Nuclear Energy: Overview of Congressional Issues

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Summary

The policy debate over the role of nuclear power in the nation's energy mix is rooted in the technology's fundamental characteristics. Nuclear reactors can produce potentially vast amounts of energy with relatively low consumption of natural resources and emissions of greenhouse gases and other pollutants. However, facilities that produce nuclear fuel for civilian power reactors can also produce materials for nuclear weapons. The process of nuclear fission (splitting of atomic nuclei) to generate power also results in the production of radioactive material that must be contained in the reactor and can remain hazardous for thousands of years. How to manage the weapons proliferation and safety risks of nuclear power, or whether nuclear power is worth those risks, are issues that have long been debated in Congress.

The 104 licensed nuclear power reactors at 65 sites in the United States generate about 20% of the nation's electricity. Five new reactors are currently licensed for construction. About a dozen more are planned, but whether they move forward will depend largely on their economic competitiveness with natural gas and coal plants. Throughout the world, 436 reactors are currently in service, and 62 more are under construction.

The March 2011 disaster at the Fukushima Dai-ichi nuclear power plant in Japan increased attention to nuclear safety throughout the world. The U.S. Nuclear Regulatory Commission (NRC), which issues and enforces nuclear safety requirements, established a task force to identify lessons from Fukushima applicable to U.S. reactors. The task force's report led to NRC's first Fukushima-related regulatory requirements on March 12, 2012. Several other countries, such as Germany and Japan, eliminated or reduced their planned future reliance on nuclear power after the accident.

Highly radioactive spent nuclear fuel that is regularly removed from nuclear power plants is currently stored at plant sites in the United States. Plans for a permanent underground repository at Yucca Mountain, NV, were abandoned by the Obama Administration, although that decision is being challenged in court. The Obama Administration appointed the Blue Ribbon Commission on America's Nuclear Future to recommend an alternative nuclear waste policy. The Commission recommended in January 2012 that new candidate sites for nuclear waste storage and disposal facilities be selected through a "consent based" process.

The level of security that must be provided at nuclear power plants has been a high-profile issue since the 9/11 terrorist attacks on the United States in 2001. Since those attacks, NRC issued a series of orders and regulations that substantially increased nuclear plant security requirements, although industry critics contend that those measures are still insufficient.

Encouraging exports of U.S. civilian nuclear products, services, and technology while making sure they are not used for foreign nuclear weapons programs has long been a fundamental goal of U.S. nuclear energy policy. Recent proposals to build nuclear power plants in several countries in the less developed world, including the Middle East, have prompted concerns that international controls may prove inadequate.

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Synthesis of Key Issues

The long-running public policy debate over the future of nuclear energy is rooted in the technology's inherent characteristics. Initially developed for its unprecedented destructive power during World War II, nuclear energy seemed to hold equal promise after the war as a way of providing limitless energy to all mankind. International diplomacy has focused ever since on finding institutional mechanisms for spreading the perceived benefits of nuclear energy throughout the world while preventing the technology from being used for the proliferation of nuclear weapons. Much of this international effort is focused on key nuclear fuel cycle facilities—plants for enriching uranium in the fissile isotope U-235 and for separating plutonium from irradiated nuclear fuel. Such plants can be used to produce civilian nuclear reactor fuel as well as fissile material for nuclear warheads.

Yet even the use of nuclear power solely for peaceful energy production has proven intrinsically controversial. The harnessing of nuclear fission in a reactor creates highly radioactive materials that must be kept from overheating and escaping from the reactor building, as occurred during the disasters at Fukushima and Chernobyl. Spent nuclear fuel that is regularly removed from reactors during refueling must be isolated from the environment for up to a million years. Potential technologies to reduce nuclear waste through recycling usually involve separating plutonium that could be used for nuclear weapons and would still leave substantial amounts of radioactive waste to be stored and disposed of. Long-term storage and disposal sites for nuclear waste have proven difficult to develop throughout the world, as illustrated by the Obama Administration's cancellation of the proposed U.S. waste repository at Yucca Mountain, NV.

The March 2011 disaster at Japan's Fukushima Dai-ichi nuclear power plant, which forced the evacuation of areas as far as 30 miles away, has slowed nuclear power expansion plans around the world, particularly in Japan and Western Europe. However, dozens of new reactors are still being planned and built in China, India, Eastern Europe, and elsewhere.[1] In these areas, nuclear power's initial promise of generating large amounts of electricity without the need for often-imported fossil fuels, along with the more recent desire to reduce greenhouse gas emissions, remains a compelling motivation.

