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COMMENT

The Changing Perspectives of U.S and Japanese Nuclear Energy Policies in the Aftermath of the Fukushima Daiichi Disaster

DANIEL A. DORFMAN*

I. INTRODUCTION: A TREMOR

At 2:46 PM, a tremor strikes off the coast of Honshu Island.[1] The 9.0 magnitude earthquake tears the earth apart at its seams, and shockwaves trigger an automatic shutdown of eleven of Japan's nuclear power reactors.[2] Although warned in 2008 that a tremor could occur in the region, it is now too late.[3] The quake quickly dismantles its first obstacle, the national electricity grid.[4]

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1. *Magnitude 9.0 – Near the East Coast of Honshu, Japan: March 11, 2011*, U.S. GEOLOGICAL SURVEY, http://earthquake.usgs.gov/earthquakes/recenteqsww/Quakes/usc0001xgp.php (last visited Sept. 27, 2012); *Deadly Earthquake is Strongest in Japan's History*, ACCUWEATHER.COM (Mar. 11, 2011, 9:00 AM), http://www.accuweather.com/es/weather-news/deadly-earthquake-is-strongest/46859.

2. Josef Oehmen, *Fukushima Nuclear Accident – A Simple and Accurate Explanation*, ENERGY COLLECTIVE (Mar. 15, 2011), http://theenergycollective.com/node/53461; *Japan Earthquake: Evacuations Ordered as Fears Grow of Radiation Leak at Nuclear Plant*, NEWS.COM.AU (Mar. 12, 2011, 11:43 PM), http://www.news.com.au/world-old/japan-earthquake-evacuations-ordered-as-fears-grow-of-radiation-leak-at-nuclear-plant/story-e6frfkyi-1226020473244.

3. AFP, *IAEA Warned Japan Over Nuclear Quake Risk: WikiLeaks*, TRIBUNE (Mar. 17, 2011), http://tribune.com.pk/story/133824/iaea-warned-japan-over-nuclear-quake-risk/.

4. *Timeline: Japan Power Plant Crisis*, BBC (Mar. 13 2011, 4:29 PM), http://www.bbc.co.uk/news/science-environment-12722719.

At 3:27 PM, the first tsunami slams up against Fukushima's massive walls.[5] Tokyo Electric Power Company notifies government officials, and at 7:30 PM Prime Minister Naoto Kan declares a nuclear emergency status.[6] Officials reassure the public this is standard procedure and no radioactive material has been detected.[7] Then the final strike—a forty-eight foot wave.[8] It engulfs the facility, floods the basement, and disables the emergency diesel generators.[9]

Over the new few days, a three kilometer exclusion zone is established around the power plant and people within a ten kilometer radius zone are advised to stay indoors.[10] The United Kingdom, France, and Italy advise their nationals in Tokyo to consider leaving in response to fears of spreading radioactive contamination.[11] What looks like a scene from a horror movie is now a harrowing reality. The disaster ranks as the second biggest nuclear accident ever—second only to Chernobyl.[12] Many predict the area will not be habitable for decades.[13]

5. *TEPCO Details Tsunami Damage / Waves That Hit Fukushima Plant Exceeded Firm's Worst-Case Projections*, DAILY YOMIURI, Apr. 11, 2011, http://www.yomiuri.co.jp/dy/national/T110410003477.htm.

6. *Timeline: Japan Power Plant Crisis*, *supra* note 4.

7. *Id.*; AFP, *supra* note 3 (ranked only a four out of ten on the International Nuclear Event Scale, the Japanese Atomic Energy Agency classified the event as an "accident with local consequences").

8. *Fukushima N-Plant Hit by Giant Waves as High as 48 Feet*, ECON. TIMES, Apr. 10, 2011, 12:37 PM, http://articles.economictimes.indiatimes.com/2011-04-10/news/29403378_1_power-plant-reactors-highly-radioactive-water.

9. *Timeline: Japan Power Plant Crisis*, *supra* note 4; *Fukushima Radiation Sizzling at 10 Sieverts in Flooded Basement of Unit 1*, JAPAN TIMES ONLINE, June 29, 2012, http://www.japantimes.co.jp/text/nn20120629a7.html.

10. *Timeline: Japan Power Plant Crisis*, *supra* note 4.

11. Justin McCurry & Robert Booth, *Britain Joins Countries Urging Their Citizens to Leave Tokyo*, THEGUARDIAN, Mar. 16, 2011, 5:49 PM, http://www.guardian.co.uk/world/2011/mar/16/britain-urging-citizens-leave-tokyo.

12. *How Does Fukushima Differ From Chernobyl?*, BBC (Dec. 16, 2011, 5:11 AM), http://www.bbc.co.uk/news/world-asia-pacific-13050228 (noting that while Fukushima ranks a distant second to Chernobyl in that the Japanese government estimates the radiation released at Fukushima was one-tenth the radiation released from Chernobyl, Fukushima is arguably far more complicated than Chernobyl because six reactors were involved. Both accidents are the only level seven accidents in history).

13. Martin Fackler, *Large Zone Near Japanese Reactors to Be Off Limits*, N.Y. TIMES, Aug. 21, 2011, http://www.nytimes.com/2011/08/22/world/asia/22japan.html?_r=0.

In the aftermath, questions emerge: Why? How? Could it happen here? Both ends of the political spectrum voice opinions and sides are taken. Some countries, like Germany, jump ship, abandoning all plans for a nuclear future. Others, like the United States (U.S.), experience a more complicated dynamic—the populace frightened, agencies unshaken, and a President eager to push forward. Still some, more cautious, feel that the issue is somehow less simple, not black or white, but a balancing act: the future of non-renewable resources in a scientifically advancing world versus the potential risks of harnessing the powerful unknown. The Fukushima disaster, while devastating, offers profound insight into the world of nuclear energy law around the globe, and may promulgate a foundational shift on the international perspective of nuclear energy into the future.

This Comment examines the aftermath of the Fukushima Daiichi nuclear disaster, and its impact on American and Japanese nuclear energy policies. The second section of this Comment provides a brief history of the United States' nuclear energy policy, describes U.S. nuclear policy in response to the Fukushima disaster, and offers recommendations for U.S. nuclear policy in the future. Section three provides a brief history of Japanese nuclear energy policy, describes Japanese nuclear policy in the wake of Fukushima, and offers recommendations for Japanese nuclear policy in the future. Section four concludes with a synopsis of American and Japanese nuclear energy policies and makes a prediction for these countries' policies in the future.

II. UNITED STATES NUCLEAR ENERGY POLICY

A. The Atomic Age

The history of nuclear energy in the U.S. began with a more purposeful disaster. In August 1945, television sets and radios blared news that the Japanese cities of Hiroshima and Nagasaki were flattened by a new kind of weapon—one that leaves cities devastated and ends wars without ground troops.[14] Newspapers

14. J. SAMUEL WALKER & THOMAS R. WELLOCK, U.S. NUCLEAR REGULATORY COMM'N, A SHORT HISTORY OF NUCLEAR REGULATION 1946-2009 1 (2010),

across the country declared our ascendance into the "atomic age."[15] Shortly after World War II ended, many scientists, scholars, and politicians alike suggested that the technology used to cripple Japan could be used for more peaceful purposes.[16] Alvin M. Weinberg, a nuclear physicist, told the U.S. Senate's Special Committee on Atomic Energy that "[a]tomic power can cure as well as kill. It can fertilize and enrich a region as well as devastate it. It can widen man's horizons as well as force him back into the cave."[17] While scientists and scholars imagined a world with atomic powered airplanes and personal nuclear heating units for the home, the U.S. government remained hesitant to relinquish absolute control of this new and powerful technology before first testing to see what it could do for the military.[18]

As a result, six months after the bombing of Hiroshima and Nagasaki, President Harry Truman signed the Atomic Energy Act of 1946 (also known as the MacMahon Act), the first U.S. law outlaying precisely how the federal government would control this new and powerful resource.[19] While the Act did not allow for the private use of atomic energy, it did rule that nuclear weapon development and power management would be governed by the newly created five-member Atomic Energy Commission (AEC), a non-military agency.[20] Because the Atomic Energy Act of 1946 is the preeminent law on the United States' stance on nuclear energy, an enormous degree of insight can be garnered from its diction and tone.

This analysis is informative for two key reasons. First, the Act is the foundation of U.S. nuclear energy policy, and therefore, plays an important role in the way the U.S. views nuclear energy today. Second, the Act provides insight into the early beliefs and

available at http://www.nrc.gov/reading-rm/doc-collections/nuregs/brochures/br0175/br0175.pdf.

15. *Id.*

16. *Id.*

17. *Id.*

18. *Id.*

19. *Id.* at 1-2; *see also* Atomic Energy Act 1946, Pub. L. No. 79-585, 60 Stat. 755 (1946).

