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Nuclear Waste Dumping in the Oceans: Has the Cold War Taught Us Anything?

ABSTRACT

The United States and other international actors have relied without much success on traditional approaches to contain environmental damage done to our oceans by Russian dumping of nuclear waste. Our arms control experience suggests that on-site inspection is successful in situations where there is a lack of information or a lack of trust. Using on-site inspection to gather information and bolster trust could ameliorate the problem of Russian dumping of radioactive wastes into the ocean, so long as the political and financial costs of on-site inspection do not prove to be prohibitively high.

I. THREATS TO NATURAL RESOURCES AS THREATS TO PEACE—COLD WAR SOLUTIONS TO NEW AGE PROBLEMS?

Gone are the days when natural resources are considered in solely an economic or allocative fashion. Instead, threats to natural resources increasingly are seen as threats to international peace. Traditionally, "peace" has been defined simply as "an absence of war."¹ However, more progressive definitions of peace have been suggested:

By peace we mean the absence of violence in any given society, both internal and external, direct and indirect. We further mean the nonviolent results of equality of rights, by which every member of that society, through nonviolent means, participates equally in decisional power which regulates it, and the distribution of the resources which sustain it.²

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1. See generally BIRGIT BROCK-UTNE, *EDUCATING FOR PEACE: A FEMINIST PERSPECTIVE* 1 (1985).

2. BROCK-UTNE, *supra* note 1, at 2 (emphasis added).

Under this definition, when a country harms the environment at the expense of the international community, it threatens international peace and security.

Although natural resources play an important role in maintaining peace and security, we do not have much experience with how to resolve conflicts arising in this area. This has become only too evident recently, as the United States and other international actors try to contain the environmental damage being done to our oceans by Russian dumping of nuclear waste. Traditional approaches have failed to gain Russian compliance with international demands. How should we resolve this conflict?

Since most of our experience with breaches of peace and security is in the military area, perhaps we should look for solutions in our military and nuclear experience. One of the most promising in the military area, in terms of its transferability to the environmental realm, is the use of on-site inspection in arms control agreements. On-site inspection provisions in arms control agreements have been an effective means for reducing past threats to peace and security.³ As the name suggests, on-site inspection includes a variety of techniques in which inspectors physically go to a certain site to verify that a signatory to an arms control agreement is actually complying with the agreement.⁴ In this Article, I suggest that many of the experiences gained from on-site inspection provisions in arms control agreements can be transferred to the environmental arena, particularly to the problem of Russian dumping of radioactive wastes into the ocean.

II. THE PROBLEM—WHAT HAS RUSSIA DONE WRONG?

Long History of Radioactive Dumping

The irony of Russia's newfound openness is the extent to which the rest of the world is discovering how much the former Soviet Union was able to keep secret over the years. A recent report released by the Russian Federation indicates that the Soviet Union misled world authorities in asserting that it had never dumped radioactive waste into the oceans.⁵ The report was prepared by forty-six Russian experts,

3. For a more complete survey of treaties containing on-site inspection provisions, evaluations of success/failure of on-site inspection provisions, et cetera, see the On-Site Inspection Database, compiled by Sandia National Laboratories. This database contains abstracts of a variety of resources discussing on-site inspection provisions in arms control agreements.

4. See generally LAURENCE COSTIN ET AL., *ARMS CONTROL AND VERIFICATION* (1992).

5. See generally *FACTS AND PROBLEMS RELATED TO RADIOACTIVE WASTE DISPOSAL IN SEAS*

headed by Dr. Aleksei Yablokov, the top environmental advisor to Russian President Boris Yeltsin.⁶ The Yablokov report says the Soviet Union dumped eighteen nuclear reactors from submarines and from a nuclear icebreaker.⁷

The Yablokov report reveals that the Soviet Union dumped 2.5 million curies of radioactive waste into the oceans.⁸ This amount of waste is twice the combined total radioactive waste dumped by twelve other nuclear nations during the entire nuclear era.⁹ The amount dumped is significant: for example, "the recent accident at the Tomsk-7 nuclear plant in Siberia is said to have released ten curies of radiation,"¹⁰ and after the accident at Three Mile Island, a total of fifteen curies were released. Of the eighteen reactors that were dumped, six contained highly radioactive fuel and were deposited in the shallow waters of the Arctic Ocean, the Sea of Japan, the Barents Sea, and the Kara Sea.¹¹

