriminate in form or in fact against the ships of any State or against ships carrying cargoes to, from or on behalf of any State."[113]

The language in article 24 seems to be unequivocal. Article 25, however, provides that coastal states have the right to take measures to protect their coastline "to prevent passage which is not innocent."[114] Article 19 lays out a list of activities where passage of a foreign ship shall be considered non-innocent, of which the only mention of environmental concern is a provision making passage non-innocent for "any act of willful and serious pollution . . . . "[115] Seemingly, there is a presumption that peaceful shipping of nuclear materials would be considered an exercise of innocent passage as long as the intent to voyage was not to cause serious pollution.

Under article 25, however, a coastal state may "suspend temporarily in specified areas of its territorial sea the innocent passage of foreign ships if such suspension is essential for the protection of its security, . . . " and only after such suspension has been "duly published."[116] The qualifying language "in specified areas" in this article seems to contemplate limited zones of special environmental concern, or areas of military concern, and does not seem to provide a blanket right for coastal states to suspend innocent passage from the entire territorial sea as was seen in the controversies in part two of this paper.

Most relevant to the topic of this paper are the articles that specifically deal with ships carrying nuclear materials: articles 22 and 23. Article 22 provides that coastal states may require ships carrying nuclear materials to use "sea lanes and traffic separation schemes" when exercising the right of innocent passage through their territorial seas.[117] It does not, however, allow coastal states to suspend innocent passage for these ships. Article 23 states that "ships carrying nuclear . . . substances shall, when exercising the right of innocent passage . . . carry documents and observe *special*

112. *Id.* art 19(1).
113. *Id.* art. 24(1).
114. *Id.* art. 25(1).
115. *Id.* art. 19(2)(h).
116. *Id.* art. 25(3).
117. *Id.* art. 22(1).

precautionary measures established for such ships by *international agreements*."[118]

Presumptively, under the provisions of article 23, as long as a ship follows the "special precautionary measures" coastal states cannot deny innocent passage. But what are these "special precautionary measures" and which "international agreements" does this article refer to? This language might suggest hope for the advocates of the precautionary principle in that they may contemplate international agreements incorporating it. This, however, is not the case. The language "international agreements" in article 23, is a term of art specifically contemplating IMO agreements, and most importantly the INF Code.[119]

B. Protection of the Marine Environment

Part XII of UNCLOS deals with the protection of the marine environment. Article 194 provides that states shall take all measures necessary "to prevent, reduce and control pollution of the marine environment from any source . . . ."[120] Paragraph four of this article, however, conditions this right by providing that "States shall refrain from unjustifiable interference with activities carried out by other States in the exercise of their rights and in pursuance of their duties in conformity with this Convention."[121]

Article 211 addresses the specific issue of measures to prevent pollution from vessels, providing:

> States, acting through the competent international organization or general diplomatic conference, shall establish international rules and standards to prevent . . . pollution of the marine environment from vessels and promote the adoption, in the same manner, wherever appropriate, of routeing systems designed to minimize the threat of accidents which might cause pollution . . . .[122]

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118. *Id.* art. 23 (emphasis added).

119. *See* Competent or relevant international organizations under the United Nations Convention on the Law of the Sea, reprinted in 31 LAW SEA BULL. 79, 81 (1996), *available at* http://www.un.org/Depts/los/doalos_publications/LOSBulletins/bulletinpdf/bulletinE31.pdf [hereinafter UNCLOS Competent International Organizations]; INF Code, *supra* note 54.

120. UNCLOS, *supra* note 1, art. 194(1).

121. *Id.* art. 194(4).

122. *Id.* art. 211(1).

In this provision, however, we once again find qualifying language stating that coastal states shall "not hamper innocent passage of foreign vessels."[123] Notice that this article does not provide that coastal states themselves may establish rules regarding prevention of vessel pollution, but instead specifically requires states to act "through the *competent international organization* or diplomatic conference."[124] This language is a term of art and specifically contemplates states working multilaterally through the IMO to establish such rules and standards.[125] Thus, one can presume that any enactment of the precautionary principle in domestic laws, as contemplated in Section Three of this paper, would be suspect under this provision.