20. Atomic Energy Act 1946, Pub. L. No. 79-585, 2 (1946).

stigmas regarding nuclear energy, many of which are still prevalent today. The strongest underlying message in the Act is the idea that nuclear power stemmed from U.S. military secrecy, and should thus continue to be kept the military's secret weapon.[21] The Act's introduction supports this message with statements such as, "[t]he significance of the atomic bomb for military purposes is evident" and "[t]he effect of the use of atomic energy for civilian purposes upon the social, economic, and political structures of today cannot now be determined."[22] Setting a tone of secrecy, the Act goes on to say, "[i]t shall be the policy of the Commission to control the dissemination of restricted data in such a manner as to assure the common defense and security."[23] As a result, the 1946 law did not allow for the commercial use of atomic energy; it did, however, allow for "private research" in order to "encourage maximum scientific progress."[24]

The federal government seemed uncomfortable relinquishing its monopoly over nuclear power until it passed The Atomic Energy Act of 1954.[25] This act proudly sanctioned privatized commercial nuclear power use for the first time.[26] Over the eight years between the two acts, projections for future energy requirements fueled a desire to master the new technology. Even more important, however, was the fear that the United States would fall behind other countries, namely Britain and the U.S.S.R, in developing nuclear technologies.[27]

21. *See id.; see also* Oscar M. Ruebhausen & Robert B. von Mehren, *The Atomic Energy Act and the Private Production of Atomic Power*, 66 HARV. L. REV. 1450 (1953). In fact, many were convinced that the United States' dropping of atomic bombs in Hiroshima and Nagasaki was evidence of the United States' military invincibility. *Id.*

22. Atomic Energy Act 1946, Pub. L. No. 79-585, 1 (1946).

23. *Id.*

24. *Id.*

25. *See* Atomic Energy Act 1954, Pub. L. No. 83-703, 68 Stat. 919 (1954) (codified as amended at 42 U.S.C. §§ 2011-2297 (2006)); *see also* Todd Garvey, *State Authority to Regulate Nuclear Power: Federal Preemption Under the Atomic Energy Act*, CONG. RES. SERV. 1 (2011), *available at* https://www.hsdl.org/?view&did=718958.

26. *Id.*

27. WALKER & WELLOCK, *supra* note 14, at 3.

The 1954 law, considered to be "the fundamental U.S. law on both the civilian and the military uses of nuclear materials,"[28] articulated the first laws for the development, regulation, and disposal of nuclear materials and facilities.[29] This fundamental shift in policy is perhaps best encapsulated by the first line of the Act: "Atomic energy is capable of application for peaceful as well as for military purposes."[30] In a 1953 speech, Thomas E. Murray, the AEC Commissioner, predicted a "nuclear power race" and warned that the "stakes are high."[31] A growing number of high-ranking government officials echoed Murray's sentiment and believed that a reluctance to allow privatization of nuclear technology would lead to the United States' surrender in the fight for global scientific dominance.[32] As a result, the new act championed a new missive: to "encourage widespread participation in the development and utilization of atomic energy for peaceful purposes."[33] With a larger degree of control now in the hands of the public, however, the Act also instructed the AEC to draft regulations designed to protect communities from the potentially devastating effects of nuclear radiation.[34] This new twin aim was somewhat contradictory, and as commercial demand for nuclear power grew, many felt that the AEC favored its promotional duties over protection of the public.[35] The dual responsibilities of both developing and regulating nuclear technologies led many to question the AEC's decision-making process.[36] As one critic eloquently phrased the problem, it was like "letting the fox guard the henhouse."[37]

28. *Governing Legislation: Atomic Energy Act of 1954, as Amended in NUREG-0980*, U.S. NUCLEAR REGULATORY COMM'N, http://www.nrc.gov/about-nrc/governing-laws.html (last updated Sept. 25, 2012).

29. *See* 42 U.S.C. §§ 2011-2296 (1976).

30. *Id.* § 2011.

31. WALKER & WELLOCK, *supra* note 14, at 2.

32. *Id.*

33. 42 U.S.C. § 2013(d).

34. *See id.* § 2210(h).

35. WALKER & WELLOCK, *supra* note 14, at 4.

36. *Id.* at 48.

37. *Id.* at 48-49; *see also* Justin Elliott, *Ex-Regulator Flacking for Pro-Nuke Lobby*, SALON (Mar. 17, 2011, 08:15 PM), http://www.salon.com/2011/03/18/jeff_merrifield_nuclear_energy_institute/ (in 2007, candidate Barack Obama

The AEC's next task was to craft regulations and devise licensing procedures that would be strict enough to prevent accidents, but flexible enough to encourage new discoveries from the private sector.[38] Among the most important of these procedures were standards for radiation protection, methods for storing nuclear waste, qualifications for plant operators, and perhaps most critically, procedures for issuing licenses.[39] The Act established a two-part procedure for granting licenses.[40] First, the AEC would analyze a safety analysis submitted by the plant owner and, if it were deemed satisfactory, would issue a construction permit.[41] Second, after the construction of the facility was completed and declared safe, the plant would be granted a license to acquire fuel and begin operation.[42]

It is worth noting, however, that the AEC did not require a plant owner to submit finalized data or more specialized information on the safety of a facility before receiving a permit.[43] The AEC was ready to grant a permit to a facility so long as it had "reasonable assurance" that the plant could operate "without undue risk to the health and safety of the public."[44] The benefit of this system was to allow plant owners to begin the lengthy process of construction while the AEC simultaneously analyzed any remaining safety risks.[45] The fact that private development,[46] and perhaps other countries, were already rapidly developing nuclear technologies, likely only increased pressure on the AEC to implement nuclear power. Soon, however, it became clear that the AEC's licensing process was more focused on propelling the private nuclear industry than protecting the public

made a similar comparison, saying that the five-member NRC is a "captive of the industries that it regulates.").

38. WALKER & WELLOCK, *supra* note 14, at 8-9.

39. *Id.* at 9.

40. *Id.*; *see also* 42 U.S.C. §§ 2011-2296 (1976).

41. *See generally* WALKER & WELLOCK, *supra* note 14, at 9; 42 U.S.C. §§ 2011-2296 (1976).

42. *Id.*

43. WALKER & WELLOCK, *supra* note 14, at 10.

44. *Id.*

45. *Id.*

46. *Id.*

from potential safety hazards.[47] Outstanding safety issues could be concealed in exchange for promises of big returns on privatized plants.[48] Eventually, in 1973, due to growing concerns about the AEC's ability to regulate itself and in order to expedite the licensing process, President Nixon asked Congress to create a new agency with a primary focus on licensing nuclear plants.[49]

After many years of deliberation, Congress passed the Energy Reorganization Act of 1974, which abolished the AEC.[50] In its place, the Act established the U.S. Energy Research and Development Administration (ERDA) and the U.S. Nuclear Regulatory Commission (NRC).[51] While the NRC inherited many of the issues that plagued the AEC, it originally succeeded in prioritizing issues of safety over promotional concerns.[52] Other issues, however, began to emerge. The U.S. had become the leading supplier of nuclear fuel for the production of nuclear power overseas.[53] The NRC, therefore, had a duty to prevent nuclear fuel and nuclear technologies from falling into the hands of those who might use this new power against the U.S.[54] Perhaps most important, though, was the need to address the issue of nuclear safety inside the United States.

B. Safety Risks and Fears

Opponents of nuclear power believed that nuclear power posed more safety risks than it was worth, in part because nuclear power had not become a financial and technological

47. *See id.*

48. *See* STEPHANIE COOKE, IN MORTAL HANDS: A CAUTIONARY HISTORY OF THE NUCLEAR AGE 252 (2009).

49. *Id.*

50. *See* Energy Reorganization Act of 1974, Pub. L. No. 93-438, § 104(a), 88 Stat. 1233, 1237 (1974), *available at* http://science.energy.gov/~/media/bes/pdf/nureg_0980_v1_no7_june2005.pdf.

51. *Id.* The Act transferred the AEC's promotional duties to the ERDA. *Id.* The Act transferred its regulatory and licensing responsibilities to the NRC. *Id.* § 201(f).

52. WALKER & WELLOCK, *supra* note 14, at 51.

53. *Id.* at 52.

54. *Id.*

alternative to fossil fuel as quickly as originally promised.[55] Shortly after the creation of the NRC, the "Reactor Safety Study" was released.[56] It applied new methodologies and complex analysis to determine the likelihood of a serious nuclear accident.[57] In 1975, the report concluded that a nuclear emergency was unlikely, and that even if an emergency did occur, the damage would be minimal.[58] Soon, however, theories became reality. On March 28, 1979, the greatest single event to shape nuclear energy policy occurred near Middletown, Pennsylvania.[59] Half the result of machine malfunction, and half due to human error, a stuck-open pressure relief valve allowed large volumes of reactor coolant to escape from the power core at Three Mile Island.[60] Making matters worse, the control panel did not properly convey to the operators what was happening inside the reactor.[61] As a result, the operators failed to recognize the signs of a potential disaster.[62] The accident resulted in the release of approximately 2.5 million curies[63] of radioactive gas, and approximately fifteen curies of radioiodines.[64] Over a period of five days, 144,000 people evacuated the surrounding area.[65]

55. JOHN BYRNE & STEVEN M. HOFFMAN, GOVERNING THE ATOM: THE POLITICS OF RISK 145-49 (1996).

56. U.S. NUCLEAR REGULATORY COMM'N, REACTOR SAFETY STUDY (1975), *available at* http://www.osti.gov/energycitations/servlets/purl/7134131-wKhXcG/7134131.pdf.

57. *See id.* at 1.

58. *Id.*

59. *See Backgrounder on the Three Mile Island Accident*, U.S. NUCLEAR REGULATORY COMM'N, http://www.nrc.gov/reading-rm/doc-collections/factsheets/3mile-isle.html (last updated Mar. 15, 2011) (explaining that while the accident did more to shape nuclear energy policy than any other single event, it led to no deaths or injuries).

60. *Id.*

61. *Id.*

62. *Id.*

63. A curie is a unit of radioactivity. For a point of reference, the amount of curies produced by a radiotherapy machine is roughly 1,000 curies, and can cause serious health effects with only a few minutes of close-range, un-shielded exposure. *Curies: Radiation Protection*, U.S. EPA, http://www.epa.gov/radiation/understand/curies.html (last updated June 29, 2012).

64. MITCHELL ROGOVIN & GEORGE T. FRAMPTON, JR., 1 THREE MILE ISLAND: A REPORT TO THE COMMISSIONERS AND TO THE PUBLIC 153 (1980), *available at* http://www.threemileisland.org/downloads/354.pdf.

