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# Compensating Damage Arising from Global Nuclear Accidents: The Chernobyl Situation

"The unleashed power of the atom has changed everything save our modes of thinking, and we thus drift toward unparalleled catastrophes."

Albert Einstein<sup>1</sup>

## I. INTRODUCTION

In the wake of the near meltdown at the Chernobyl nuclear power plant in the Union of Soviet Socialist Republics ("Soviet Union"), a new kind of industrial accident was born. The Chernobyl accident is the first nuclear power plant disaster in which widespread nuclear contamination occurred on a global scale. Chernobyl illustrates the danger of "global disasters" which will inevitably arise as a consequence of large scale industrial activity.

As Chernobyl is the first nuclear accident of its kind, where damage caused by escaping radioactivity crossed transnational boundaries, the procedure used in rectifying the resulting damage will set the stage for future damage determinations and compensation. Other nuclear power accidents have occurred, such as the accidents at Windscale and Three Mile Island. At Windscale, a fire in the plutonium reactor spewed radioactive iodine into the air near the Irish sea for three days.<sup>2</sup> All of the resulting damage was confined to the general

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1. Chaze, *Chernobyl's Fiery Story Emerges*, U.S. NEWS & WORLD REP., May 19, 1986, at 23. Currently, there are 390 nuclear reactors in operation throughout the world. *Id.* at 20. All told, 15% of the world's electricity is generated by nuclear power. *Id.*

Country	Reactors in Service	Share of power	Country	Reactors in service	Share of power
France	39	65%	Belgium	6	60%
Taiwan	6	59%	Sweden	10	42%
Switzerland	6	40%	Finland	4	38%
Bulgaria	4	32%	West Germany	20	31%
Japan	32	25%	Hungary	2	25%
Spain	7	24%	Argentina	2	23%
Britain	32	19%	South Korea	3	18%
United States	101	16%	Czechoslovakia	1	15%
Canada	15	13%	U.S.S.R.	50	11%
East Germany	5	11%			

2. Trafford & Wellborn, *Stark Fallout from Chernobyl*, U.S. NEWS & WORLD REP., May 12, 1986, at 20. Approximately 39 cancer cases were eventually traced to the October 1957, Windscale accident. *Id.*

area surrounding the reactor.<sup>3</sup> At Three Mile Island, a partial nuclear meltdown occurred.<sup>4</sup> Once again, the scale of the accident was minimal and the damage limited to the immediate area surrounding the nuclear plant. Chernobyl is a unique situation because it is the first nuclear accident to transgress national boundaries and cause damage on an international scale.<sup>5</sup>

This Comment will address the issue of who should pay the cost when a nuclear plant accident occurs, resulting in damage and destruction on a global scale. By analogizing to past transboundary industrial accidents, such as nuclear satellite collisions with the Earth, this Comment will analyze the various approaches to the civil liability issue arising from Chernobyl. First, this Comment will examine existing agreements and treaties concerning nuclear damage and damage caused by space objects. Second, this Comment will give a brief overview of each agreement and analyze each in terms of how it applies to the Chernobyl situation. Third, this Comment will propose additions and alterations to existing, yet dormant treaty agreements. Finally, this Comment will propose a way to redress the damage caused by radiation contamination.

Reliance on modern nuclear technology has its costs.<sup>6</sup> Yet society has accepted these risks in exchange for the gained benefits of nuclear power.<sup>7</sup> In the United States, the economic market has shown a preference towards greater safety precautions. Even though a nuclear plant accident might be worrisome to the community, the accident is likely to be financially disastrous to the utility company.<sup>8</sup> This choice does not apply when the entity causing the damage does not have to worry about being driven into bankruptcy proceedings due to its own negligence, as is the case with a governmental entity. The difference in the Chernobyl situation is that there is no current active interna-

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3. *Id.*

4. *Id.* The accident at Three Mile Island, a General Public Utilities plant located near Harrisburg, Pennsylvania, was the worst U.S. nuclear accident to occur. No actual deaths were attributed to the accident and damage was highly localized. *Id.*

5. *Id.*

6. *Id.* at 21. Harvard University physicist Richard Wilson warns, "[w]ith 300 big reactors in place around the world, we'll average a meltdown every 30 years." *Id.*

7. See Huber, *Safety and the Second Best: The Hazards of Public Risk Management In The Courts*, 85 COLUM. L. REV. 277 (1985); see also Cohen, *Innovation and Atomic Energy: Nuclear Power Regulation, 1966-Present*, 43 LAW & CONTEMP. PROBS. 67 (1979); Bazelon, *Science and Uncertainty: A Jurist's View*, 5 HARV. ENVTL. L. REV. 209 (1981).

8. See Huber, *supra* note 7, at 298; see e.g., Starr & Whipple, *Coping with Nuclear Power Risks the Electric Utility Incentives*, 23 NUCLEAR SAFETY, Jan.-Feb. 1982, at 1, 64.

tional treaty for the adjudication of damage flowing from nuclear power accidents which affect countries other than the one in which the accident occurs. This Comment will not debate the pros and cons of nuclear power. It will address the practical problem of damage rectification which has arisen from the nuclear accident at Chernobyl.

## II. THE CHERNOBYL MELTDOWN

### A. Facts

The accident at Chernobyl's No. 4 reactor occurred while the reactor was shut down for repairs on April 26, 1986.<sup>9</sup> According to Soviet officials, a series of explosions occurred, most likely touched off by a malfunctioning turbine and an electrical failure.<sup>10</sup> The resulting fire spread to the equipment, and then to the reactor itself.<sup>11</sup> The explosion blew the top off the reactor and spread a cloud of radioactive residue across the Soviet Union, as well as across much of Europe.<sup>12</sup> It was not until May 8, 1986 that foreign reporters were allowed to visit Kiev which is eighty miles from Chernobyl.<sup>13</sup> On May 9, fourteen days after the accident, the Soviet government finally agreed to supply daily radiation measurements, wind reports, and other meteorological information to the International Atomic Energy Agency.<sup>14</sup> Soviet officials have officially attributed the accident to human error.<sup>15</sup>

As a direct result of the accident, countries from around the world have called for international agreements to determine a standard for handling such crises.<sup>16</sup> The British Minister of Energy, Peter

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9. For a detailed explanation of the official Soviet version of the accident, see U.S.S.R. State Committee on the Utilization of Atomic Energy, *The Accident at the Chernobyl Nuclear Power Plant and Its Consequences*, at 15 (1986), reprinted in, Patterson, *Chernobyl - the Official Story*, 43 BULL. ATOM. SCI., Aug. - Sept. 1986 at 34-36.

10. Thompson, *What Happened at Reactor Four*, 43 BULL. ATOM. SCI., Aug. - Sept. 1986 at 26-31 (detailed description of the accident in technical terms).

11. Chaze, *supra* note 1, at 23. It is estimated that the fire in the reactor's graphite core burnt at approximately 4,000 degrees Fahrenheit. *Id.*

12. *Id.* Among the nations directly affected by the radioactive waste released by the Chernobyl accident were, the Netherlands, Finland, Italy, Norway, Sweden, Switzerland, Poland and Hungary. It is estimated that the amount of radiation detected in Sweden was 15 times the normal amount, 4 times greater in Switzerland and twice as great in Italy. Nations affected economically by contaminated food included Canada, West Germany and many other nations who import food from the Soviet Union. Malaysia refused to take delivery of 100,000 pounds of butter from the Netherlands on the ground that it was excessively contaminated with cesium 137. See L.A. Times, Oct. 6, 1986, part I, at 12, col. 3.

13. See Chaze, *supra* note 1, at 25.

14. *Id.*

15. Trafford & Wellborn, *supra* note 2, at 18.

16. Among the nations calling for international compensation agreements have been

Walker, was quoted by the International Atomic Energy Agency as stating that "the British government is anxious to see a general system of compensation in respect of nuclear accidents, and we would support a binding international regime to provide that compensation."<sup>17</sup>

### B. Damage

The initial damage at Chernobyl was extensive. The official Soviet death count was 31, with over 200 seriously injured.<sup>18</sup> More insidious than the immediate casualties was the creeping radioactivity which spread across much of Europe without any kind of warning from the Soviet Union. European governments were not prepared to deal with the harmful effects of the radioactive fallout because the Soviet Union failed to provide any warning or information concerning the disaster for eight days. In the Soviet Union, an area the size of Rhode Island is believed to have been contaminated.<sup>19</sup> In Poland, milk from grass-fed cows was banned.<sup>20</sup> West Germany placed an embargo on Soviet fruits and vegetables.<sup>21</sup> The damage caused by the nuclear fallout is hard to estimate and is likely to linger indefinitely.<sup>22</sup> One indicator, the measure of "half-life,"<sup>23</sup> shows that the radioactivity spread by Chernobyl will last as long as the half-life of radioactive cesium 137, which is approximately thirty years.<sup>24</sup> A report by Sweden's National Institute of Radiation Protection estimates that more exposure to radiation resulted from Chernobyl than from all past nuclear tests combined.<sup>25</sup>

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Great Britain, West Germany, Austria, and Luxembourg. L.A. Times, Oct. 6, 1986, part I, at 12, col. 2-4.