Vitaliy Lystsov, deputy director of the Russian ministry of environment, who helped to prepare the Yablokov report, stated that the reactor material is shielded by a mix of special polymers, cement, and other compounds. This protective coating is supposed to keep the radiation sealed off from the marine environment for at least five centuries, according to Lystsov.¹² However, no one has examined the shield to see whether it is holding up. The Yablokov report is frank in admitting failures in this area:

[The] container material is subject to corrosion. Metal containers fail in seawater after 10 years, and concrete ones in 30 years. All studies of radiation conditions since 1967 have been performed in water areas located 50-100 kilometers from solid radioactive waste disposal areas. Direct monitoring of radia-

ADJACENT TO THE TERRITORY OF THE RUSSIAN FEDERATION (materials for a Report by the Government Commission on Matters Related to Radioactive Waste Disposal at Sea, Created by Decree No. 613 of the Russian Federation President, October 24, 1992) [hereinafter YABLOKOV REPORT]. On file with author.

6. *Id.*

7. YABLOKOV REPORT, *supra* note 5, at tbl. A4.

8. A curie is the amount of radiation given off by one gram of radium and, in any nuclear material, is equal to the disintegration of thirty-seven billion atoms per second. An old-style luminous watch dial with twelve radium dots emitted about three one-thousandths of a curie of radiation.

9. YABLOKOV REPORT, *supra* note 5, at § 1.2.

10. William J. Broad, *Study Says Soviets Dumped Nuclear Reactors Into Sea*, DETROIT FREE PRESS, Apr. 27, 1993, at 5A.

11. Senator Frank Murkowski, *Russia Has to Clean Up Nuclear Weapons Dumped in Sea*, CHRISTIAN SCIENCE MONITOR, May 11, 1993, available in LEXIS, Nexis Library, Papers File.

12. Hal Bernton, *Russian Revelations Indicate Arctic Region Is Awash in Contaminants*, WASHINGTON POST, May 17, 1993, at A3.

tion conditions in such waste disposal areas themselves has not been performed for 25 years.¹³

Other incidents of radioactive contamination are also being revealed. From 1948 to 1952, in one of the "secret cities" of the former Soviet Union, Chelyabinsk-65, weapons producers dumped radioactive waste directly into a river that served as the source of drinking water for 28,000 downstream residents.¹⁴ In addition, severely contaminated Russian rivers have been pouring radioactive contaminants, polyvinyl chlorides, heavy metals, and raw sewage into the once pristine Arctic Ocean. "Although the Arctic Ocean represents only 1.5 percent of the world's ocean volume, it receives roughly 10 percent of the planet's river discharges," according to the University of Washington's Polar Science Center.¹⁵ "Underground atomic bomb explosions have fouled ground water that flows into some rivers [a]nd a once-secret plutonium plant at Krasnyarsk has for decades been bleeding wastes into the Ob, one of Russia's largest rivers."¹⁶ Heavy metals and PCBs exist in many Arctic plants and animals.¹⁷ These are only a few examples of the many environmental disasters unfolding in the era of *glasnost*.

Recent Dumping in the Sea of Japan

The international community has recently voiced concern about Russia's practice of dumping low-level radioactive waste into the seas.¹⁸ Russia confirmed on October 18, 1993, that "one of its tankers dumped 900 tons of liquid nuclear waste in the Sea of Japan."¹⁹ It also confirmed plans to dump another 800 tons by November 15.²⁰ This dump was later postponed.²¹ The Russian Federation is a signatory to the London Convention—formally the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972—which is a treaty under the International Maritime Organization (IMO).²² The Convention bans the dumping of high-level radioactive wastes listed in

13. YABLOKOV REPORT, *supra* note 5, at § 3.1.

14. *Id.*

15. Hal Bernton, *Russian Revelations Indicate Arctic Region Is Awash in Contaminants*, WASHINGTON POST, May 17, 1993, at A3.