65. WALKER & WELLOCK, *supra* note 14, at 55.

Although the incident negatively impacted the public's perception of the safety of nuclear plants, studies conducted in the decades that followed revealed that the accident caused no increase in cancer rates.[66] But it was too late—public perception of nuclear energy would never be the same.[67] While the AEC and NRC had believed a nuclear accident was nearly impossible, critics of nuclear energy earned significant public support in their belief that something as powerful as nuclear energy should be assumed to be inherently dangerous.[68]

Before the Three Mile Island accident, between 1963 and 1979, the number of reactors under construction across the world increased almost every year.[69] Following the disaster, however, the number of reactors constructed decreased every year between 1980 and 1988.[70] From a public opinion perspective, polls showed a significant decline in support for nuclear energy, and a majority of citizens opposed the building of new plants.[71] Eventually, the Three Mile Island accident incited thousands of people to take to the streets across the world to voice their concern over nuclear energy. In May 1979, 65,000 people marched against nuclear power in Washington, D.C.[72] In September of that year, 200,000 people in New York City marched through the streets voicing their outrage over the release of radioactive gas from Three Mile Island.[73]

Years later, on April 26, 1986, the nuclear power station at Chernobyl in the U.S.S.R. violently exploded, destroying the reactor and blowing the top off the building.[74] The accident occurred as a result of a test in which the operators turned off the

66. *Id.* at 56.

67. *Id.*

68. *Id.*

69. *See* INT'L ATOMIC ENERGY AGENCY, 50 YEARS OF NUCLEAR ENERGY (2004), *available at* http://www.iaea.org/About/Policy/GC/GC48/Documents/gc48inf-4_ftn3.pdf.

70. *See id.*

71. WALKER & WELLOCK, *supra* note 14, at 56-57.

72. MARCO GIUGNI, SOCIAL PROTEST AND POLICY CHANGE 45 (2004).

73. Robin Herman, *Nearly 200,000 Rally to Protest Nuclear Energy*, N.Y. TIMES, Sept. 24, 1979, at B1.

74. Natallia Pinchuk, *Chernobyl Timeline*, WHAT IS NUCLEAR?, http://www.whatisnuclear.com/chernobyl/timeline.html (last visited Sept. 17, 2012).

plant's security measures and then lost control of the reactivity.[75] Because they had shut off the security devices, there was no way to cool or contain the radiation.[76] The result was a radioactive plume that contaminated not merely the surrounding areas, but spread into other parts of Europe.[77] One estimate suggests that the level of iodine-131 released was three times greater than at Three Mile Island.[78] Although supporters of nuclear power emphasized that the reactor at Chernobyl was completely different from the reactors in U.S. plants, and therefore, that the same sort of mass-damage accident could not occur in the U.S., opponents of nuclear power remained unconvinced.[79] The new slogan, "Chernobyl is everywhere," became the mantra for the emerging anti-nuclear movement.[80] What was already a growing skepticism after the Three Mile Island accident was now a concrete fear. A poll conducted in May 1986, found that seventy-eight percent of people opposed the building of more nuclear plants in the United States.[81]

After a temporary pause in issuing licenses, the NRC, in August 1980, issued its first license to North Anna Power Station in Virginia.[82] Over the next nine years, the NRC issued another forty full-power licenses, and even authorized the undamaged Unit One at Three Mile Island to resume operation.[83] After the accident, the NRC, encouraged by Congress, added a new rule concerning emergency planning.[84] Each utility, in conjunction with local police and fire departments, was required to create an evacuation plan.[85] Some states, however, such as New York and

75. *Id.*

76. *Id.*

77. *Scientific Facts on the Chernobyl Nuclear Accident*, GREENFACTS, http://www.greenfacts.org/en/chernobyl/index.htm (last visited Sept. 20, 2012).

78. WALKER & WELLOCK, *supra* note 14, at 58.

79. *Id.* at 58-59.

80. *Id.* at 59.

81. *Id.*

82. *Operating Nuclear Plants in the United States*, http://clonemaster.homestead.com/files/Operating.htm (last visited Sept. 26, 2012).

83. WALKER & WELLOCK, *supra* note 14, at 59-60.

84. *Backgrounder on Emergency Preparedness at Nuclear Power Plants*, U.S. NUCLEAR REGULATORY COMM'N, http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/emerg-plan-prep-nuc-power-bg.html (last updated Feb. 4, 2011).

85. WALKER & WELLOCK, *supra* note 14, at 60.

Massachusetts, refused to assist in coming up with a plan because they considered their states difficult to evacuate.[86] After adopting a "realism doctrine" in 1987, the NRC essentially agreed to allow the states to operate the plants on the theory that in an actual emergency, state authorities would help.[87]

By the late 1980s, some environmentalists believed that nuclear power was an increasingly sound alternative to continued reliance on non-renewable fossil fuels, which are limited in supply and contribute to acid rain and global warming.[88] In addition, new designs for plants allowed for more efficient energy use and less chance of another Three Mile Island accident.[89] As a result, the NRC decided to simplify the licensing process to allow for the building of more plants.[90] It replaced the two-step approach with a one-step graded approach in which the level of detail a plant was required to submit depended on the complexity of its operations.[91] The objective was to stress safety while still providing room for flexibility to experiment with newer designs.[92]

In addition to licensing reforms, the NRC also reformed safety standards and made new developments through rigorous epidemiological studies and testing. One study conducted by the National Cancer Institute found no increased risk of cancer in 107 counties in the United States located near sixty-two nuclear power plants.[93] Another study, however, discovered a high occurrence of leukemia in children around the Sellafield plant in

86. RICK ECKSTEIN, NUCLEAR POWER AND SOCIAL POWER 60 (1997).

87. *Id.* at 72; *see also* Ben A. Franklin, *Nuclear Agency Moves to Ease Reactor Rules*, N.Y. TIMES, February 27, 1987, http://www.nytimes.com/1987/02/27/us/nuclear-agency-moves-to-ease-reactor-rules.html.

88. Environmentalists for Nuclear Energy, for example, is a pro-nuclear environmentalist group that believes environmental opposition to nuclear energy is "among the greatest mistakes of our times." Bruno Comby, *Environmentalists for Nuclear Energy*, WORLD NUCLEAR ASS'N ANNUAL SYMPOSIUM (2001), *available at* http://www.world-nuclear.org/sym/2001/pdfs/comby.pdf.

89. WALKER & WELLOCK, *supra* note 14, at 62.

90. *Id*.

91. *Id.* at 62-63.

92. *Id.* at 63.

93. *Id.* at 64.

Great Britain.[94] Neither study was determinative and the debate as to the health effects of nuclear plants remains ongoing.[95]

In June 1990, the NRC announced a new policy regarding small quantities of radioactive materials that were "below regulatory concern" (BRC).[96] If individuals were exposed to less than one millirem[97] of radioactive materials per year, or a population group to more than 1,000 person-rem per year, the facility could be exempted from requiring a license.[97] The NRC legitimized the policy by saying that this would allow them to spend more time and resources on larger and more dangerous issues.[98] In response, however, the NRC faced negative public response.[99] Many felt that the NRC had forgotten the oaths it took in the original Act and that the "beyond regulatory control" policy would allow nuclear plants to dump dangerous waste at public trash sites.[100] When the NRC held a meeting to discuss the policy change, the public called for the Commissioners to resign. Many even believed they should be arrested for criminal charges.[101]

The curiosity surrounding nuclear energy in the 1950s turned into anger and frustration. A country that had welcomed the growth of new technologies in the past was unconvinced and distrustful of the agency that promised to protect them.[102] Largely though, nuclear power remained and licenses were

94. *Id.*

95. WALKER & WELLOCK, *supra* note 14, at 64.

96. *See* 42 U.S.C. §§ 2021b-2021i (1988) (this was done in the Low-Level Radioactive Waste Policy Amendments Act of 1985, which was enacted to deal with the earlier act in 1980 leaving questions of low-level regulatory waste unanswered).

97. A rem is a large unit of radiation. A millirem is one thousandth of a rem and is typically produced by lesser radiation from an X-ray machine or background sources. WALKER & WELLOCK, *supra* note 14, at 64.

98. *Id.*

99. Koren Geer, *Regulatory Concern: The Nuclear Regulatory Commission's Solution for Radioactive Waste Management*, 2 FORDHAM ENVTL. L. REV. 139 (2011).

100. WALKER & WELLOCK, *supra* note 14, at 65.

101. *Id.*

102. *Id.*

granted.[103] The next phase of nuclear energy policy then would focus less on the licensing of new plants and more on managing the safety of existing plants.

C. The Modern Era and the Nuclear Revival

By the early 1980s, nearly 100 nuclear plants across the country were in full operation.[104] New issues such as decommissioning,[105] license renewal, regulation of nuclear materials, and risk assessment took precedence.[106] Unfortunately for the NRC, those critical of the nuclear power industry were outspoken in voicing their concerns. The U.S. Environmental Protection Agency (EPA) has voiced "opposing views and sometimes sharp differences" with NRC policies.[107] On the other end, the private nuclear power industry felt that the NRC's policies and regulations represented "a serious threat to America's nuclear energy resource" by undermining public perception of nuclear power, requiring ineffective and unnecessary safety precautions, and "pricing nuclear power out of the competitive energy marketplace."[108] Soon, the industry called for reform in order to "reverse the NRC's role in accelerating the decline of the nuclear industry."[109]

103. *Id.*

104. *See* David Biello, *Nuclear Reactor Approved in U.S. for First Time Since 1978*, SCI. AM. (Feb. 9, 2012), http://www.scientificamerican.com/article.cfm?id=first-new-nuclear-reactor-in-us-since-1978-approved; *Nuclear Power in the USA*, WORLD NUCLEAR ASS'N, http://www.world-nuclear.org/info/inf41.html (last updated Sept. 2012).