17. *Id.*

18. L.A. Times, Sept. 27, 1986, pt. I, at 4, col. 4. Additionally, over 135,000 people were evacuated from the general area of the accident site.

19. Trafford & Wellborn, *supra* note 2, at 18. Chernobyl is located about 80 miles from Kiev in the heart of the Soviet wheat land. Approximately 47% of the Soviet Union's winter wheat is grown there. *Id.* at 19.

20. *Id.*

21. *Id.*

22. McCally, *Hospital Number Six: A First-Hand Report*, 43 BULL. ATOM. SCI. Aug.-Sept. 1986 at 12. The time required for a radioactive element to lose fifty percent of its radioactivity by decay is measured by half-life. See von Hippel & Cochran, *Estimating Long-Term Health Effects*, 43 BULL. ATOM. SCI. Aug.-Sept. 1986 at 19.

23. McCally, *supra* note 22, at 12.

24. *Id.* at 19.

25. L.A. Times, Oct. 6, 1986, pt. I, at 12, col. 3. "[Cesium 137] has been found in quantities up to 20 times the cumulative deposition from all past nuclear tests." *Id.* Scientists at the Lawrence Livermore Laboratory estimated that between one million and six million curies of cesium 137 were released into the atmosphere. *Id.* at 28, col. 2. A curie is defined as the rate

The immediate damages resulting from the dispersal of radioactive fallout ranged from the forced disposal of huge amounts of fresh vegetables, milk and butter, to the slaughter of thousands of radioactively contaminated sheep and reindeer.<sup>26</sup>

Exposure to large amounts of radiation can result in death within days or hours.<sup>27</sup> If the radioactive exposure is in smaller amounts it can destroy the bone marrow which produces the white blood cells that ward off infection.<sup>28</sup> Additional side effects include heightened susceptibility to illness, nausea and sterility.<sup>29</sup> Intermediate health effects from radiation exposure potentially include the development of radiation cataracts in the eyes, birth defects in children, and infertility in both males and females.<sup>30</sup> Long term effects will probably include lengthy monitoring for radioactivity and increased cases of cancer from the fallout.<sup>31</sup> The total loss is estimated as running into the hun-

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of disintegration of one gram of radium, which is 37 billion disintegrations per second. McCally, *supra* note 22, at 12. It is estimated that the total radioactive release from Chernobyl is near 50 million curies. This contrasts to the total amount of cesium 137 released from all past atmospheric tests which is estimated to be between four and ten million curies. *Id.* The maximum permissible dose of radioactivity per year is 500 millirem (a thousandth of a rem). *Id.* A rem is defined as "roentgen equivalent, man." *Id.* It is estimated that the 299 patients admitted into Soviet hospitals following the accident were exposed to between 100 and 1,000 rads. *Id.* at 10. A rad is defined as "radiation absorbed dose." One rad equals the amount of ionizing radiation that deposits 100 ergs of energy in each gram of exposed biological tissue. *Id.* at 12. For purposes of comparison, these examples are typical radiation doses:

- a) Average annual natural background radiation: 90-100 millirem;
- b) Average annual radiation from medical radiation or man-made radiation (i.e. diagnostic X-rays, weapons testing, building materials): 90-100 millirem;
- c) Cosmic radiation received during a transcontinental U.S. flight: 2.5 millirem;
- d) Chest exam: 10 millirem. *Id.*

26. L.A. Times, *supra* note 25, at 12. Reindeer are the lifeblood of the Lapp economy. The accident has been very traumatic for this fragile culture. Tor Gunnerød, the head of research at Norway's Directorate for Nature Management has indicated that levels of radioactivity in the primary food for reindeer, lichen, is estimated to increase to four to five times above the current high levels. This could lead to mass deaths of reindeer, a regular part of the Nordic diet, within the next two to three years. *Id.*

27. Abrams, *How Radiation Victims Suffer*, 43 BULL. ATOM. SCI. Aug.-Sept. 1986 at 13-17.

28. *Id.* at 16.

29. *Id.* at 17.

30. *Id.*

31. Trafford & Wellborn, *supra* note 2, at 18. Exposure to smaller doses of radioactivity may cause birth defects, and various cancers, including that of the bone marrow, breast and thyroid. *Id.* at 19. Dr. Robert Gale, the United States physician who was called upon by the Soviets to assist in the treatment of Chernobyl radiation victims, commented, "[that] upwards of 100,000 individuals will face increased risks of cancer the rest of their lives." Wellborn, *A Soft-Talk, Tough-Talk Kremlin Defense*, U.S. NEWS & WORLD REP., May 26, 1986, at 4. Additionally, Dr. Gale has estimated that the radioactive fallout from Chernobyl would cause

dreds of millions of dollars.<sup>32</sup>

### C. *The Soviet Response*

The Soviet Union has balked at paying any compensation for the Chernobyl incident.<sup>33</sup> It has claimed that the Western nations instigated most of the problems by instituting "unnecessary" radioactive monitoring and food restrictions. It has further argued that no international legal mechanism exists for determining liability from nuclear accidents.<sup>34</sup> The Soviet Union, in a formal statement, suggested that a multilateral agreement "could envisage the liability of states for international damage" but that any such agreement would also have to assign liability for "material, moral and political damage caused by unwarranted action taken under the pretext of protection against the consequences of nuclear accidents."<sup>35</sup>

## III. EXISTING CONVENTIONS: THE VIENNA CONVENTION ON CIVIL LIABILITY FOR NUCLEAR DAMAGE

The Soviet claim that no international legal mechanism exists to settle damage claims is not altogether true. In May 1963, nations anticipating future situations where civil liability for nuclear damage would be an issue, met in Vienna to discuss setting a framework to address the issue.

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between 5,000 to 75,000 additional cancer related deaths. L.A. Times, Jan. 21, 1987, pt. I, at 5, col. 2. For an in-depth discussion of the effects of radiation poisoning in humans, see Abrams, *supra* note 27, at 13-17. A number of sources provide supplemental reading on the topic of physiological effects of radiation poisoning. See generally Hemplemann, Lisco, & Hoffman, *The Acute Radiation Syndrome: A Study of Nine Cases and a Review of the Problem*, 36 ANNALS INTERNAL MED. 279 (1952) (injury occurring as a result of uncontrolled chain reaction); V. BOND, T. FLIEDNER, & J. ARCHAMBEAU, MAMMALIAN RADIATION LETHALITY, 57 (1965) (effect of radiation on cells and their reproductive cycle); Mole, *The LD 50 for Uniform Low LET Irradiation of Man*, 57 BRIT. J. RADIOLOGY 355 (1984) (discussion of the amount of radiation exposure that will kill 50% of those exposed to it); Cronkite, *Treatment of Radiation Injuries*, 118 MIL. MED. 328 (1956) (possible treatment of radiation exposure victims); von Hippel & Cochran, *supra* note 22, at 18-24 (in-depth evaluation of long term health effects). A number of estimates have been made concerning the long term medical effects of the Chernobyl disaster. Notably, 2,000-40,000 thyroid tumor cases from iodine 131 inhalation, 10,000-250,000 potential thyroid tumor cases from iodine 131 absorbed via grass-cow-milk route in absence of action by public officials to block this route, and 3,500-70,000 cancer cases from whole body doses of cesium 137 (with approximately 50% being fatal). *Id.* at 24.