16. *Id.*

17. Scott A. Hajost & Stephanie L. Pfirman, *Arctic Pollution Cleanup Overdue*, CHRISTIAN SCIENCE MONITOR, Feb. 8, 1993, at 18.

18. Nuclear Dumping Ban, CHRISTIAN SCIENCE MONITOR, Nov. 23, 1993, at 18.

19. *Id.*

20. *Id.*

21. *Id.*

22. Intergovernmental Conference on the Convention on the Dumping of Wastes at Sea: Final Documents, Nov. 13, 1972, 11 I.L.M. 1291. [hereinafter London Convention].

Annex I, and the signatories recently agreed to a moratorium on dumping of other radioactive wastes listed in Annex II, except under special circumstances. However, dumping of "unpackaged liquid radioactive waste" is prohibited.²³ Pursuant to this treaty, the Russian Federation Ministry of Protection of the Environment & Natural Resources wrote a letter to the International Atomic Energy Agency (IAEA) on October 5, 1993, that warned of the dumping to take place in the Sea of Japan.²⁴ However, the IAEA failed to tell the Russian Federation that the proposed dumping was prohibited under the London Convention until after the dumping took place, and failed to notify the IMO or the other signatories to the London Convention.²⁵

Naturally, Japan was not pleased with these developments. After the October 17 dumping, in response to national outrage in Japan, Japanese Foreign Minister Tsutomu Hata phoned his Russian counterpart Andrei Kozyrev to ask him to stop the second dump.²⁶ However, the Russian Federation did not make this concession without pressing its advantage. During a meeting between representatives of the Russian Federation and Japan in Tokyo during December, the Russia claimed it would be forced to dump radioactive waste again unless Japan put up the money for an additional storage site.²⁷ Japan responded by offering to provide a chemical tanker, with a storage of capacity of 5,000 to 25,000 tons, for the coastal area of the Russian Far East. Japan also agreed to help build a facility on Russian soil that would solidify the liquid waste and store the compact waste underground.²⁸ Japan seemed insistent that the new facilities be used for the four unused tankers anchored in the Russian Far East, rather than for waste from submarines that are still in service.²⁹

Curiously, a high ranking official of the Russian Foreign Ministry commented that, although Russia was grateful to Japan for its offer to cooperate in nuclear ecology, "unfortunately the inspection of a Japanese tanker showed that it cannot be used as a safe storage of liquid nuclear waste. Secondly, we can fill up one tanker and then what? Therefore, the main workload has to be carried out by Russian vessels"³⁰

23. *Id.*

24. *Id.*

25. *Id.*

26. Naoaki Usui, *Mikhailov, in Tokyo, Pledges No More Waste Dumping in Japan Sea*, NUCLEONICS WEEK, Oct. 28, 1993, at 10.

27. Satoshi Isaka, *Moscow's Brinkmanship Tries Tokyo's Patience: Russian Request for Disposal Assistance Meets Cagay Response*, NIKKEI WEEKLY, Dec. 27, 1993, at 24.

28. *Id.*

29. *Id.*

30. *Russia: Prospects for Cooperation with Japan on Dumping of Nuclear Waste*, BBC SUMMARY OF WORLD BROADCASTS, Jan. 28, 1994, available in LEXIS, Nexis Library, Curnws File.

Obviously, the Russian Federation, despite its new "openness," feels strongly about retaining control over its own dumping of nuclear waste. This desire to retain authority over its own affairs continues to be seen in the Russian Federation's refusal to sign on to the most recent modification of the London Convention.