105. Nuclear decommissioning is the process of dismantling a power plant and decontaminating the area in order to restore it for general use by the public. On average, nuclear plants have a life of about thirty years while newer plants may be double that time. *Decommissioning Nuclear Facilities*, WORLD NUCLEAR ASS'N, http://www.world-nuclear.org/info/inf19.html (last updated Apr. 2011).

106. WALKER & WELLOCK, *supra* note 14, at 67-69.

107. *Id.* at 68.

108. *Id.* at 70 (discussing that some of this criticism led to the creation of probabilistic risk assessments, the NRC's response to criticism that safety issues should be better prioritized and more accurately defined. For example, safety factors did not distinguish between human and non-human malfunction when merely 35% of "abnormal occurrences" were due to machine-error).

109. *Id.*

Finally, in 2001, the nuclear power industry saw the first signs of a "nuclear revival after a slump of more than two decades."[110] Improvements in operator training, plant management, control room design, and equipment, led to safer and more efficient implementation of nuclear power.[111] For example, the capacity factor for nuclear plants, or the percentage of time a plant is able to produce power, increased from fifty to sixty percent in the 1970s to ninety percent.[112] The cost of generating nuclear electricity also dropped.[113] Moreover, "the increasing need for power" made investors willing to stomach the "high capital costs of construction."[114] One major reason was that the United States' energy consumption grew by about twenty-three percent, while energy production grew by only three percent.[115] In addition, the disadvantages of relying on fossil fuels such as coal and gas became harder to ignore.[116] Securing more oil meant having to deal with politically unstable nations and many were willing to recognize that coal has profoundly detrimental effects on the environment.[117]

In 2002, a group of environmental analysts argued that "nuclear power can play a significant role in mitigating climate change."[118] This position received strong support, and in 2003, a report conducted at MIT entitled "The Future of Nuclear Power" explained that fossil fuels were not the answer.[119] Instead, it concluded that nuclear power was a viable option and called for financial incentives to promote the construction of new nuclear

110. *Id.* at 93.
111. *Id.* at 94.
112. WALKER & WELLOCK, *supra* note 14, at 94.
113. *Id.*
114. *Id.*
115. *Id.*
116. *Id.*
117. *Id.*; *The Economics of Nuclear Power*, WORLD NUCLEAR ASS'N, http://world-nuclear.org/info/inf02.html (last updated July 2012) (the power produced by the world's nuclear plants would produce two billion metric tons of CO_2 if produced by fossil fuels).
118. WALKER & WELLOCK, *supra* note 14, at 95.
119. *See generally* JOHN DEUTSCH & ERNEST MONIZ, MASS. INST. OF TECH., THE FUTURE OF NUCLEAR POWER (2003), *available at* http://web.mit.edu/nuclearpower/pdf/nuclearpower-full.pdf.

plants.[120] Although the capital costs of building new nuclear plants were still considered by many to be a gamble, in 2005, Congress passed The Energy Policy Act of 2005, which eased the financial burden on new nuclear construction in an effort to spark the nuclear industry.[121] In 2009, the NRC received eighteen applications to construct twenty-six new nuclear reactors,[122] and today, in the U.S., 104 nuclear plants provide twenty percent of the nation's energy.[123] The country was, at last, coming to accept nuclear energy as a safe and efficient resource.[124] On March 11, 2011, at 2:46 P.M., however, that belief was shaken.

D. United States' Response to the Fukushima Disaster

Images of explosions, massive flooding, and widespread panic flooded every television in the United States. Warren Buffett best captured the Fukushima disaster's impact on U.S. nuclear energy policy. He stated: "Radiation terrifies people" . . . "[t]he United States was poised to move ahead with nuclear plans here, but the events in Japan derailed that."[125] For many American citizens, portrayals of the Fukushima disaster in the media were enough to convince them that nuclear power is an unnecessary evil: forty-three percent of those polled after the Fukushima disaster said they would approve building new facilities in the

120. *Id.*

121. *See* Energy Policy Act of 2005, Pub. L. 109-58.

122. *Combined License Applications for New Reactors*, U.S. NUCLEAR REGULATORY COMM'N, http://www.nrc.gov/reactors/new-reactors/col.html (last updated Mar. 29, 2012).

123. To be exact, there was 807 billion kWh (kilowatt hours) in 2010, with some states benefiting more than others. This makes the U.S. the world's largest supplier of commercial nuclear energy. Marshall Brian & Robert Lamb, *How Nuclear Power Works*, HOWSTUFFWORKS.COM, http://www.howstuffworks.com/nuclear-power.htm (last visited Sept. 26, 2012).

124. Even President Obama's 2012 budget proposal included $36 billion in loan guarantees for building nuclear plants. Julie Ann McKellogg, *U.S Nuclear Renaissance Further Crippled by Japan Crisis*, VOICE OF AMERICA, Mar. 17, 2011, 8:00 AM, http://www.voanews.com/content/us-nuclear-renaissance-further-crippled-by-japan-crisis-118272249/169632.html.

125. Becky Quick, *Japan Disaster to Delay U.S. Nuclear Energy Plans: Buffett*, CNBC, Mar. 20, 2011, 9:08 AM, http://www.cnbc.com/id/42178651/Japan_Disaster_To_Delay_US_Nuclear_Energy_Plans_Buffett.

U.S. to generate electricity.[126] Only three years earlier, fifty-seven percent approved of new plants.[127] As in the aftermath of Chernobyl, public perception formed quickly.[128]

At the request of President Obama, the U.S. NRC announced it would launch a comprehensive review of the 104 nuclear power reactors across the U.S.[129] Nevertheless, President Obama did not back down from his pro-nuclear stance, announcing that he "continues to support the expansion of nuclear power in the United States, despite the crisis in Japan,"[130] and that nuclear energy is "an important part of our own energy future."[131] One month after the incident, forty-five organizations challenged the NRC's business practices, petitioning the Commission to suspend all licensing activities at twenty-one proposed nuclear construction sites until a thorough investigation of the post-Fukushima reactor site was conducted.[132]

Most recently, in February 2012, the NRC approved licenses to build two new nuclear reactors, the first since 1978, one year before the Three Mile Island accident.[133] The reactors will be built in Georgia at the Vogtle nuclear power plant complex about 170 miles east of Atlanta.[134] The five-member NRC voted in favor of the licenses four to one, with Chairman Gregory Jaczko dissenting, explaining that the new licenses do not go far enough in requiring builders to incorporate lessons learned from

126. Even lower than the forty-three percent that approved after Three Mile Island. Michael Cooper, *Nuclear Power Loses Support in New Poll*, N.Y. TIMES, Mar. 22, 2011, http://www.nytimes.com/2011/03/23/us/23poll.html?_r=2.

127. *Id.*

128. McKellogg, *supra* note 124.

129. *See NRC to Review Safety of all US Nuclear Plants*, ASSOCIATED PRESS (Mar. 18, 2011, 9:03 AM), http://www.msnbc.msn.com/id/42148423/ns/politics-more_politics/t/nrc-review-safety-all-us-nuclear-plants/#.TyrIqpiLMQY.

130. McKellogg, *supra* note 124.

131. *NRC to Review Safety of all US Nuclear Plants*, *supra* note 129.

132. Carly Nairn, *Anti Nuclear Movement Gears Pp*, S.F. BAY GUARDIAN ONLINE, Apr. 14, 2011, 7:12 PM, http://www.sfbg.com/politics/2011/04/14/anti-nuclear-movement-gears.

133. Steve Hargreaves, *First New Nuclear Reactor OK'd in over 30 Years*, CNN MONEY, Feb. 9, 2012, 2:50 PM, http://money.cnn.com/2012/02/09/news/economy/nuclear_reactors/.

134. *Id.*

Fukushima.[135] The two reactors are expected to cost $14 billion and provide 2,200 megawatts of power, enough to power one million homes by 2016 and 2017.[136] The construction costs are being paid through the help of a conditional $8.3 billion loan from the Department of Energy.[137] This approval for nuclear plant construction suggests that the Fukushima disaster did less to curb nuclear development in the U.S. than originally predicted. It could also be a solid predictor of the U.S. continuing in a pro-nuclear direction within the next few years.

E. Three Recommendations for an Improved United States Nuclear Energy Policy

Nuclear power represents a practical and powerful technology that, when fully controlled, presents the best solution[138] to growing energy demands in a world with increasingly high fossil fuel prices and a growing threat of greenhouse gas emissions. According to the International Atomic Energy Agency, nuclear power generation is expected to increase by an amount ranging from seventeen percent to as much as ninety-two percent between 2007 and 2030.[139] The issue then is not whether to embrace or abandon nuclear energy, but rather,

135. *Id.*

136. *Id.*

137. *Id.*

138. There are surely *other* solutions (solar, wind, hydroelectric, just to name a few), but in a country with the largest overall and per capita energy consumption, nuclear energy poses the most realistic solution. As Max Schulz articulated:

> The beauty of nuclear fission is its ability to derive so much from so little. The energy density of nuclear fuel far exceeds that of any other energy source. As my Manhattan Institute colleague Peter Huber has noted, "A bundle of enriched-uranium fuel rods that could fit into a two-bedroom apartment in Hell's Kitchen would power [New York City] for a year: furnaces, espresso machines, subways, streetlights, stock tickers, Times Square, everything—even our cars and taxis, if we could conveniently plug them into the grid.

Max Schulz, *Nuclear Power is the Future*, WILSON Q., Autumn 2006, at 60 (2006), *available at* http://www.wilsonquarterly.com/article.cfm?AID=917 (internal quotations omitted).