32. L.A. Times, Sept. 27, 1986, pt. I, at 4, col. 4.

33. L.A. Times, Oct. 6, 1986, pt. I, at 12, col. 4.

34. L.A. Times, Sept. 27, 1986, pt. I, at 4, col. 4.

35. L.A. Times, Oct. 6, 1986, pt. I, at 12, col. 4.

### A. Goals of the Convention

The Vienna Convention on Civil Liability for Nuclear Damage (Vienna Convention) was held on May 19, 1963. The Convention was attended by representatives of fifteen countries,<sup>36</sup> including the Soviet Union. The purpose of the Convention was fivefold: (1) to review problems relating to the Convention and to advise the Director General of the International Atomic Energy Agency of such problems; (2) to study the feasibility of setting up an international compensation fund for nuclear damage including ways to cover damage exceeding the amount provided; (3) to study any problems arising from applying the Convention to nuclear power plants operated by an intergovernmental organization; (4) to prepare documents for a revision conference to be held five years after the date the Convention enters into force; and (5) to study the feasibility of establishing a procedure for settling questions arising between two or more of the contracting parties, with respect to whose courts will exercise jurisdiction.<sup>37</sup>

The Vienna Convention Conference was the first attempt by the international community to solve the problems of allocating and recovering damages arising from nuclear accidents. As defined by the Vienna Convention, "Nuclear Damage" is:

(1) loss of life, any personal injury or any loss of, or damage to, property which arises out of or results from the radioactive properties or a combination of radioactive properties with toxic, explosive or other hazardous properties of nuclear fuel or radioactive products or waste in, or of nuclear material coming from, originating in, or sent to, a nuclear installation;<sup>38</sup>

(2) any other loss or damage so arising or resulting if and to the extent that the law of the competent court so provides;<sup>39</sup> and

(3) if the law of the Installation State so provides, loss of life, any personal injury or any loss of, or damage to property which arises out of or results from other ionizing radiation emitted by any other source of radiation inside a nuclear installation.<sup>40</sup>

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36. International Conventions on Civil Liability for Nuclear Damage, series No. 4, at 6, (1976) [hereinafter "Vienna Convention"]. The standing committee was formed composing representatives from the governments of Argentina, Brazil, Canada, Czechoslovakia, Egypt, the Federal Republic of Germany, Finland, France, India, Japan, the Philippines, Poland, the Union of Soviet Socialist Republics, Great Britain and Northern Ireland, and the United States. *Id.*

37. *Id.* Resolution on the Establishment of a Standing Committee, at § 1(a)-(e).

38. *Id.* at 8, art. I.

39. *Id.*

40. *Id.*



### B. Damages

The concept of damages is of primary importance in determining the extent and scope of Soviet liability from Chernobyl. United States jurisprudence has established that damages are the amount of money awarded to a person injured by another's tortious conduct.<sup>41</sup> The wide variety of damage and injury suffered as a result of the radioactivity released by Chernobyl falls within the concepts of direct, general, foreseeable and compensatory damages. The four types of damages enumerated by the Vienna Convention fall squarely within the previously mentioned classifications.<sup>42</sup> For a victim to be compensated under general principles of tort law, a showing that the damage or harm suffered was proximately caused by the reactor is required.<sup>43</sup>

### C. Compensable Harm-Direct Damages

A further determination would be the types of damage or injury compensable under the terms of the Vienna Convention. Direct damages are traditionally thought of as resulting from an act or incident without the intervention of any intermediate controlling causes.<sup>44</sup> If the requirements for causation are present and the harm had been determined according to United States practices, the following types of losses would be compensable: lost time and earnings, loss or impairment of earning capacity, loss of property, impairment of use of property through radiation contamination, loss of rents from lands contaminated by fallout, loss of livestock, reasonable medical, hospital or nursing costs associated with radioactivity contamination, accompanying physical impairments and disease, pain and suffering, reasonable costs associated with making property fit for use again, reasonable costs associated with radiation cleanup, costs associated with mitigating wrongful harm and reasonable costs associated with

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41. W. PROSSER, LAW OF TORTS 49-51 (4th ed., 1971).

42. See Vienna Convention, *supra* note 36, art. I, at 8.

43. Vienna Convention, *supra* note 36, art. II, at 8. Article II clearly specifies a direct causation requirement. It states that the operator of a nuclear installation shall be liable for nuclear damage upon proof that the damage was caused by a nuclear incident: 1) at the operator's nuclear installation; or 2) involving nuclear material coming from or originating from the operator's nuclear installation. *Id.* at 8-9. The term "nuclear fuel" refers to any material capable of producing energy by a self-sustaining chain reaction process of nuclear fission. *Id.* at 7. The term "nuclear material" means either nuclear fuel, according to the above definition or any other radioactive byproducts or waste. *Id.*

44. Christol, *International Liability For Damage Caused By Space Objects*, 74 AM. J. INT'L L. 346, 360 (1980).

the monitoring of radiation levels in the environment.<sup>45</sup> Direct losses suffered as a result of the direct relationship between the actual accident and corresponding damage or injury are the easiest to ascertain, but are not the only basis for recovery.

#### D. Compensable Harm—Indirect Damages

Another possible form of compensable damages would be indirect damages. If it is determined that the fallout from Chernobyl caused no measurable damage in the environment, then the cleanup costs associated with the efforts to mitigate possible anticipated damage might be treated as a form of indirect or consequential damages.

The Chernobyl situation would be analogous to the Cosmos 954 incident,<sup>46</sup> where the Soviet satellite Cosmos 954 prematurely reentered the earth's atmosphere after the failure of its nuclear propulsion system and crash landed in the Canadian tundra.<sup>47</sup> The Canadian government conducted an extensive clean up effort with the possibility that no actual measurable damage had occurred. In that situation, it has been argued,<sup>48</sup> "Canada's search and rescue costs were caused by fulfilling its common law duty to mitigate probable damages and that these costs would therefore qualify as indirect or consequential damage in the sense of Article VII of the Outer Space Treaty."<sup>49</sup> The costs incurred by Canada for the cleanup of radioactive debris from Cosmos 954 were later partially settled with the Soviet Union, even though no actual measurable damage occurred to the tundra.<sup>50</sup>

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45. *Id.* at 359.

46. *See infra* text accompanying notes 104-106.

47. For a more detailed discussion of the accident, *see infra* text accompanying notes 104-07.

48. Haanappel, *Some Observations on the Crash of the Cosmos 954*, 6 J. SPACE L. 147, 148 (1978) (emphasis in original).

49. *Id.*; *see also* The 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, 18 U.S.T. 2410, T.I.A.S. No. 6347, 610 U.N.T.S. 205, *reprinted in* 6 I.L.M. 386 (1967) [hereinafter "Outer Space Treaty"] (entered into force for the United States on Oct. 10, 1967). Over 80 nations are party to the treaty, including the Soviet Union. The purpose of the treaty was to govern the activities involved in the exploration and use of outer space, including the moon and other celestial bodies, according to principles of international law, including the United Nations Charter. The uses of space should be carried out in the interest of maintaining international peace, security and to promote international cooperation and understanding. *See also* Christol, *supra* note 44, at 351 n.17. For a further elaboration on the use of the Outer Space Treaty in determining damages, *see* Galloway, *Nuclear Powered Satellites: The U.S.S.R. Cosmos 954 and the Canadian Claim*, 12 AKRON. L. REV. 401, 409-10 (1979).

50. Canada's total costs for cleaning up the Cosmos accident site were \$13,970,143.66. The Soviets were presented with a claim for \$6,041,174.70 by the Canadian government, of

This argument should also apply to a claim for the cleanup of damages from Chernobyl, even if it is eventually determined that the steps taken by Western European nations to cleanup and monitor affected areas were unnecessary because no measurable damage occurred. Any future claim made to the Soviet Union for damages should include costs associated with cleanup of radioactive debris, regardless of whether any actual measurable damage occurred.

### *E. Nominal Damages*

Nuclear power inherently contains elements of both beneficial use and great danger. Its inherently ultrahazardous nature means the risk from possible mishap cannot be eliminated by the exercise of reasonable care. For this reason, the Vienna Convention imposed a standard of absolute liability.<sup>51</sup> The Vienna Convention, however, does provide exceptions to liability in the event of nuclear damage occurring as a result of acts of armed conflict, hostilities, civil war or insurrection.<sup>52</sup> Additionally, no liability attaches to the operator of a nuclear plant when nuclear damage occurs as a result of a natural disaster of exceptional character.

Under the Convention, the state where the accident occurs may set a limit on the amount of liability.<sup>53</sup> One of the main drawbacks to the Vienna Convention is the language stating, "[t]he liability of the operator may be limited by the Installation State to not less than US \$5 million for any one nuclear incident."<sup>54</sup> This is a problem area for two primary reasons. First, the five million dollar liability is unquestionably insufficient in terms of compensation, both in terms of property damage and future health costs.<sup>55</sup> Second, the five million dollar compensation floor is tied to the 1963 value of gold.<sup>56</sup> Gold prices in 1963 were approximately \$35 per troy ounce, while current gold prices are nearly \$500 per troy ounce. The Vienna Convention further states, "[a]ny limits of liability which may be established pursuant to this Article shall not include any interest or costs awarded by a

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which the Soviets eventually paid a substantial portion. For a more detailed discussion of this subject, see *infra* text accompanying notes 107-08.

51. Vienna Convention, *supra* note 36, art. IV, at 10.

52. *Id.*

53. *Id.* art. V, at 11.

54. *Id.*

55. L.A. Times, Sept. 27, 1986, pt. I, at 4, col. 1. Preliminary estimates of the damage caused by Chernobyl indicate the loss of hundreds of millions of dollars.

