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## Medzamor: Weighing the Reopening of Armenia's Unstable Nuclear Power Plant and the Duties of the International Community

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1994]

**MEDZAMOR: WEIGHING THE REOPENING OF ARMENIA'S  
UNSTABLE NUCLEAR POWER PLANT AND THE  
DUTIES OF THE INTERNATIONAL  
COMMUNITY**

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I. INTRODUCTION

From 1991-92, the world witnessed miraculous changes. From the dissolution of the communist bloc and the Union of Soviet Socialist Republics ("USSR") arose several new nations. Throughout this period of change, however, one condition remained constant: the environment remained in a state of crisis.<sup>1</sup>

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1. Although this Comment focuses on Armenia's environmental crisis, other former members of the USSR inherited environmental problems as well. *See generally* Stephanie Gillette, Comment, *Nuclear Energy Crisis in the Former Soviet Union: Will the Nuclear Energy Protocol of the European Energy Charter Provide the Necessary Solutions?*, 5 GEO. INT'L ENVTL. L. REV. 375, 375 (1993). For example, on March 24, 1992, a Chernobyl-type reactor at the Sosnovy Bor power station near St. Petersburg, Russia, leaked radioactive iodine into the atmosphere. *Id.* Similar events have led to global concern over the reactors inherited from the former USSR. *Id.* Experts believe that the heirs lack the skill, knowledge, and funds to run the reactors safely. *Id.* at 376.

The environmental crises these new nations face are the result of years of neglect by the former USSR. Faced with the choice between environmental protection and economic development, the former USSR selected the latter.<sup>2</sup> The newly independent republics now face the same choice, but under even more dire circumstances. For instance, Armenia is in extreme economic turmoil.<sup>3</sup> The new nation lacks food, energy, and heat. With another harsh winter fast approaching, Armenia needs answers to its economic and energy problems. In the eyes of the government, the solution is to reopen Medzamor, a nuclear power plant which was shut down

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This fear has promulgated neighboring nations to develop assistance programs to aid the former republics. *Id.* at 377. The new nations require assistance because they are dependent on nuclear energy. *Id.* at 375-82 (stating that dependence stems from devastated economies and lack of hard currency needed to shift energy production to other sectors). Despite the danger the reactors pose, the former Soviet citizens require heat to survive the harsh "Soviet" winters. *Id.* at 376. This dilemma is precisely the predicament in which Armenia finds itself.

For a comprehensive discussion on the Commonwealth of Independent States' ("CIS") lack of alternatives to nuclear reactors, see Gillette, *supra*. For a discussion on the different designs of USSR reactors including diagrams, see Philip P. Ketchian, *The History and Environmental Impact of Nuclear Power in Armenia*, THE ARMENIAN MIRROR-SPECTATOR, Sept. 25, 1993, at 8 [hereinafter Ketchian, *Part Two*].

2. For a discussion of how the former Soviet Union traded the environment for economic development, see *infra* notes 13-21 and accompanying text.

There is some indication that the former USSR was not alone in its pursuit of economic advances at the expense of the environment. For a discussion of global neglect of the environment, see Roseann Eshbach, Comment, *A Global Approach to the Protection of the Environment: Balancing State Sovereignty and Global Interests*, 4 TEMP. INT'L & COMP. L.J. 271 (1990).

The international community has recently recognized the need to interconnect environmental concerns with economic concerns. In June 1992, the United Nations Conference on Environment and Development ("UNCED") identified five key elements of sustainable development:

- 1) [E]mphasis on quality of life rather than on sustained production of commodities;
- 2) a broadened concept integrating pollution and natural resources with the whole natural environment;
- 3) treating the environment as an economic resource;
- 4) differentiating between developed and developing countries' responsibilities for global environmental damage and for response measures to potentially damaging activities; and
- 5) concern with broader national policies, strategies, and practices.

Mukul Sanwal, *Sustainable Development, the Rio Declaration and Multilateral Cooperation*, 4 COLO. J. INT'L ENVTL. L. & POL'Y 45, 45-46 (1993). Countries are to work on decreasing the disparity in standards of living and promote an international economic system that will support the environment. *Id.* at 50. The focus on economic concerns will also include increased participation in international agreements from Nongovernmental Organizations ("NGOs"). *Id.* at 58-59. For additional information on NGOs, see Edith B. Weiss, *International Environmental Law: Contemporary Issues and the Emergence of a New World Order*, 81 GEO. L.J. 675 (1993).

3. For a discussion of Armenia's dire situation, see *infra* notes 91-111 and accompanying text.

in 1989.<sup>4</sup> The Armenian government expects the reopening will stimulate the economy and produce the energy needed to run factories and heat homes.

Although this solution seems ideal, there is a critical problem: Medzamor is extremely unstable.<sup>5</sup> The plant is situated at a point where forty fault lines converge.<sup>6</sup> In addition, the plant has deteriorated since its shutdown and experts believe that Armenia does not have the funds to reopen it safely.<sup>7</sup> Furthermore, Armenia is already one of the most polluted former Soviet republics.<sup>8</sup> Thus, like the former USSR, the republic must choose between the environment and the economy. However, unlike the former USSR, this choice is complicated by Armenia's struggle to survive and the need to feed and heat its citizenry.

This Comment first traces the history of environmental pollution in Armenia. It examines the period of Soviet domination and shows how economic development overshadowed environmental concerns. Second, it explores Armenia's struggle to survive and explains why that struggle has caused the republic to consider reopening the unstable nuclear power plant. Next, this Comment examines customary international duties in international environmental law. Finally, this Comment addresses Armenia's duties in reopening the plant and explores whether foreign nations have an obligation to ensure a safe reopening.

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4. Michael Parks, *Soviets Closing A-Plant Due to Fear of Quakes*, L.A. TIMES, Feb. 26, 1989, at 1, 14.

5. *Id.*

6. Michael Gray, *Environmental Pollution Reaches Dangerous Proportions In Armenia*, CAL. COURIER, Jan. 22, 1987, at 7. Medzamor was the first USSR nuclear reactor built in a seismically active area. Ketchian, *Part Two*, *supra* note 1, at 8, 9. The Arabian plate and Eurasian plate are converging underneath the area of Medzamor's location. *Id.* Since the Abu-Samsar fault zone is 30 miles west of Medzamor, geologists have indicated that a powerful earthquake, measuring 10 on the former USSR's MSK-64 scale is a possibility. *Id.* Medzamor was built only to withstand an earthquake measuring 8 on the MSK-64 scale. *Id.* at 8. For a further discussion of the seismic nature of the area surrounding Medzamor (including a map of epicenters) see Ketchian, *Part Two*, *supra* note 1, at 8.

7. See Tony Haplin, *Cold Comfort*, ARMENIAN INT'L MAG., Mar. 1992, at 12, 13. Neither the atomic state inspector nor Medzamor's vice-director believe that the funds allocated to Medzamor are enough to open it safely. *Id.*

8. See Editors of *Raparakainutyun, Armenia Threatened With Biological Death*, 10-11 GLASNOST INFO. BULL. 1987, at 8 [hereinafter *Raparakainutyun*].

## II. THE ROOTS OF ARMENIA'S ENVIRONMENTAL PROBLEMS: THE SOVIET BEGINNING

### A. Soviet Environmental Development

Historically, the USSR was environmentally unenlightened until the mid-1960s.<sup>9</sup> The USSR initially believed that only a socialist, not a capitalist, economy could guarantee environmental protection.<sup>10</sup> Theoretically, socialism promotes harmony between man and his environment by placing both the means of production and the state's natural resources in the people's possession.<sup>11</sup> Thus, the people should promote the welfare of both. Ironically, in practice socialism has actually doomed the environment.<sup>12</sup> Under a socialist system, there is no price attached to the use of natural resources because they belong equally and freely to everyone.<sup>13</sup> Since there is no charge for using resources, factories are not motivated to conserve.<sup>14</sup> In a socialist society, conservation is unprofitable; therefore, it is avoided.<sup>15</sup>

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9. Charles E. Ziegler, *The Politics of Pollution in the Soviet Union and East Europe, Two Years After Chernobyl*, COMM'N ON SECURITY AND COOPERATION IN EUR. DIG., Apr. 26, 1988, at 3; see also W. E. BUTLER, SOVIET LAW 274-276 (1988) (discussing Soviet ecological history). The Soviet people believed that the USSR was so enormous that it would never run out of natural resources. Daniel Sneider, *The Soviet "Ecocidal" Legacy*, CHRISTIAN SCI. MONITOR, June 11, 1992, at 10. This belief led to wasteful practices. *Id.* For instance, orders would be given to mine a single metal from a mountain and then leave the rest as wasteland. *Id.*

10. Eugene N. Lisitsyn, *Environmental Law and Management in the USSR: A Reflection on Contemporary Reforms*, 17 REV. SOCIALIST L. 125, 133-34 (1991).

11. Michael Gray, *High Price for Rapid Industrial Growth*, BOSTON GLOBE, Jan. 4, 1987, at A18, A19 [hereinafter Gray, *High Price*]; see also BUTLER, *supra* note 9, at 274-76 (discussing the relationship of Marxist-Leninism to environmental protection).

12. Robert G. Darst, Jr., *Environmentalism in the USSR: The Opposition to the River Diversion Projects*, 4 SOVIET ECON. 223, 233 (1988). Since the mid-1970s, the former USSR realized that socialist ideas themselves would not ensure conservation. See BUTLER, *supra* note 9, at 274-76. Only then did the government incorporate conservation into the national economic plan. *Id.*; see also Sneider, *supra* note 9, at 10 (discussing a variety of Soviet environmental problems, including the pollution from giant steel complex in Magnitogorsk and Chelyabinsk-65, largest nuclear-waste reprocessing site where unprocessed waste is stored and risk of seepage into Siberian rivers is high).

13. Darst, *supra* note 12, at 233.

14. *Id.*

15. *Id.* The USSR's system serves as a good example of this principle. Productivity had pervasive detrimental effects on the Soviet environment and governed much Soviet action. For instance, even though the former USSR had many environmental laws, these laws were unenforced in order to ensure economic productivity. Lisitsyn, *supra* note 10, at 135; see also MURRAY FESHBACH & ALFRED FRIENDLY, JR., ECOCIDE IN THE USSR 91-110 (1992) (discussing sacrifice of health and environment for production). The former Soviet government punished and rewarded each enterprise according to whether it met its production plan; therefore, an

The former USSR recognized the interrelationship of economic expansion and environmental protection only a few years before its dissolution.<sup>16</sup> This awareness resulted from such incidents as the Chernobyl nuclear power plant accident,<sup>17</sup> the pollu-

enterprise would focus on meeting production targets, not on protecting the environment. Darst, *supra* note 12, at 233. For instance, although there was a reward for meeting production targets, there was none for installing anti-pollution devices. *Id.*

Ultimately, in order to support the economy, environmental protection laws were rendered meaningless by decisions, resolutions, and regulations. Lisitsyn, *supra* note 10, at 134.

16. Lisitsyn, *supra* note 10, at 125-26, 129-32. Despite this realization and the former USSR's attempts to cope with environmental problems, by 1990 the USSR's environmental protection policies were seen as a hindrance to an already suffering economy. FESHBACH & FRIENDLY, *supra* note 15, at 248. Environmentalists were criticized for decreasing production levels of needed items and for leaving the country dependent on imports. *Id.* at 248-49. Environmental proponents argued that without cleaner air and water people could not survive to sustain the economy. *Id.* at 253-56.

17. See Martin Sieff, *Environmental Movement Gains in Soviet Union*, WASH. TIMES, Apr. 8, 1988, at A10. Chernobyl, an atomic power station, exploded in April 1986. See Bill Keller, *Public Mistrust Curbs Soviet Nuclear Power Efforts*, N.Y. TIMES, Oct. 13, 1988, at A1 [hereinafter Keller, *Public Mistrust*]; see Parks, *supra* note 4, at 14 (mentioning Chernobyl-related deaths and injuries). Chernobyl was located near Prip'yat in the former USSR. Keller, *Public Mistrust*, *supra*, at A1. It was 72 miles from Kiev, Ukraine. FESHBACH & FRIENDLY, *supra* note 15, at 12.

The explosion was attributed to general apathy among members of the USSR's Ministry of Atomic Energy. Quentin Peel, *N-Industry Criticized in Pravda*, FIN. TIMES, May 23, 1988, at 3. The equipment and training in the nuclear industry deteriorated as the industry grew. *Id.* Although the members were warned about the inadequate safety standards, they failed to act. *Id.*

The Chernobyl accident was the first major disaster at a nuclear plant. Paul C. Szasz, *International Responsibility for Manmade Disasters*, 1987 AM. SOC'Y INT'L L. PROC. 320. It was rated the maximum seven on the International Nuclear Event Scale. Gillette, *supra* note 1, at 375. The accident contaminated the USSR and its many republics. See Philip P. Ketchian, *An Update on the Environmental Crisis in Armenia*, ARMENIAN WKLY., Oct. 17, 1992, at 8 [hereinafter Ketchian, *Environmental Crisis in Armenia*].

The fallout from Chernobyl also contaminated eastern and western Europe. Alan E. Boyle, *Nuclear Energy and International Law: An Environmental Perspective*, LX BRIT. Y.B. INT'L L. 257 (1989). The explosion rained radioactive materials on Ukrainian farms and towns, farmlands in Poland and Sweden, and reindeer pastures in the Arctic. Bill Keller, *Soviet Scraps a New Atomic Plant In Face of Protest Over Chernobyl*, N.Y. TIMES, Jan. 28, 1988, A9 [hereinafter Keller, *Soviet Scraps a New Atomic Plant*]; Christopher C. Joyner, Book Note, 85 AM. J. INT'L L. 584, 585 (1991). Even the United States received radioactive fallout. *Developments—International Environmental Law*, 104 HARV. L. REV. 1487 (1991) (citing Sullivan, *Fallout Found in U.S. Is Said to Pose No Risk*, N.Y. TIMES, May 13, 1986, at A6); Schmemmann, *Delay Reported on Evacuation at Nuclear Site*, N.Y. TIMES, May 7, 1986, at A1. In fact, more radioactive material entered the atmosphere from the Chernobyl accident than from the Hiroshima and Nagasaki atomic bombings. FESHBACH & FRIENDLY, *supra* note 15, at 12. As a result, food chains were contaminated. Peter Obstler, *Toward a Working Solution to Global Pollution: Importing CERCLA to Regulate the Export of Hazardous Waste*, 16 YALE J. INT'L L. 73, 80 (1991). The effects of this widespread contamination will last for decades. Jonathan Turley, "When in Rome": *Multinational*

tion of Lake Baikal in Siberia,<sup>18</sup> and the depletion of the Aral Sea.<sup>19</sup> In 1985, the Soviet government fully realized that the USSR's environmental laws were neither followed nor properly enforced,<sup>20</sup> as pollution exceeded permissible levels in 104 Soviet cities.<sup>21</sup> In response, the USSR formed the State Committee on Environment/

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*Misconduct and the Presumption Against Extraterritoriality*, 84 Nw. U. L. Rev. 598, 640-41 (1990).