With 104 licensed reactors, the United States has the largest nuclear power industry in the world. But U.S. nuclear power growth has been largely stagnant for the past two decades, as natural gas has captured most of the market for new electric generating capacity.[2] Congress enacted incentives for new nuclear plants in the Energy Policy Act of 2005 (P.L. 109-58), including production tax credits, loan guarantees, and insurance against regulatory delays. Those incentives, combined with rising natural gas prices and concerns about federal restrictions on carbon dioxide emissions, prompted industry plans by late 2009 for up to 30 new nuclear power reactors in the United States.[3] However, falling natural gas prices and the defeat of greenhouse gas legislation in the 111th Congress have put many of those projects on hold. Currently, four reactors, in Georgia and South Carolina, have been licensed for construction and operation, and an older reactor on

[1] World Nuclear Association, "World Nuclear Power Reactors & Uranium Requirements," November 2012, http://www.world-nuclear.org/info/reactors.html.

[2] Energy Information Administration, "Most Electric Generating Capacity Additions in the Last Decade Were Natural Gas-Fired," July 5, 2011, http://www.eia.gov/todayinenergy/detail.cfm?id=2070.

[3] Nuclear Regulatory Commission, "Expected New Nuclear Power Plant Applications," updated September 28, 2009. Available from the author.

which construction had been suspended for two decades is now being completed in Tennessee. A variety of incentives to renew the growth of nuclear power have been proposed, including a plan by President Obama to include nuclear power, along with natural gas and advanced coal technologies, in a federal mandate for the production of "clean energy."

The extent to which the growth of nuclear power should be encouraged in the United States and around the world will continue to be a major component of the U.S. energy policy debate. Questions for Congress will include the implementation of policies to encourage or discourage nuclear power, post-Fukushima safety standards, development of new nuclear power and fuel cycle technologies, and nuclear waste management strategies.

Basic Facts and Statistics

The 104 licensed nuclear power reactors at 65 sites in the United States generate about 20% of the nation's electricity. The oldest of today's operating reactors were licensed in 1969, and the most recent was in 1996. The reactors were initially licensed to operate for 40 years, but 80% have received or applied for 20-year license renewals by the Nuclear Regulatory Commission (NRC).Under the current mixture of 40- and 60-year licenses, 36 reactors would have to shut down by 2030 and the rest by 2049.[4]

Whether new reactors will be constructed to replace the existing fleet or even to expand nuclear power's market share will depend largely on costs. The cost of building and operating a new nuclear power plant in the United States is generally estimated to be significantly higher than natural gas combined-cycle plants (which use both combustion and steam turbines) and somewhat above conventional coal-fired plants. For example, the Energy Information Administration estimates that electricity generation from a nuclear power plant coming on line in 2016 would be 11.4 cents per kilowatt-hour (kwh), while combined-cycle gas would be 6.6 cents/kwh, conventional coal 9.5 cents/kwh, onshore wind 9.7 cents/kwh, offshore wind 24.3 cent/kwh, and solar photovoltaic 21.1 cents/kwh.[5] Such estimates depend on a wide range of variables, however, such as future fuel costs, environmental regulations, and tax credits and other incentives.

As noted above, the United States currently has five new reactors licensed for construction. They are scheduled to begin operating in 2015 through 2018.[6] Licenses to build and operate 14 additional reactors are currently pending at NRC, although their review schedules are uncertain.[7] If those additional U.S. reactors are licensed, they could begin coming on line in the early 2020s.

Throughout the world, 436 reactors are currently in service, and 62 more are under construction. France is the most heavily nuclear-reliant country in the world, with 58 reactors generating 78%

[4] Nuclear Regulatory Commission, *Information Digest, 2012-2013*, NUREG-1350, Vol. 24, August 2012, Section 3: Nuclear Reactors, http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1350.

[5] Energy Information Administration, "Levelized Cost of New Generation Resources in the Annual Energy Outlook 2011," November 2010, http://www.eia.gov/oiaf/aeo/electricity_generation.html.

[6] Tennessee Valley Authority, "Watts Bar Unit 2 Project Construction Update," October 26, 2012, http://www.tva.com/power/nuclear/wattsbar_unit2.htm; South Carolina Electric and Gas, "Project Schedule," http://www.sceg.com/en/about-sceg/power-plants/new-nuclear-development/schedule/default.htm; Southern Company, "Milestones," http://www.southerncompany.com/nuclearenergy/milestones.aspx.