56. Vienna Convention, *supra* note 36, art. V, at 11. Valuation of U.S. currency is set in terms of the price of gold as of April 29, 1963. *Id.*

court in actions for compensation of nuclear damage.”<sup>57</sup>

This provision does grant additional flexibility for compensation but not nearly enough to provide for the potential loss caused by a nuclear incident. Since liability is not limitless, as it is under the Space Objects Agreement,<sup>58</sup> nominal damages may exist and should be discussed during future negotiations with the Soviet Union.<sup>59</sup>

### F. Punitive Damages

Punitive damages are also not enumerated in the Vienna Convention. The purpose of the Vienna Convention is to provide compensation for people, nations or land damaged by the peaceful use of nuclear power. Since neither nominal nor punitive damages serve this purpose, they have no place in the Convention.<sup>60</sup> Another problem with punitive damages is that they are usually not allowed in international law unless it is determined they are generally available within all major legal systems and can be applied by international tribunals.

In international law, punitive damages are rare and when plead, are only reluctantly awarded.<sup>61</sup> In terms of international treaties, the language of the treaty must be clear and unambiguous regarding the allowance of both punitive and nominal damages.<sup>62</sup> For the most part, international lawyers have, on occasion, contemplated making a claim for punitive damages as a result of a breach of international law.<sup>63</sup> Acceptance of this concept, however, has been limited.<sup>64</sup> For the above reasons, punitive and nominal damages are highly unlikely to be granted as a measure of compensating the Chernobyl damage.

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57. *Id.*

58. 1972 Convention on International Liability for Damage Caused by Space Objects, October 9, 1973, 24 U.S.T. 2389, T.I.A.S. 7762 [hereinafter “Space Objects Agreement”]. Over 60 nations are party to it, including the Soviet Union. See Christol, *supra* note 44, at 347 n.3. Article II provides that the launching State “shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the earth or to aircraft in flight.” *Id.*

59. Christol, *supra* note 44, at 366. The rationale for nominal damages is that they serve to confirm the existence of a right when there has been no substantial loss or injury. *Id.*

60. *Id.* See also Foster, *The Convention on International Liability for Damage Caused by Space Objects*, 10 CANADIAN Y.B. INT’L L. 137, 172 (1972).

61. See Christol, *supra* note 44, at 368.

62. *Id.*

63. G. HACKWORTH, 5 DIGEST OF INTERNATIONAL LAW 723-26 (1943).

64. *Id.* See also Christol, *supra* note 44, at 368. For further information on the issue of punitive damages, see M. WHITEMAN, 8 DIGEST OF INTERNATIONAL LAW 813 (1967).

### G. *Specialized Problems Relating To Nuclear Damage*

There are three major problems with the compensation of nuclear damages under the Vienna Convention. First, many of the injuries and other damages will not become known for a number of years.<sup>65</sup> The Vienna Convention limits the time in which damages may be sought to ten years from the occurrence of a nuclear accident.<sup>66</sup> Yet, if under the laws of the Installation State,<sup>67</sup> an operator is covered by insurance or other financial security, rights of compensation may be extended if the State's coverage lasts longer than ten years.<sup>68</sup> Under these provisions, most immediate and intermediate damages are taken into account. However, the Vienna Convention fails to provide for the long term medical damages, such as chromosomal damage and increased cases of cancer, which occur as a direct result of exposure or ingestion of nuclear contaminated materials.<sup>69</sup> Any future agreement enacted to update the Vienna Convention should include provisions dealing with the long term effects of exposure to radioactivity. In the instant situation, the limitations of the Vienna Convention limit the scope of Soviet liability to immediate and intermediate damages and do not provide for the long term effects of the accident.

The second problem is that the Vienna Convention only remained in force for ten years from its inception.<sup>70</sup> At the end of that period, a member of the Convention could terminate its application upon serving the Director General of the International Atomic Energy Agency with twelve months notice.<sup>71</sup> Unless notice of termination of membership is given, the Convention remains in force for five more years.<sup>72</sup> After that, membership is renewed in successive five year intervals until the member country gives notice of membership termination.<sup>73</sup> The main problem with this clause is that the treaty has neither been updated, nor applied before the Chernobyl accident.

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65. See *supra* text accompanying notes 22-31.

66. Vienna Convention, *supra* note 36, art. VI, at 11.

67. "Installation State" in relation to nuclear installations refers to the Contracting Party within whose territory that installation is situated or, if not situated within the territory of any State, the Contracting Party by which or under the authority of which the nuclear installation is operated. *Id.* art. I, at 7.

68. *Id.* art. VI, at 11.

69. See *supra* text accompanying notes 22-31.

70. Vienna Convention, *supra* note 36, art. XXV, at 15.

71. *Id.*

72. *Id.*

73. *Id.*

As a result, the Vienna Convention's primary use should be as a framework for compensation claims to the Soviet Union.

Third, the Vienna Convention allows a nation to limit its liability in operating nuclear power plants to five million dollars in gold, calculated according to 1963 gold prices.<sup>74</sup> Even if this figure was updated to the current price of gold, the amount of compensation available to those injured by radioactivity released by the Chernobyl nuclear power plant would be vastly insufficient. With damage estimates running into the hundreds of millions of dollars,<sup>75</sup> five million dollars would be inadequate to compensate those suffering loss. Here, as in the case of damage caused by space objects, liability should also be unlimited<sup>76</sup> because nuclear power is a highly dangerous endeavor.

#### IV. FRAMEWORK FOR COMPENSATION

At the present time, no current treaty addresses the immediate problem of compensation for nuclear accidents. Yet, the Vienna Convention establishes the initial framework for compensation to nations damaged by the radioactive fallout from nuclear plant accidents as represented by Chernobyl. Such damaged nations should use the Vienna Convention, international conferences, analogous international treaties and case law to approach the problem and begin the initial discussion of reparations with the Soviet Union.<sup>77</sup>

##### A. International Conventions

Customary international law supports compensation for nuclear

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74. Vienna Convention, *supra* note 36, art. V, at 11.

75. L.A. Times, Sept. 27, 1986, pt. I, at 4, col. 1.

76. See Christol, *supra* note 44, at 366. This treaty also exonerates a launching state for "damage [that] has resulted either wholly or partially from gross negligence or from an act or omission done with intent to cause damage on the part of a claimant State." *Id.*

77. A number of excellent sources exist for general background on the subject of compensation for transboundary pollution. See generally Magraw, *Transboundary Harm: The International Law Commission's Study of "International Liability,"* 80 AM. J. INT'L L. 305 (1986); Note, *Compensating Private Parties for Transnational Pollution Injury*, 58 ST. JOHN'S L. REV. 529 (1984); Teclaff, *International Law and the Protection of the Oceans from Pollution*, 40 FORDHAM L. REV. 529 (1972); Billingsley, *Private Party Protection against Transnational Radiation Pollution through Compulsory Arbitration: A Proposal*, 14 CASE W. RES. J. INT'L L. 339 (1982) (increased risk of pollution from radioactivity); Handl, *Managing Nuclear Wastes: The International Connection*, 21 NAT. RESOURCES J. 267 (1981) (build up of nuclear waste can affect world population); Davila, *Air Pollution Control on the United States-Mexico Border: International Considerations*, 12 NAT. RESOURCES J. 545 (1972) (air pollution problem in terms of transboundary effect); Note, *Ixtoc I: International and Domestic Remedies for Transboundary Pollution Injury*, 49 FORDHAM L. REV. 404 (1980) (claim may be litigated in the International Court of Justice).

plant mishaps.<sup>78</sup> The United Nations, through General Assembly Resolution 2996, espoused the policy that States have "the responsibility to ensure that activities within their jurisdiction and control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction."<sup>79</sup> The 1967 *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*<sup>80</sup> supports the premise that States which cause damage to other States are liable for acts committed within their own jurisdiction, especially those acts committed with a high degree of state participation and supervision.<sup>81</sup> By analogy, accidents releasing nuclear fallout are within the category of high risk activities conducted by governmental entities. This is the case in countries like the Soviet Union where the nuclear power facility is a state run organization. International conferences<sup>82</sup> have further emphasized that States have "the responsibility to ensure that activities within their jurisdiction and control do not cause damage to the environment of other states or to areas beyond the limits of national jurisdiction."<sup>83</sup>

### B. International Case Law

Support for claims of compensation may also be found in the common law. International case law establishes the duty of States to avoid causing damage to other States, persons and property.

In the *Corfu Channel* case,<sup>84</sup> the International Court of Justice held that there is an obligation for every State to avoid knowingly using its territory for acts contrary to the rights of other States.<sup>85</sup> The case stemmed from the large loss of life and property which occurred

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78. This was confirmed by General Assembly Resolution 2996 (XXVII) of December 15, 1972, acknowledging the legal significance of Principle 21. The significance of the principle was to lay down the ground rules which govern the responsibility of states to the international arena in preserving and protecting the environment. 14 U.N. GAOR A/8730 at 278, U.N. Doc. A/CONF 4816 (1972), reprinted in Christol, *supra* note 44, at 353.