London Convention

The London Convention was originally signed in 1972 by the world's major maritime and industrial states.³¹ The Convention outlined certain rules as to what could be dumped in the sea. A ban on dumping heavily radioactive waste was instituted at once, followed by a ten-year moratorium in 1983 on depositing slightly or moderately radioactive substances in the sea.³² A motion proposed by Denmark and adopted in November, 1993, calls for an absolute and unconditional ban on dumping any nuclear waste in the seas. This agreement follows the Ocean Dumping Ban Act of 1988, enacted by the United States, which is an attempt to end dumping of industrial waste and sewage sludge at sea. "An earlier version of the act permit[ted] dumping low-level waste at sea only if 'designated findings had been made by the Environmental Protection Agency.'"³³ Russia is now the only country refusing to ratify the absolute ban on dumping radioactive materials in the sea. However, upon entry into force of this amendment, the International Maritime Organization announced that Russia had pledged to "endeavor to avoid pollution of the sea by dumping of wastes."³⁴ Many groups are not convinced, however; Greenpeace had this to say on Russia's refusal to comply: "[I]n spite of offers of aid from the international community, and the scientific and technical resources available in Russia, the authorities have chosen to persist in their irresponsible, incompetent, and isolationist attitudes, which could lead to increased pollution in the oceans due to the dumping of radioactive military waste."³⁵ Only time will tell whether Russia will be able to keep its pledge.

31. Gamini Seneviratne, *IAEA Accused of Supporting Russian Radwaste Dumping*, NUCLEONICS WEEK, Nov. 11, 1993, at 14.

32. *Nuclear Waste: Russia Alone in Dumping Radioactive Waste in the Sea*, EUROPE ENERGY, Mar. 4, 1994, No. 419, available in LEXIS, Nexis Library, Curnws File.

33. *Nuclear Dumping Ban*, *supra* note 18, at 18.

34. *Radioactive Waste Dumping Ban at Sea Takes Effect*, REUTERS WORLD SERVICE, Feb. 21, 1994, available in LEXIS, Nexis Library, Curnws File.

35. *Nuclear Waste: Russia Alone in Dumping Radioactive Waste in the Sea*, *supra* note 32, at 14.

III. HOW CAN OUR NUCLEAR ARMS CONTROL EXPERIENCE INFORM OUR NUCLEAR WASTE CONTROL FUTURE?

The Role of On-Site Inspection

On-site inspection has been a useful means of reducing conflict in arms control negotiations. So where have on-site inspection provisions in arms control agreements been helpful in reducing threats to peace and security? On-site inspection provisions have been most useful where they: 1) increase certainty (or trust, to use a more value-laden term); or 2) increase information. These factors do not operate independently of one another, but are interrelated.

Take, for example, the Non-Proliferation Treaty (NPT), one of the longest running examples of an arms control treaty incorporating on-site inspection provisions.³⁶ The NPT is founded on the policy belief that control over the nuclear materials used in the peaceful uses of nuclear energy is as important as control over nuclear armaments themselves.³⁷ To this end, a system of "safeguards" was developed to provide assurance that the materials and equipment used in peaceful nuclear activities are not diverted to use in nuclear weapons programs.³⁸ This complex accounting system continues to be administered by the International Atomic Energy Agency (IAEA).³⁹ Under the NPT, non-nuclear weapon parties must accept IAEA safeguards and IAEA inspectors for the purpose of verification of the fulfillment of their obligation not to acquire nuclear weapons.⁴⁰

The long experience with IAEA safeguards has helped to improve the quality and consistency of information about nuclear materials and equipment globally.⁴¹ While it is impossible to say how many non-nuclear weapons states would have become nuclear weapons states without the NPT, it is probable that the NPT was instrumental in reducing nuclear proliferation. Since the implementation of the NPT, only Israel,

36. Treaty on the Non-Proliferation of Nuclear Weapons, July 1, 1968, 21 U.S.T. 483, 729 U.N.T.S. 161.

37. MASON WILLRICH, NON-PROLIFERATION TREATY: FRAMEWORK FOR NUCLEAR ARMS CONTROL 58 (1969).

38. *Id.*

39. *Id.*

40. Treaty on the Non-Proliferation of Nuclear Weapons art. III, *supra* note 36.

41. Note, however, that this information is far from perfect. Many nations, including the United States, have questioned the accuracy of the IAEA accounting methods and systems of controlling the international trade and exchange of nuclear technology and materials. See U.S. DEPARTMENT OF STATE, BUREAU OF PUBLIC AFFAIRS, SECURITY AND ARMS CONTROL: THE SEARCH FOR A MORE STABLE PEACE 60 (1983).