139. INT'L ATOMIC ENERGY AGENCY, ENERGY, ELECTRICITY AND NUCLEAR POWER: DEVELOPMENTS AND PROJECTIONS 67 (2007), *available at* http://www-pub.iaea.org/mtcd/publications/pdf/pub1304_web.pdf.

how to maximize the efficiency of nuclear energy while maintaining a healthy respect for its risks. The question is by no means a simple one, and the answer may prove just as elusive. An open forum in which to discuss the current U.S. approach, its weaknesses and its strengths, may represent the best approach to finding an answer.

Many of the issues stemming from the discussion and debate over nuclear energy arise from an apparent contradiction: nuclear energy has the potential to provide more energy at a lower cost than any other energy source, but currently only provides about twenty percent of U.S. energy output, and costs a fortune.[140] One of the most obvious reasons for this anomaly is the increasingly high price of nuclear reactor safety oversight, nuclear plant development, and extensive licensing processes.[141] One proposed solution is to limit the NRC's involvement in nuclear oversight, but this would be an unwise decision.

First and foremost, one must recognize that nuclear energy left unguarded and unregulated has the potential to result in environmental and societal devastation.[142] An effective NRC is absolutely essential to ensure the safe operation and the future expansion of U.S. plants. While it is easy to point out flaws with the NRC,[143] one fact remains: the regulations in place should be sufficient to ensure safe operation and construction of U.S. plants, and its system of operations is more transparent than in

140. The estimated cost of building a new nuclear power plant is well over $1 billion. Over half of that cost is related to the cost of licensing, approval, and other bureaucratic expenses. *What does it cost to build a nuclear plant? What would it cost?*, DEPLETED CRANIUM - THE BAD SCIENCE BLOG (Mar. 2, 2008, 8:20 PM), http://depletedcranium.com/hope-this-works/.

141. Daniel Indiviglio, *Why Are New U.S. Nuclear Reactor Projects Fizzling?*, ATLANTIC, Feb. 1, 2011, 12:13 PM, http://www.theatlantic.com/business/archive/2011/02/why-are-new-us-nuclear-reactor-projects-fizzling/70591/.

142. For instance, the Three-Mile Island Accident, the Chernobyl Accident, and the Fukushima Daiichi Disaster.

143. The NRC has long been criticized as a paradigm for "regulatory capture," which is a term that refers to the situation when an industry gains control of an agency designed to regulate it. While these allegations bear some truth, it appears to be less an issue of the NRC's five individual members and more an issue of the NRC's organizational structure resulting in a conflict of interest.

many other countries.[144] The issue, then, is not a lack of regulation, like in Japan, but the NRC's ability to strictly enforce its regulations and encourage a strong safety culture within new and existing plants. This is key to not only preventing disasters and the shutdown of working plants, but also to promoting a safe, open, and honest image for nuclear energy among the U.S. public.

i. Establish A Nuclear Development Agency

One recommendation for the U.S. Department of Energy is to create a new and separate agency bifurcating responsibility for two seemingly conflicting goals. Managing plant oversight, regulation, and licensing would remain the purview of the NRC, while this new agency would focus less on safety regulations and more on creating new and improved reactor designs that produce more energy, safely, and at a lower cost. Recognizing that the NRC can only accomplish so much is a good first step towards establishing safer reactors for the present, and promoting new and innovative designs for the future. By creating a new agency focused on the future of nuclear energy, more resources could be devoted to improving plant designs without fear of past failures. This new agency can focus its efforts on conquering the biggest issues regarding the cost effectiveness of nuclear energy. For example, one major hurdle to overcome is the great distances nuclear plants are often located from where energy is most needed. The farther the energy must travel from its source, the more energy lost in the process. Whatever the proposed solution, it begins with an agency that has the time, resources, and objectivity to identify the problems.

Ideally, this agency would be staffed not by policy-makers or politicians, but by experts in the field of nuclear engineering with a healthy respect for radiation, not a fear of it. Furthermore, establishing a new agency whose primary goal is nuclear development would also allow the NRC to utilize more resources

144. The NRC has held thirty-eight public meetings, ten closed meetings, fourteen planning sessions, and issued dozens of decisions just this year. J. Patrick Coolican, *Scuffle at NRC has Stench of Industry Influence Behind It*, LAS VEGAS SUN, Dec. 12, 2011, http://www.lasvegassun.com/news/2011/dec/12/scuffle-nrc-has-stench-industry-influence-behind-i/.

in the nuclear safety arena. For example, the NRC's Office of the Inspector General discovered twenty-four instances of nuclear plants failing to report equipment defects that could pose safety risks.[145] However, no penalties were imposed on plant operators for these violations.[146] By dividing and reassigning responsibilities, the NRC would be forced to focus on enforcing regulations and responsible licensing without fear of inhibiting industry.

ii. Encourage Federal Funding and Higher Level Education

The U.S. federal government should encourage exploration and innovation by funding grants at the undergraduate and graduate levels to increase the number of highly trained and intelligent nuclear engineers in the field.[147] Human error contributed to many of the worst disasters in the nuclear power industry, including Chernobyl, Three Mile Island, and to some extent, Fukushima (in containing the damage done).[148] As John Ricci, Manager of Specialized Technical Training at the NRC, poignantly said, "You cannot regulate against stupidity."[149] Both nuclear safety and development, then, are limited by the number of well-trained, intelligent individuals willing to take on challenges to the industry and nuclear design. This recommendation is not aimed just at lower-level nuclear plant operators, but also at leadership. Human error exists as much at

145. Daniel Kaufmann & Veronika Penciakova, *Preventing Nuclear Meltdown: Assessing Regulatory Failure in Japan and the United States*, BROOKINGS, Apr. 1, 2011, http://www.brookings.edu/opinions/2011/0401_nuclear_meltdown_kaufmann.aspx.

146. *Id.*

147. Funding grants result in higher costs. However, this price should be distinguished from the cost of maintaining old plants. Viewed in this light, this research and development funding is less of a burden to bear and more an investment in the future of our energy infrastructure.

148. *See* Shogo Suzuki, *Fukushima and Cultural Superiority*, DIPLOMAT, July 15, 2011, http://the-diplomat.com/2011/07/15/fukushima-and-cultural-superiority.

149. David Biello, *Atomic Weight: Balancing the Risks and Rewards of a Power Source*, SCI. AM., Jan. 29, 2009, http://www.scientificamerican.com/article.cfm?id=nuclear-power-plant-safety&page=3.

an administrative level as it does in the day-to-day operations of a nuclear plant.

While many new reactors applied for licenses in 2010, costs are now on the rise and are likely to increase due to the implementation of more stringent requirements for nuclear safety and management in the wake of Fukushima.[150] Licensing extensions for existing plants also face additional scrutiny and the geographical disposal of spent fuel is likely to be reevaluated in a new light.[151] As a result, the federal government should increase loan guarantees to the nuclear power industry.[152] Providing these added incentives to investors would allow for continued exploration of nuclear energy and would likely push the U.S. into a phase of nuclear enlightenment not yet seen globally. Currently, half of the 104 nuclear plants in the U.S. are over thirty years old and are operating with outdated technology.[153] Newer plants may provide a better understanding of the costs and construction times for future plants, and provide confidence in an industry badly needing it.

iii. Separate Nuclear Policy from Nuclear Politics

It would be unfair to criticize U.S. nuclear policy without discussing the deficiencies of the NRC. The NRC is a five-member commission, currently led by Chairman Gregory Jaczko. Commissioners are appointed by the President and confirmed by the Senate for five-year terms.[154] Three of the sitting commissioners are Democrats, and two are Republicans.[155]

150. MASS. INST. OF TECH., THE FUTURE OF THE NUCLEAR FUEL CYCLE vii, xv (2011), *available at* http://web.mit.edu/mitei/research/studies/documents/nuclear-fuel-cycle/ The_Nuclear_Fuel_Cycle-all.pdf.

151. *Id.*

152. This is true even considering the roughly $18 billion authorized in the Energy Bill of 2005.

153. Steve Hargreaves, *First New Nuclear Reactor OK'd in Over 30 Years*, CNN MONEY, Feb. 9, 2012, 2:50 PM, http://money.cnn.com/2012/02/09/news/economy/nuclear_reactors/.

154. *The Commission*, U.S. NUCLEAR REGULATORY COMM'N, http://www.nrc.gov/about-nrc/organization/commfuncdesc.html (last updated July 11, 2012).

155. Karoun Demirjian, *Jaczko's successor at NRC could be another staunch Yucca opponent*, LAS VEGAS SUN, Mar. 22, 2012, http://www.lasvegassun.com/news/2012/may/22/jaczkos-replacement-nrc-could-also-be-staunch-yucc/.

While the NRC refers to itself as an independent agency, it receives ninety percent of its funding from industry fees.[156] In 2011, the United States' nuclear industry "spent nearly $54 million to lobby Congress and employed twelve former members of Congress as lobbyists."[157] Some of the biggest supporters of the nuclear power sector have also been some of the largest recipients of campaign contributions.[158]

Although the NRC's structure may result in those with the most money being in the position of making the most important decisions, even if one supports the NRC's decisions, the process is inefficient and prone to miscalculations. Nuclear energy is too powerful to be a marionette to politics. All steps forward should be calculated, well researched, and the implications must be fully understood. Furthermore, the most undesirable effect of initiatives based on cash influence and excessive politicking is nuclear policy gridlock—or the inability, due to political considerations, to move forward with industry.[159]

iv. Confront the Issue of Nuclear Waste Disposal

One of the biggest challenges to the United States' nuclear energy policy has been the handling (or non-handling) of spent nuclear fuel.[160] Spent fuel is highly radioactive and there is currently approximately 50,000 tons of it sitting at nuclear plants

156. Shankar Vedantam, *Nuclear Plants Not Keeping Track of Waste*, WASH. POST, Apr. 12, 2005, http://www.washingtonpost.com/wp-dyn/articles/A44916-2005Apr11.html.