79. *Id.*

80. Outer Space Treaty, *supra* note 49.

81. See STAFF OF SENATE COMM. ON AERONAUTICAL AND SPACE SCIENCES, 92D CONG., 2D SESS., REPORT ON CONVENTION ON INTERNATIONAL LIABILITY FOR DAMAGE CAUSED BY SPACE OBJECTS, ANALYSIS AND BACKGROUND DATA 44 (Comm. Print 1972).

82. 1972 U.N. Conference on the Human Environment, Principle 21 (1972). This international principle was confirmed by General Assembly Resolution 2996 (XXVII) of December 15, 1972.

83. *Id.*; reprinted in Christol, *supra* note 44, at 353.

84. *Corfu Channel* (U.K. v. Alb.), 1949 I.C.J. 4 (Judgment of Apr. 9).

85. *Id.* at 22.

after the British ships *Saumarez* and *Volage* struck mines planted off the Albanian coast.<sup>86</sup> In the *Corfu Channel* case, the main issue was whether the mines which caused the damage were part of a mine field laid with the knowledge or participation of the Albanian government. The International Court of Justice found that Albania had an obligation to notify approaching ships of the dangerous condition.<sup>87</sup> The court held the Albanian government responsible under international law for the explosions and for the resulting loss of life and damages.<sup>88</sup>

A similar theory for finding culpability was espoused in the *Trail Smelter* arbitration,<sup>89</sup> along with the duty to pay monetary damages for identified harm to property. The case involved a large copper smelter in Trail, British Columbia. Over a thirty year period, the smelter emitted large quantities of sulfur into the atmosphere. This pollution severely damaged agricultural property in Washington State. The United States and Canada submitted the dispute to arbitration after private attempts to resolve the problem failed. After the arbitration commission completed its report, the United States refused to adopt it. It took thirteen years before the victims were paid approximately \$350,000 in compensatory damages for the injuries suffered as a result of the smelter emissions.

Further support for this principle is found in the *Chorzow Factory* case.<sup>90</sup> In *Chorzow Factory*, international law was used to establish the principle that reparations for unlawful conduct "must, as far as possible, wipe out all the consequences of the illegal act and reestablish the situation which would, in all probability, have existed if that act had not been committed."<sup>91</sup>

These cases must be taken into account in identifying the duty to compensate under international law and in formulating the damages arising from nuclear mishaps. They represent the recognition by the international legal community of the responsibility of nations to avoid accidents which cause damage to neighboring States. Further, they represent the obligation of States to pay compensation to those in-

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86. *Id.* The accident occurred October 22, 1946.

87. *Id.*

88. *Id.* at 23.

89. *Trail Smelter* (U.S. v. Can.), 3 R. Int'l Arb. Awards 1905 (1938 & 1941). For further reading on the *Trail Smelter* case, see *The Trail Smelter Dispute*, 1 CAN. Y.B. INT'L L. 213, 215-29 (1963).

90. Case Concerning the Factory at Chorzow (Ger. v. Pol.), 1928 P.C.I.J. (ser. A) No. 17 (Sept. 13).

91. *Id.* at 47. See also Christol, *supra* note 44, at 352, 358.



jured by State activities which cause harm to persons and property. International case law, international customary law and international treaty agreements establish ample precedent for the right of the injured nations of Northern Europe to present the Soviet Union with damage claims.<sup>92</sup>

### C. *Comparison Between U.S. and Soviet Tort Law*

Another element in presenting a damage claim to the Soviet Union is the determination of what standard of tort liability should be used to calculate the Soviet Union's liability. According to the American Law Institute's Restatement, direct or compensatory damages include both general and special damages.<sup>93</sup> General damages include loss of property and loss of use of property. Special damages, in a personal injury context, include harm to earning capacity, expenses for medical treatment and nursing care.<sup>94</sup> Additionally, U.S. tort law also allows damages for non-pecuniary harm which includes fear, anxiety, loss of companionship, loss of consortium, injury to feelings and loss of freedom.<sup>95</sup> The tort law of the Soviet Union differs from that of the United States in a number of ways.<sup>96</sup> The Soviets pose questions about compensation in terms of institutional costs, as opposed to personal individual loss.<sup>97</sup> Further, Soviet law concerning ultra-hazardous activities states:

[o]rganizations and citizens whose activity is connected with an increased danger for surrounding persons (transport organizations, industrial enterprises, construction sites, owners of automobiles, etc.) shall be obliged to compensate harm caused by a source of increased danger unless they prove that the harm arose as a consequence of insuperable force or intention of the victim.<sup>98</sup>

This statement of Soviet law supports the ability of nations af-

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92. In the case of space objects, over 4,700 such objects have been identified with only the Cosmos 954 causing measurable monetary loss. Christol, *supra* note 44, at 350. Monetary harm for which compensation should be paid pursuant to Article 12 of the Space Objects Agreement is based on the duty of the international tortfeasor to "restore the person, natural or juridical, State or international organization on whose behalf the claim is presented to the condition which would have existed if the damage had not occurred." *Id.* at 350 n.14.

93. 4 RESTATEMENT (SECOND) OF TORTS § 904 (1979).

94. *Id.* See also Christol, *supra* note 44, at 364.

95. Christol, *supra* note 44, at 365.

96. For an in-depth treatment on the subject of Soviet tort law, see J. HAZARD, W. BUTLER & P. MAGGS, *THE SOVIET LEGAL SYSTEM* 440-59 (1977).

97. Hosenball, *Space Law, Liability and Insurable Risks*, 12 THE FORUM 141, 150 (1976).

98. J. HAZARD, W. BUTLER, & P. MAGGS, *supra* note 96, at 450.

affected by radiation generated by the Chernobyl accident to make supportable claims for compensation to the Soviets. As Soviet law places the burden of proof on the nation engaging in the ultra-hazardous activity to show insuperable force or the intentional misfeasance of the victim, the claims of affected nations stand in a significantly stronger position. Under Soviet law, the Soviets will only be able to avoid liability by showing the interference of insuperable force<sup>99</sup> or the negligence<sup>100</sup> of those affected by radiation contamination.

Another difference is that under Soviet law, there is no differentiation between "direct" and "indirect" harm. As a result, States faced with the task of determining a legal standard to apply might look to Article 38 of the Statute of the International Court of Justice to identify "the general principles of law recognized by civilized nations."<sup>101</sup> It is only by identifying such general legal principles that the laws and practices of different States become relevant.<sup>102</sup>

#### V. THE CANADIAN-SOVIET SATELLITE INCIDENT: *THE 1972 CONVENTION ON INTERNATIONAL LIABILITY FOR DAMAGES CAUSED BY SPACE OBJECTS*

Notwithstanding the Vienna Convention, the Soviets should be held liable under the principle that the "polluter pays."<sup>103</sup> In the winter of 1978, Cosmos 954, a nuclear powered Soviet satellite<sup>104</sup> plunged back through the earth's atmosphere,<sup>105</sup> crashed in Canada, and

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99. E. JOHNSON, AN INTRODUCTION TO THE SOVIET LEGAL SYSTEM 166 (1969). The concept of insuperable force is similar to the Roman concept of *vis major*, or Act of God. *Id.* For additional explanation of the Soviet concept of damages for ultra-hazardous activity, see J. HAZARD & I. SHAPIRO, THE SOVIET LEGAL SYSTEM Part III, 72-80 (1962).

100. J. HAZARD, W. BUTLER, & P. MAGGS, *supra* note 96, at 450.

101. Christol, *supra* note 44, at 365.

102. *Id.*

103. Statement by Walter Wallman, West German Minister for the Environment and Nuclear Safety, L.A. Times, Oct. 6, 1986, pt. I, at 12, col. 1.

104. See Galloway, *supra* note 49, at 401-02. The satellite was launched from the Soviet Union in September, 1977. It was powered by a nuclear reactor fueled by 50 kilograms of uranium enriched with isotope of uranium-235. *Id.* at 402; see also Krey, Leifer, Benson, Dietz, Hendrikson & Coluzza, *Atmospheric Burnup of the Cosmos-954 Reactor*, 205 SCIENCE 583 (1979). For a further assessment of international law regarding space law agreements, see Matte, *Cosmos 954: Coexistence Pacifique et Vide Juridique*, 3 ANNALS AIR & SPACE L. 483 (1978); see also Foster, *supra* note 60, at 137, 172.