[7] Nuclear Regulatory Commission, "New Reactor Licensing Applications," September 10, 2012, http://www.nrc.gov/reactors/new-reactors.html.

of the country's electricity in 2011. Thirty countries in 2011 generated at least some of their electricity from nuclear power. After the Fukushima accident, Germany, which had previously generated about 30% of its electricity with nuclear power, closed eight of the country's 17 power reactors and decided to shut the remainder by 2022.[8] Japan, which had also generated about 30% of its electricity with nuclear power and had planned to raise that level to 50%, is reconsidering its energy policy. Only two Japanese reactors are currently operating, with the remaining 48 operable reactors undergoing safety improvements and regulatory reviews.

Major Nuclear Energy Issues

Safety

The Fukushima Dai-ichi disaster, triggered by a huge earthquake and tsunami, greatly increased concerns about safety in the nuclear policy debate. The accident clearly demonstrated the potential consequences of a total loss of power (or "station blackout") at today's commercial nuclear plants. Even when a reactor shuts down, as the Fukushima plant did after the initial earthquake, residual radioactivity in the reactor core continues to generate heat that must be removed, typically by electrically driven cooling systems. When the tsunami knocked out power at three of the Fukushima reactors, the buildup of heat and pressure became so great that it melted the reactors' nuclear fuel and exceeded the limits of their containment structures. Cooling was also lost in Fukushima's spent fuel storage pools, causing concern that they could overheat, although later examination indicated that they did not.

Safety requirements for nuclear power plants are established and enforced in the United States by NRC, an independent regulatory commission. NRC safety regulations address the effects of external events such as earthquakes and floods, equipment failure such as breaks in coolant pipes, and other problems that could lead to radioactive releases into the environment. Critics of nuclear power contend that NRC is often reluctant to impose necessary safety requirements that would be costly or disruptive to the nuclear industry. However, the industry has frequently contended that costly safety proposals are unnecessary and would not significantly increase large existing safety margins.

Recent Events

Following the Fukushima disaster, NRC established a task force to identify lessons applicable to U.S. reactors and recommend safety improvements. The task force's report led to NRC's first Fukushima-related regulatory requirements on March 12, 2012. NRC ordered all reactors to develop strategies to maintain cooling and containment integrity during external events, such as floods and earthquakes, that were more severe than anticipated by the plants' designs ("beyond design basis"). In addition, NRC required that U.S. reactors of similar design to the Fukushima reactors have "reliable hardened vents" to remove excess pressure from their primary containments, and that better instrumentation be installed to monitor the condition of spent fuel pools during accidents.[9] NRC staff announced on November 1, 2012, a proposal to require the

[8] World Nuclear Association, "Public Information Service," http://www.world-nuclear.org.

[9] Nuclear Regulatory Commission, "Actions in Response to the Japan Nuclear Accident: March 12, 2012," updated May 30, 2012, http://www.nrc.gov/reactors/operating/ops-experience/japan/timeline/03122012.html.

newly mandated containment vents to include filters to reduce the release of radioactive material if the vents have to be used. The idea drew praise from nuclear critics but opposition from the industry on cost grounds.[10]

Selected Congressional Action

Nuclear Power Plant Safety Act of 2011 (H.R. 1242, Markey)

Requires NRC to revise its regulations within 18 months to ensure that nuclear plants could handle major disruptive events, a loss of off-site power for 14 days, and the loss of diesel generators for 72 hours. Spent fuel would routinely have to be moved from pool to dry-cask storage within a year after it had cooled sufficiently, and emergency planning would have to include multiple concurrent disasters. NRC could not issue new licenses or permits until the revised regulations were in place. Introduced March 29, 2011; referred to Committee on Energy and Commerce.

Oversight Hearing: NRC's Implementation of Recommendations for Enhancing Nuclear Reactor Safety in the 21st Century

Joint hearing before the Senate Committee on Environment and Public Works and Subcommittee on Clean Air and Nuclear Safety. September 12, 2012. Witnesses: NRC Chairman Allison M. Macfarlane and NRC commissioners.