157. Kaufmann & Penciakova, *supra* note 145.

158. Darren Samuelsohn, *Nuclear Industry Lobbyists Clout Felt on Hill*, POLITICO (Mar. 16, 2011, 1:42 PM), http://www.politico.com/news/stories/0311/51367.html (Exelon, one of the United States' largest nuclear operators, contributed to the campaigns of the House Minority Whip and the Energy and Commerce Committee chairman and contributed to fourteen of the nineteen members in the House of Representatives from states where Exelon owns reactors).

159. *See, e.g.*, Letter from Danielle Brian, POGO Exec. Dir., to Joseph Biden, U.S. Vice President (Oct. 28, 2009) (explaining that in one recent case, a commissioner voted on a matter that benefitted three nuclear companies, two of which he was negotiating an employment contract with at the time).

160. *See generally* Charles de Saillan, *Disposal of Spent Nuclear Fuel in the United States and Europe: A Persistent Environmental Problem*, 34 HARV. ENVTL. L. REV. 461, 464 (2010).

across the country.[161] Thirty-one reactors in the U.S. store spent fuel in attic pools above the reactor, similar to the design used at the Fukushima plant.[162] The other seventy-three reactors store the spent fuel in tanks, which are located in buildings adjacent to the operating reactors.[163] These steel and concrete reinforced storage tanks are designed to withstand earthquakes within a 200-mile radius.[164] However, it is not just earthquakes that have the public worried. Failures of a power grid, backup generator, or future terrorist attacks all have serious risk potential.[165] For example, the "Brookhaven National Laboratory on Long Island, New York estimated in 1997 that a massive calamity at one spent-fuel pool could ultimately lead to 138,000 deaths and contamination of 2,000 square miles of land."[166]

In 1982, Congress established a national policy to solve the problem of nuclear waste disposal.[167] The Nuclear Waste Policy Act made the U.S. Department of Energy responsible for finding, building, and operating an underground disposal facility.[168] The Yucca Mountain Nuclear Waste Repository, 100 miles north of Las Vegas,[169] was approved to be the site in 2002,[170] but funding was terminated in 2011.[171] Many felt that Yucca Mountain was the perfect place for spent nuclear waste because it could be stored deep underground.[172] Others felt that it was too close to

161. Mark Benjamin, *Nuclear-Fuel Storage to be Probed in U.S. Safety Study*, TIME (Mar. 23, 2011), http://www.time.com/time/nation/article/0,8599,2060880,00.html.

162. *Id.*

163. *Id.*

164. *Id.*

165. *Id.*

166. *Id.*

167. *See* Nuclear Waste Policy Act, 42 U.S.C. §§ 10101-270 (2006).

168. *See id.* § 10131.

169. Matthew L. Wald, *How Dead is Yucca Mountain?*, N.Y. TIMES: BLOG ABOUT ENERGY & ENV'T (Sept. 12, 2011, 7:16 AM), http://green.blogs.nytimes.com/2011/09/12/how-dead-is-yucca-mountain/.

170. Evelyn Nieves, *Yucca Mountain Looms Over* Vote, WASH. POST, Oct. 29, 2004, http://www.washingtonpost.com/wp-dyn/articles/A7362-2004Oct28.html.

171. Wald, *supra* note 169.

172. *See* Stuart Rojstaczer, *Yucca Mountain: A Pragmatic Solution to Storing Nuclear Waste*, SFGATE (Aug. 4, 2002, 4:00 AM), http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2002/08/04/ED209638.DTL&ao=all.

where millions live and the transportation of the nuclear waste to the mountain posed a serious risk.[173] Because the Obama Administration did not provide a technical or scientific basis for shutting down the site, many felt that the decision was strictly political.[174] In response, President Obama recently created the Blue Ribbon Commission on America's Nuclear Future, a group tasked with providing another solution to the United States' growing nuclear waste problem.[175] In January 2012, the Commission released a number of general recommendations including finding an interim storage location for the spent fuel, continuing to search for another disposal site, and lastly, creating another government entity named FedCorp to execute the program and take control of the Nuclear Waste Fund.[176] Whether Congress will act on these recommendations, however, is another issue entirely, and, ultimately, only time will tell.

III. JAPANESE NUCLEAR ENERGY POLICY

A. Japan's Atomic Energy Basic Act and The Three Non Nuclear Principles

Japan is all too familiar with the devastating effects of atomic energy. After the bombings of Hiroshima and Nagasaki ended World War II, Japanese public opinion strongly opposed the building of nuclear weapons on Japanese soil.[177] Soon,

173. *See* David Krieger & Marissa Zubia, *Nuclear Age Peace Foundation's Top Ten Reasons to Oppose the DoE's Yucca Mountain Plan*, NUCLEAR AGE PEACE FOUNDATION (Aug. 23, 2002), http://www.wagingpeace.org/articles/2002/08/23_krieger _yucca-top10.htm.

174. Hannah Northey, *Death of Yucca Mountain Caused by Political Maneuvering*, N.Y. TIMES, May 10, 2011, http://www.nytimes.com/gwire/2011/05/10/10greenwire-gao-death-of-yucca-mountain-caused-by-politica-36298.html?pagewanted=all.

175. Christopher Helman, *Obama's Nuclear Commission Issues Final Report, Urges Immediate Action on Atomic Waste*, FORBES (Jan. 26, 2012, 3:31 PM), http://www.forbes.com/sites/christopherhelman/2012/01/26/obamas-nuclear-commission-issues-final-report-urges-immediate-action-on-atomic-waste/.

176. *Id.*

177. Peter Kuznick, *Japan's Nuclear History in Perspective: Eisenhower and Atoms for War and Peace*, BULLETIN ATOMIC SCIS. (Apr. 13, 2011), http://www.thebulletin.org/web-edition/features/japans-nuclear-history-perspective-eisenhower-and-atoms-war-and-peace.

however, one factor played an enormous role in distinguishing Japan's nuclear energy policy from other countries and pushed Japan to face the increasing use of nuclear energy abroad: Japan's lack of domestic energy resources.[178] In fact, even today, Japan must import over eighty percent of their primary energy needs.[179]

As a result, Japan's first nuclear research program was established in 1954 with the Atomic Energy Basic Law.[180] Passed in the same year the United States adopted its second piece of atomic energy legislation, the Atomic Energy Act of 1954, Japan's law imitated many of the concepts embodied in the United States' first piece of atomic energy legislation ten years earlier.[181] The Atomic Basic Law provided strict limitations on the use of nuclear technology primarily for peaceful purposes and established the Japanese Atomic Energy Commission (later to be reformed as the Nuclear Safety Commission).[182] In an effort to catch-up with the rest of a world already on the brink of nuclear development, Japan turned to Great Britain for help in establishing civilian nuclear power.[183] Japan's first reactor, Tokai 1, was designed by the British and completed in 1965.[184] Soon, however, Japan's energy needs outgrew the moderate capacity of British designed reactors and the nation turned to American designed reactors instead.[185]

Beyond the Atomic Energy Basic Law, which supported the safe use of atomic energy,[186] another powerful line of thought

178. Kennedy Maize, *A Short History of Nuclear Power in Japan*, POWERBLOG (Mar. 14, 2011, 10:05 AM), http://blog.powermag.com/index.php/2011/03/14/a-short-history-of-nuclear-power-in-japan/.

179. *Id.*

180. Atomic Energy Basic Act, 2004, Act No. 186 of 1955, art. 4-6 (Japan), *available at* http://www.nsc.go.jp/NSCenglish/documents/laws/1.pdf.

181. *See generally id.*

182. *Id.*

183. Maize, *supra* note 178.

184. *Id.*

185. *Id.*; Matt Smith, *U.S. Nuclear Plants Similar to Fukushima Spark Concerns*, CNN (Feb. 17, 2012, 8:41 AM), http://www.cnn.com/2012/02/17/us/us-nuclear-reactor-concerns/index.html (in fact, Fukushima Daiichi 1, a boiling water reactor, was the same design used by U.S. General Electric).

186. *Nuclear Power in Japan*, WORLD NUCLEAR ASS'N, http://www.world-nuclear.org/info/inf79.html (last updated Sept. 30, 2012).

influenced Japan's nuclear energy policy, and continues to have a powerful influence today.[187] Japan's Three Non-Nuclear Principles are detailed in a parliamentary resolution that were never adopted into law, but were outlined in a speech given by Prime Minister Eisaku Sato to the House of Representatives in 1967.[188] It states that "Japan for its part, has been firmly committed to the Three-Non-Nuclear principles of not possessing nuclear weapons, not producing them[,] and not permitting their entry into the country."[189] Although every Prime Minister of Japan since Sato has re-affirmed the Three Non-Nuclear Principles, some government officials have questioned strict adherence to these principles to the extent that they interfere with Japan's national defense.[190] This suggested a growing trend from a cautionary nuclear policy to one that was more expansive and open-minded. Eventually, scarce domestic energy resources meant increasing pressure to advance a Japanese nuclear renaissance.[191]

By the end of the 1970s, Japan was largely capable of producing nuclear energy without the assistance of other nations.[192] By the mid-1980s, Japan had improved their nuclear technologies and brought their plants up to world standards.[193] However, this did not prevent industry from making rudimentary mistakes and acting deceitfully. In 2002, Japanese regulators forced Tokyo Electric Power Co. to shut down many of its reactors after company officials were charged with twenty-nine cases of

187. *See Examples of Announcements of the Three Non-Nuclear Principles*, MINISTRY OF FOREIGN AFFAIRS OF JAPAN, http://www.mofa.go.jp/policy/un/disarmament/nnp/announce.html (last visited Sept. 26, 2012).