India, Pakistan, Algeria, Egypt, Iran, Iraq, Libya, North Korea, and Syria have either officially or non-officially joined the nuclear club.⁴² Without the exchange of information made possible through on-site inspection by the IAEA, the certainty or "trust" among nuclear and non-nuclear weapon nations would probably have not resulted.

On the downside, on-site inspection provisions have been less than helpful in reducing threats to peace and security where: 1) they have been a "deal-breaker" in treaty negotiations or 2) the cost was too high, either financially or politically. These two factors are interrelated. If the cost is too high, either financially or politically, an on-site inspection provision can be a deal-breaker in treaty negotiations. This dynamic occurred in several arms control treaty negotiations between the United States and the Soviet Union.⁴³ Also, State One will sometimes make on-site inspection a crucial element in a treaty, knowing the provision will be a deal-breaker for State Two, because the cost to State One of the proposed arms control is simply too high. The United States used this tactic in several arms control negotiations with the USSR.⁴⁴

Now that on-site inspection in the arms control context has been discussed, the next question is whether these ideas are transferable to the environmental context, in particular to the problem of Russian dumping of radioactive wastes into the oceans.

Lack of Certainty or Trust

There is a problem of certainty and trust when it comes to the problem of radioactive dumping in the former Soviet Union, or any dumping worldwide for that matter. Currently, there is not any one overarching international agency or association that monitors nuclear dumping in the seas.⁴⁵ As noted above, the International Maritime Organization sponsors the London Convention, but it does not purport to monitor the agreement. In the absence of international authority, then, we should look to domestic Russian law to see whether it will be adequate to control Russian nuclear waste dumping.

42. ROBERT D. BLACKWELL & ALBERT CARNESALE, *NEW NUCLEAR NATIONS: CONSEQUENCES FOR U.S. POLICY* 36 (1993).

43. See generally COSTIN ET AL., *supra* note 4.

44. *Id.*

45. Currently, the IAEA says it has only a technical role in the IMO—to define high-level radioactive waste, recommend provisions under which dumping permits for other radioactive wastes may be issued by the convention signatories, and regularly advise the parties on technical matters. Seneviratne, *supra* note 31, at 14.

Russian Law on Nuclear Dumping in the Seas

Little law exists in Russia regarding the dumping of nuclear waste in the seas. Probably the most relevant law is the Russian Federation Law, *Protection of the Natural Environment* (December 1991), Article 50 of which, *Ecological Requirements in the Use of Radioactive Materials*, provides:

The import of radioactive waste and materials from other nations for storage or disposal purposes, and the sinking or sending into space of radioactive waste and materials for disposal purposes, is prohibited.⁴⁶

The Yablokov report goes on to admit that "this law not only prohibits the disposal of radioactive waste in the territorial waters of the Russian Federation, it prohibits any disposal of radioactive waste on Russian territory in any sea."⁴⁷ However, as noted above, the Russian Federation has acknowledged in the Yablokov report that it repeatedly has broken its own laws.

Another set of relevant Russian Federation laws are the *Rules Governing Charges for Environmental Pollution, Waste Disposal, and Other Hazardous Effects*, as confirmed by Russian Federation Government Decree No. 632 of August 28, 1992.⁴⁸ The main purpose of these rules is to levy charges for "several hazardous effects on the environment," including:

- emission into the atmosphere of pollutants from stationary and mobile sources;
- dumping of pollutants into surface and underground bodies of water;
- waste disposal; and
- other hazardous effects (noise, vibration, electromagnetic and radiation effects, et cetera).