Economically, the Chernobyl disaster cost the USSR billions of dollars. Keller, *Soviet Scraps a New Atomic Plant*, *supra*, at A9; see FESHBACH & FRIENDLY, *supra* note 15, at 143-56 (discussing aftermath and costs of Chernobyl). Prior to the Chernobyl accident, nuclear power plants were considered profitable and helpful to the regions that possessed them. Keller, *Soviet Scraps a New Atomic Plant*, *supra*, at A1. The government gave those regions more attention—more jobs, more housing, more cultural amenities—than other regions. *Id.* After the disaster, the economic cost of nuclear energy became apparent and spurred the former USSR's recognition of environmental concerns. *Id.* at A9. It is interesting to note that most reforms were made in recognition of the economic costs of pollution such as Chernobyl, not the health costs. Ziegler, *supra* note 9, at 3.

18. Lake Baikal is located in Siberia. FESHBACH & FRIENDLY, *supra* note 15, at 112. This lake is the deepest and eighth-largest in the world. *Id.* at 116. It holds one-fifth of the earth's fresh water. Don Belt, *The World's Great Lake*, NAT'L GEOGRAPHIC, June 1992, at 2. The lake is over 25 million years old and contains 1,500 species. *Id.* at 20. The lake was polluted by cellulose-cord processing factories which produced heavy-duty tire cord. FESHBACH & FRIENDLY, *supra* note 15, at 117-18. Soviet planners wanted to produce this cord domestically rather than rely on imports. *Id.* at 118; see also Belt, *supra*, at 8. Although the Soviets eventually discovered a synthetic material that was better suited for these tires, the plant still functions. Belt, *supra*, at 32; see also FESHBACH & FRIENDLY, *supra* note 15, at 119 (explaining plant's projects after need for cellulose cord vanished).

For further information on the USSR's water pollution, see FESHBACH & FRIENDLY, *supra* note 15, at 113-130 (discussing "Water Torture" in former USSR).

19. The Aral Sea is located between the former Soviet republics of Kazakhstan and Uzbekistan. FESHBACH & FRIENDLY, *supra* note 15, at 72. For the past thirty years, its flow was diverted for massive irrigation and its waters were saturated with fertilizers, herbicides, and pesticides used in cotton production. *Id.* at 74. The destruction of the sea was hushed in an effort to become a net exporter of cotton, the area's "white gold." William S. Ellis, *A Soviet Sea Lies Dying*, NAT'L GEOGRAPHIC, Feb. 1990, at 72, 76. More than forty percent of the Aral's surface water has turned to salt and sand in the past thirty years and its volume has decreased by two-thirds. *Id.* at 72-73; see also FESHBACH & FRIENDLY, *supra* note 15, at 73-88 (discussing evaporation of Aral Sea and its consequences).

Despite the pervasive detrimental effects of the loss of the sea on the health of the people and the loss of work in the fishing field, some argue that the cost of saving the Aral Sea is too high. Ellis, *supra*, at 72-92. The critics question how the irrigation workers will be fed if irrigation is stopped. *Id.* at 92. Thus, even in the face of destruction some Soviets fail to see the long-term consequences of their actions. *Id.*

20. Nicholas A. Robinson & Gary R. Waxmonsky, *The U.S.—U.S.S.R Agreement to Protect the Environment: 15 Years of Cooperation*, 18 ENVTL. L. 403, 431 (1988).

21. Sieff, *supra* note 17, at A10.

Nature Protection ("SCEP")<sup>22</sup> in 1988.<sup>23</sup> The purpose of this committee was "to centralize and modernize environmental administration and regulate the use of natural resources . . . ."<sup>24</sup> SCEP was responsible for everything "from the siting of industrial waste dumps to the issuing of hunting licenses."<sup>25</sup> Furthermore, SCEP had the power to enforce all Soviet environmental laws.<sup>26</sup>

22. The SCEP was also known as "Goskompriroda." Lisitsyn, *supra* note 10, at 129. In 1991, SCEP became the USSR Ministry on Environmental Protection and the Use of Natural Resources. *Id.*

23. Darst, *supra* note 12, at 237. This agency was a combination of all the agencies and departments that formerly dealt with the environment. *Id.* SCEP was comparable to the United States' Environmental Protection Agency; both have exclusive control over the environment. Michael Axline, (*Out*) *Back in the USSR: A Review of Charles Ziegler's Environmental Policy in the USSR*, 18 ENV'T L. 383, 384 (1988). SCEP was advised by "a council of scholars, public figures, representatives of local soviets, and enterprise directors." BUTLER, *supra* note 9, at 283.

24. Ziegler, *supra* note 9, at 6. SCEP had been suggested by Soviet environmentalists for years. *Id.* See generally Parks, *supra* note 4, at 14 (discussing promises of environmental protection by Soviet authorities).

25. *When the Fishing Had to Stop*, ECONOMIST, Feb. 6, 1988, at 46. The principal functions of the SCEP included:

[E]ffecting the integrated administration of nature protection activities in the country; developing and implementing a unified scientific-technical policy in nature conservation and the rational use of natural resources; co-ordinating the relevant activities of other ministries and departments; State control over the use and protection of all lands, water, atmosphere, flora, fauna, minerals, and the marine environment; preparation and submission of proposals to the State Planning Committee for inclusion in the long-term environmental planning schemes; control over the implementation of planning tasks; confirmation of ecological normative standards, rules, and standards directed against pollution; performing State expert ecological evaluations of general schemes for developing and siting new plants and factories; control over the observance of ecological norms when new technology and materials are developed, as well as over the environmental impact of new construction; the issuance of permits for the burial of wastes, for discharges of harmful substances into the environment, for special use of water, wildlife, air, and land; direction of game preserves, hunting, and protected species, and co-operation with foreign countries and international organisations [sic] in environmental matters.

BUTLER, *supra* note 9, at 282.

26. Robinson & Waxmonsky, *supra* note 20, at 432. SCEP had the power to prohibit the construction, renovation, and expansion of industries. BUTLER, *supra* note 9, at 283. It also had the power to bring suit against violators and suspend enterprises that exploited the environment. *Id.* In addition, decisions by SCEP were binding on "all ministries, departments, associations, enterprises, and organizations." *Id.*

Despite the power SCEP was given and its eventual elevation to a Ministry in 1991, it lacked the information and authority it needed to be effective. See FESHBACH & FRIENDLY, *supra* note 15, at 245. For instance, it did not have power over the State Committee on Hydrometeorology, the agency that collected data on the condition of air and water resources. *Id.* It also lacked the power to halt, modify, or inspect other state agencies' development plans. *Id.* In 1989, SCEP's chief stated that the lack of an environmental turnaround was due to "the prevail-



Early on, SCEP found that the USSR lacked the infrastructure required to implement complex environmental reforms.<sup>27</sup> The USSR needed an infrastructure that would encourage, with economic incentives, the rational use of resources and the end of pollution.<sup>28</sup> Therefore, SCEP first restructured state institutions and organizations.<sup>29</sup>

The former USSR also turned to legal solutions. The drafters of the new National Environmental Protection Law<sup>30</sup> suggested the inclusion of concepts new to Soviet law, the introduction of specific environmental crimes.<sup>31</sup> Another suggestion was to levy a tax on natural resources to encourage moderate use.<sup>32</sup> This idea was par-

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ing attitude of production enterprises toward nature as a free and inexhaustible resource . . . ." *Id.*

27. Lisitsyn, *supra* note 10, at 129.

28. *Id.*

29. *Id.* A new law to protect the environment was drafted, but the government was not prepared to enact new laws without the proper infrastructure. *When the Fishing Had to Stop*, *supra* note 25, at 47; see also Dr. Vazken L. Parsegian, *On Helping Armenia: A Disquieting Report*, ARMENIAN WKLY., May 30, 1992, at 2. The proposed idea for restructuring included realigning the USSR government by creating 25 All-Union Ministries and State Committees to govern the "general regulation of national development" and 32 Ministries and Committees to focus on "the sectoral aspects of social-economic development." Lisitsyn, *supra* note 10, at 130. In addition, the republics were to gain more control over the environment. *Id.* This restructuring, needed to implement the laws, would take at least two years to complete. Robinson & Waxmonsky, *supra* note 20, at 432. Furthermore, at least an additional two years were needed to create the procedures and compliance mechanisms necessary to enforce new laws. *Id.*

30. Lisitsyn, *supra* note 10, at 136.

31. *Id.* Minor violations of these laws by private citizens were usually punished by administrative fines. BUTLER, *supra* note 9, at 280. Managers and officials that committed environmental crimes were subjected to disciplinary actions by superior agencies which were also bound by the law. *Id.* Punishments included reprimands, demotions, and dismissal. *Id.* Tort liability was also imposed on violators. *Id.* at 281. Despite the strength of these laws, problems arose because punishments could not be enforced.

The State is both the owner of the resource and, through the operations of its departments, officials, and State-owned enterprises, the principal violator of natural resource legislation. Fines ordinarily are effective only against individuals, but even in instances when State officials are at fault or when liability can be placed upon a juridical entity, responsibility in individual cases can be very difficult to determine . . . . In a planned economy an enterprise's capacity to obtain equipment often may be circumscribed by agencies or circumstances beyond its control, and this unavoidably has implications for traditional notions of criminal responsibility for an omission to act . . . .

*Id.*

SCEP's fees and fines system was anticipated to be in place nationwide by 1991; this estimate was not met. *Id.* at 247.

32. Lisitsyn, *supra* note 10, at 136-37. Some argued that the amount of the taxes was too high and fought to lower the penalties. FESHBACH & FRIENDLY, *supra* note 15, at 246. For instance, one silica-processing factory was initially charged

ticularly interesting since the USSR had historically maintained that natural resources were public property.<sup>33</sup> A similar suggestion involved imposing fees for polluting the environment and for using natural resources.<sup>34</sup> This new law would impose such heavy fines that it would be economically beneficial to implement environmental protection devices rather than continue to pollute the environment.<sup>35</sup>

Aside from the lack of economic incentives, the lack of information and public awareness of environmental issues were also responsible for the widespread pollution in the former USSR.<sup>36</sup> The government had to stop its practice of propagandizing economic advancement at any cost in order for Soviet citizens to recognize the need for environmental conservation.<sup>37</sup> The government could no longer hide its environmental problems<sup>38</sup> out of fear of being unable to meet production quotas.<sup>39</sup> When the government restructured the environmental protection system, it also had to make

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45,000 rubles a year for emissions into the environment and an additional 50 rubles for each ton of waste above a certain level. *Id.* After discussions with the factory, the initial fine was lowered to 22,000 rubles. *Id.* Most factories paid high fines until they were able to modernize their plants. *See id.* For a further discussion of the fee system, see FESHBACH & FRIENDLY, *supra* note 15, at 245-48, 251.

33. Lisitsyn, *supra* note 10, at 137. The Soviet system was changed; no longer would resources be free to all. BUTLER, *supra* note 9, at 278. In 1987, the government began categorizing resources and issuing permits and granting rights to use them. *Id.* The right to use was limited in years and was attached with obligations to protect the resource. *Id.* A violation of these duties would not only result in loss of the right to use the resource, but also criminal or administrative penalties. *Id.*

34. Robinson & Waxmonsky, *supra* note 20, at 432. For a discussion of the old system where use of natural resources was free, see *supra* notes 13-15 and accompanying text.

35. Nicholas A. Robinson, *Soviet Environmental Law: Emerging Business Constraints*, 506 PLI/COMM. 191 (1989); *see also* BUTLER, *supra* note 9, at 283.

36. Axline, *supra* note 23, at 386; *see also* FESHBACH & FRIENDLY, *supra* note 15, at 11.

37. Gray, *High Price*, *supra* note 11, at A19.

38. The USSR has a pervasive history of hiding environmental problems from both its people and other nations. FESHBACH & FRIENDLY, *supra* note 15, at 12-13. For instance, information about the radioactive contamination of the USSR from the Chernobyl accident was hidden from Soviet citizens for three to four years. *Id.* Furthermore, the USSR government refused to admit to other nations that an explosion had occurred until two days after the incident. *Id.* at 13. Even then, the Soviets falsified the extent of the damage. *Id.* Eventually, Gorbachev's policy of *glasnost* ("openness") helped to eliminate the secrecy. *Id.*

Despite *glasnost*, however, the CIS seems to have inherited the habit of secrecy, as well as environmental problems, from the former USSR. Gillette, *supra* note 1, at 681. When the Sosnovy Bor accident occurred in Russia, the government first reported the radiation emission levels to be 19 times less than what they actually were. *Id.* The government did not correct the report until a week later. *Id.*

39. Axline, *supra* note 23, at 384.

its citizens environmentally conscious.<sup>40</sup> Furthermore, for the laws to work, the Soviets needed to have confidence in them and a reason to obey them.<sup>41</sup> To achieve this, SCEP planned to create an extensive educational program and publish a newspaper called *Priroda* to inform the citizens of environmental concerns.<sup>42</sup>

Overall, the USSR's new environmental policy set forth four goals: (1) prevention of man-made risks; (2) eradication of past errors in the policy; (3) conservation and protection of rare animals; and (4) restoration of monuments.<sup>43</sup> All levels of Soviet government were involved in reforming environmental policy to reach these goals.<sup>44</sup> As a result, these reforms, implemented after Gorbachev took power, produced six notable differences in the Soviet approach to environmental protection:<sup>45</sup> (1) a more discriminatory look by party leaders at costly and dubious environmental projects; (2) an increased cognizance of the economic costs of wasted natural resources and the consequential costs of pollution; (3) an increased acknowledgment of environmental disasters; (4) recognition by then-President Gorbachev of common environmental problems which could have a unifying effect among nations; (5) new environmental groups operating free from party control; and (6) the use of nationalistic terms in the environmental debate.<sup>46</sup>

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40. See Lisitsyn, *supra* note 10, at 129-130.

41. *Id.* at 143.

42. Robinson & Waxmonsky, *supra* note 20, at 191.

43. Lisitsyn, *supra* note 10, at 132.

44. *Id.* at 131. In the executive branch, a Commission on National Resources was established. *Id.* An addition to the legislative branch included the Ecological Committee of the new USSR Parliament. *Id.* Additionally, the legislative branch included:

(i) Pan-Union Fundamental Principles of Legislation concerning land, minerals, water and forests; (ii) the USSR Laws on the protection and use of wild flora and fauna, on the protection of the atmosphere; (iii) Codes within the Union Republics on land, minerals, water and forests; (iv) Republican Laws on the protection and use of fauna, on the protection of the atmosphere and nature conservation.