Article 221 gives coastal states enforcement mechanisms to avoid pollution arising from maritime casualties. It provides:

> Nothing in [Part XII] shall prejudice the right of States, pursuant to international law, *both customary and conventional,* to take and enforce measures *beyond the territorial sea* proportionate to the *actual or threatened damage* to protect their coastline or related interests, including fishing, from pollution *or threat of pollution* following upon a maritime casualty *or acts relating to such a casualty, which may reasonably be expected to result in major harmful consequences.*[126]

This article provides the most concrete example yet of a justification within UNCLOS of a coastal state to use measures to prevent a ship carrying nuclear materials from coming within its territorial waters or EEZ. Notice that authority for state action under this article is justified under both customary and conventional international law. What is meant by customary law here? Some scholars have suggested that this language is in reference to earlier conventions on intervention on the high seas that use similar language as that found in article 221, and have achieved customary status.[127]

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123. *Id.* art. 211(4).
124. *Id.* art. 211(5).
125. *See* UNCLOS Competent International Organizations, *supra* note 119, at 87 (emphasis added).
126. UNCLOS, *supra* note 1, art. 221(1) (emphasis added).
127. *See* R. R. CHURCHILL & A. V. LOWE, THE LAW OF THE SEA 262 (2nd ed., Manchester University Press 1988). *See also* Nadelson, *After MOX*, *supra* note 104, at 205, n.68.

For example, after the 1969 International Convention Relating to Intervention on the High Seas[128] was negotiated, a 1973 protocol was adopted relating to Intervention on the High Seas in Cases of Marine Pollution by Substances Other than Oil.[129] Article 1 of this protocol authorizes coastal states to protect coastal marine resources by taking any necessary measures on the high seas to prevent or mitigate "grave and imminent danger to their coastline or related interests from *pollution or threat of pollution* by substances other than oil following upon a maritime casualty *or acts related to such a casualty, which may reasonably be expected to result in harmful consequences.*"[130]

Notice also that article 221 deals with both actual or "threatened damage" by maritime casualty "or acts relating to such a casualty."[131] Commentators such as Van Dyke have suggested that this article gives coastal states flexibility to prevent ultrahazardous materials from passing through their waters without certain precautions. Van Dyke writes:

> Concerned coastal nations might view "acts relating to such a casualty" as including foreseeable risks created by shipments of ultrahazardous cargoes without proper advance consultation, creation of emergency contingency plans, and liability regimes, and hence might view this provision as authorizing intervention to block such shipments. If nations with flag state jurisdiction do not fulfill their obligations to "take adequate steps to control and regulate sources of serious environmental pollution or transboundary harm within their territory or subject to their jurisdiction," then nations threatened by such lack of protective action will inevitably act to protect their threatened coastal resources.[132]

Lastly, the discussion in Section Two of this paper described the 1995 controversy of the voyage of the *Pacific Pintail,* in which it was stated that the Chilean Maritime Authority cited the pre-

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128. International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, Nov. 29, 1969, 26 U.S.T. 765, 9 I.L.M. 25.

129. Protocol Relating to Intervention on the High Seas in Cases of Substances Other than Oil, Nov. 2, 1973, 13 I.L.M. 605.

130. *Id.* art. 1(1) (emphasis added).