The law establishes charges for two tiers of pollution—for emissions within acceptable standards, and for emissions within established limits (i.e., temporarily agreed standards). Charges are fixed for each ingredient of pollutant and type of hazardous effect, taking into account the degree of hazard posed to the environment and to human health. Coefficients to the basic charges will be established for individual regions and river

46. YABLOKOV REPORT, *supra* note 5, at § 2.2.

47. *Id.*

48. Rules Governing Charges for Environmental Pollution, Waste Disposal and Other Hazardous Effects, as confirmed by RF Government Decree No. 632 of Aug. 28, 1992, available in WESTLAW, RUSLINE Database, 1992 WL 474515 (Rus. Legis.).

basins taking into account ecological factors and importance of natural and sociocultural objects.⁴⁹

Although it is not entirely clear from this set of rules, it appears that in order to release emissions a "user of nature" must be in possession of "a duly perfected emission-dumping-disposal permit."⁵⁰ If the polluter is not in possession of such a permit, the whole mass of pollutants will be regarded as being over and above the limit.⁵¹ In this case, charges for the over-limit of pollution will be determined by multiplying the respective charge rates for pollution within the established limits by the magnitude of excess of the actual mass of emitted pollutants, volume of disposed waste, and hazardous effect levels over and above the established limits.⁵² Once these figures are summed, they are multiplied by a five-fold increase coefficient.⁵³

While these rules represent a positive step toward stemming the flow of nuclear waste into the seas, they fall short in many respects. First, the *Rules* only apply to "enterprises, institutions, and organizations, and foreign legal and natural persons engaged in any type of activity on Russian Federation territory involving the use and management of nature."⁵⁴ The majority of the problems to date have resulted from dumping by Russian governmental agencies or by Russian military units. While the law does not define "enterprises, institutions, or organizations," it is likely that neither the Russian government nor the military are obligated by this particular law. Second, it is not clear what "acceptable standards" for pollution are under this law. Are the standards set "case-by-case," or are they set per type of pollutant? When it comes to radioactive waste dumping in rivers and oceans any level of radioactive contamination may create objectionable environmental and health risks.

There are other Russian laws that bear upon the problem of radioactive waste, but they relate more to the preservation of lands and the use of subsoil. The *Statute of State Monitoring of Land Use and Protection* does mention the dumping of radioactive substances, but the agencies involved only enforce the prevention of littering of lands and the pollution of soils.⁵⁵ The *Statute of Charges of Use of Subsoil, Water, and Seabed Areas* also discusses radioactive waste, but only in conjunction with extracting subsoil minerals.⁵⁶ These laws have many of the same

49. *Id.* cl. 2.

50. *Id.* cl. 6.

51. *Id.*

52. *Id.* cl. 5.

53. *Id.*

54. *Id.* cl. 1.

55. RF Government Decree No. 594, available in WESTLAW, RUSLINE Database, 1992 WL 472550 (Rus. Legis.).

56. Statute of Charges for Use of Subsoil, Water, and Seabed Areas, RF Government

problems as the *Rule Governing Charges* discussed above. They only apply to the amorphous institutions, enterprises, and organizations, not government entities, and the details of enforcement and standards within these laws are not clear.

It is obvious that Russian internal regulations are not yet sufficient to convince the rest of the world that radioactive waste will not be dumped into the seas. Since Russia refuses to sign the latest amendment to the London Conference, and as of yet there is no international monitoring authority, some external check on Russian dumping must be explored to increase certainty and trust among nations. Because of this lack of certainty, on-site inspection of Russian waste facilities and oceans surrounding Russia would reduce threats to security.

Lack of Information

There is also a lack of information with regard to the problem of Russian dumping. Although the Yablokov report is a step in the right direction, little information about Russian dumping has been available from Russian sources. It is not clear the extent to which the various Russian agencies communicate with one another. The recent troubles between Boris Yeltsin and the Russian military suggest that the relationship among various governmental agencies in Russia is not always cooperative and harmonious. Diminished economic resources for Russia also mean that things like nuclear waste disposal, and monitoring of waste discharges, have a lower priority than ever.⁵⁷

The international community is beginning to step into the information breach, but not with any coordination. Upon discovery of the thirty-five ocean nuclear dump sites used by the former Soviet Union, scientists associated with the Woods Hole Oceanographic Institution met to assess environmental damage.⁵⁸ The groups consisted of 116 representatives from ten countries, including twenty-four Russian scientists.⁵⁹ The group concluded that "any potential problem would be a local one and would pose no threat on a global scale."⁶⁰ However, the group recognized a lack of information, and revealed that Norway, Russia, and the United States were planning a total of five research cruises to the

Decree No. 828, available in WESTLAW, RUSLINE Database, 1992 WL 472599 (Rus. Legis.).