105. Galloway, *supra* note 49, at 401. Cosmos 954 was launched into a temporary orbit for three weeks and then was to be raised to a higher orbit where the radioactivity from its reactor could decay naturally over the next 600 years. Unfortunately, the satellite malfunctioned and could not be sent into the higher orbit as planned. Because of the Earth's gravitational pull, the satellite was drawn to Earth and resulting destruction. *Id.*

strewed radioactive material across the tundra.<sup>106</sup> After months of environmental cleanup efforts,<sup>107</sup> the Canadian government presented the U.S.S.R. with a cleanup bill of \$6 million (Canadian).<sup>108</sup>

Canada based its claim in accordance with international law and agreements, most notably the 1972 Convention on International Liability for Damages Caused by Space Objects,<sup>109</sup> to which both Canada and the U.S.S.R. were signatories.<sup>110</sup> This agreement is similar in purpose to the Vienna Conventions allocating the civil liability for nuclear incidents.<sup>111</sup> It provides, in Article II, that the State launching the satellite "[is] absolutely liable to pay compensation for damage

106. *Id.* at 401. The Soviet satellite disintegrated over Canada at 11:53 a.m. Greenwich Mean Time to the north of the Queen Charlotte Islands on the west coast of Canada. Debris from the satellite was spread across Canada, including parts of the Northwest Territories, Alberta and Saskatchewan. Gov't of Canada, Dep't of External Aff., Note from the Secretary of State for External Aff. to the Soviet Ambassador, Jan. 23, 1979, Annex A: Statement of Claim [hereinafter Annex A], at 1 (on file with the Yale J. Int'l L.).

107. The clean-up operation was called, "Operation Morning Light," with a cost of \$14 million (Canadian currency) to the Canadians and a cost of \$2-2.5 million to the United States. Annex A, *supra* note 106, at 3. The exchange rate between Canadian and U.S. currency is approximately U.S. \$1/C \$0.80.

108. Canada Presents Cosmos 954 Claim to U.S.S.R., Dept. of External Affairs, Ottawa, Canada, No. 8, Jan. 23, 1979. *See also* U.N. Doc. A/A.C. 105/214 and 214/Corr. 1, Feb. 8, 1978; U.N. Doc. A/A.C. 105/217, Mar. 6, 1978; U.N. Doc. A/A.C. 105/236, Dec. 22, 1978. The original cost of cleaning up the impact site from Cosmos 954 was \$13,970,143.66. Canada's claim to the U.S.S.R. was for \$6,041,174.70, and later reduced to \$6,026,083.56, representing the amount directly pertaining to the satellite debris and not including administrative or other related expenses. *See* Christol, *supra* note 44, at 346-71. Canada also preserved its right, without prejudice, to make future additional claims which were at that time unidentified. Letter, Canadian Secretary of State for External Affairs to the Ambassador of the Soviet Union to Canada, File No. FLA-268, Jan. 23, 1979.

Canada also mentions costs associated with search and rescue operations "undertaken as a consequence of the events giving rise to Canada's claim." *Id.* Canada further reserved its right to "claim from the Government of the Union of Soviet Socialist Republics payment of interest at an appropriate rate on the amount of compensation declared payable by a Claims Commission, such interest to accrue from the date of the decision or award of the Claims Commission." *Id.* at 908.

109. *See*, Space Objects Agreement, *supra* note 58. The Soviet Union is a signatory to the treaty, as are about 60 other nations. The treaty entered into force for the United States on October 9, 1973. The Canadians also relied upon these other international agreements and treaties in making its claim for compensation from the Soviet Union. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Oct. 10, 1967, 18 U.S.T. 2410, T.I.A.S. No. 6347, 610 U.N.T.S. 205; Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, Dec. 3, 1968, 19 U.S.T. 7570, T.I.A.S. No. 6592, 672 U.N.T.S. 119; Convention on Registration of Objects Launched into Outer Space, Sept. 15, 1976, 28 U.S.T. 695, T.I.A.S. No. 8480.

110. Space Objects Agreement, *supra* note 58.

111. *See supra* text accompanying notes 36-40.

caused by its space object on the surface of the earth or to aircraft in flight.”<sup>112</sup> Absolute liability for the State responsible for the damaging incident is also included in the Vienna Convention.<sup>113</sup> The main reason for applying a standard of absolute liability is the recognition by the Convention’s signatories of the inherent high risk of damage and loss should an accident occur.<sup>114</sup>

After initially refusing to pay, the Soviet Union later entered into negotiations with Canada, and eventually agreed to pay three million Canadian dollars in damages for the injury caused by the Cosmos 954 accident.<sup>115</sup> By entering into this agreement, the Soviets acted in conformity with established international law<sup>116</sup> and agreements<sup>117</sup> to effect compensation where nuclear accidents damage other nations.

Although Chernobyl is only the Soviet Union’s second incident causing nuclear damage to a foreign nation, the Soviet Union has now established a precedent for payment of compensation for other nuclear incidents. If the countries of the world use technology of a type that can cause damage on a global scale, they must be prepared to pay the price when that technology fails, whether by mechanical or human error, and causes damage on a global scale. Even though the Soviets partly reimbursed the Canadians for their cleanup costs after the satellite crash, this approach has not been adopted in the Chernobyl situation.

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112. Space Objects Agreement, *supra* note 58. It should be noted that a 1978 assessment of Canada’s position, observed that “[n]o physical or property damage had been suffered by Canadian citizens.” Christol, *supra* note 44, at 347. It was also discovered that the Canadian environment suffered no measurable damage resulting from the nuclear debris from Cosmos 954. *Id.*

113. Vienna Convention, *supra* note 36, art. IV, at 10. Part I of this section specifically states: “[T]he liability of the operator for nuclear damage under this Convention shall be absolute.”

114. It is essential that any meaningful future agreement should contain a “meaningful statement as to the standards to be applied to evaluate losses suffered and the amount of compensation to be paid.” Christol, *supra* note 44, at 352. As far as money can ever go to compensate the injured for loss, the ideal objective should be to restore the claimants to their prior existing condition before the injury occurred. *Id.* See also Reis, *Some Reflections on the Liability Convention for Outer Space*, 6 J. SPACE L. 126 (1978); RESTATEMENT (SECOND) OF FOREIGN RELATIONS LAW OF THE UNITED STATES § 188 (1965).

115. L.A. Times, Oct. 6, 1986, pt. I, at 12, col. 1. The Soviets paid \$3 million to Canada “in full and final settlement of all matters connected with the disintegration of the Soviet satellite ‘Cosmos 954’ in January 1978.” Claims Protocol, Apr. 2, 1981, Canada-U.S.S.R., 1981 Can. T.S. No. 8, art. 2.

116. *Trail Smelter* (U.S. v. Can.), 3 R. Int’l Arb. Awards 1905 (1938 & 1941), Chorzow Factory, 1928 P.C.I.J. (ser. A) No. 17, *Corfu Channel* (U.K. v. Alb.), 1949 I.C.J. 4 (Judgment of Apr. 9).

117. See *supra* text accompanying note 109.

There are a number of possible reasons why the Soviets have refused to reimburse countries affected by the Chernobyl accident. One possible reason is because of the much greater damage inflicted upon the world by a nuclear accident of this proportion. In the present case, the total damage caused by Cosmos 954 was approximately sixteen million dollars.<sup>118</sup> This pales in comparison to the hundreds of millions of dollars of estimated damages which have occurred as a result of the Chernobyl incident.<sup>119</sup>

Another reason may be that the damage which occurred to Canada as a result of Cosmos 954 was fairly concentrated and easy to ascertain. The damage in the Chernobyl incident, in contrast, was spread over a much greater area. Additionally, the entire scope of the Chernobyl damage may not become apparent for several years. Many health problems caused by radiation exposure do not become manifest for years.<sup>120</sup> Accordingly, claims from a variety of parties, both nations and individuals, will arise periodically over the next ten to twenty years. To further complicate the compensation process, the connection between health problems and radiation exposure from Chernobyl will be attenuated and difficult to ascertain.

A third distinction between the Cosmos 954 incident and Chernobyl is that the Cosmos 954 incident involved physical debris as well as radiation contamination. The damage was confined to an easily identifiable area and enabled a fairly accurate rendering of actual cleanup expenses. The Chernobyl damage, in contrast, was primarily radiation orientated and damage caused by such radiation was spread over a large area as a result of nuclear fallout. This may give rise to serious questions on the part of the Soviet Union as to what claims for damages are actually legitimate.

As a result, the Soviet Union is again refusing to compensate injured parties. Perhaps the Soviet Union is attempting to set the stage for negotiations as in the Canadian situation. So far, they have been adamant in their refusal to pay for the damages caused by Chernobyl. Only with repeated insistence will the Soviet Union concede to entering into any form of negotiations over their liability arising out of the Chernobyl accident.

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118. See *supra* notes 107-08, discussing the compensation claims of the Canadians resulting from Cosmos 954.