131. UNCLOS, *supra* note 1, art. 221(1).

132. Boyle, *supra* note 84, at 269. *See also* Van Dyke, *Regime*, *supra* note 9, at 102; Nadelson, *After MOX*, *supra* note 104, at 206.

cautionary principle as justification for denying the ship passage.[133] According to Van Dyke, the Chilean Maritime Authority also cited UNCLOS article 234.[134] This article states:

> Coastal States have the right to adopt and enforce non-discriminatory laws and regulations for the prevention, reduction and control of marine pollution from vessels in ice-covered areas within the limits of the exclusive economic zone, where particularly severe climatic conditions and the presence of ice covering such areas for most of the year create obstructions or exceptional hazards to navigation, and pollution of the marine environment could cause major harm to or irreversible disturbance of the ecological balance.[135]

Article 234 provides strong support for coastal states to deny the right of innocent passage in these ice-covered areas. Thus, this is one of the very few exceptions to the general rule that states cannot deny the right of innocent passage.

In summary, one can glean from the above UNCLOS provisions that despite the fact that coastal states have the right to take measures to protect their marine environment, this right generally does not supersede the right of foreign flag state vessels to exercise innocent passage though coastal state territorial waters or freedom of navigation within their EEZ. This determination is supported by the writings of many scholars of the subject.[136] The only exceptions to this right would seem to be if the ships passage was in fact non-innocent by intending to seriously pollute the waters of a coastal state, or if the ship was in violation of IMO regulations with regard to the storage and transport of nuclear materials, or if it posed an environmental threat to an ice-covered area. There is an interesting debate regarding Article 221's customary rights to take measures in the case of maritime "casualty or acts relating to such a casualty."[137] The language of this article, however, provides that states can only take measures against such ships if they are "reasonably . . . expected to result in major harmful conse-

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133. *See supra* text accompanying notes 16 through 25.
134. Van Dyke, *Regime*, *supra* note 9, at 88 & n.134.
135. UNCLOS, *supra* note 1, art. 234.
136. *See generally* Fidell, *Maritime Transportation*, *supra* note 42 (providing a thorough examination on the thoughts of scholars on this subject). *See also* Raul A. F. Pedrozo, *Transport of Nuclear Cargoes by Sea*, 28 J. MAR. L. & COM. 207 (1997).
137. UNCLOS, *supra* note 1, art. 221(1).

quences."[138] Thus, if a ship has satisfied the inspection regime of the IMO with regard to the transport of nuclear materials it most likely would not be reasonable to "expect" harmful consequences, even though a possibility of such consequences may exist.

VI. DISCUSSION

From the above analysis of the precautionary principle, IAEA and IMO safeguards regime, and the UNCLOS provisions on innocent passage and environmental protection, is it clear that there is a clash of international law doctrines. It would be difficult to argue that at this stage of development of the precautionary principle that its requirements are customary law or that they supersede UNCLOS or IMO regulation on the transport of nuclear materials at sea. Never the less, there is still the problem of state practice. There are more than a handful of states that prohibit the passage of these ships. Therefore, this last section will discuss how this dispute can be equitably resolved.

To begin with, Jon Van Dyke, has provided a wellspring of valid suggestions for the international community to resolve this issue. His most pragmatic solution is for the IMO to adopt precautionary principles in the INF Code.[139] This solution is consistent with the procedure set out in UNCLOS article 211 where coastal states would work through the IMO ("the competent international organization or general diplomatic conference") to create new international rules for protecting the marine environment from the harm of ships. The positive aspect of this recommendation is that it is the method for changing the rules recommended by UNCLOS, and if (or when) the requirements of the precautionary principle are incorporated into the INF Code they become mandatory regulations. This would at one time change the rules for everyone in the shipping community, and thus would be a very efficient solution. The drawback of this approach is that change at an international organization is slow. Van Dyke made this recommendation in 1996, nearly 10 years ago, yet little progress has been made at the IMO to incorporate the precautionary principle.