CRS Reports

CRS Report RL33558, *Nuclear Energy Policy*, by Mark Holt

CRS Report R41805, *Nuclear Power Plant Design and Seismic Safety Considerations*, by Anthony Andrews and Peter Folger

CRS Report R41694, *Fukushima Nuclear Disaster*, by Mark Holt, Richard J. Campbell, and Mary Beth Nikitin

Additional References

Recommendations for Enhancing Reactor Safety in the 21st Century, Nuclear Regulatory Commission, Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, July 12, 2011, http://pbadupws.nrc.gov/docs/ML1118/ML111861807.pdf.

State-of-the-Art Reactor Consequence Analyses (SOARCA) Report: Draft Report for Comment, Nuclear Regulatory Commission, NUREG-1935, January 2012, http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1935.

[10] Freebairn, William, "NRC Staff Recommends Ordering Filtered Vents for 31 Power Reactors," *Inside NRC*, November 5, 2012, p. 1.

Radioactive Waste

Highly radioactive spent nuclear fuel must regularly be removed from operating reactors and stored in adjacent pools of water. After several years of cooling, the spent fuel can be placed in dry casks for storage elsewhere on the plant site. When the reactors were built, it had been expected that spent fuel would be taken away for reprocessing (separation of plutonium and uranium to make new fuel) or permanent disposal. However, reprocessing has not become commercialized in the United States, for economic and nonproliferation reasons, and central waste storage and disposal facilities have proven difficult to site. As a result, the vast majority of U.S. commercial spent fuel remains at the nuclear plants where it was generated—currently totaling 67,450 metric tons and rising at the rate of about 2,000 metric tons per year.[11]

Recent Events

The Nuclear Waste Policy Act (P.L. 97-425, NWPA), as amended in 1987, named Yucca Mountain, NV, as the nation's sole candidate site for a permanent high-level nuclear waste repository. However, the Obama Administration decided to halt the Yucca Mountain project and appointed the Blue Ribbon Commission on America's Nuclear Future to recommend an alternative policy. The Commission recommended in January 2012 that new candidate sites for nuclear waste storage and disposal facilities be found through a "consent based" process. The Department of Energy (DOE) is currently preparing legislation to implement the Commission's recommendations. At the same time, lawsuits are pending in federal court to require the development of the Yucca Mountain repository to continue, as specified by NWPA.

Selected Congressional Action

Restore America Act of 2011 (H.R. 3302, Rooney)

Among other provisions, encourages tripling of U.S. nuclear power capacity, requires licensing proceedings to continue for the proposed Yucca Mountain waste repository, removes statutory capacity limits on the repository, prohibits the President from blocking or hindering nuclear spent fuel recycling, establishes a nuclear fuel reserve, and establishes expedited reactor licensing procedures. Introduced November 1, 2011; referred to multiple committees.

Yucca Utilization to Control Contamination Act (H.R. 4625, Joe Wilson)/Nuclear Waste Fund Relief and Rebate Act (S. 2176, Graham)

Requires that payments into the Nuclear Waste Fund be returned to utilities unless the President certifies that Yucca Mountain is the selected site for a nuclear waste repository; that defense nuclear waste be transported to Yucca Mountain beginning in 2017; and that statutory requirements for disposal of nuclear waste be sufficient grounds for NRC to determine that waste from new or relicensed reactors will be disposed of in a timely manner. House bill introduced April 25, 2012; referred to Committee on Energy and Commerce. Senate bill introduced March 8, 2012; referred to Committee on Energy and Natural Resources.

[11] Gutherman Technical Services, "2010 Used Fuel Data," Report to Nuclear Energy Institute, January 18, 2010.

Nuclear Fuel Storage Improvement Act of 2011 (S. 1320, Murkowski)

Authorizes the Secretary of Energy to provide payments to units of local government that, with the approval of the state governor, volunteer to host a "privately owned and operated temporary used fuel storage facility." Introduced June 30, 2011; referred to Committee on Environment and Public Works.

Nuclear Waste Administration Act of 2012 (S. 3469, Bingaman)

Establishes the Nuclear Waste Administration to develop central storage and disposal facilities for high-level nuclear waste. Sites would require the consent of the host state and local governments and Indian tribes. Introduced August 1, 2012; referred to Committee on Energy and Natural Resources. Committee hearing held September 12, 2012.