188. *See Three Non-Nuclear Principles*, MINISTRY OF FOREIGN AFFAIRS OF JAPAN, http://www.mofa.go.jp/policy/un/disarmament/nnp/index.html (last visited Sept. 26, 2012).

189. *Id.*

190. *Non-Nuclear Principles to be Reviewed,* CUGOKU SIMBUN PEACE NEWS (June 2, 2002), http://www.chugoku-np.co.jp/abom/02e/An02060202.html.

191. *The Nuclear Renaissance,* WORLD NUCLEAR ASS'N, http://www.world-nuclear.org/info/inf104.html (last updated Aug. 2011) (nuclear renaissance, coined in 2001, refers to a nuclear energy revival in a world with increasingly high fossil fuel prices and concerns about greenhouse gas emissions).

192. Maize, *supra* note 178.

193. *Id.*

falsifying or ignoring inspection records.[194] In 2004, a pipe break at the Mihama plant killed four workers and injured seven others.[195] In 2005, three reactors at the Onagawa station shut down following an earthquake after monitors indicated the plant experienced shocks that would create damage beyond its ability to control.[196] In 2007, an earthquake led to an extended outage at the Kasiwazaki-Kariwa plant causing considerable damage.[197]

However, no accident compared to what happened on March 11, 2011. Prior to the Fukushima disaster, Japan had fifty-four operating reactors providing over forty-six gigawatts—about one third of Japan's total electricity.[198] One Japanese energy plan showed Japan intended to build at least fourteen new reactors by 2030.[199] But on March 11, 2011, that plan changed.

B. Japanese Nuclear Energy Policy Post-Fukushima

On March 11, 2011, the Fukushima disaster changed international nuclear energy policy forever. Two months after the disaster, Prime Minister Naoto Kan ordered that the Hamaoka Nuclear Plant be shut down in response to data predictions of another earthquake striking the area within the next thirty years.[200] Days later, facing public pressure, Kan called for a new energy policy in Japan with less reliance on

194. Howard French, *Nuclear Power Scandal Grows*, N.Y. TIMES, Sep. 21, 2002, http://www.nytimes.com/2002/09/21/world/world-briefing-asia-japan-nuclear-power-scandal-grows.html.

195. *Accident at Japan Nuclear Plant,* GREENPEACE INT'L (Aug. 9, 2004), http://www.greenpeace.org/international/en/news/features/accident-at-japan-nuclear-plan/.

196. *Nuclear Power Plants and Earthquakes*, WORLD NUCLEAR ASS'N, http://www.world-nuclear.org/info/inf18.html (last updated January 2012).

197. *See generally Kashiwazaki Kariwa Nuclear Units Shut Down on Earthquake*, WORLD NUCLEAR NEWS (July 16, 2007), http://www.world-nuclear-news.org/newsarticle.aspx?id=13714.

198. Maize, *supra* note 178.

199. Andrew Pollack, *Japan's Nuclear Future in the Balance*, N.Y. TIMES, May 9, 2011, http://www.nytimes.com/2011/05/10/business/energy-environment/10yen.html?pagewanted=all&_moc.semityn.www.

200. Peter Ford, *Japan's Hamaoka Nuclear Plant Sees Tsunami Defense in (Very Big) Wall*, CHRISTIAN SCI. MONITOR (Mar. 10, 2012), http://www.csmonitor.com/World/Asia-Pacific/2012/0310/Japan-s-Hamaoka-nuclear-plant-sees-tsunami-defense-in-very-big-wall.

nuclear power, saying, "the current basic energy policy envisages that over 50 percent of total electricity supply will come from nuclear power while 20 percent will come from renewable power in 2030. But that basic plan needs to be reviewed now from scratch . . . ."[201] He listed wind, solar, and biomass energy as possible alternatives.[202] This was a bold proposition by Kan, and the statement was criticized in some circles and applauded in others. Masayoshi Son, Japan's richest man said he would donate twelve million dollars to start a research foundation for renewable energy.[203] Those who supported nuclear expansion, including business leaders and the media, criticized the decision as overly rash and without a good explanation.[204]

Like Chernobyl and Three Mile Island years before Fukushima, public perception towards nuclear energy in Japan changed immediately. Anti-nuclear sentiment grew only stronger when the Japanese government was accused of withholding information from the public about the true damage caused by the Fukushima disaster, and its failure to bring the situation under control.[205] Public opinion polls found between seventy-five and eighty percent of the Japanese people to be in favor of shutting down all of Japan's fifty-four reactors.[206] In September 2011, "[c]hanting 'Sayonara nuclear power' and waving banners, tens of thousands of people marched in central Tokyo on Monday to call on Japan's government to abandon atomic energy. . . ."[207] One month later, the Energy White Paper was released and "mark[ed]

201. Chikako Mogi, *Japan Says Nuclear Policy Must Be Reviewed From Scratch*, REUTERS (May 10, 2011, 10:13 PM), http://www.reuters.com/article/2011/05/11/us-japan-politics-pm-idUSTRE7491SC20110511.

202. *Id.*

203. Pollack, *supra* note 199.

204. Mogi, *supra* note 201.

205. Charles Digges, *Japan Ignored its Own Radiation Forecasts in Days Following Disaster, Imperiling Thousands*, BELLONA (Nov. 8, 2011), http://www.bellona.org/articles/articles_2011/rad_forcasts_ignored; Gavin Blair, *Beginning of the End for Nuclear Power in Japan?*, CHRISTIAN SCI. MONITOR (June 20, 2011), http://www.csmonitor.com/World/Asia-Pacific/2011/0620/Beginning-of-the-end-for-nuclear-power-in-Japan.

206. Blair, *supra* note 205.

207. Koji Sasahara, *Thousands March Against Nuclear Power in Tokyo*, USA TODAY, Sept. 19, 2011, http://www.usatoday.com/news/world/story/2011-09-19/japan-anti-nuclear-protest/50461872/1.

an explicit and official retreat from the policy of centering the energy economy on nuclear."[208] "Public confidence in safety of nuclear power was greatly damaged . . . [the government] regrets its past energy policy and will review it with no sacred cows," the paper said.[209] Since the disaster, forty-nine out of fifty reactors have gone offline due to safety checks or government order.[210] While there have been electricity shortages, Japan survived the summer without the severe blackouts originally predicted.[211] A country that "is the world's third largest nuclear power user"[212] is now in the midst of re-designing a new energy future.[213]

C. Recommendations For An Improved Japanese Nuclear Energy Policy

In coming to terms with an international disaster, the first question is often a simple one: could the disaster have been prevented? Many are quick to point fingers at the Tokyo Electric Power Company (TEPCO)—its history of failure makes it an easy target. Some are keener on pointing fingers at Japan's Nuclear and Industrial Safety Agency (NISA), the agency designed to provide oversight and ensure safety regulations are met.[214] In

208. Andrew DeWit, *Fallout From the Fukushima Shock: Japan's Emerging Energy Policy*, ASIA-PAC. J.: JAPAN FOCUS (Nov. 7, 2011), http://www.japanfocus.org/-andrew-dewit/3645.

209. Tsuyoshi Inajima & Yuji Okada, *Nuclear Promotion Dropped in Japan Energy Policy After Fukushima*, BLOOMBERG (Oct. 27, 2011), http://www.businessweek.com/news/2011-10-27/nuclear-promotion-dropped-in-japan-energy-policy-after-fukushima.html.

210. *US and Japan to Strengthen Civil Nuclear Cooperation*, NUCLEAR ENERGY INST. (May 2, 2012, 4:05 PM), http://safetyfirst.nei.org/japan/us-and-japan-to-strengthen-civil-nuclear-cooperation/.

211. Stephanie Cooke, *After Fukushima, Does Nuclear Power Have a Future?*, N.Y. TIMES, Oct. 10, 2011, http://www.nytimes.com/2011/10/11/business/energy-environment/after-fukushima-does-nuclear-power-have-a-future.html?pagewanted=all.

212. Robin McKie, *Japan Ministers Ignored Safety Warning Over Nuclear Reactors*, THEGUARDIAN (Mar. 12, 2011, 1:51 PM), http://www.guardian.co.uk/world/2011/mar/12/japan-ministers-ignored-warnings-nuclear.

213. Cooke, *supra* note 211.

214. The Nuclear Safety Commission of Japan, *The Basic Policies for the Long-Term Initiatives of the Nuclear Safety Commission*, NSC Decision No. 2010-D33, Dec. 2, 2010. Although not reflected in the main text of my article, on June 20, 2012, the Nuclear and Industrial Safety Agency and the Nuclear Safety

assessing the failures that led to a global disaster, however, it is perhaps more revealing to discuss the big picture and begin to analyze the system as a whole. No *one* agency or corporation is at fault. Rather, each entity is flawed in distinct ways that combined to create the perfect storm. Now that that storm has manifested, this Comment will examine the ways Japan can regain momentum from both a public safety standpoint, and perhaps, in redirecting their nuclear energy future.

i. End Regulatory Capture

Japan's Nuclear Safety Commission, similar to the United States' NRC, labels itself an independent agency within the Cabinet of Japan and plays the central role in nuclear safety administration.[215] Commissioners are appointed by the Prime Minister and are confirmed by the Diet—Japan's bicameral legislature.[216] The Nuclear Safety Commission occupies a unique cabinet position in that it is the only ordinary advisory committee that can make recommendations to other agencies in the name of the Prime Minister.[217] The Nuclear Safety Commission is also responsible for reviewing safety inspections conducted by NISA, Japan's principle nuclear regulatory and oversight branch.[218]

As with the United States' own NRC, however, NISA is not entirely independent. NISA is part of Japan's Ministry of Economy, Trade, and Industry (METI) whose goals are to promote the nuclear industry within Japan and abroad.[219] METI has been charged with distorting information on the dangers of

Commission merged together to form the Nuclear Regulatory Authority, now part of Japan's independent Environment Ministry. As predicted in this article, the main purpose of the change was to separate the functions of nuclear regulation with nuclear industry and commerce. No regulations or plans by the agency have been made public, and only time will tell whether the agency plans to continue restarting nuclear reactors or aim to end nuclear energy reliance in the future. Asashi Shimbun, *Japan Gets a New Nuclear Safety Body, Now Needs to Write Rules*, ASAHI SHUMBUM (Sep. 20, 2012), http://ajw.asahi.com/article/0311disaster/fukushima/AJ201209200081.