*Id.* at 133. Lastly, the judicial branch had a new "special body." *Id.* at 131. Despite the formation of these new bodies, it was uncertain what effect and what function each was to serve in saving the environment. *Id.* This separation of powers was new to the USSR and without a system of checks and balances, it was difficult to predict the level of success this system would enjoy. Lisitsyn, *supra* note 10, at 131.

45. Ziegler, *supra* note 9, at 3. For a discussion of the effect of Gorbachev's policies on the USSR, see Olga Floroff & Susan Tiefenbrun, *A Legal Framework for Soviet Privatization*, 18 PEPP. L. REV. 849 (1991); Thomas J. Samuelian, *Cultural Ecology and Gorbachev's Restructured Union*, 32 HARV. INT'L L.J. 159 (1991); Urs W. Saxter, Comment, *The Transformation of the Soviet Union: From a Socialist Federation to a Commonwealth of Independent States*, 14 LOY. L.A. INT'L & COMP. L.J. 581 (1992).

46. Two other noteworthy changes included the openness of discussions and the fact that non-specialists, authors, and poets for example, participated in the debate. *Id.* at 6. Many of these reforms are attributable to Gorbachev's policy of

The disaster at Chernobyl awakened the Soviet Union to the environmental crisis it faced and was the primary impetus for these changes.

## B. The Soviet Republics

Prior to the dissolution of the USSR, the former Soviet republics believed their individual nationalities were under attack by Soviet policies.<sup>47</sup> This made resolution of the environmental problems even more difficult.<sup>48</sup> Along with the tension between republics, non-Russian nationalities believed the USSR's concern over the environment was limited to the Russian Republic.<sup>49</sup>

In an attempt to remedy this, in 1989 the USSR Council of Ministers enacted the General Principles which brought environmental problems directly and exclusively under each republic's control.<sup>50</sup> The republics were to "establish their own limits and norms for extraction of natural resources, and issue all licenses and permits to develop and use natural resources within their territory."<sup>51</sup> They also were given the responsibility to implement environmental laws against all enterprises within their own bounda-

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*glasnost*. See Darst, *supra* note 12, at 240. See generally Keller, *Public Mistrust*, *supra* note 17, at A10 (discussing openness of press).

47. *Commission On Security and Cooperation in Europe Hearing On: Politics of Pollution in the Soviet Union and Eastern Europe (On the Second Anniversary of the Chernobyl Disaster)* (1988) (statement of Dr. Barbara Jancar).

48. Darst, *supra* note 12, at 223. For example, the Soviet government's proposal to divert water from Siberia and Northern Russia, where water was abundant, to Central Asia and the Caspian Sea, where the use of water was exceeding the supply, caused great debate. *Id.* at 224, 226-27. Critics argued that this project would flood certain areas, resulting in the destruction of many historical and cultural monuments. *Id.* at 228-29. Scientists opposed the project because it would deplete the water supply in Siberia and Northern Russia, leading to higher levels of pollution. *Id.* at 227-28. Scientists further argued that the Caspian Sea was not as low as proponents for the plan argued, and in fact, that levels in the Caspian sea were instead rising. *Id.* at 228. Economists argued that the costs of the project were too high and that Central Asia mismanaged its own water supply; thus, the solution was not to give it more water. *Id.* There was also opposition from the ethnic groups in the area that did not want their resources to be used for another region. *Id.* at 248. Although the opposition was kept out of the press, protests continued until Gorbachev, who did not want to extend the capital for the project, canceled it. *Id.* at 229.

49. Ziegler, *supra* note 9, at 6.

50. Lisitsyn, *supra* note 10, at 132. Prior to this enactment, most of the republics had their own legislative bodies regulating the environment. *Id.* at 131-32. Under the General Principles, the republics had the power to enforce environmental laws and set environmental standards. *Id.*

51. *Id.*

ries.<sup>52</sup> The 1990 USSR Law on Ownership made the republics responsible for the management of their own natural resources.<sup>53</sup>

### C. Soviet Armenia

Notwithstanding the grave environmental problems in the other former republics, Armenia's environment deserves special attention. Five of the former USSR's most polluted cities were located in Armenia.<sup>54</sup> For example, in the 1930s-40s, poor planning resulted in the erection of forty industrial buildings within the small geographical area of Yerevan, the capital of Armenia.<sup>55</sup> Although the USSR had environmental standards and fines for violations, these penalties were much smaller than those imposed for failing to meet production targets; thus, in Armenia as elsewhere in

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52. *Id.*

53. *Id.* at 141-42. Prior to 1990, the former Soviet republics had demonstrated against pollution in their regions. Latvians held a demonstration on October 25, 1987 to protest Latvia's pollution problems. *Demonstrators Protest Pollution at Armenian and Latvian Rallies*, UKRAINIAN WKLY., Jan. 17, 1988, at 2 [hereinafter *Demonstrators Protest Pollution*]. Responding to rumors, citizens of the Baltic republics complained of a nuclear waste dump in Estonia. Ziegler, *supra* note 9, at 6. Georgian intellectuals objected to the creation of the Caucasus Mountain Railway which would destroy the republic's beautiful terrain. *Id.* Plans to build a nuclear plant in the Ukraine were halted after protests and the Chernobyl accident. *Public Mistrust*, *supra* note 17, at A10.

54. *Raparakainutyun*, *supra* note 8, at 8. The pollution in Vanadzor, (formerly Kirovakan) was physically visible to the population. Interview with Maxy Kazandjian, former resident of Kirovakan, in Cherry Hill, N.J. (Oct. 18, 1992). On some mornings, residents would awaken and find their city covered with a white dust that looked like snow, but was really a chemical emitted from a nearby plant. *Id.* Other mornings, the sky would be yellow. Interview with Hairabed Kazandjian, former resident of Kirovakan, in Cherry Hill, N.J. (Oct. 18, 1992). Some days the air would prickle people's skin and cause women's stockings to run. Interview with Maxy Kazandjian, *supra*.

55. Elizabeth Fuller, *Is Armenia on the Brink of Ecological Disaster?*, ARMENIAN REP., Sept. 18, 1986, at 1, 3.

Yerevan, an ancient Armenian city dating back to 782 B.C., is the Armenian republic's capital. Philip P. Ketchian, *Air Pollution in Yerevan: Causes and Effects*, ARMENIAN WKLY., Aug. 1, 1992, at 8 [hereinafter Ketchian, *Air Pollution in Yerevan*]. Thirty-three percent of Armenia's 3.5 million residents live in Yerevan where 80% of the utilized air basin is poisoned from pollution. *Raparakainutyun*, *supra* note 8, at 8. The everyday air has been likened to the exhaust fumes from a jet engine. Eric Lima, *Armenia's Environment*, ARMENIAN WKLY., Aug. 1, 1992, at 2.

The republic began producing chemicals in the 1930s. *Raparakainutyun*, *supra* note 8, at 9. In 1989, official government statistics stated that over 530 million pounds of pollutants and toxic compounds were discharged over Yerevan annually, an amount far beyond official maximum safety limits. Ketchian, *Air Pollution in Yerevan*, *supra*, at 9. In fact, this amount may be underestimated because official reports of industrial pollution have been falsified, probably to prevent the imposition of fines or to facilitate meeting production quotas. *Id.*

the USSR, production was pursued at the expense of the environment.<sup>56</sup>

Armenia was the first republic to openly exercise the Soviet Union's policy of *glasnost*, or "openness."<sup>57</sup> Armenians had suffered through decades of environmental crisis, but remained silent in fear of the Soviet regime. With *glasnost*, the Armenian people were no longer afraid to voice their opinions; they took to the streets on October 17, 1987 to publicly oppose the devastating environmental problems that plagued their republic.<sup>58</sup> Over 2,000 protestors signed an appeal to the Soviet government and sent it to the Fifth Session of the USSR's Supreme Soviet.<sup>59</sup> The appeal called for the closing of the Medzamor nuclear power plant and the abandonment of a plan to build a second plant.<sup>60</sup>

### 1. *Medzamor: A History of a Troubled Nuclear Power Plant*

Armenians had opposed the Medzamor plant before it was even built.<sup>61</sup> In the late 1960s, when plans for the plant were first

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56. Fuller, *supra* note 55, at 3. In 1985, a joint resolution of the Communist Party of the Soviet Union ("CPSU") Central Committee and the USSR Council of Ministries addressed the pollution problem and adopted some reforms. *Id.* Some reforms were to change the type of fuels or raw materials that some enterprises used and to change the types of goods they produce. *Id.* Another reform was to move some industries outside the city limits. *Id.* However, the reforms were nullified by the order to increase Armenia's industrial output by over 28%. *Id.* This target for production was one of the highest targets for a republic. *Id.*; see also *When the Fishing Had to Stop*, *supra* note 25, at 46 (noting lack of incentive to implement anti-pollution targets). In 1989, the Soviet government again promised reforms while concomitantly calling for greater use of nuclear power to foster economic growth. Parks, *supra* note 4, at 14.

57. Ketchian, *Air Pollution in Yerevan*, *supra* note 55, at 8. For articles discussing *glasnost*, see Olga Floroff & Susan Tiefenbrun, *A Legal Framework for Soviet Privatization*, 18 PEPP. L. REV. 849 (1991); Thomas J. Samuelian, *Cultural Ecology and Gorbachev's Restructured Union*, 32 HARV. INT'L L.J. 159 (1991); Urs W. Saxter, Comment, *The Transformation of the Soviet Union: From a Socialist Federation to a Commonwealth of Independent States*, 14 LOY. L.A. INT'L & COMP. L.J. 581 (1992).

58. *Raparakainutyun*, *supra* note 8, at 8. Five thousand Armenians gathered in Yerevan with banners reading "We Want Healthy Children!" and "Nuclear Power Plant: A Bomb Buried in the Heart of Armenia!" *Raparakainutyun*, *supra* note 8, at 8. A year earlier, in March, 1986, 350 Armenian intellectuals wrote to CPSU General Secretary Gorbachev objecting to the contamination of Armenia's environment in the quest for industrialization. Fuller, *supra* note 55, at 1; see also Gray, *supra* note 6, at 7. The letter pressed for the closing of Medzamor because of serious leaks, the near catastrophes that the plant had experienced, and the serious health risks the plant imposed on the people. *Id.*

The environmental protests were the testing ground for demonstrations in the USSR. These protests were soon followed by other nationalistic protests. FESHBACH & FRIENDLY, *supra* note 15, at 232.

59. *Id.*

60. *Raparakainutyun*, *supra* note 8, at 9.

61. Parks, *supra* note 4, at 15.

publicized, scientists objected because the plant was to be built on the Ararat fault line.<sup>62</sup> In addition, any leaks would contaminate Armenia's main water supply.<sup>63</sup>

When Medzamor was built in 1977,<sup>64</sup> it did not meet the Soviet safety requirements then in effect.<sup>65</sup> The reactor hall had a flimsy flat iron-and-zinc roof and the reactor lacked a concrete dome.<sup>66</sup> The style of the plant was adapted for use in areas where uninhabited land surrounds a plant, such as Russia, not in areas such as Armenia, where a heavily populated city lay fifteen miles away.<sup>67</sup>

In the first ten years that Medzamor was active, over 150 serious accidents occurred.<sup>68</sup> Three incidents almost resulted in cata-

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62. *Id.* at 15. According to leading Soviet scientists, 40 fault lines meet near the 880-megawatt nuclear power plant. Incredibly, it was built without reinforcements to make it seismically safe. Gray, *supra* note 6, at 7. Medzamor is located on the Ararat Valley. Parks, *supra* note 4, at 14. For a further discussion of the Ararat Valley, see *supra* notes 6, 55 and accompanying text.

63. Parks, *supra* note 4, at 15. Philip P. Ketchian, *The History and Environmental Impact of Nuclear Power in Armenia*, THE ARMENIAN MIRROR-SPECTATOR, Sept. 18, 1993, at 8, 9 [hereinafter Ketchian, *Part One*]. "The river is 25 miles in length, and is supplied solely by underground waters, as a result of which its flow remains constant throughout the year, unlike all other rivers in Armenia." *Id.*

64. Ketchian, *Part One*, *supra* note 63, at 1.

65. Haplin, *supra* note 7, at 13. For instance, nuclear plants were not to be built closer than 15 miles from a city with a population of 300,000 or 25 miles from a city with a population of one million people. Ketchian, *Part One*, *supra* note 63, at 9. Yerevan is 16 miles from Medzamor and has a population of 1.3 million. *Id.* Power plants were only supposed to be built in areas with the potential for an earthquake of less than eight on the MSK-64 scale. Ketchian, *Part One*, *supra* note 63, at 9. Yerevan has the potential to reach 10 on the MSK-64 scale. *Id.* For a discussion of Medzamor's power, see *supra* note 6.

Medzamor was listed as a plant that needed urgent extra seismic stability, but no work was completed to make it safer. Parks, *supra* note 4, at 14-15. The construction supervisor, Vilem Arzoumanian (also the plant's first chief engineer), and his colleagues had demanded to no avail that the safety requirements be met. Haplin, *supra* note 7, at 13. Reconstruction would have cost 450 million rubles and would have taken 8-10 years to complete. *Id.* Furthermore, the plant would not have been operable until 4 or 5 years after reconstruction. *Id.*

66. Haplin, *supra* note 7, at 13. Concrete domes are usually used in Western plants. *Id.* Without a containment structure, any leaks within the plant will seep into the atmosphere. Telephone interview with Michael Lally, Defense Analyst for Science Applications International Corporation, (Feb. 10, 1993). Walls to contain fires are also absent. *Id.*

67. Haplin, *supra* note 7, at 12-13; Ketchian, *Part One*, *supra* note 63, at 9. The closest city to Medzamor is Hoktemberian. *Id.* This city is five miles from Medzamor and has a population of 50,000. *Id.* Over 2.1 million people live within an 18.6 mile radius of Medzamor. *Id.*

68. *Raparakainutyun*, *supra* note 8, at 9; see also Gray, *supra* note 6, at 7. According to the United Nations Atomic Energy Agency in Vienna, Medzamor experienced a fire in 1975. Gray, *supra* note 6, at 7. This was not the only fire Medzamor experienced. After a fire and leakage at the plant in 1982, Medzamor was shut down for 15 days. *Id.* The shutdown resulted in a 33% decrease in elec-

strophic disaster.<sup>69</sup> Some accidents resulted in radioactive permeation of the atmosphere and contamination of the local water system.<sup>70</sup>

Surprisingly, the problems with Medzamor did not halt further nuclear development in Armenia. In the early 1980's, the 27th Party Congress of the Communist Party of the Soviet Union ordered that a second, larger nuclear power plant be built near Yerevan to double chemical production.<sup>71</sup> Despite opposition,<sup>72</sup> the former USSR persisted in its plans to build a sister plant until fear inspired the government to close the plant.<sup>73</sup>

Fearing another Chernobyl, the Soviet government in 1988 announced plans to close Medzamor and to halt the erection of the second plant.<sup>74</sup> The actual shutdown was not scheduled to begin

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tricity around the plant. *Id.* Ironically, Medzamor is to be reopened in order to generate electricity.