57. Russia's threats to Japan regarding dumping nuclear waste in the Sea of Japan evidence this lack of resources. See *supra* text accompanying notes 18-30.

58. David Arnold, *Waste Threat Called Slight—No Wide Contamination Seen From Dumped Soviet Reactors*, BOSTON GLOBE, June 28, 1993, at 38.

59. *Id.*

60. *Id.*

Barents, Kara, and Norwegian seas to assess the situation further.⁶¹ The Woods Hole group made several recommendations to improve information flow:

- Declassification of all data regarding nuclear material dumped overboard.
- A continuing series of international workshops to compare data and develop models for better understanding radioactive decay in the ocean.
- Establishment of universal standards for scientific sampling and recordkeeping.
- A closer study of the dumpsites and human populations living in regions near the sites.⁶²

In addition, the eight Arctic nations—Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden, and the United States—in 1991, adopted the Arctic Environmental Protection Strategy, which includes an Arctic Monitoring and Assessment Program to "promote international efforts to protect the Arctic environment and its native peoples."⁶³ The monitoring program sent scientists on boat trips to sample waters from western Russia to Alaska's Beaufort Sea.⁶⁴ Although a positive step, the group does not focus exclusively on radioactive dumping in the seas, and is severely underprioritized and underfunded.⁶⁵

In addition to these multilateral efforts, Japan and Russia have agreed to carry out the first joint study to assess the environmental impact of Russia's past dumping of nuclear waste into the Sea of Japan. Research vessels from the two nations will conduct a 31-day survey of the areas where the dumping occurred. They will be joined by South Korea.⁶⁶ However, this excursion is largely the result of a single crisis—the international community needs to implement a more regular, consistent program of nuclear waste monitoring.

As mentioned above, the IAEA is not prepared to take on the task of monitoring nuclear waste dumping in the oceans, nor is it currently enabled by any treaty to take on this duty. The IMO only gives them a "technical role," although this may change, as we shall see in later sections.

61. *Id.* See generally 8 ARCTIC RESEARCH OF THE UNITED STATES, Spring 1994.

62. *Id.*

63. Hajost & Pfirman, *supra* note 17, at 18.

64. *Conference Details Extent of Pollution in Arctic*, CHICAGO TRIBUNE, May 6, 1993, at 4.

65. Hajost & Pfirman, *supra* note 17, at 18.

66. Isaka, *supra* note 27, at 24.

Problems of On-Site Inspection

It is not likely that on-site inspection in and of itself would be a deal-breaker for Russia. The trend in international agreements has been toward accepting more and more intrusive means of verification. For example, the PNET and INF treaties incorporated more intrusive on-site inspection provisions than ever accepted before by the former Soviet Union.⁶⁷ Although not on the subject of nuclear arms control, the Chemical Weapons Convention breaks many barriers to verification, incorporating challenge inspections and anytime, anyplace inspections.⁶⁸ The more difficult question is whether the costs of inspection will be too much for Russia and other signatories to a multilateral convention permitting such inspection.

Costs of On-Site Inspection

The costs of on-site inspection could be quite high and may be unacceptable not only to the Russian Federation, but to the rest of the world. Since many respectable scientists have dismissed Russian dumping of low-level radioactive waste as harmless,⁶⁹ Russia and many others in the global community may simply consider the cost of on-site inspection too high. If an agreement to verify were adopted multilaterally, there may well be other nations who object to intrusive inspection of their nuclear programs, such as the United States and North Korea.

One Russian scientist, Vladimir Lakimets of the Russian Academy Sciences, said he hoped the United States would be as candid about aspects of the submarine *Scorpion*, lost off the Azores in 1968, as the Russians have been about the *Komsosets*, lost off the coast of Norway in 1989.⁷⁰ "We would all gain much if we knew the state of the reactor on the *Scorpion* and corrosion coefficients (a means to estimate the rate of leakage from the submarine)."⁷¹ He also pointed out that the United States has been less than forthcoming about the way liquid and solid nuclear waste is stored on land.⁷²

In addition to the high political cost of permitting multilateral on-site inspection of nuclear waste dumping in the oceans, the financial cost is also likely to be high. Countries which have been dumping

67. See generally On-Site Inspection Database, *supra* note 3.

68. Convention on the Prohibition of the Development, Production, Stockpiling, and Use of Chemical Weapons and on Their Destruction, Jan. 13, 1993, 32 I.L.M. 800 (1993).