119. L.A. Times, Sept. 27, 1986, pt. I, at 4, col. 1.

120. See *supra* text accompanying notes 22-31.

## VI. ANALYSIS OF RELEVANT PORTIONS OF THE VIENNA CONVENTION

### A. Allocation of Liability

The Vienna Convention provides that the operator of a nuclear installation shall be held liable for nuclear damage upon proof that the accident occurred at his installation.<sup>121</sup> "Nuclear Installation" is defined by the Vienna Convention as:

(i) any nuclear reactor other than one with which a means of sea or air transport is equipped for use as a source of power, whether for propulsion thereof or for any other purpose; (ii) any factory using nuclear fuel for the production of nuclear material, or any factory for the processing of nuclear material, including any factory for the reprocessing of irradiated nuclear fuel; and (iii) any facility where nuclear material is stored, other than storage incidental to the carriage of such material.<sup>122</sup>

By this definition, the Chernobyl installation clearly meets the requirement of a nuclear installation.

The second part of the liability definition requires that the accident involve material originating from the operator's reactor or from radioactive material being sent to the operator's nuclear installation.<sup>123</sup> The Chernobyl accident fulfilled this part of the liability requirement as the accident involved the radioactive fuel of the installation.

As the initial requirements for liability have been met, the next question is whether the cause for the accident releases the Soviet Union from liability. The Vienna Convention specifies in Article IV that, "[n]o liability under this Convention shall attach to an operator for nuclear damage caused by a nuclear incident directly due to an act of armed conflict, hostilities, civil war, or insurrection."<sup>124</sup> A further exception states that, "the operator shall not be liable for nuclear damage caused by a nuclear incident directly due to a grave natural disaster of an exceptional character."<sup>125</sup> Without showing one of the above mentioned exceptions, liability attaches to the operator state causing the nuclear damage. In Chernobyl, the Soviet Union has not

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121. Vienna Convention, *supra* note 36, at 8, art. II.

122. *Id.* at 8, art. I(j).

123. *Id.*

124. *Id.* at 10, art. IV(3)(a).

125. *Id.* at (3)(b). The Vienna Convention also states that this clause is subject to any contrary laws of the Installation State.

attempted to attribute the cause of the accident to any of the exceptions. This further strengthens the claims of affected nations.

These requirements for liability have been fulfilled by the Soviet Union. The accident occurred at one of their nuclear power installations, and has been attributed to human error.<sup>126</sup> Further, no extenuating circumstances have been claimed.<sup>127</sup> Thus, if international law and the Vienna Convention are to have any weight, the Soviet Union must be held liable for damage resulting from the accident.

### B. *Extent of Liability*

The next question is the extent to which the operator state is considered liable for a nuclear accident. The Vienna Convention provides that the operator of the installation will not be responsible for damage to the installation itself or any of the installation's property.<sup>128</sup> Nor will it be liable for the transport on which the nuclear material was involved at the time of the accident.<sup>129</sup> Further, the Convention states that, "[w]here nuclear damage engages the liability of more than one operator, the operators involved shall, in so far as the damage attributable to each operator is not reasonably separable, be jointly and severally liable."<sup>130</sup> This provision was adopted to deal with a situation where the nuclear damage occurred from the negligence of more than one operator.<sup>131</sup> In such a case, each operator would be jointly and severally liable for all damage which is not reasonably severable from other operators.<sup>132</sup>

Whenever more than one nuclear installation is involved, operators are liable up to the amount established by Article V; no less than \$5 million dollars in United States currency for any one nuclear accident.<sup>133</sup> The Vienna Convention does provide, under Article IV, that:

if the operator proves that the nuclear damage resulted wholly or partly either from the gross negligence of the person suffering the damage or from an act or omission of such person done with intent to cause damage, the competent court may, if its law so provides, relieve the operator wholly or partly from his obligation to pay

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126. Trafford & Wellborn, *supra* note 2, at 18.

127. *Id.*

128. Vienna Convention, *supra* note 36, at 10, art. IV.

129. *Id.* at 11.

130. *Id.* art. II, at 9.

131. *Id.*

132. *Id.*

133. *Id.* art. V, at 11.

compensation in respect of the damage suffered by such person.<sup>134</sup>

### C. Statute of Limitations

The Vienna Convention requires all claims to be filed within ten years from the date of the nuclear incident.<sup>135</sup> This attempts to address the problem of lingering radioactive damage and provide for the damage claims such as those arising from Chernobyl. It took almost two years to determine the extent of Soviet damage in the Canadian incident.<sup>136</sup> Even so, the Space Objects Agreement only allows a one year period to submit damages measured from the time of the accident. There is, however, provision for an extension of the one year limit to further ascertain damages caused by a falling satellite.<sup>137</sup> These time limits apply even if the full extent of the damage is not yet known.<sup>138</sup>

The time provisions of the Space Objects Agreement are important in deciding liability for Chernobyl because of the similarity in terms of nuclear damage. The ten year limit was imposed by the Vienna Convention to limit the time a country may procrastinate in the resolution of its damage claims. As most claims would be covered under this period, only the most attenuated types of damage or loss would remain uncompensated.<sup>139</sup> This is a serious shortcoming of the Vienna Convention, but one that is a necessary evil. A line must be drawn somewhere, or else liability claims could be stretched out for an indefinite period of time. As was discussed previously,<sup>140</sup> many of the consequences of exposure to radioactivity will not be apparent for years to come. Of primary concern, in human terms, are the in-

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134. *Id.* art. IV, at 10.

135. *Id.* art. VI, at 11. In the case where the installation state has insurance or other financial security covering liability for a period of time greater than ten years, the competent court may provide that the rights of compensation against the operator of the nuclear plant shall only end after a period longer than ten years, but shall not be longer than the period under which the installation state's liability is covered under the state's laws. *Id.* However, the extension of the extinction period does not affect the compensation rights of people bringing claims for loss of life or personal injury against the plant operator before the expiration of the ten year period. *Id.* Additionally, the state court may establish an extinction period not less than three years from the date on which the person suffering from nuclear exposure had knowledge or should have had knowledge of the damage caused to him so long as the period does not exceed the ten year time limit. *Id.*

136. L.A. Times, Oct. 6, 1986 pt. I, at 12, col. 1.

137. Space Objects Agreement, *supra* note 58, art. X.

138. *Id.*

139. See *supra* text accompanying notes 22-31.

140. *Id.*



creased risks of cancer, future birth defects, and a myriad of other radiation related illnesses.<sup>141</sup>

#### D. Insurance

The Vienna Convention requires all participating nations to maintain insurance covering the amount of liability that the Installation state shall specify.<sup>142</sup> Paragraph 1 states that, "[t]he operator shall be required to maintain insurance or other financial security covering his liability for nuclear damage in such amount, of such type and in such terms as the Installation State shall specify."<sup>143</sup> However, in the next portion of the insurance section, the Convention seems to change the mandatory insurance provision so as not to require a member of the Convention to maintain insurance or other financial security to cover his liability.<sup>144</sup> Specifically, the Vienna Convention language reads, "[n]othing in paragraph 1 of this Article shall require a Contracting Party or any of its constituent sub-divisions, such as States or Republics, to maintain insurance or other financial security to cover their liability as operators."<sup>145</sup>

This provision weakens the entire section so as to completely undercut the effectiveness of requiring the maintenance of insurance. There must be a way to compensate those injured by a nuclear accident. By realizing the inherent risk and possibility of damage from a nuclear accident, nations can plan for compensation by requiring insurance in proportion to the number of reactors the country has operating. The cost is much greater when a nuclear accident occurs and a nation must compensate property and other losses out of pocket if insurance has not been required.

This huge cost would make sufficient compensation prohibitively expensive. Any nation would attempt to avoid paying liability claims in the hundreds of millions of dollars. Thus, by requiring sufficient insurance to offset probable damage, the procedure would be in place for handling future nuclear accidents. Unless nations can agree to a method of dealing with the problem, there is no incentive to follow

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141. *Id.*

142. Vienna Convention, *supra* note 36, art. VII, at 12.

143. *Id.*

144. *Id.* The section also addresses the situation where the damage caused exceeds the amount of insurance. Any damage beyond the amount of insurance coverage and the five million dollar compensation floor, pursuant to Article V, becomes the liability of the operator state. *Id.*

145. *Id.*

any kind of international treaties or conventions dealing with the issue. As the Vienna Convention is the only readily available, multilateral agreement pertaining to nuclear damage liability, it should be given weight in approaching the Soviet Union with compensation claims for the present situation. A treaty to compensate the injured State benefits all operator countries. If the Soviet Union can shirk their obligations to compensate here, how will the world enforce compensation when nuclear accidents occur in the future?