69. *Raparakainutyun*, *supra* note 8, at 9.

70. *Id.* Information about radioactive leakage was kept from the Armenian people. Gray, *supra* note 6, at 7. As a result, the inhabitants may slowly die from the effects of the emissions and the government's failure to evacuate the area. *Id.*

71. *Raparakainutyun*, *supra* note 8, at 9. This plant was built 24 kilometers from Yerevan in the Ararat Valley. *Id.* All of Armenia is only 29,800 square kilometers, approximately the size of Connecticut. *Id.* The Ararat Valley contains 70% of Armenia's cultivated land and the only source of drinking water for two-thirds of Armenia's population. *Id.* The valley possesses 40 volcanoes and experiences earthquakes which measure up to nine points on the Richter scale. *Id.*

72. In both May and October of 1985, members of the Armenian Academy of Sciences sent letters to the Presidium of the Republic Academy warning that a second plant would render Armenia a desert. *Raparakainutyun*, *supra* note 8, at 9. Their call went unheeded. *Id.*

73. *When the Fishing had to Stop*, *supra* note 25, at 47; see also Keller, *Public Mistrust*, *supra* note 17, at A10 (discussing other cancellations); Parks, *supra* note 4, at 14 (discussing other cancellations).

On October 8, 1988, the party chief of the Communist Party of Soviet Armenia announced plans to close Medzamor. *Armenia to Close Atom Plant*, N.Y. TIMES, Oct. 16, 1988, at 24.

74. *When the Fishing had to Stop*, *supra* note 25, at 47. Two types of reactors were used in the former USSR. Jonathan Kaufman, *Faulty Nuclear Plants Imperil East Europe*, BOSTON GLOBE, March 26, 1992, at 1. One is a "Chernobyl-type" reactor which does not have a containment vessel. *Id.* The other is a pressurized water reactor which originally lacked safety features. *Id.* The model was improved; however, the metal used in the plants is now brittle and needs to be replaced. *Id.* In addition, safety procedures have lapsed and instruments need replacing. *Id.* With the centralized control of the plants gone, local republics are at a loss when it comes to maintaining the plants. *Id.* Critics argue that the money it would cost to make the plants safe according to western standards would be better used in improving energy efficiency or developing new sources of energy in the former USSR. *Id.*

Medzamor is not of the Chernobyl design. Haplin, *supra* note 7, at 13. According to the Armenian state atomic inspector, Vilem Arzoumanian, Chernobyl's design should have made an explosion very difficult, while Medzamor's design would facilitate an explosion. *Id.* The atomic inspector stated: "It has lots of pipes;



until 1991.<sup>75</sup> In December 1988, however, Armenia experienced a devastating earthquake.<sup>76</sup> Fear of another earthquake moved the shut down date up to February of 1989.<sup>77</sup>

## 2. Specific Environmental Problems

Although the first public demonstration against environmental abuse was held in October 1987, a more subtle demonstration took place during 1980-85 when 20,000 Armenians moved from the Ararat Valley to escape the unbearable pollution.<sup>78</sup> The pollution has resulted in the phenomenon of thermal inversion which has cre-

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if even one of them explodes, the reactor will collapse." *Id.* Since an accident occurred at Chernobyl, which was believed to be sturdier than Medzamor, it is logical to be concerned about an explosion at Medzamor.

75. Haplin, *supra* note 7, at 13.

76. FESHBACH & FRIENDLY, *supra* note 15, at 194.

77. Parks, *supra* note 4, at 14. Plans to close Medzamor early came as a result of an inspection of the plant by top Soviet scientists and foreign nuclear power specialists who urged an immediate shutdown because the plant was seismically unstable and because there was fear of another earthquake in Armenia. *Id.* Medzamor was closed February 25, 1989, and the second plant closed on March 18, 1989. Haplin, *supra* note 7, at 13. The shutdown caused a one-third decrease in electricity to the surrounding area. *Id.* Medzamor was the first plant to be removed from service in the Soviet Union. *Soviets Scrap Nuclear Plant*, L.A. TIMES, Mar. 28, 1989, Part 1, at 2.

Northern Armenia suffered a massive earthquake measuring 6.9 on the Richter scale on December 7, 1988. Parks, *supra* note 4, at 15. According to Soviet authorities, Medzamor was built to withstand earthquakes reaching the magnitude of eight points and suffered no damage. *Id.* at 15. However, a western earthquake specialist stated, "[a]n 8-point quake would probably bring down the station's principal buildings, including those containing the control systems, and if the tremor were directly underneath, it could easily rupture the reactor chamber." *Id.* Soviet authorities stated that the plant would automatically close down if a quake of six or more struck; the plant operated throughout the December quake when tremors reached 5.5 points for close to four minutes. *Id.* The authorities later admitted the dangers inherent in the plant. *Id.*

78. *Raparakainutyun*, *supra* note 8, at 8-9. Most people fled to southern Russia or the northern Caucasus. Gray, *supra* note 6, at 7.

The major air pollutants in Yerevan are ozone, carbon monoxide, nitrogen oxides, acidic pollutants, and lead. Harout Bronozian, *Environmental Pollution in Armenia*, ARMENIAN WKLY., Oct. 24, 1987, at 8. Other serious environmental issues facing the republic are the pollution from car emissions, the operation of a rubber plant, Nairit, and the depletion of Lake Sevan. Ketchian, *Environmental Crisis in Armenia*, *supra* note 17, at 9. Armenia had the most cars of all the former Soviet Republics. *Id.* Even when a subway was built in 1981, people continued to use their own personal vehicles. *Id.* The fuel these vehicles use is of poor quality and accounts for 99.9% of the lead pollution in Yerevan. *Id.* Nairit, a synthetic rubber plant, has been noted as Yerevan's prime polluter. Ketchian, *Air Pollution in Yerevan*, ARMENIAN WKLY., Aug. 8, 1992, at 8-10 [hereinafter Ketchian, *Causes and Effects*]. Most of the plant's liquid chemical waste is dumped into the nearby river called Hrazdan. *Id.* The vast ecological problems beyond the Medzamor plant are beyond the scope of this Comment. See *Raparakainutyun*, *supra* note 8, at 8 (discussing Armenia's forest depletion, vegetation, and animal life). See Ketchian, *Air Pollution in Yerevan*, *supra* note 55, at 8-10; Ketchian, *Causes and Effects*, *supra*, at 8.

ated a dome over Yerevan.<sup>79</sup> The result is a new type of smog called "Yerevan smog": Los Angeles photochemical smog in the summer and London classical chemical smog in the winter.<sup>80</sup> The pollution in Armenia is currently so dense that it prevents the people from viewing Mount Ararat, their national symbol.<sup>81</sup>

The environmental crisis has reached such proportions that some refer to it as the second genocide of the Armenian people, a hauntingly invisible genocide.<sup>82</sup> The consequences of the pollution are apparent in the increased rates of mortality, birth defects, gastrointestinal and cardiovascular disease, respiratory tract and lung problems, and infertility.<sup>83</sup> In addition, Armenia leads the former

79. Ketchian, *Air Pollution in Yerevan*, *supra* note 55, at 8. Yerevan is shaped like a huge amphitheater, surrounded by mountains. *Id.* This topography, combined with the area's meteorological situation, has created a thermal inversion. *Id.*

[This phenomenon] occurs when colder, heavier air has drained into the basin and is trapped under a layer of warm high-altitude air above it. Acting as a lid, the warm air prevents the upward motion of cooler air, thus trapping the pollutants introduced to the atmosphere from within the basin and forming an unhealthy stationary caustic haze.

*Id.* For further information on the types of air pollutants, see Ketchian, *Causes and Effects*, *supra* note 78, at 8-9.

80. *Id.*

81. *Raparakainutyun*, *supra* note 8, at 8. Mt. Ararat is 30 miles from Yerevan and is 16,496 feet high. FESHBACH & FRIENDLY, *supra* note 15, at 16. Mt. Ararat is located across the Armenian Republic's border in Turkey. The mountain belonged to Armenia before the Turkish Government invaded the country. Mount Ararat also has historical significance. According to the Bible, Noah landed his ark on this mountain. *Genesis* 8:5.

82. *Raparakainutyun*, *supra* note 8, at 8.

83. *Raparakainutyun*, *supra* note 8, at 8. For example, "[i]n the past 15 years, the number of mentally retarded children has increased five-fold, the number of psychologically disturbed children has increased six-fold, the incidence of anemia has increased four-fold, the number of premature births has increased seven-fold and the number of myocardial infarctions has increased eight-fold." *Id.* at 8; *see also* E.S. Gabrielyan, *Armenian SSR Gosplan Report on the Situation Which has Developed in Yerevan in Connection with the Existence and Development of the Nairit NPO of the USSR Ministry of Chemical Industry*, 10-11 *GLASNOST INFO. BULL.*, 1987, at 11 (detailing study on pollution's effects on women and children). Half of the children born near Medzamor are either stillborn, live no longer than 40 days after birth, have congenital defects, or are mentally handicapped. Fuller, *supra* note 55, at 1. An American pediatrician stated that some of the abnormalities can be attributed to exposure to radiation during early pregnancy. *Id.* at 3.

An article in the Soviet Armenian press announced that a center in Yerevan would be opened to screen the unborn for hereditary defects. *Id.* at 3. This article attempted to mollify the Armenians' fears of pollution by persuading them to believe the defects were hereditary and not from exposure to radiation or toxins. *Id.* Other propaganda was issued to convince the masses that 60% of the pollution was caused by vehicles and the other 40% by factories without proper filtering devices. *Id.* Yerevan had the highest per capita car ownership rate in the former USSR and gasoline shortages forced many to use gasoline with unrecommended octane levels. *Id.*

Soviet republics in lung, stomach, esophageal, and other cancers.<sup>84</sup> According to international pollution standards, an evacuation of Yerevan residents should have been undertaken long ago.<sup>85</sup>

### III. ARMENIA'S ENERGY AND ECONOMIC CRISES

Responsibility for Armenia's environmental crisis shifted into the hands of the Armenian people when the republic declared its independence on September 21, 1991.<sup>86</sup> Amongst its many problems, the new Armenian republic is currently undergoing energy and economic crises.<sup>87</sup> Since only half of the megawatts of power needed for normal life in Armenia are being produced,<sup>88</sup> there is no heat or electricity for homes.<sup>89</sup> Heat and electricity are

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84. *Raparakainutyun*, *supra* note 8, at 8. The cancer rate in 1985 was four times what it was in 1965. *Id.*

85. *Id.*

86. The new republic was officially established on September 21, 1991. Ellen Ishkanian, *1st Anniversary of Armenia's Independence Celebrated*, ARMENIAN WKLY., Oct. 3, 1992, at 10. For most new republics, environmental protection must take a back seat to economic, political, and ethnic concerns. Sneider, *supra* note 9, at 10.

87. *Armenia Seeks Loan for Power Plant*, ARMENIAN REP. INT'L, Aug. 29, 1992, at 18; see Haplin, *supra* note 7, at 13. These crises caused a variety of ills for Armenia. The President of Armenia declared a national disaster on Dec. 7, 1992 and urged foreign countries to send help. Hugh Pope, *Morale Slips as Armenians Suffer in Cold*, L.A. TIMES, Dec. 25, 1992, at A5. Armenia once had one of the highest standards of living in the former USSR. *Id.* According to the United Nations, about 70% of Armenians were living below subsistence level in 1992. *Id.* Half of new mothers are unable to nurse newborns and baby food is extremely scarce. *Id.* The country has little running water. *Azerbaijan Pressures Georgia*, ARMENIAN WKLY., Dec. 5, 1992, at 1. Agriculture is suffering. *Id.* Construction in the earthquake-stricken regions has stopped. *Id.* Social unrest is rising. *Id.* All factories and schools are shut. *Armenia Pleading Case on Embargo with U.S. Leaders*, OILGRAM NEWS, Dec. 18, 1992 at 1. There is no public transportation at all. *Id.* The temperature in most apartments does not rise above 41 degrees Fahrenheit. Richard Boudreaux, *Gas Line Explosion Severs Armenia's Energy Supply*, L.A. TIMES, Jan. 24, 1993, at A6. Hungry dogs are travelling in packs attacking the people. Margaret Shapiro, *Armenia's "Good Life" Lost to Misery, Darkness, Cold*, WASH. POST, Jan. 30, 1993, at A1. Floorboards and botanical gardens are destroyed for firewood. *Id.* Drippings from melted ice are collected in buckets for drinking water. *Id.* Telephones are inoperable and information travels only by word of mouth. *Id.* Most hospitals are closed. *Id.* In 1988, an earthquake wiped out 50% of the republic's industrial base and left the people to live in makeshift homes; those people are now freezing to death. *See id.* Bread has been rationed by coupons. *Bread in Armenia to be Rationed by Coupons*, ARMENIAN WKLY., Oct. 10, 1992, at 1. For some of the Armenians, this ration is their only source of sustenance. *Id.*

88. Haplin, *supra* note 7, at 13; see *Gas Reaches Armenia, Nuclear Power Still Needed*, REUTERS, Jan. 31, 1993, at 1. The republic is at a standstill; some areas receive only one hour of power in ten days. *Id.*

89. Antranig Kasbarian, *Armenia's Energy Minister in U.S., Tashjian Appeals to Federal Agencies for Help*, ARMENIAN WKLY., June 13, 1992, at 1.

allocated only to hospitals, bakeries, and other indispensable services.<sup>90</sup>

Without heat and electricity, factories have been forced to close, resulting in even harsher circumstances for the troubled economy.<sup>91</sup> With factories shut down and other industries operating at a minimum, Armenia is struggling to prevent massive unemployment.<sup>92</sup> Moreover, the attempt to adopt a market economy has also had devastating effects on Armenia.<sup>93</sup> This attempt coupled with a blockade imposed by Azerbaijan on Armenia has produced economic catastrophe.<sup>94</sup> Armenian food supplies are minimal.<sup>95</sup> Supplies sent to Armenia must reach the republic through one of three railways: two run through Azerbaijan and the other runs

90. *Id.*

91. Haplin, *supra* note 7, at 13. Ironically, industry stoppages have improved the air. Kim Hekimian, *Interns Report on Conditions in Armenia, Second Impressions: Armenia 1992*, ARMENIAN WKLY., July 4, 1992, at 18. Many of the levels of pollution have decreased due to the blockade and economic crisis. *Id.* However, once the factories begin running again, the pollution level will increase to its pre-crisis level. Ketchian, *Causes and Effects*, *supra* note 55, at 10.