Oversight Hearing: Recommendations of the Blue Ribbon Commission on America's Nuclear Future

Hearing before the Subcommittee on Environment and the Economy of the House Committee on Energy and Commerce. February 1, 2012. Lead witnesses: Hon. Lee Hamilton and Lt. Gen. Brent Brent Scowcroft (Ret.), co-chairs of the Blue Ribbon Commission on America's Nuclear Future.

CRS Reports

CRS Report RL33461, *Civilian Nuclear Waste Disposal*, by Mark Holt

CRS Report R42513, *U.S. Spent Nuclear Fuel Storage*, by James D. Werner

CRS Report R40996, *Contract Liability Arising from the Nuclear Waste Policy Act (NWPA) of 1982*, by Todd Garvey

Additional References

Report to the Secretary of Energy, Blue Ribbon Commission on America's Nuclear Future, January 2012, http://cybercemetery.unt.edu/archive/brc/20120620211605/http:/brc.gov.

Managing Spent Nuclear Fuel: Strategy Alternatives and Policy Implications, RAND Corporation, 2010, http://www.rand.org/pubs/monographs/MG970.html.

Energy and Environmental Policy

Congress has long debated the role that nuclear power should play in meeting national energy and environmental goals. Nuclear power supporters generally point to the technology as crucial for providing a secure, domestic source of energy with low emissions of greenhouse gases and other emissions. Opponents generally counter that safety and proliferation risks, nuclear waste hazards, and high costs outweigh those benefits. The debate over nuclear power's role often focuses on the level of federal support that should be provided to encourage the construction of new nuclear plants, through such mechanisms as loan guarantees, tax credits, clean energy mandates, and liability limits. Because of the relatively high cost of new nuclear reactors, especially compared

with natural gas plants, the level of federal support is expected to be a key determinant of the future growth or decline of nuclear power in the United States. Federal support for nuclear energy research and development could also be an important factor in the long term.

Recent Events

One nuclear power project, consisting of two new reactors at the Vogtle plant in Georgia, received a conditional commitment from DOE for an $8.33 billion loan guarantee in February 2010, as authorized by Section 1703 of the Energy Policy Act of 2005 (P.L. 109-58). However, negotiations over the detailed terms of the loan guarantee have continued since then, particularly over the level of fees that the borrower would have to pay, so it has not been finalized. No other planned nuclear plants have received conditional commitments for DOE loan guarantees.

Selected Congressional Action

Clean Energy Financing Act of 2011 (S. 1510, Bingaman)

Establishes a Clean Energy Deployment Administration to provide financial assistance to commercial projects using clean energy technology, including nuclear power. Introduced and reported as an original measure by the Committee on Energy and Natural Resources August 30, 2011 (S.Rept. 112-47).

Clean Energy Standard Act of 2012 (S. 2146)

Establishes minimum U.S. annual percentages of clean energy use, including nuclear power, starting at 24% in 2015 and rising to 84% in 2035. Introduced March 1, 2012; referred to Committee on Energy and Natural Resources. Committee hearing held May 17, 2012.

CRS Reports

CRS Report RL33558, *Nuclear Energy Policy*, by Mark Holt

Additional References

Maintaining U.S. Leadership in Global Nuclear Energy Markets, Bipartisan Policy Center, September 2012, http://bipartisanpolicy.org/sites/default/files/Nuclear%20Report.PDF.

World Nuclear Industry Status Report 2012, Mycle Scheider Consulting, July 2012, http://www.worldnuclearreport.org/IMG/pdf/2012MSC-WorldNuclearReport-EN-V2.pdf.

Security and Emergency Response

The level of security that must be provided at nuclear power plants has been a high-profile issue since the 9/11 terrorist attacks on the United States in 2001. Since those attacks, NRC issued a series of orders and regulations that substantially increased nuclear plant security requirements, although industry critics contend that those measures are still insufficient. Key measures include an increase in the level of attacks that nuclear plant security forces must be able to repel,

requirements for mitigating the effects of large fires and explosions, and a requirement that new reactors be capable of withstanding aircraft crashes without releasing radioactive material. NRC also modified its planning requirements for evacuations and other emergency responses after the 9/11 attacks, and the Fukushima disaster illustrated the importance of emergency response to radioactive releases from any cause.