### E. Jurisdiction

The Vienna Convention provides that, "[e]xcept as otherwise provided in this Article, jurisdiction over actions under Article II shall lie only with the courts of the Contracting Party within whose territory the nuclear incident occurs."<sup>146</sup> This provision gives the Soviet Union an opportunity to act evenhandedly in the determination of damages flowing from the Chernobyl accident. By allowing the party causing the damage to litigate the issue in their own forum, the members of the Vienna Convention avoid the situation of one country imposing unfair compensation on another country. A final judgment entered by the court having jurisdiction will be recognized within the territory of any other contracting party unless the judgment was obtained by fraud or the party against whom judgment is rendered did not have a fair chance to present a case.<sup>147</sup> A judgment is also invalid if it is contrary to the public policy in the territory where recognition is sought and if it is not within fundamental traditions of justice.<sup>148</sup>

The flaw in this clause is readily apparent. A judgment rendered by a court of the Installation State would have to be quite extensive after an incident such as Chernobyl. With damages estimated at hundreds of millions of dollars, such a judgment might be against the public policy of the Installation State simply due to the economic ramifications of paying the judgment. This would render the possibility of judgment ineffective. The Vienna Convention provides that after judgment has been rendered, the judgment is final and not subject to further discussion on the merits.<sup>149</sup> In order to address this problem, members of the Convention should meet to specify allowable damages for accidents in the future. Any discussion of damage appro-

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146. Vienna Convention, *supra* note 36, art. XI, at 13.

147. *Id.* art. XII, at 13.

148. *Id.*

149. *Id.*

priation should attempt to remedy specific immediate damage, such as debris removal, purification of contaminated lands and aquatic bodies, loss of livestock, loss of foodstuffs, and other related damage.<sup>150</sup> It should also take into account some way to remedy the problems connected with long term damage.<sup>151</sup> The Chernobyl decision will set the precedent for all future nuclear accidents. Thus, its importance is obvious. The most sensible approach would be to allow the Vienna Convention, with its carefully chosen provisions, to govern the Chernobyl situation.

## VII. OPTIONAL PROTOCOL

An optional protocol was also enacted by the Vienna Convention to deal with the compulsory settlement of disputes. Article I of the Convention establishes compulsory jurisdiction to the International Court of Justice.<sup>152</sup> An action may be brought before the Court by an application to adjudicate the dispute by any party which is a party to the Protocol.<sup>153</sup> As an alternative to the Court of Justice, within two months after the concerned parties have been notified that a dispute exists, the conflict may be brought to an arbitral tribunal.<sup>154</sup> After this period expires, either party may bring the dispute before the Court upon application.<sup>155</sup> Another option for concerned parties is to form a conciliation procedure.<sup>156</sup> The commission must make its recommendations within five months after its appointment.<sup>157</sup> If the recommendations are not accepted by the parties to the dispute, any party may bring an application to be heard before the Court.<sup>158</sup>

## VIII. PROPOSAL

As nations begin to compile their damage claims from the radioactive effects of Chernobyl, they will have to look towards incidents such as Canada's approach to the damage caused by the radioactivity of Cosmos 954. Canada's Secretary of State for External Affairs

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150. See *supra* text accompanying notes 13, 22-31.

151. See *supra* text accompanying notes 22-31.

152. Optional Protocol Concerning the Compulsory Settlement of Disputes, series No. 4, art. I, at 17 (1963).

153. *Id.*

154. *Id.* art. II, at 8.

155. *Id.*

156. *Id.* art. III, at 10.

157. *Id.*

158. *Id.*

presented to the Soviet Ambassador a claim for compensation arising from the damage caused by the Soviet satellite's intrusion into Canadian airspace and territory.<sup>159</sup> Canada made its claim for compensation based on relevant international law,<sup>160</sup> agreements<sup>161</sup> and primarily on the *1972 Convention on International Liability for Damage Caused by Space Objects*.<sup>162</sup> Nations presenting claims for damage arising from Chernobyl will have to make their claims based on the similar foundation presented by the Vienna Convention. Under Article II, the U.S.S.R. as the Installation State, would be liable for damage which occurred at its nuclear installation.<sup>163</sup> This liability is absolute under Article IV.<sup>164</sup> Special attention should be called to the point that the high risk and degree of loss from a nuclear incident is further reason to hold an Installation State subject to absolute liability.<sup>165</sup> Nations planning on presenting compensation claims to the Soviet Union should also reserve for themselves rights similar to those reserved by the Canadians. These reservations should certainly include a right to make additional claims if more damage is discovered.<sup>166</sup> This is of particular importance to the Chernobyl situation, considering the possibility of long term effects of radioactive contamination.<sup>167</sup>

The Vienna Convention provisions speak directly to the damage incurred by Chernobyl. On further deliberations regarding Chernobyl, these conventions should serve as a model for negotiations between the U.S.S.R. and its radioactive-damaged neighbors. Just as

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159. Galloway, *supra* note 49, at 413. Canada based its claim for damages on two theories. First, that the intrusion of the satellite was considered a "harmful intrusion" and second, that the impact of the satellite on Canadian territory was a violation of Canada's sovereignty. *Id.*

160. *Trail Smelter* (U.S. v. Can.), 3 R. Int'l Arb. Awards 1905 (1938 & 1941), Chorzow Factory, 1928 P.C.I.J. (ser. A) No. 17, *Corfu Channel* (U.K. v. Alb.), 1949 I.C.J. 4 (Judgment of Apr. 9).

161. See *supra* text accompanying note 109.

162. Space Objects Agreement, *supra* note 58.

163. Vienna Convention, *supra* note 36, art. II, at 9. "Installation State" is defined as the contracting party within whose territory the nuclear installation is situated or under whose authority the installation is operated. *Id.* at 7.

164. *Id.* art. IV, at 10.

165. Galloway, *supra* note 49, at 413. Canada emphasized this point in regards to the risks associated with space activities and noted that the high risk associated with such activities should subject those engaging in such activities to absolute liability, should damage or injury result.

166. *Id.* Canada also reserved the right to claim from the U.S.S.R. the total cost if a Claims Commission is established and the right to claim interest at a reasonable rate from the date of the Claims Commission's decision.

167. See *supra* text accompanying notes 22-31.

the Space Objects Agreement was used as a framework to determine compensation for the damage that occurred in Canada, the Vienna Convention could serve a very useful function to allocate damages in the present situation. A disaster like Chernobyl, in terms of both economic and human costs, must be dealt with according to international law and relevant international agreements. Only then can a valid framework be developed which will deal with the present situation and future occurrences which will inevitably occur as a result of the industrial nations' decision to pursue nuclear power.

For the future, the signatory nations should reconvene to remedy the deficient provisions of the Vienna Convention. Specifically, there are a number of points which should be clarified during future Convention meetings. First, the language in Article V which allows a nation to set the amount of liability at its own option<sup>168</sup> should be eliminated. In its place, new language should be inserted setting a standard floor of liability for any nation engaging in the use of nuclear power. Secondly, the valuation provisions of Article V<sup>169</sup> must also be updated to reflect the current value of gold and inflation. One solution to this problem may be to tie the compensation amounts to the spot price of gold and raise the liability floor accordingly. Third, the language in Article I providing for the definition of nuclear damage should be clarified to reflect the inherent long term health problems associated with exposure to radiation.<sup>170</sup>

Additionally, persons exposed to radiation from an accident like Chernobyl should be required to reserve their right to present a claim for possible anticipated health problems. This would help to prevent the filing of claims which are either unrelated or remotely related to a nuclear incident. Fourth, the issue of insurance should be more fully explored. A requirement for maintaining a specified amount of liability insurance may be considered to lessen the burden of compensation when an accident occurs. However, associated costs may be prohibitive and nations with advanced nuclear power programs may not want to pay to cover the compensation costs of other countries with less advanced programs. Lastly, jurisdiction over nuclear incidents should be specified to reside with the International Court of Justice. Any claims brought against a Convention member should be heard by an impartial panel made up of members of the Convention. To pre-

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168. Vienna Convention, *supra* note 36, art. V, at 11.

169. *Id.* art. V(3), at 11.

170. *Id.* art. I(k)(i)(ii)(iii), at 7.

vent any claims of partiality, at least one panel member should be from the country in which the subject nuclear accident occurred.

### IX. CONCLUSION

The purpose of this Comment was to delineate the steps that parties affected by the radiation from Chernobyl should take to present claims to the Soviet Union for compensation. This Comment has addressed analogous treaties and their value in analyzing Chernobyl compensation claims. Further, it has discussed relevant international case law and its effect on adjudicating cases involving transboundary harm. This Comment has analyzed the applicable international treaty, the Vienna Convention and presented an analysis of the accident issues within the framework of the Convention. Although the Vienna Convention does address the Chernobyl accident, there are problems with its provisions. By revising the Vienna Convention to address the problems mentioned within this Comment, the agreement will be more succinct and have more universal applicability in addressing claims for damages.

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