92. Ketchian, *Environmental Crisis in Armenia*, *supra* note 17, at 8. Armenia has faced skyrocketing unemployment since 1992. *Social Unrest Growing in Armenia*, ARMENIAN WKLY., Nov. 7, 1992, at 1. Unemployment was estimated to be as high as 90% last winter. Pope, *supra* note 87, at A5. Some employed people have not received paychecks for months. *Social Unrest Growing in Armenia*, *supra*, at 1. To increase employment, the synthetic rubber plant, Nairit, was reopened even though the pollution controls in the plant were mostly inoperative. *Ketchian Speaks on Armenia's Environment*, ARMENIAN WKLY., Nov. 21, 1992, at 3. The plant was eventually ordered to close in 1989. FESHBACH & FRIENDLY, *supra* note 15, at 16, 232, 248.

93. Pope, *supra* note 87, at A5. Economic instability can be seen in the decline of the ruble's value. Within a month, the ruble-to-dollar exchange went from 125:1 to 190:1. Sona Dulgarian, *Reflecting on Armenia*, ARMENIAN WKLY., Oct. 3, 1992, at 8. The average monthly salary is 800 rubles per month. *Id.*

94. Dulgarian, *supra* note 93, at 8. Armenia's economy needs energy immediately. *Armenia's Energy Minister Addresses AMAA Gathering*, ARMENIAN WKLY., June 20, 1992, at 5 [hereinafter *Armenia's Energy Minister*]. Armenia will soon enter the sixth year of the transportation and energy blockade by Azerbaijan. *Azerbaijan Pressures Georgia*, *supra* note 87, at 1.

95. Ketchian, *Environmental Crisis in Armenia*, *supra* note 17, at 8. Since the winter of 1992, Armenians have protested the high prices for necessities such as bread. *Armenian Protesters Demand Bread, Higher Wages*, ARMENIAN WKLY., Nov. 7, 1992, at 1. Bread requires energy to be baked; since the nation has been importing energy, prices have risen dramatically. *Id.* The United States, through the "Food For Progress Program," responded to Armenia's plea for relief in November 1992 when bread was rationed and reserves of flour were depleted to a day's supply. *Id.* at 1, 3. The supplies were to be shipped to Turkey or Georgia and then taken by rail or truck to Armenia. *Id.* at 3. However, despite shipments of wheat from outside sources, Armenia experienced longer bread lines. *Social Unrest Growing in Armenia*, *supra* note 92, at 1.

through Georgia.<sup>96</sup> The Georgian railway is inoperable due to fighting in the area,<sup>97</sup> and the Azerbaijani railways have been blockaded by the Azeris for the past six years.<sup>98</sup> Due to the blockade, very few goods, if any, can be imported or exported.<sup>99</sup>

Armenia also has no secure source of energy.<sup>100</sup> The country is incapable of handling its energy crisis because it does not have its own fuel resources.<sup>101</sup> Importing all its fuel has not been easy. For example, during the winter of 1991, only a quarter of the usual amount of imported fuel was able to reach Armenia.<sup>102</sup> The blockade has already forced the reopening of six hydroelectric stations which are drying out Armenia's Lake Sevan.<sup>103</sup>

Although scientists are exploring other methods of obtaining energy, new methods will take more time than Armenia has to spare.<sup>104</sup> The last several Armenian winters have been extremely

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96. Telephone Interview with Sharistan Melkonian, Executive Director, Armenian National Committee (Sept. 25, 1992).

97. *Turkey Agrees to Send Wheat*, ARMENIAN WKLY., Sept. 26, 1992, at 1. Unrest in Georgia has caused their rail line to Armenia to be closed. *Armenian Protestors Demand Bread, Higher Wages*, *supra* note 95, at 3. This unrest has severely diminished gas shipments from Turkmenistan and Kazakhstan. *Gas Reaches Armenia, Nuclear Power Still Needed*, *supra* note 88, at 1.

98. Azerbaijan and Armenia have been warring over the Karabagh region for the past six years. Samuelian, *supra* note 45, at 159. Almost all of Karabagh has historically been populated by Armenians because Karabagh originally was part of Armenia. *Id.* In 1923, under the Stalin regime, it was given to Azerbaijan. *Id.*

99. Ketchian, *Environmental Crisis in Armenia*, *supra* note 17, at 8.

100. Haplin, *supra* note 7, at 12-13. Oil supplies from Georgia are unreliable. *Id.* at 12.

Sebu Tashjian, Armenia's Minister of Energy, visited the United States in June, 1992, to ask for support during Armenia's energy crisis. Kasbarian, *supra* note 89, at 1. He is also searching for help from the West to assist in deciding whether or not to open Medzamor. *Id.* at 1, 4.

101. Ketchian, *Causes and Effects*, *supra* note 78, at 10. In January 23, 1993 Armenia's last source of energy from an outside source, the gas pipeline in Georgia, exploded. Boudreaux, *supra* note 87, at A6. The pipeline was located in Marneuli, Georgia, an area heavily populated by Azerbaijanis; Azeris are suspected of causing the explosion. *Id.* Armenia has few energy sources of its own, therefore, it depended on pipelines from Georgia and Azerbaijan. *Id.* In 1990, Azerbaijan cut off Armenia. *Id.*

102. *Id.* Since 1989, Azerbaijan has blockaded Armenia's gas supply. *Yerevan Toxicologist Speaks in Boston*, ARMENIAN WKLY., June 20, 1992, at 5; see also *Armenia Seeks Loan for Power Plant*, *supra* note 87, at 18. For a discussion of the Azeri blockade against Armenia, see *supra* notes 94-99 and accompanying text.

103. *Id.* For further information on Lake Sevan, see *infra* notes 125-26 and accompanying text.

104. *Armenia's Energy Minister*, *supra* note 94, at 5. Two gas pipelines are to be built to adjoining countries, one between Armenia and Georgia, and another between Armenia and Iran. *Id.* Armenia also hopes to obtain diesel oil from Iran. *Id.*

harsh.<sup>105</sup> Whereas in the past Armenia could provide a minimum of both heat and electricity, during the winter of 1993-94 the republic will have to choose between the two.<sup>106</sup> In all likelihood, electricity will be forgone in order to prevent the frostbite, hypothermia, malnutrition and starvation that would result from the lack of heat.<sup>107</sup>

#### A. A Way Out: Medzamor

For many Armenians, the only way out of the energy and economic crises appears to be the reopening of Medzamor, the nuclear power plant that was decommissioned in 1989.<sup>108</sup> The Armenian government had promised a referendum to decide whether or not to reopen the plant,<sup>109</sup> however, the referendum never took place.<sup>110</sup> Although the government formally decided to reopen the

105. During the winter of 1992, Armenians ravaged the land in order to stay warm. *Wars Envelop Armenia, Corroding Environment*, N.Y. TIMES, August 17, 1993, at A2. With indoor temperatures slightly above freezing, over one million trees were cut down for firewood. *Gas Reaches Armenia, Nuclear Power Still Needed*, *supra* note 88. Telephone poles were also chopped down and burned. *Wars Envelop Armenia, Corroding Environment*, *supra*, at A2. Books and furniture also went up in flames as the struggle to survive became a daily ordeal. *Id.* Despite efforts to stay warm, thousands perished from lack of heat and starvation. *Id.* Some may argue that the children are suffering the most. *Without Aid From Outside, Armenia Faces Major Crisis*, ARMENIAN WKLY., Sept. 4, 1993, at 4. From March to September 1993, child malnutrition increased 100%. *Id.* From April to October 1992, "monthly incidence rates of measles had increased by 60%, diarrheal illnesses by 61%, viral hepatitis by 163%, and tuberculosis by 76%." *Id.*

106. *Expert Predicts Minimal Heat, No Light for Armenia This Winter*, ARMENIAN WKLY., Sept. 11, 1993, at 4.

107. *Id.* Starvation and malnutrition would result from the inability to cook food. *Id.*

108. *Armenia Seeks Loan for Power Plant*, *supra* note 87, at 18. Besides Medzamor, a hydroelectric plant with the capacity to produce 550 megawatts has also been shut down because its water source is the almost-deplete Lake Sevan. Kasbarian, *supra* note 88, at 1, 4. For a further discussion of Lake Sevan, see *infra* notes 125-26. There is also a new hydroelectric plant, "Eduard," outside of Yerevan which is 30% complete. Kasbarian, *supra* note 88, at 1, 4. The Armenian government has asked American help to complete the "Eduard" project. *Rep. Lehman Appeals For Steps To Solve Armenia's Energy Crisis*, ARMENIAN WKLY., June, 13, 1992, at 3. For a discussion of Medzamor's history, see *supra* notes 61-77 and accompanying text.

109. Haplin, *supra* note 7, at 13.

110. *Id.* In March 1993, Armenia's President convinced the parliament that the referendum was unnecessary. *Armenia PWRs Likely to Restart Without RPS, I&C Replacements*, NUCLEONICS WEEK, July 5, 1993, at 2. The government abandoned the promised referendum, stating that scientists who are more knowledgeable should decide Medzamor's fate, not the people. *Conference of Energy Specialists Advocate Re-opening of Medzamor Nuclear Plant*, ARMENIAN WKLY., Nov. 28, 1992, at 1.

plant in April 1993,<sup>111</sup> the plant probably will not reopen until early 1995.<sup>112</sup> The government is still pushing for an earlier date.<sup>113</sup>

Armenia does not have the funds to replace Medzamor's instrumentation and control systems or reactor protection systems.<sup>114</sup> Members of the Armenian Nature and Environmental Protection Ministry ("NEPM") oppose the reopening because the plant is unsafe and may destroy the country's environment.<sup>115</sup> Moreover, some believe that the Azeri blockade will hinder the ability to obtain equipment necessary to run the plant safely.<sup>116</sup>

## B. Possible Alternatives to Reopening Medzamor

Because most Armenians and NEPM fiercely oppose Medzamor's reopening, some have searched for feasible alternatives. Fortunately, Armenia may not be without alternatives to opening Medzamor.<sup>117</sup> For instance, some argue that with Arme-

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111. *Wars Envelop Armenia, Corroding Environment*, *supra* note 104, at A2.

112. Ketchian, *Air Pollution in Yerevan*, *supra* note 55, at 8; *Armenia PWRs Likely to Restart Without RPS, I&C Replacements*, *supra* note 110, at 2.

113. *Gas Reaches Armenia, Nuclear Power Still Needed*, *supra* note 88. The government asserts that if crews work 24 hours a day, the reopening will take place in less than a year and a half. *Id.*

114. *Armenia PWRs Likely to Restart Without RPS, I&C Replacements*, *supra* note 110, at 2. The 800 million rubles the government allocated to the plant in 1993 is enough to reopen it, but is not enough to make it safe. Haplin, *supra* note 7, at 13. Estimates to safely open Medzamor range as high as \$500 million. *Armenia PWRs Likely to Restart Without RPS, I&C Replacements*, *supra* note 110, at 2. Medzamor appears to have deteriorated in the years it has been closed. Haplin, *supra* note 7, at 13. Deterioration is visible in the "radiation detectors and security devices [which] appear broken and obsolete." *Id.* If Medzamor is not reopened, the country will be faced with the need to raise four billion dollars or more for a new plant. Kasbarian, *supra* note 89, at 4. To make the plant safe according to Western safety standards, \$150 million is needed. *Id.* This amount is beyond Armenia's budget. *Id.* Armenia is asking for Western loans (\$100-150 million) to help it reopen Medzamor. *Armenia Seeks Loan for Power Plant*, *supra* note 87, at 18. Some of the plant's equipment has been lost and the control system needs to be modernized. *Armenian Nuclear Plant will Possibly be Commissioned by the End of the Year*, *MOSCOW NEWS*, April 28, 1993, at 9. The government will likely have difficulty employing skillful specialists. *Id.*

115. Ketchian, *Air Pollution in Yerevan*, *supra* note 55, at 8. Recently some organizations have stated that Medzamor is not as unsafe as is generally believed. "New Chernobyl" *Fears in Armenia*, *REUTERS*, Feb. 1, 1993, at 6; see *Armenia PWRs Likely to Restart Without RPS, I&C Replacements*, *supra* note 110, at 2. Framatome, a French group, has stated that there are no major difficulties in the plant that would prevent its reopening. *Id.* This organization has found the pressure boundaries of the plant to be in good shape. *Id.* It appears that the closer Armenia comes to reopening the plant, the stronger the government's assertions are that the plant is safe. *Gas Reaches Armenia, Nuclear Power Still Needed*, *supra* note 88.

116. *Stopping By On The Way Home*, *NUCLEAR NEWS*, June 1993, at 74.

117. *Raparakainutyun*, *supra* note 8, at 9.

nia's wealth of natural resources, it does not need to resort to nuclear power.<sup>118</sup>

Scientists suggest that Armenia can annually produce double what is needed in kilowatt-hours of electricity without the aid of nuclear power.<sup>119</sup> Therefore, hydroelectric plants possibly could alleviate Armenia's energy crisis.<sup>120</sup> These plants can produce 25-30 billion kilowatt-hours of electricity; however, only forty percent of Armenia's hydroelectric power currently is being utilized.<sup>121</sup> Yet, although this solution seems feasible, it is not without its drawbacks. Increasing hydroelectric power will deplete Armenia's water supply and cause other environmental difficulties such as eutrophication.<sup>122</sup> While forty percent of Armenia's dry land could be irrigated by building hydroelectric plants,<sup>123</sup> Armenia's natural source of obtaining food, its waterways, could evaporate as a consequence.<sup>124</sup> In addition, Lake Sevan, which is evaporating due to the drain caused by hydroelectric plants, provides Armenia with drinking water.<sup>125</sup> Without Lake Sevan's supply of water, Armenian wells will go dry, depriving Armenians of another necessity.<sup>126</sup>

Another alternative may be exploratory mining for coal.<sup>127</sup> After weighing the need to heat schools, homes, and hospitals against the possibility of further environmental depletion, NEPM approved such mining.<sup>128</sup> However, environmental concerns arose because the mining will take place in perhaps the most beautiful area in all of Armenia.<sup>129</sup>

118. Gray, *supra* note 6, at 7 (citing Soviet scientists' letter to Gorbachev).

119. *Raparakainutyun*, *supra* note 8, at 9.

120. *Id.*

121. *Id.*; Gray, *supra* note 6, at 7 (citing Soviet scientists' letter to Gorbachev).

122. The use of hydroelectric power has already depleted Lake Sevan. Ketchian, *Environmental Crisis in Armenia*, *supra* note 17, at 8. The water level has dropped 80 centimeters in the past two years. *Lake Sevan Facing Evaporation Threat*, REUTERS, May 20, 1993, at 2.

Lake Sevan is the only lake where the rare Ishkhan fish can be found. *Id.* With the depletion and eutrophication of the lake, this unique species will become extinct, for the lake will be unable to support any life. *Id.*

123. *Raparakainutyun*, *supra* note 8, at 9.

124. Ketchian, *Environmental Crisis in Armenia*, *supra* note 17, at 8.

125. *Wars Envelop Armenia, Corroding Environment*, *supra* note 105, at A2.