Recent Events

NRC issued wide-ranging revisions to its emergency preparedness regulations on November 1, 2011, dealing with duties of emergency personnel and the inclusion of hostile actions in emergency planning drills.[12] In response to Fukushima, NRC staff recommended that nuclear emergency plans be required to address events affecting multiple reactors and prolonged station blackout. NRC told nuclear power plants on March 12, 2012, to provide specific information and analysis on those issues.[13]

Selected Congressional Action

Nuclear Power Licensing Reform Act of 2011 (H.R. 1268, Lowey)

Requires evacuation planning within 50 miles of U.S. nuclear power plants and that reactor license renewals be subject to the same standards that would apply to new reactors. Introduced April 7, 2011; referred Committee on Energy and Commerce.

Nuclear Disaster Preparedness Act (H.R. 1694, Engle)

Requires the President to issue guidance for federal response to nuclear disasters, covering specific topics listed in the bill. Introduced May 3, 2011; referred to Committee on Transportation and Infrastructure.

CRS Reports

CRS Report RL34331, *Nuclear Power Plant Security and Vulnerabilities*, by Mark Holt and Anthony Andrews

Additional References

Backgrounder—Nuclear Security, Nuclear Regulatory Commission, October 2008 (last reviewed or updated October 3, 2012), http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/security-enhancements.html.

[12] NRC, "Enhancements to Emergency Preparedness Regulations," final rule, *Federal Register*, November 23, 2011, p. 72560.

[13] NRC, "Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," March 12, 2012, http://pbadupws.nrc.gov/docs/ML1205/ML12053A340.pdf.

Nuclear Weapons Nonproliferation

Encouraging exports of U.S. civilian nuclear products, services, and technology while making sure they are not used for foreign nuclear weapons programs has long been a fundamental goal of U.S. nuclear energy policy. International controls and inspections are intended to ensure the peaceful use of civilian nuclear facilities and prevent the proliferation of nuclear weapons. However, recent proposals to build nuclear power plants in as many as 18 countries[14] that have not previously used nuclear energy, including several in the Middle East and elsewhere in the less developed world, have prompted concerns that international controls may prove inadequate. Numerous recommendations have been made in the United States and elsewhere to create new incentives for nations to forgo the development of uranium enrichment and spent nuclear fuel reprocessing facilities that could produce weapons materials as well as civilian nuclear fuel.

Recent Events

Iran is currently the prime example of the tension between peaceful and weapons uses of nuclear technology. Of particular concern is a growing Iranian uranium enrichment program, which Iran contends is solely for peaceful purposes but which the United States and other countries suspect is for producing weapons material. The U.N. Security Council has imposed sanctions and passed several resolutions calling on Iran to suspend its enrichment program and other sensitive nuclear activities. Nevertheless, Iran continues to advance its nuclear program.

Extension of the U.S.-South Korea nuclear cooperation agreement, which expires in 2014, is also being affected by nonproliferation issues. South Korea would like to include advance U.S. consent for spent fuel reprocessing and uranium enrichment, but the United States is concerned about the precedent that such an agreement might set and how it would affect other ongoing issues on the Korean peninsula. Official talks on the extension began in October 2010, with two more rounds held since, most recently in February 2012.

Selected Congressional Action

To amend the Atomic Energy Act of 1954 to require congressional approval of agreements for peaceful nuclear cooperation with foreign countries, and for other purposes (H.R. 1280, Ros-Lehtinen/S. 109, Ensign)

Requires congressional approval of U.S. peaceful nuclear cooperation agreements with countries that do not agree to forgo enrichment and reprocessing. House bill introduced March 31, 2011; reported by Committee on Foreign Affairs May 30, 2012 (H.Rept. 112-507). Senate bill introduced January 25, 2011; referred to Committee on Foreign Relations.

CRS Reports

CRS Report RL34234, *Managing the Nuclear Fuel Cycle: Policy Implications of Expanding Global Access to Nuclear Power*, coordinated by Mary Beth Nikitin

[14] World Nuclear Association, "World Nuclear Power Reactors & Uranium Requirements," November 2012, http://www.world-nuclear.org/info/reactors.html.

CRS Report R41910, *Nuclear Energy Cooperation with Foreign Countries: Issues for Congress*, by Paul K. Kerr, Mark Holt, and Mary Beth Nikitin

CRS Report RL31559, *Proliferation Control Regimes: Background and Status*, coordinated by Mary Beth Nikitin

Other References

U.S. Nuclear Cooperation as Nonproliferation: Reforms, or the Devil You Know? Nuclear Threat Initiative, November 27, 2012, http://www.nti.org/analysis/articles/us-nuclear-cooperation-nonproliferation-reforms-or-devil-you-know.

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