215. *Id.*
216. *Id.*
217. *Id.*
218. *Id.*
219. Kaufmann & Penciakova, *supra* note 145.

nuclear energy presented to public officials and consistently working to foil alternative energy legislation.[220] METI was also influential in the "launching of the International Nuclear Energy Development of Japan Co. (JINED), a public-private partnership headed by TEPCO to sell nuclear reactor contracts to developing countries."[221] In response to critiques that NISA and METI's relationship constitutes a conflict of interest, reports have been released that the Japanese government is considering splitting NISA from METI[222]—a wise decision in the wake of Fukushima.

Another problem that stems from Japan's system of regulatory capture is a practice called amakudari or "descent from heaven" (in the U.S. we refer to this as the "revolving door").[223] Japanese officials turn their heads from private sector wrong-doings because retiring public officials often go on to obtain high-paying private sector jobs.[224] Nuclear regulation only works when regulators are entirely independent of industry. In Japan, it is not unusual for individuals in the nuclear sector to also play roles in plant licensing, rulemaking, and inspecting.[225] For example, after retiring from his job as METI's director general, Ishida Toru went on to become an advisor to TEPCO—the owner and operator of the Fukushima power plant.[226] In 2005, when the Japanese government convened a panel to modify nuclear regulatory standards, eleven of the nineteen panel members worked in the nuclear industry.[227] At worst, this blatant conflict of interest is likely to lead to underestimating the amount of damage that can be done to a nuclear plant, and possibly another Fukushima-type disaster. At best, it undermines Japanese public perception and trust in NISA as an agency whose primary goal should be protecting public safety by ensuring strict regulations are in place and are being enforced.

220. *Id.*
221. *Id.*
222. *Id.*
223. *Id.*
224. *Id.*
225. Kaufmann & Penciakova, *supra* note 145.
226. *Pro-Nuclear Ministry's Bureaucrats Become TEPCO's Vice Chair*, JAPAN PRESS WEEKLY (Apr. 10, 2011), http://www.japan-press.co.jp/modules/news/index.php?id=1728.
227. Kaufmann & Penciakova, *supra* note 145.

ii. Upgrade Nuclear Technology and Enforce Regulations

Critiques of Japan's Nuclear Safety Commission run parallel with critiques of the United States' own NRC. But there are also some flaws in Japanese policy that are unique. For example, one significant area of weakness that became dauntingly obvious in the aftermath of Fukushima is Japan's reliance on "older scientific precepts for protecting nuclear plants."[228] This is not just limited to nuclear plant construction, but also to evolving scientific data and technology.[229] Since the 1980s, NISA has ignored warnings it received regarding the ability of reactor containment structures to "withstand earthquakes and tsunamis."[230] Only a few years ago, "a 6.8-magnitude earthquake resulted in 1,200 liters of radioactive water leaking into the Japan Sea."[231] TEPCO, the plant operator, later admitted "that the reactors had not been designed to withstand an earthquake of that size."[232] This negligence is especially disconcerting considering Japan has historically been prone to both earthquakes and tsunamis.[233]

While many feel that a country prone to natural disasters should steer clear of building nuclear plants altogether, the very least NISA can do is plan for the worst and keep up with the technology that has changed the way safety data is calculated, viewed, and implemented. Much of Japan's nuclear safety regulations are based on archaic data that fail to take into account technological advances made since the 1970s.[234] These methods do not take into account more devastating events that could occur in the future, "even though risk assessment models that do so currently exist."[235] Worse, NISA publishes no binding

228. Norimitsu Onishi & James Glanz, *Japenese Rules for Nuclear Plants Relied on Old Science*, N.Y. TIMES, Mar. 26, 2011, http://www.nytimes.com/2011/03/27/world/asia/27nuke.html?pagewanted=all.

229. *Id.*

230. Kaufmann & Penciakova, *supra* note 145.

231. *Id.*

232. *Id.*

233. *Id.*

234. Onishi & Glanz, *supra* note 228.

235. Kaufmann & Penciakova, *supra* note 145.

regulations.[236] Instead, they release only voluntary guidelines that leave the task of risk assessment and emergency response planning in the hands of plant operators.[237]

One recommendation would be to completely overhaul Japan's system of nuclear technologies. In fact, days after Fukushima, the Japanese government said that immediate safety upgrades would be put into place at every nuclear plant in Japan.[238] Ideally, NISA should not just adopt safety upgrades used in other countries, but completely re-evaluate what is needed in a country prone to natural disasters. If NISA follows through on the promise, this would be a significant step in Japan's pro-nuclear policies and would provide reassurance that Japan plans to bring its plants back online sooner than later. However, to truly reinstate confidence in Japan's nuclear power industry, government transparency must be as strong and comprehensive as the physical upgrades to the facilities. The general public's confidence will have to be re-established, a difficult task considering the damage done.

iii. Suspension and Debarment of TEPCO

One way to begin re-building public confidence is to publicly acknowledge the failings of TEPCO. This is easier said than done, however, considering TEPCO is one of the most powerful and influential companies in Japan. Furthermore, unlike in the U.S. where nuclear plant owners remain out of sight from the general public, TEPCO spends an enormous amount of money on advertising.[239] As a result, the Japanese media fails to broadcast anti-nuclear activities for fear they would lose TEPCO as an advertiser.[240] While it may be impossible to keep TEPCO from advertising, the media's failure to broadcast any anti-nuclear sentiments can cast shadows of skepticism in the minds of the

236. *Id.*

237. *Id.*

238. *Safety Upgrades Ordered at Japan's Nuclear Plants*, CNN (Mar. 30, 2011, 2:45 PM), http://www.cnn.com/2011/WORLD/asiapcf/03/30/japan.nuclear.safety.

239. Krista Mahr, *What Does Fukushima's Level 7 Status Mean?*, TIME (Apr. 11, 2011), http://science.time.com/2011/04/11/what-does-fukushima%E2%80%99s-new-%E2%80%9Clevel-7%E2%80%9D-status-mean/.

240. *Id.*

Japanese public who must live in the aftermath of an unrivaled nuclear disaster.

Another recommendation is to institute a sub-agency that has the power to suspend or debar TEPCO from working with the Japanese government. For example, in the U.S., EPA's Suspension and Debarment Division has the authority to prevent companies from participating in government contracts, loans, and grants.[241] The Suspension and Debarment Division operates under the rationale that they have a responsibility to protect the government from doing business with companies who pose a business risk to the government.[242] Often times, a company may face large monetary fines for acting irresponsibly but view the fine as the mere cost of doing business. Suspension and Debarment is a solution to this problem because they have the power to prevent the company from conducting business with the government altogether. The Division also serves as a check on the U.S. Department of Justice who may decline to prosecute an environmental crime. At that point, the Suspension and Debarment Division can still take steps to suspend or debar the particular entity. Japan can benefit by instituting a Suspension and Debarment program as a tool to keep powerful companies like TEPCO from abusing their power. Certainly, TEPCO has acted irresponsibly enough over the past few decades to warrant an investigation into their safety and maintenance practices.

IV. CONCLUSION

There can be no doubt that the Fukushima Disaster has played a significant role in altering the course of U.S. and Japanese nuclear energy policies. From the media's portrayal of Fukushima burning, to the agencies abilities to react and restore confidence, to the millions that took to the streets in protest, nuclear energy policy is created, bent, and fashioned at all ends of society. While the extent and causes of nuclear issues vary in the U.S and Japan, there are many similarities.

241. *Suspension and Debarment Program*, U.S. EPA, http://www.epa.gov/ogd/sdd/debarment.htm (last visited Apr. 18, 2011).

242. *See* 48 C.F.R. § 9.4 (1993).

In the U.S., the NRC must make every effort to enforce their regulations and free itself from regulatory capture. By dividing the NRC into two sub-agencies, one focused on licensing and safety regulations, and the other focused on nuclear development and encouraging industry, this goal is within reach. It must also remember that nuclear energy promises a powerful and exciting prospect, and that even one mistake can set back any and all plans for the future. Thinking forward, the Government must invest in the future and remember that success is only an option if it invests in highly trained, specialized scientists, astute leaders in the field of regulation, and cutting edge technologies. The newly licensed plants in Georgia are a step in the right direction, but spent nuclear waste is an issue that has yet to be resolved and may make or break U.S. nuclear energy policy moving forward. One must not forget that when dealing with nuclear energy, public perception is fragile, and failure is not an option.

Japan's nuclear energy policy, unlike the United States', is under the microscope, and subject to intense critique. As a result, Japan has a lot to work on in the upcoming years to restore public faith in an industry under attack. While the Prime Minister and TEPCO are perhaps the easiest to blame, Fukushima is really the result of many failed policies, including NISA's lack of regulation and oversight. By failing to sanction plant operators for countless safety violations, providing no concrete regulations, and relying on outdated risk assessment models, NISA has largely allowed the private nuclear industry to rule itself. If Japan wishes to continue on a pro-nuclear path, a decision that will likely be made after the Fukushima cleanup is complete, NISA may be re-organized and re-commissioned under a new Cabinet. This re-commissioning, in addition to regaining the public trust, is essential for Japan's nuclear energy policy moving forward as the Japanese struggle to revive what was once a promising nuclear future.