126. *Wars Envelop Armenia, Corroding Environment*, *supra* note 105, at A2.

127. *Id.*

128. *Id.* at 9.

129. *Id.* The trees that will be destroyed in the mining process are the rarest in Armenia. *Id.* The fear is that the mining will turn the priceless landscape into a "barren moonscape." *Id.*



The sun and wind are untapped resources which may also serve as alternatives to reopening Medzamor.<sup>130</sup> Armenia receives 250 kilocalories per square centimeter annually from the sun's heat.<sup>131</sup> A project has begun to assess the possibility of using these two sources to produce electricity.<sup>132</sup> However, critics contend that solar and wind energy, even if used, would not provide sufficient power to run a city.<sup>133</sup>

Another alternative to reopening Medzamor is to transform the country's garbage into a useful resource. The refuse in the Yerevan city dump, after proper processing, could be used to produce natural methane gas.<sup>134</sup> The oldest section of the city dump is currently being prepared to produce the gas.<sup>135</sup>

All of these alternatives, if feasible, would allay the need to reopen Medzamor.<sup>136</sup> However, Armenia is in the midst of a crisis that needs immediate relief. Unfortunately, the lack of an immediate alternative increases the pressure to reopen Medzamor. Although the Medzamor solution may be the only viable one, it has been rejected by the people and the environmental movement of Armenia.

The new environmental movement is adamantly opposed to any alternative that would harm the Armenian environment. In order to confront the growing environmental problems, Armenian citizens have formed the Greens Union of Armenia ("GUA").<sup>137</sup> GUA is a voluntary public organization which acts within the framework of the Constitution of the Republic of Armenia, international legal guidelines, and present regulations.<sup>138</sup> The goals of the organization are: "[1] the inculcation of an ecological way of thinking; [2] the resolution of basic problems of environmental protection; [3] the prevention of ecological destruction."<sup>139</sup> This strong new

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130. *Raparakhainutyun*, *supra* note 8, at 9.

131. *Id.*

132. *Armenia's Energy Minister*, *supra* note 94, at 5. The demonstration units appear to be successful. *Solar and Wind Energy Being Developed in Armenia*, *ARMENIAN WKLY.*, Sept. 4, 1993, at 12. This project has prompted USAID to become involved in developing all types of energy resources, except nuclear, for Armenia. *Id.* USAID will be "contributing \$10 million a year to help Armenia become reasonably energy independent by the end of this decade." *Id.*

133. Telephone interview with Dr. Vasken Parsegian, (Sept. 7, 1992).

134. Ketchian, *Air Pollution in Yerevan*, *supra* note 55, at 8.

135. *Id.*

136. *Armenia's Energy Minister*, *supra* note 94, at 5.

137. Hakob Sanasarian, *The Program and Regulations of the Greens Union of Armenia* (Dec. 21-23, 1990) (unpublished manuscript, on file with *Villanova Environmental Law Journal*).

138. *Id.*

139. *Id.* The most important GUA goals and activities are as follows:

1. To put before the Supreme Council of the Republic of Armenia the necessity of passing a new Environmental Protection Law of the Republic and approving the Ecological Code of the Republic.
2. To aid in the fulfillment of national and international environmental protection laws and programs in Armenia.
3. To comprehensively promote the preservation of the genetic pool of species of flora and fauna in the Republic; to implant an environmental way of thinking in the political and economic activities of the Republic, as well as to promote the further development and realization of programs proceeding from the interests of the Republic.
4. To promote the rational utilization of the renewable natural resources such as soil, water, wind, sun, bioenergy, etc.; and the productive and economic utilization of nonrenewable resources.
5. To promote the restoration of ecologically clean and traditional methods of agricultural cultivation, while simultaneously decreasing the use of chemical fertilizers, weed-killers, and pesticides.
6. To promote the implementation and development of biogas, store-gas and bio-humus technologies as well as the popularization of the idea of saving energy as a "new source of energy".
7. To promote the technological modernization of industrial, agricultural, energy branches of the Republic.
8. To promote the realization of a decrease in the amount of traffic exhaust.
9. To conduct ecological assessments of projects of all acting, stipulated, constructing or expanding enterprises, other units and programs.
10. To promote the urgent closure or improvement of enterprises that may cause numerous victims through environmental damage.
11. To promote the gradual cessation or improvement, and modernization [of] those enterprises polluting the environment, which are extremely dangerous for public health and do not comply with the conditions of the Republic. The following must be taken into account: the inadmissibility of the existence of even minimal polluting chemical large industries in Armenia, owing to its geographical position, natural conditions and the constant danger of earthquakes.
12. To promote the neutralization of environmental pollutants with constructions and equipment aimed at environmental protection as well as
  - a) to aid in the full usage of the facilities available;
  - b) to assist in the completion and putting into operation of those which are not finished;
  - c) to promote the development of environmental protecting facilities and the installation of equipment in the enterprises which lack it.
13. To support the creation, establishment, and development of those enterprises which improve the ecological conditions of the Republic.
14. To develop an inventory of the hazardous and toxic wastes of the Republic; the safe transportation and the correct location of waste disposal sites.
15. To start a comprehensive program of treatment and recycling of household and industrial wastes.
16. To establish independent laboratories with modern equipment which will promote the evaluation of the qualitative and quantitative composition of the harmful substances contained in soil, water, air, food, and any substance that bears any relation to people's activity.
17. To establish a databank on problems concerning the pollution of the biosphere, public health, and general environmental problems, while making this information available to the public.

movement also opposes any of the above-mentioned alternatives to reopening Medzamor.<sup>140</sup>

#### IV. INTERNATIONAL ENVIRONMENTAL LAW<sup>141</sup>

##### A. International Duties Regarding Nuclear Developments

When one state uses nuclear energy, every state is potentially affected by “the possibility of radioactive contamination, the spread of toxic substances derived from nuclear energy, and the long-term health hazards consequent on exposure to radiation.”<sup>142</sup> When nu-

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18. To organize environmental conferences, symposiums, seminars and consultations, demonstrations, meetings, marches, public discussions presenting alternative programs, inquiries, and referendum data.

19. To put forward before the corresponding governmental bodies the question of calling for juridical responsibility of those enterprises, departments and individuals whose activities or idleness cause (or have already caused) serious harm to the public health and biosphere.

20. To collaborate with similar organizations in other countries and, if needed, be subject to an international examination of the activities and operations of certain enterprises in the Republic.

21. To promote the teaching of the basics of environmental science in the pre-school institutions, schools, and higher educational establishments, the installation of faculties for training environmental specialists in universities, as well as to undertake the publication of literature.

22. To organize enterprises, laboratories, cooperatives, highly specialized committees promoting the fulfillment of the GUA tasks.

23. To aid in the juridical and social protection of every member of the GUA within governmental bodies.

*Id.*

140. Although GUA is dedicated to passing new laws and promoting the rational use of Armenia's natural resources, Armenia lacks the technological equipment needed to analyze and enforce new laws and regulations. Ketchian, *Air Pollution in Yerevan*, *supra* note 55, at 8. Current anti-pollution devices are ineffective or improperly operated and maintained. *Id.* at 10. Some devices are still being designed while others exist only on paper. *Id.* Others were deliberately disconnected. *Id.* Furthermore, resources designated for pollution cleanup have been channeled to other uses. *Id.*

GUA also emphasizes the need to educate the public and develop an inventory of the current pollutants. *Id.* As part of its efforts to educate the Armenian people, GUA is establishing an independent environmental laboratory where citizens will be able to take samples of their water, food, soil, or air for testing. Ketchian, *Environmental Crisis in Armenia*, *supra* note 17, at 9.

141. For a detailed discussion on the history of international environmental law, see Edith B. Weiss, *International Environmental Law: Contemporary Issues and the Emergence of a New World Order*, 81 GEO. L.J. 675 (1993). For a discussion of international environmental law and United States' environmental law, see David A. Wirth, *A Matchmaker's Challenge: Marrying International Law and American Environmental Law*, 32 VA. J. INT'L L. 377 (1992).

142. Boyle, *supra* note 17, at 257. The detrimental effect of nuclear exposure was recognized in 1963 by a treaty which banned nuclear weapons testing in outer space, underwater, and in the atmosphere. *Id.* at 258. In 1985, for environmental reasons, the South Pacific Nuclear Free Zone was created. *Id.* at 259; see South Pacific Nuclear Free Zone Treaty, 1985, 24 I.L.M. 1442, 1443 (1985).

clear energy was first used, the International Atomic Energy Agency ("IAEA")<sup>143</sup> believed the risks associated with nuclear energy could be checked by the IAEA oversight and international agreements on safety measures.<sup>144</sup> The IAEA's expectations turned out to be optimistic. When the question of state responsibility for local nuclear developments arose, the international community could not reach any agreements.<sup>145</sup>

Two crises motivated the international community to cooperate and seriously consider finding solutions to environmental problems. The first was the mid-1970's oil crisis which motivated nations to seek alternative energy sources such as nuclear power.<sup>146</sup> However, the use of this power cast attention to the serious environmental problem of disposing of radioactive waste.<sup>147</sup> The second crisis was the accident at Chernobyl. Chernobyl's contamination of eastern and western Europe prompted nations to recognize the interrelation between their own environment and that of other states.<sup>148</sup> Governments realized the need not only to be aware of their neighbors' nuclear activities, but to become involved in those

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143. IAEA was founded in 1956. Boyle, *supra* note 17, at 257. IAEA's goals are:

[To] foster research and development in the peaceful uses of nuclear energy, and the exchange of scientific and technical information; to establish and administer safeguards against the diversion to military purposes of nuclear materials intended for use in civil nuclear programs; and to establish or adopt health and safety standards.

Gillette, *supra* note 1, 398 n.216.

144. Boyle, *supra* note 17, at 257.

145. *Id.* at 259. For a further discussion of liability, see *infra* notes 184-85 and accompanying text.

146. Boyle, *supra* note 17, at 259.

147. *Id.* In 1977, the United Nations General Assembly encouraged the use of nuclear energy by all states. *Id.* at 257. The 1972 Stockholm Conference called for an international agreement on radioactive waste disposal. *Id.* at 259. The 1983 London Dumping Convention banned nuclear waste ocean dumping. *Id.* However, waste disposal is still a problem. *Id.*

148. *Id.* For a further discussion of Chernobyl, see *supra* note 17 and accompanying text.

activities.<sup>149</sup> In 1988, the Council of Europe<sup>150</sup> was the first international organization to call for international standards for safety and recommend shutdowns for those facilities that did not meet established standards.<sup>151</sup> The Council also realized the need for an institution to enforce those standards.<sup>152</sup> In addition, to be effective, international regulations had to reflect the special needs and concerns of developing nations which might lack the resources and funds necessary to adhere to those regulations.<sup>153</sup>

Also in 1988, the IAEA issued its Nuclear Safety Standards Programme of 1988 which set standards for nuclear power plants' design, construction, siting, and operation.<sup>154</sup> Under the Programme, the IAEA can set standards but lacks the power to enforce them.<sup>155</sup> However, IAEA standards are usually respected and followed since they represent the consensus opinion of experts in the nuclear field.<sup>156</sup>

Unlike the IAEA, the European Economic Community ("EEC") has more power to enforce the safety standards set in the

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149. Boyle, *supra* note 17, at 259. In 1986, after Chernobyl, an obligatory minimum level of safety standards for reactors was almost established. *Id.* at 265. Such a safety standard would require nations' current standards to be meshed into one, states to relinquish their power to set their own standards, and expensive reconstruction of present plants that do not meet the standard. *Id.* This standard clashes with the traditional unwillingness of states to relinquish sovereignty. Philippe J. Sands, *The Environment, Community and International Law*, 30 HARV. INT'L L.J. 393, 399 (1989). Furthermore, a uniform standard may not even be conducive to better safety because different standards are needed for different areas. Boyle, *supra* note 17, at 265. A further suggestion has been to increase the number of inspections done by IAEA so that pressure may be applied to consistently bad performers. *Id.* at 265-66.

150. The Council of Europe is an intergovernmental organization that has a membership of 26 nations. Joel R. Reidenberg, *The Privacy Obstacle Course Hurdling Barriers to Transnational Financial Services*, 60 FORDHAM L. REV. 137, 177 (1992). The members of the Council of Europe are: Austria, Belgium, Cyprus, Czech and Slovak Federal Republic, Denmark, Finland, France, Federal Republic of Germany, Greece, Hungary, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, San Marino, Spain, Sweden, Switzerland, Turkey, and the United Kingdom. *Id.*

151. Boyle, *supra* note 17, at 260. The regulation of nuclear facilities is based on health, safety, and the environment. *Id.*

152. *Id.*

153. Ved P. Nanda, *Global Warming and International Environmental Law—A Preliminary Inquiry*, 30 HARV. INT'L L.J. 375, 382 (1989). For a further discussion of developing nations, see *infra* notes 187-200 and accompanying text.

154. Boyle, *supra* note 17, at 262.

155. *Id.* A treaty would give IAEA more power to enforce standards for nuclear plants. *Id.* at 262-63.

156. *Id.* at 264.

Euratom Treaty.<sup>157</sup> This treaty was signed in 1957 “[f]or the purpose of creating a nuclear common market.”<sup>158</sup> The provisions of the treaty are enforceable against the EEC members.<sup>159</sup> The treaty sets the standard for radiation at the lowest level reasonably achievable.<sup>160</sup> If a potentially hazardous activity will affect another member state, the EEC has the power to veto the activity.<sup>161</sup>

In addition to formal treaties, certain customary duties exist between nations in the international community.<sup>162</sup> Three of these duties are pertinent to this discussion. First, nations have a duty to control and regulate sources of pollution in their own jurisdiction.<sup>163</sup> Nations must not knowingly permit acts within their bor-

157. *Id.* at 266. For further information on the Euratom Treaty, see Samuel B. Angus, *Radioactive Waste and Euratom: Towards a More Effective Regime of Regulation*, 16 HASTINGS INT’L & COMP. L. REV. 343, 361-70 (1993).

158. Angus, *supra* note 157, at 361 (citing EURATOM TREATY, art. 2, ch. IX, 1957, *UN Treaty Series*, vol. 298, at 162). The treaty’s objectives include applying a uniform safety standard to protect the people from radiation and ensuring non-diversion of nuclear materials for unintended uses. *Id.* Radioactivity levels are monitored through a national reporting system. *Id.*

159. Boyle, *supra* note 17, at 266. The treaty is enforced through the Court of Justice which acts much like national courts and preempts national court decisions. See Angus, *supra* note 157, at 361-70.

160. Boyle, *supra* note 17, at 266. This standard is evaluated by national reporting. *Id.* As of 1989, there were no standards for design, construction, or operation of nuclear facilities or radioactive emissions into the air or water. *Id.* at 267.