69. Arnold, *supra* note 58, at 38.

70. *Id.*

71. *Id.*

72. *Id.*

radioactive waste "free of charge" into the oceans would need to build land storage sites—an expensive proposition. Then there are the costs associated with actually monitoring a multilateral agreement—the cost of the research cruises, scientists, and maintaining an organization to implement such an agreement. A unique problem presents itself—the nuclear nations which most need monitoring are those in the best position to pay for that monitoring. However, it is not necessarily in their "national interest" to have their own nuclear disposal practices exposed to other members of the international community. This will be a difficult problem to overcome.

Solutions

The problem of maritime dumping of radioactive waste is complicated. However, information must be gathered about the extent of dumping so that solutions to the dilemma can be found. This information must be gathered not only for the Russian Federation, but for all nuclear nations. The most reasonable solution would be to expand the role of the International Atomic Energy Agency (IAEA), in coordination with the International Maritime Organization and possibly the U.S. National Oceanic and Atmospheric Agency. In addition to its task of administering safeguards controlling nuclear materials and equipment, the IAEA could send inspectors to trouble spots in the oceans to measure levels of radioactivity. These measurements need to be taken in a consistent, universal, and standardized fashion.

Other monitoring strategies could also be considered, perhaps similar to the portal-perimeter monitoring under the Intermediate Nuclear Forces Treaty. More intermediate solutions might include conditioning aid from the United States, the United Nations, or the World Bank on adherence to environmental standards.⁷³ Additional aid should be earmarked specifically for building new land-based sites.

To improve environmental waste disposal laws in countries producing radioactive waste, the International Maritime Organization could work on developing a model code which would guide development of domestic laws. Bolstering the strength of domestic laws would be akin to confidence-building measures in the Conventional Forces in

73. Under recently introduced legislation, (H.R. 1798), only Russia and Belarus would be eligible immediately for previously appropriated assistance funneled through the U.S. Department of Energy, because the aid would go only to countries that have joined the Nuclear Non-Proliferation Treaty. This bill would also require the identification and assessment of contaminated sites, along with ranking of priorities for their cleanup. *Bill Would Peg Environmental Aid to Joining Non-Proliferation Treaty*, Int'l Env'tl. Rep. (BNA) No. 336 (May 5, 1993).

Europe Treaty.⁷⁴ Model codes have improved the quality of law in many areas. For example, the International Law Commission's recommendations regarding water law and the law on reparations after nationalization have given some direction to the development of domestic laws.⁷⁵

The problem of nuclear waste dumping in the world's oceans has not developed overnight, nor will it go away that quickly. However, through cooperative measures such as the inspection and monitoring programs discussed above, progress can be made toward ensuring that our oceans do not become heavily polluted by radioactive wastes. McDougal defines international law as "a process by which the peoples of the world clarify and implement their common interests in the shaping and sharing of values."⁷⁶ The world's peoples cannot begin to implement their common interests in the area of maritime nuclear waste unless they can get accurate information. On-site inspection and monitoring of maritime nuclear waste would be a valuable first step in gathering such information. Although the solution to these problems will be difficult, the potentially disastrous results of inaction represent a far worse alternative.

74. See generally On-Site Inspection Database, *supra* note 3.

75. For example, see the work done by the ILA Water Resources Committee, including the Draft Articles for Remedies for Transboundary Damage in International Watercourses, Rome, 9-11 February, 1994.

76. Myres McDougal et al., *The World Constitutive Process of Authoritative Decision*, in 1 THE FUTURE OF THE INTERNATIONAL LEGAL ORDER 73-154 *passim* (Richard A. Falk & Cyril E. Black eds., 1969).