Van Dyke's second proposal is to create regional regimes to enforce the precautionary principle.[140] This is an interesting option since this is what in fact is taking place as has been seen in the Bamako and Waigani Conventions and from the actions of the Caribbean nations in their declaration of a nuclear-free zone. The

138. *Id.*
139. Van Dyke, *Applying*, *supra* note 18, at 388.
140. Van Dyke, *Regime*, *supra* note 9, art. 8, at 106-07.

drawback to this approach is that it creates conflicting bodies of international laws and standards. This conflict would not only be between UNCLOS/IMO and the regional regimes, but would also be between the regional regimes themselves. This can already be seen in the different standards between the Bamako and Waigani Conventions with regard to nuclear materials. Carried to its logical end, this solution would lead to inefficiencies in the shipping community that would have to comply with each of the different regimes' rules as well as the IMO regulations. Furthermore, it is conceivable to suspect that this solution would lead to more legal (or actual) conflict between shipping and coastal states, not less.

Van Dyke also provides a third recommendation: coastal states should bring a case against the states shipping nuclear materials in the International Tribunal for the Law of the Sea (ITLOS).[141] This would be the most efficient solution for resolving the currently conflicting laws in that it would bring about the most clarity in the least amount of time. It could also be a double-edged sward for proponents of the precautionary principle. One can imagine the judges ruling in favor of the laws as set out in UNCLOS and the INF Code since they are the more established and clearer standards of international law. On the other hand, ITLOS could use its equity power to require the IMO to adopt the precautionary principle in order to calm the valid security concerns of coastal states and end the controversy once and for all.

Another interesting suggestion is the creation of a "universal sea lane" for the shipment of nuclear materials.[142] This solution would maintain the status quo regarding the lack of clarity in international law, but would also create an interim option to facilitate shipping while allowing coastal states to prohibit passage. Though this is a novel idea, in practice it would seem to be a difficult undertaking to negotiate such an agreement between shipping and coastal states. To begin with, where would this sea lane be located? Coastal states would likely all have the same opinion for such an agreement: we support it as long as the route doesn't pass through our waters. This 'not in my back yard' mentality would likely stall such an agreement indefinitely. Furthermore, shipping states would most likely be wary of such an idea because of their interest in secrecy and unpredictability to protect national security. The use of a single sea lane would conceivably create predict-

141. Van Dyke, *Regime*, *supra* note 9, at 108.

142. Lawrence Marin, *Oceanic Transportation of Radioactive Materials: The Conflict between the Law of the Seas' Right of Innocent Passage and Duty to the Marine Environment*, 13 FLA. J. INT'L L. 361, 375-377 (2001).

able patterns of transport that could be exploited by pirates and/or terrorists groups.

VII. CONCLUSION

In light of the recent controversies in the international shipping of nuclear materials, and upon reviewing the divergent hard and soft international law within this area, it is clear that there is a conflict between the quickly evolving field of international environmental law and the established system surrounding the international law of the sea. How to solve this problem, however, is not clear at present. The existing nuclear safeguards and law of the sea regimes provides binding legal provisions and a system of regulation for the shipment of nuclear materials. Furthermore, it seems apparent that the denial of the right of innocent passage by coastal states to ships carrying nuclear material is, except in limited circumstances, in violation of the existing law of the sea regime.

It also seems apparent, however, that the drafters of UNCLOS may not have foreseen the scale shipments would ultimately take or the potential danger that they pose. The tremendous amount of damage that would occur in the event that a ship like the *Pacific Pintail* were to be involved in a terrorist attack or major accident with radioactive effect is almost beyond imagination. In today's energy starved world, however, these shipments are most likely going to be a permanent part of the landscape of international shipping, and thus will have to be dealt with in a safe and effective manner.

The requirements of the precautionary principle seem to be a sensible way to ensure the safety of nuclear shipments in the future, though opponents would likely argue that they would create inefficiencies. If the precautionary principle is indeed a "developing custom," it is only a matter of time before these requirements will become standard practice. Therefore, it may be in the best interests of shipping states to embrace the requirements of the precautionary principle now and find ways to overcome the inefficiencies. If shipping states wait until being forced to comply with the requirements down the road, it will only come at greater expense.