161. *Id.*

162. International law contains a psychological component described as “a conviction felt by a state that a certain practice is required by international law.” *Developments—International Environmental Law*, 104 HARV. L. REV. 1492, 1504 n.73 (1991). These laws are abstract; they rarely require specific behavior and are too vague to be instructive on acceptable behavior. *Id.* at 1505.

163. Boyle, *supra* note 17, at 269, 272. This duty has support in “United Nations resolutions, in Principle 21 of the Stockholm Declaration of 1972, in Articles 192 and 194 of the Law of the Sea Convention, 1982, in UNEP Principles, and in the work of the International Law Commission.” *Id.* at 270-71 (footnotes omitted) (citing GA Res. 2849 (XXVI) (1971); GA Res. 2995 (XXVII) (1972); GA Res. 2996 (XXVII) (1972); GA Res. 3281 (XXIX) (1974); GA Res. 34/186 (1979); *Report of the UN Conference on the Human Environment, Stockholm, 1972*, UN Doc. A/CONF. 48/14/Rev. 1; Principles of Conduct in the Field of the Environment concerning Resources Shared by Two or More States, Principle 3, UNEP/IG/12/2, 1978, *International Legal Materials*, 17 (1978), at 1091; draft articles on International Watercourses, *Yearbook of the ILC*, 1984, vol. 2, pt. I, at 101).

For example, if a plant is operated by the government, then it must be operated safely. Szasz, *supra* note 19, at 321. If it is not operated by the government, then the government must enforce its regulations. *Id.*

States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure activities within their own jurisdiction do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

ders which violate their neighbors' rights.<sup>164</sup> That duty includes "common areas," such as deep seabeds, outer space, the atmosphere, and the high seas.<sup>165</sup> Commentators have suggested that due diligence is the standard that should be applied to this duty.<sup>166</sup> This standard is preferable because it contemplates the consideration of each country's unique situation, such as a country's lack of resources to combat environmental problems, in evaluating liability.<sup>167</sup>

Second, nations have a duty to cooperate with one another to control transboundary pollution and environmental risks.<sup>168</sup> According to Article Three of the United Nation's Charter of Economic Rights and Duties of States, "each State must co-operate on the basis of a system of information and prior consultation in order to achieve optimum use of such resources without causing damage to the legitimate interests of others."<sup>169</sup> When a nation is contemplating an action, it must reasonably consider other nations' interests and negotiate with them about conducting the activity, even

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Eshbach, *supra* note 2, at 272 n.9 (quoting *Report of the United Nations Conference on the Human Environment*, U.N. Doc. A/CONF.48/14 and Corr. 1, reprinted in 11 INT'L LEGAL MATERIALS 1416, 1420 (1972)) (emphasis added).

164. Nanda, *supra* note 153, at 382-83. This international law principle is similar to the "private law principle '*sic utere tuo ut alienum non luedus*' which prohibits the use of one's own property in such a way as to injure another's property." *Id.* See also, Boyle, *supra* note 17, at 269, 270-71 (listing international recognition for this principle).

165. Boyle, *supra* note 17, at 271 (citing Louis B. Sohn, *The Stockholm Declaration on the Human Environment*, 14 HARV. INT'L L.J. 423 (1973)).

166. *Id.* at 272 (citing OECD, *Legal Aspects of Transfrontier Pollution* 380 (1977)). Due diligence has been defined as "the diligence to be expected from a 'good government,' i.e., from a government mindful of its international obligations." *Developments—International Environmental Law*, *supra* note 162, at 1496, n.22 (quoting Dupuy, *International Liability for Transfrontier Pollution*, in TRENDS IN ENV'T'L POL'Y & L. 363, 369 (M. Bothe ed., 1980)). This standard is desirable because it is flexible and does not make a nation "an absolute guarantor of the prevention of harm." Boyle, *supra* note 17, at 272. This vague standard, however, may be insufficient for environmental protection. *Id.* Critics argue that standards set out in treaties would provide better protection. *Id.* (citing Paulo Conti & Peter H. Sand, *Methods to Expedite Environment Protection: International Ecostandards*, 66 AM. J. INT'L L. 37 (1972)).

Alternatives to the due diligence standard include the standard of strict liability. *Id.* at 273. However, this alternative places too many restrictions on states because it interferes with their rights to perform lawful activities in their own countries. *Id.* Furthermore, this standard ignores the lack of foreseeability of certain consequences and runs counter to the few judicial decisions already made. See *id.* at 274.

167. *Id.*

168. Boyle, *supra* note 17, at 278 (citations omitted).

169. *Id.* (quoting GA Res. 3281 (XXIX) (1974)); see also Charter of Economic Rights and Duties of States, art. 3, U.N. Doc. A/Res/3281, reprinted in 14 I.L.M. 251, 255 (1975).

though consent from other states is not needed to proceed.<sup>170</sup> States should also notify each other about actions to be taken and conduct impact assessments.<sup>171</sup> An impact assessment would illustrate which states are at risk because of the action and the magnitude of that risk.<sup>172</sup> However, such assessments are likely to be inaccurate since variables such as the wind will play an important role in determining who may be injured.<sup>173</sup> Some suggest, however, that a state cannot be expected to negotiate with every nation when deciding where, when, and how to build a new nuclear plant or other facility.<sup>174</sup>

Third, nations have a customary duty to give timely notice of accidents and emergencies to all other states that may be affected.<sup>175</sup> Timely notice must be given to other states to allow them to protect their people and take measures to decrease damages.<sup>176</sup> Furthermore, information should continue to flow to the affected states as long as is necessary after a nuclear disaster has occurred.<sup>177</sup> The informing state may have a duty to offer emergency assistance to those affected by their actions.<sup>178</sup>

In theory, a state would be held responsible for a breach of one of these three customary duties.<sup>179</sup> To state a cause of action for

170. Boyle, *supra* note 17, at 278.

171. *Id.* at 280.

172. *Id.*

173. Stephen C. McCaffrey, *International Responsibility for Manmade Disasters*, 1987 AM. SOC'Y OF INT'L L. 320, 326.

174. *Id.*

175. Boyle, *supra* note 17, at 281, 284; *see also Developments—International Environmental Law*, *supra* note 162, at 1493.

176. Boyle, *supra* note 17, at 281-82. The USSR was criticized for not giving timely notice to States that were subject to harm from Chernobyl. Boyle, *supra* note 17, at 283. There are no grounds, however, "in international law for intervention by neighboring States seeking to avert the consequences of a nuclear catastrophe, such as Chernobyl. Any attempt to take unilateral preventative action within another State, or to render unrequested assistance in these circumstances, would in principle appear a violation of the source State's sovereignty." *Id.* at 285.

177. Szasz, *supra* note 17, at 321.

178. *Id.*

179. Boyle, *supra* note 17, at 287. According to the International Law Commission of the United Nations, if an act is not prohibited by international law, but it causes injury to another state, there must be physical effects for liability to attach. Nanda, *supra* note 153, at 383 (citing *Report of the International Law Commission on the Work of its Fortieth Session*, U.N. GAOR, 43d Sess., Supp. No. 10, at 8, U.N. Doc. A/43/10 (1988)). Damages are primarily limited to injuries to persons and property, not the environment. Some suggest reparations should be in accordance with shared expectations of the states. McCaffrey, *supra* note 173, at 326.

Chernobyl adversely affected agriculture and livestock in Europe as well as wildlife. *Id.* at 295. The governments that were harmed did not seek payment from the Soviet Union; instead they paid their own citizens themselves. *Id.* at 295-



violation of one of these duties, an aggrieved sovereign state must prove: (1) the offending conduct is attributable to the defendant state; (2) the breach of an international duty; (3) a causal connection between the conduct and the injury; and (4) material damages.<sup>180</sup> There has been debate over whether these duties are breached by negligence or whether nations can be subject to strict liability.<sup>181</sup> In practice, these duties have had little practical effect.<sup>182</sup>

Nations must work together to prevent environmental problems that may overcome the entire planet.<sup>183</sup> Education is imperative to meet this end; nations must be taught the importance of their roles in the world environment.<sup>184</sup> The abundance of treaties indicates that nations recognize a need for international standards and regulation of the environment.<sup>185</sup>

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96. Victims ultimately must seek assistance from their own government; however, not all governments are in a position to provide the help needed. McCaffrey, *supra* note 173, at 329. *But see* Szasz, *supra* note 17, at 322 (discussing other international cases where legal liability attached and was settled). That no nation filed suit against the USSR may demonstrate nations' desires not to enforce laws against neighboring states even when there has been a clear violation of an existing rule. Sands, *supra* note 149, at 393. Failure to file suit may also be explained as a political move. Further, states may not want to bring suit because they know they may be the perpetrators tomorrow. Pierre-Marie Dupuy, *Soft Law and the International Law of the Environment*, 12 MICH. J. INT'L L. 420, 435 (1991).

In theory, nations will be held responsible for breaches, but in actuality, the vagueness of these duties leaves room for violating nations to claim that their conduct met international duties. *Developments—International Environmental Law*, *supra* note 162, at 1493. In addition, other nations seem unwilling to pursue enforcement because none want to relinquish the sovereignty that is required for enforcement. *Id.* at 1501.

180. *Id.* at 1494 (citing Gunther Handl, *Territorial Sovereignty and the Problem of Transnational Pollution*, 69 AM. J. INT'L L. 50, 74 (1975)). Those found liable would be required to pay damages. Szasz, *supra* note 17, at 322.

181. *See supra* note 66 and accompanying text.

182. For instance, the procedural requirements of a duty to assess damages and inform surrounding countries of activities is not violated until after the pollution since another nation must suffer damages. *Developments—International Environmental Law*, *supra* note 162, at 1512. In addition, the duty to inform and assess does not require a country to change their activity once an assessment has been made. *Id.* at 1513-20. The duty is satisfied by disclosure and imposes no further obligations. *Id.*

183. Nanda, *supra* note 153, at 378 (citing *Greenhouse Effect and Global Climate Change: Hearings Before the Senate Commission on Energy and National Resources*, 100th Cong., 1st Sess. (1987)).

184. *Id.* at 390.

185. Sachiko Kuwabara, *International Responsibility for Manmade Disasters*, 1987 AM. SOC'Y OF INT'L L. 320, 324. Treaties can be improved by including a clarification of the standard of care to prevent, control and mitigate environmental catastrophes. *Id.* Treaty law would also be improved by a broader definition of recoverable damages and the establishment of an international procedure and body to settle claims. *Id.* at 324-25.

## B. Developing Countries

Nations must recognize the special needs and concerns of developing nations when formulating rules for environmental protection. The foregoing duties may not be applicable to developing nations due to their underdeveloped status.<sup>186</sup> These countries are less willing to comply with international agreements and standards on the environment out of fear that their development will be slowed.<sup>187</sup> Their participation in international discussions on the environment stems only from a desire to be informed and to discover how development may be coupled with environmental preservation.<sup>188</sup> Although these nations may attend discussions, they do not wish to be bound by the ultimate decisions that result.<sup>189</sup> At the 1972 Stockholm Conference, developing nations indicated "that the needs of environmental conservation must be harmonized with those of development."<sup>190</sup> The international community must recognize that developing nations must address their immediate needs before addressing environmental issues.<sup>191</sup>

One suggested method of gaining compliance from developing nations is to offer them a lower standard of liability for environmental transgressions.<sup>192</sup> This suggestion recognizes that developing nations simply cannot afford to pay exorbitant damage awards for harming the environment.<sup>193</sup> Another possible method is to delay the developing nations' compliance to standards for a certain number of years.<sup>194</sup> For instance, the Montreal Protocol al-

186. Kilaparti Ramakrishna, *International Responsibility for Manmade Disasters*, 1987 AM. SOC'Y OF INT'L L. PROC. 320, 337.

187. *Id.* In addition, developing nations have requested payment from developed nations since the former nations paid no attention to the environment while the latter were developing. Catherine Tinker, Note, *Environmental Planet Management by the United Nations: An Idea Whose Time Has Not Yet Come?*, 22 N.Y.U. J. INT'L L. & POL. 793, 812 n.79 (1990). Developing nations believe developed nations should pay for the environmental harm already caused. *Developments—International Environmental Law*, *supra* note 162, at 1500. Many developing nations do not feel bound by "customary" international duties which were established before their existence or created by other nations. *Id.* at 1505 (citing LUNG-CHU CHEN, AN INTRODUCTION TO CONTEMPORARY INTERNATIONAL LAW 406 (1989)).

188. Ramakrishna, *supra* note 186, at 337.

189. *Id.*

190. *Id.*

191. John Ntambirweki, *The Developing Countries in the Evolution of an International Environmental Law*, 14 HASTINGS INT'L & COMP. L. REV. 905, 910 (1991).

192. L.F.E. Goldie, *International Responsibility for Manmade Disasters*, 1987 AM. SOC'Y OF INT'L L. PROC. 320, 339. Strictness could vary with the economic development of each state. *Id.*

193. *Id.*

194. Ntambirweki, *supra* note 191, at 910.

lows developing countries ten years to comply with the control measures necessary to protect the ozone layer so long as they adhere to a lower minimum standard.<sup>195</sup> This would help developing nations meet their immediate needs, yet still acknowledge the need for their compliance with international standards.<sup>196</sup>

Finally, some have suggested establishing a fund so that developing countries can secure loans or receive grants in order to implement environmental legislation.<sup>197</sup> Such a fund was created under an amendment to the Montreal Protocol.<sup>198</sup> This fund was designed to provide "financial transfers and technical cooperation" to developing nations to help them comply with the Montreal Protocol environmental control measures.<sup>199</sup> A grant system was also established by the World Bank through its new Global Environmental Facility ("GEF").<sup>200</sup>

### C. Suggested Improvements to International Environmental Regulations

International environmental law is uncoordinated, slow, and cumbersome.<sup>201</sup> There are no institutional or legal mechanisms to make international laws effective.<sup>202</sup> The international community needs an agency within the United Nations that has the power to enforce environmental laws.<sup>203</sup> This agency would transform inter-

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195. *Id.* (citing *Montreal Protocol on Substances that Deplete the Ozone Layer*, 26 INT'L LEGAL MAG. 1550 (1987)). The Montreal Protocol used as a framework the 1985 Vienna Convention for the Protection of the Ozone Layer. *Id.* (citing *Vienna Convention for the Protection of the Ozone Layer*, 26 INT'L LEGAL MAG. 1529 (1987)). It "seeks to protect the stratospheric ozone layer through the control of deleterious emissions . . . ." *Id.*

196. *Id.*

197. *Id.* at 914.

198. *Id.* at 913.

199. Ntambirweki, *supra* note 191, at 913.

200. *Id.* at 914-15.

201. Geoffrey Palmer, *New Ways to Make International Environmental Law*, 86 AM. J. INT'L L. 259, 271 (1992).

202. *Id.*

203. *Id.* The United Nations' activities in the environmental field are limited to "information-gathering, monitoring, and rule-making," not enforcement. Tinker, *supra* note 187, at 795. Currently, the United Nations enforces international law through the International Court of Justice ("ICJ") which has limited jurisdiction. *Id.* at 806. For a further discussion of the ICJ, see *Developments—International Environmental Law*, 104 HARV. L. REV. 1487, 1499-1503 (1991). For a detailed discussion on the United Nations Environment Programme, see Tinker, *supra* note 187, at 793.

national environmental law from "soft law" to "hard law."<sup>204</sup> Soft law is either law not yet in existence or a combination of things not all law.<sup>205</sup> Soft law itself is not legally binding.<sup>206</sup> Even soft law, though, can be helpful in determining obligations and everyday decisions.<sup>207</sup> Soft law essentially serves as a list of established international values.<sup>208</sup>

Another suggestion is to abolish the need for unanimous consent to international agreements.<sup>209</sup> Although unanimous consent generates a feeling of cooperation among nations, it weakens the law.<sup>210</sup> In reaching a unanimous decision, each nation extracts a portion of the law it does not like; in the end, the law is left impotent.<sup>211</sup> Furthermore, one nation has the power to block the law completely.<sup>212</sup> Some recent international agreements include a provision limiting the need for unanimous consent.<sup>213</sup> In these agreements, nations unanimously agree to be bound by any provisions on which a certain number of participating states agree.<sup>214</sup> The abandonment of unanimous consent requires the relinquishment of some state sovereignty, but it is in every state's interest to relinquish this power to further important international goals.<sup>215</sup>

Recently, the Pan-European Energy Charter (the "Charter") was designed specifically to deal with the Commonwealth of Independent States ("CIS"),<sup>216</sup> of which Armenia is a member, and its

204. Dupuy, *supra* note 184, at 431. Hard law is binding and usually is found in treaties. Tinker, *supra* note 193, at 802. The parties to the treaty, and occasionally third parties, are bound to the treaty. *Id.*

205. Dupuy, *supra* note 179, at 420.

206. *Id.* at 429.

207. *Id.* at 435.

208. Palmer, *supra* note 201, at 269.

209. *Id.*

210. *Id.*

211. *Id.*

212. Palmer, *supra* note 201, at 264.

213. *Id.*

214. *Id.*

215. *Id.* Many international agreements hesitate to withdraw sovereignty from a state. See Gillette, *supra* note 1, at 410-11. However, sovereignty need not pose such an obstacle to a binding agreement between nations; for example, treaties are reached by exchanging some sovereignty for another good. See *Developments—International Environmental Law*, *supra* note 162, at 1503. For a detailed discussion of sovereignty versus global concerns, see Eshbach, *supra* note 2, at 271.

216. The CIS is comprised of eleven of the fifteen former Soviet Republics: Armenia, Azerbaijan, Belarus, Moldova, Kazakhstan, Kirghizstan, the Russian Federation, Tadjikistan, Turkmenistan, Ukraine, and Uzbekistan. Gillette, *supra* note 1, at 376 n.5.

nuclear reactors.<sup>217</sup> The main goal of the Charter is to create a framework “for trade and cooperation in the field of energy, and to promote and guide the restructuring of Eastern Europe’s energy industries.”<sup>218</sup> The Protocol calls for cooperation among members of the international community to improve nuclear safety.<sup>219</sup> The main goals for regulating domestic conduct are “to develop nuclear regulatory organizations in each country, to improve reactor safety, and to develop waste management plans.”<sup>220</sup> The main goals for international conduct are to focus on “international organizations as sources of information, on international consultation concerning transboundary safety effects, and on international alternative energy studies.”<sup>221</sup>

#### V. MEDZAMOR: AN ASSESSMENT OF LIABILITY

If Armenia reopens Medzamor, it must control the disastrous consequences that may follow. In maintaining this control, Armenia must at least exercise due diligence.<sup>222</sup> Since due diligence considers each nation’s particular situation, it is questionable how much control Armenia, a nation in a dire condition, will have to exercise to limit its liability should an accident occur.

Arguably, Armenia would not violate its international environmental duties by reopening Medzamor. Since the due diligence standard takes into consideration the circumstances of the offending nation, Armenia could possibly be free from liability since it is plagued with energy and economic crises. Armenia is in a dismal predicament; it lacks the equipment and anti-pollution devices to operate Medzamor safely. It also lacks funds to restart Medzamor safely, it lacks food, heat and electricity for the people.

Even if liability were imposed on Armenia if Medzamor exploded, Armenia would be in no position to pay for the resulting

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217. *Id.* at 377. “The Charter is a statement of political intent among the signatories to establish a binding Basic Agreement and Protocols addressed to various areas of trade and cooperation in the energy field.” *Id.* The Basic Agreement and the Protocols have not yet been finalized, but once they are, they will have “the political authority of a treaty.” *Id.* For a comprehensive analysis of the Charter and suggested improvements, see Gillette, *supra* note 1, at 375.

218. Gillette, *supra* note 1, at 395 (citing *More than 45 Countries Sign European Energy Charter*, INT’L ENV’T’L DAILY, Jan. 15, 1992, at 19).

219. *Id.* at 401 (citing Draft of the Protocol of Principles Governing the Peaceful Uses of Nuclear Energy and Safety of Nuclear Installations, art. 3, Jan. 28, 1993).

220. *Id.*

221. *Id.*

222. For a discussion of the due diligence standard, see *supra* notes 166 and accompanying text.

damage suffered by other nations, or the damages to even its own nation. Since international law is soft law, Armenia could not be forced to pay for the injuries it caused.

If Medzamor reopens, there is a high risk that a nuclear accident will occur at the plant. Such an accident would spread nuclear contamination to other nations, as did the fallout from Chernobyl. Although any nation that suffered damages may look to Armenia for reparation, Armenia will be unable to pay for the damages. As a result, the international community would best be able to protect itself by assisting Armenia in preventing an accident, rather than seeking reparation after an accident occurs.

As discussed earlier, there is a customary duty to cooperate with other nations. However, given Armenia's choices, it is unlikely that the government will heed any of its neighbors' pleas to not open the plant.<sup>223</sup> The most Armenia's neighbors will be able to do to protect their own interests will be to help Armenia open the plant safely. After the opening, foreign nations may also have to watch the plant to ensure its safe operation. Ordinarily, the nation opening the plant has this duty. However, in this instance, a nation like Armenia may need to shift this burden to nations that are in a better position to carry out the obligation.<sup>224</sup>

## VI. CONCLUSION

If foreign nations intervene to cure Armenia's energy and economic crises, they can help end the resulting environmental crises.

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223. After all, if Medzamor had an accident like the one at Chernobyl, Yerevan would be uninhabitable. *Ketchian Speaks on Armenia's Environment*, *supra* note 95, at 3. Therefore, it is obvious that survival is the nation's top priority; environmental concerns are only secondary. *Id.*

224. A Member of the United States House of Representatives has stated that "[m]erely to applaud countries who fought for democracy is not enough. The world must provide the technical assistance to successfully complete the transformation." *Rep. Lehman Appeals for Steps to Solve Armenia's Energy Crisis*, *supra* note 108, at 3. Although international law imposes no legal obligation on other countries to help, it recognizes that developing countries should be given special assistance. In addition, when a nation suffers catastrophe, it is not uncommon for foreign nations to come to the rescue if the nation itself is unable to cope with the disaster. For example, in 1988, when a massive earthquake devastated Armenia, foreign aid poured into the republic. See Jim Naughton, *Aftershock of the Quake; Relief Workers Relive Their Armenia Experience*, THE WASH. POST, Jan. 7, 1989, at G1; *Armenia — Earthquake Relief Aid*, TASS, Jan. 25, 1989, available in LEXIS, Nexis Library. Given this fact, it is only logical to conclude that nations willing to aid in cases of unpredictable catastrophe should be willing to aid in the prevention of predictable ones.

Resolving the issue of Karabagh question is key to ending Armenia's energy and economic crises.<sup>225</sup>

One method of rescuing Armenia from its economic turmoil is to send non-military or humanitarian aid to Armenia. Organizations within the United States already have offered such aid.<sup>226</sup> To further rectify the situation, other nations could attempt to provide Armenia with an alternative energy source. Some believe that strengthened ties with foreign nations and the importation of organic fuels from Iran, Iraq or Turkey will eliminate the need to open Medzamor.<sup>227</sup>

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225. For a discussion of the Karabagh problem, see *supra* notes 97-105 and accompanying text. Five hundred thousand refugees have fled the massacre of Armenians in Azerbaijan and Karabagh seeking bare necessities such as food, shelter, employment and medical attention. *Armenian Foreign Minister Meets with Eagleburger*, ARMENIAN WKLY., Oct. 3, 1992, at 13. Furthermore, the blockade of Armenia by the Azeris has kept out the supplies Armenia needs to keep from reopening Medzamor. Sometimes, supplies sent to Armenia have been halted on railroads for three months. *Armenia Pleading Case on Embargo with U.S. Leaders*, *supra* note 90, at 1. Even after Armenia has paid for fuels, it has no way to import it since the rail lines are blockaded. *Id.* Armenia requested that United States help convince Turkey and Georgia to establish "humanitarian corridors" which would provide paths for food to reach Armenia and alleviate some of the impact of the Azeri blockade. *Id.*

226. The United States Agency for International Development and the Department of Energy has designated \$15.6 million to the former republics for energy assistance. Thomas F. Berg, *USAID, DOE Reach Out to Former Soviet States*, 130 No. 4 FORTNIGHT, Aug. 15, 1992, at 7. Energy efficiency and nuclear power plant safety are two issues to be addressed with the funds. *Id.* The United Armenian Fund has sent \$55 million of humanitarian aid to Armenia since the earthquake. *UAF's 58th Airlift Arrives in Yerevan*, ARMENIAN WKLY., Sept. 11, 1993, at 5. In addition, several Armenian-Americans helped to create a new environmental engineering program for the State Engineering University of Armenia. *Environmental Engineering Program to Start at SEUA in Armenia*, ARMENIAN WKLY., July 11, 1992, at 5. One of the courses will cover solid and water waste. *Id.* This program aims to teach the students how to solve Armenia's environmental problems. *Id.*

227. Haplin, *supra* note 7, at 13. Turkey has expressed some fear concerning the possibility of an accident at Medzamor. *Gas Reaches Armenia, Nuclear Power Still Needed*, REUTERS, *supra* note 88. The plant is not far from the Turkish border. *Id.* Turkey talked about supplying Armenia with electricity; however, this action would only take place if Armenia renounced its territorial claims and charges of the Armenian massacre from 1915. *Id.* In addition, such action would be seen as traitorous by the Azeris. *Id.*

In 1992, Iran held a Regional Energy Meeting to discuss the possibility of aiding Armenia and other former Soviet republics by connecting them to seas with pipelines. *Iran to Host Regional Energy Meeting*, ARMENIAN REP. INT'L, Aug. 29, 1992, at 18. Armenia agreed to buy 500,000 metric tons of fuel oil a year from the Iranian National Oil Company. *U.S. Executive Fights to Light up Armenia as Energy Minister*, WASH. POST, June 1, 1992, at B9.

Other countries have also offered assistance. The President of the International Association of Atomic Engineers, also former chairman of Britain's electricity industry, appeared willing to help the new republic when he visited Medzamor in December 1991. Haplin, *supra* note 7, at 13.

Another option would be to lend assistance to insure the safe reopening of the Medzamor plant.<sup>228</sup> There are several reasons why countries may be willing to work for a safe reopening despite their lack of a duty to do so. Western countries would help for two reasons: (1) to gain lucrative contracts for nuclear reactor upgrading and construction,<sup>229</sup> and (2) to improve the public's perception of nuclear energy worldwide.<sup>230</sup> Eastern countries would assist out of fear of accidents at the reactors which will affect the safety and health of their own citizens.<sup>231</sup> This option would require greater effort in lending Armenia money and sending specialists to Yerevan to inspect and repair the plant.<sup>232</sup>

Armenia's environmental crisis has climaxed since the time of Soviet domination. As the new nation struggles to survive, it searches for ways to feed and heat its people during another bitter winter. In the backdrop of disaster looms the Medzamor nuclear power plant, dormant and tantalizing. In the city of Yerevan it stands as a symbol of hope and fear.<sup>233</sup> The reopening may relieve

228. In late 1992, an international conference was held to evaluate the reopening of Medzamor. *Conference of Energy Specialists Advocate Re-opening of Medzamor nuclear plant*, ARMENIAN WKLY., Nov. 28, 1992, at 1. After the conference, specialists agreed to advocate the re-opening of Medzamor in order to alleviate Armenia's need for energy. *Id.* In economic terms, this solution costs less than buying energy from other nations. *Id.* Environmentally, the costs may be extremely high. *Id.* Since Medzamor's shutdown, parts of the plant have been sold to other countries and other parts have been stolen. *Id.* If Medzamor is reopened, it will be the first time ever that a nuclear plant that was "permanently" shutdown was re-opened. *Id.*

229. *Id.*

230. Gillette, *supra* note 1, at 389. Improving safety at CIS reactors will reduce the chances of accidents and thus improve the public's perception. *Id.*

231. *Id.* Eastern countries may also be motivated by the possibility of procuring construction contracts. *Id.*

232. Some countries and organizations have moved to adopt this approach. For instance, Russia has agreed to help Armenia in restarting the plant. *Russia Conditions help to Armenia in Restarting Nuclear Plant*, THE TELEGRAPH AGENCY OF THE SOVIET UNION TASS, Sept. 6, 1993. In addition, the IAEA has visited the plant and deemed it technically ready to start. *Medzamor Nuclear Plant Fit for Work Claims Expert*, ARMENIAN WKLY., Sept. 4, 1993, at 1. IAEA stated that it will help restore the plant and has invited Armenia to join its organization. *Id.* Armenia seems to be begging for aid from any nation that will offer assistance, even from a nation that once massacred two thirds of her population—Turkey.

233.

Medzamor  
Crisis in our homeland,  
"Isolated" from the world,  
With no other alternative,  
We turn to you with hope  
and fear  
And we ask, voices quivering:  
"If we give you life,  
will you save us,  
or destroy us?"



the people of the long endured energy and economic crises, but it will also invite environmental disaster. An explosion at Medzamor would devastate not only Armenia, but surrounding nations. Consequently, the world must recognize a new duty of nations to aid an economically embattled country whose only option for survival is to reopen a nuclear power plant that could potentially destroy the region's environment. As the international community struggles to save the environment within its own borders, it must remember that "[t]he actions of one nation could render nugatory the actions of all the others."<sup>234</sup>

*Tamara C. Gureghian*

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Tamara C. Gureghian, Medzamor (Sept. 24, 1992) (unpublished poem, on file with the *Villanova Environmental Law Journal*).

<sup>234</sup> Palmer, *supra* note 201, at 259 (referring preservation of global environment).