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**Testimony of Michele Boyd, Legislative Director
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**Before the Subcommittee on Energy and Air Quality
Committee on Energy and Commerce
U.S. House of Representatives**

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I would like to thank the Chairman and members of the Subcommittee on Energy and Air Quality for the opportunity to testify on issues related to nuclear waste storage and disposal. My name is Michele Boyd and I am the Legislative Director of Public Citizen's Energy Program. Public Citizen is a 35-year old public interest organization with over 150,000 members nationwide. We represent consumer interests through research, public education and grassroots organizing.

Five years after the September 11 attacks, Congress has yet to implement safeguards that address our most vulnerable and dangerous security threat – the storage of highly radioactive spent fuel from commercial nuclear reactors in fuel pools. If any of the many spent fuel pools in the United States were breached through terrorist attack or any other action, the health, environmental, and economic consequences could be catastrophic. National focus should be on addressing the threats from this waste, not on wasting resources on a failed repository program, a dangerous reprocessing program, or interim away-from-reactor storage. The most sensible action in the near-term is to require hardened on-site storage.

I am going to start with a discussion of the proposed geologic repository at Yucca Mountain in Nevada, followed by the Global Nuclear Energy Partnership (GNEP) and the proposal for interim storage. I will conclude with a plan developed by national and grassroots public interest groups to address the urgent need to protect the public from the threats posed by the current vulnerable storage of commercial spent fuel. Unlike the other proposed "solutions," this proposal could be implemented in the near-term and would dramatically increase the safety of spent fuel for decades to come.

Yucca Mountain

Clearly, the United States does not have a near-term solution for the permanent storage of high-level nuclear waste. The U.S. Department of Energy's (DOE) recent estimate of when Yucca Mountain will begin accepting waste is overly optimistic, because it does not factor in delays due

to funding limitations or litigation and ignores the scientific problems with the site. Nor does DOE have a current estimate of how much the Project will cost. Energy Secretary Bodman stated in February that DOE “may never have an accurate prediction of the cost.”¹

Even under DOE’s optimistic scenario, the proposed geologic repository at Yucca Mountain is not predicted to begin receiving waste until at least 2017. Transporting all of the waste to the site then would take more than 30 years. Meanwhile, spent fuel at reactor sites remains vulnerable to accidents and attacks for decades.

DOE’s flawed scientific and quality assurance practices have cast serious doubt on the validity of the work performed at Yucca Mountain. Quality assurance (QA) is crucial to sound science and engineering, especially for a project employing thousands and spanning several decades. QA is used to verify methods and results, and is the very backbone of scientific research and engineering design. Since 1988, the Government Accountability Office has issued eight reports repeatedly criticizing DOE’s quality assurance and model validation programs. An August 2006 report by the DOE’s Office of Inspector General concluded that DOE’s Corrective Action Program to identify and resolve the ongoing QA problems “was not effectively managing and resolving conditions adverse to quality at the Yucca Mountain Project,” including omitting problems from the Corrective Action Program, failing to implement the corrective actions in a timely manner, and failing to solve the underlying problem even when implemented.²

New cases of scientific misconduct continue to surface. Some of the more recent revelations include:

- In January 2006, the NRC staff released a critical report of a Bechtel SAIC LLC (BSC) audit made last fall at Lawrence Livermore National Laboratory. The Bechtel audit was on research related to corrosion rates of the metals to be used to construct the waste packages and drip shields. The NRC found that researchers incorrectly measured the amount of corrosion on the metals, and overestimated the ability of the metals to isolate nuclear waste in engineered packages. The NRC also found that researchers failed to calibrate equipment, used equipment beyond its verifiable accuracy range, and referenced cancelled documents. According to the NRC’s audit report, “the NRC observers questioned whether the corrosion data could be considered technically sound and defensible.”³ Because of the problems NRC discovered, DOE issued a stop work order on all cask research.
- In December 2005, DOE instructed BSC, its main contractor, to cease engineering work and safety assessment on key areas of design, including the redesign of the surface facility. This order was the result of QA and design control deficiencies, which were revealed by a

¹ Matthew L. Wald, “Big Question Marks on Nuclear Waste Facility,” *New York Times*, February 14, 2006.

² U.S. Department of Energy, Office of Inspector General, “Audit Report: Office of Civilian Radioactive Waste Management’s Corrective Action Program,” August 2006, DOE/IG-0736, <http://www.ig.doe.gov/pdf/IG-0736.pdf>.

³ U.S. Nuclear Regulatory Commission, “U.S. Nuclear Regulatory Commission Observation Audit Report No. OAR-05-05, Observation Audit Of Bechtel SAIC Company, LLC Internal Audit BQAP-BSC-05-07,” January 9, 2006.

whistleblower.⁴ Despite Bechtel's failings, DOE nevertheless extended its contract for another year, with an option for a second year.

- In March 2005, it was revealed that U.S. Geologic Survey (USGS) scientists studying water infiltration and climate at Yucca Mountain in Nevada altered and omitted various data related to QA of the modeling of water flow through the ground at Yucca Mountain. Faster water movement will cause increased amounts of radioactive waste to migrate more rapidly through the ground to the aquifer. DOE hired Sandia National Laboratory to create new infiltration models redo all of the infiltration analyses that were a primary basis for its 2002 Yucca Mountain Site Recommendation.

The Administration's proposed "Nuclear Fuel Management and Disposal Act" (H.R. 5360 and S. 2589) has the goal to "facilitate the licensing, construction and operation" of Yucca Mountain, but in fact it fails to address any of the project's fundamental problems. Rather, this bill is about overriding public health and safety laws and eliminating the role of science in determining whether Yucca Mountain can safely isolate nuclear waste for hundreds of thousands of years, as is required under the law. This bill is fundamentally contrary to the findings and purposes of the Nuclear Waste Policy Act (section 111), including a finding "to ensure that such waste and spent fuel do not adversely affect public health and safety and the environment for this or future generations." Specifically, the bill:

- Weakens Public Health and Environmental Laws: If enacted, the bill would waive state and local air quality laws at the site, and preempt states' traditional authority to manage its waters, setting an alarming precedent for other DOE projects and sites. The bill would undermine the National Environmental Policy Act (NEPA) by exempting DOE from having to consider the need for the action, alternative actions, or a no-action alternative—the key analyses of an environmental impact statement—and legislating that any action related to the site is "beneficial" *before* an analysis of the action has been done under NEPA.
- Preempts State and Tribal Rights: All authority over the transportation of radioactive waste would be given to DOE, contrary to the National Academy of Sciences' recommendation that state, local, and tribal governments must play a central role in waste transportation.⁵ The bill would pre-empt *all states'* authority over the management of hazardous, mixed, low-level, and transuranic wastes under the Resource Control and Recovery Act (RCRA) if that waste is stored or transported in NRC-certified containers, as is the waste transported to and stored at the Waste Isolation Pilot Plant (WIPP) in New Mexico.
- Politicizes Scientific and Technical Decisions: The bill would codify NRC's Waste Confidence Rule that there will be permanent disposal available for spent fuel "in a timely manner," thereby bypassing what should be a scientific and technical determination. This sets up the federal government for additional lawsuits by the nuclear industry for failing to meet its commitments. It also rewards DOE's mismanagement of the Yucca Mountain project with

⁴ Jeff Beattie, "Quality Control Issues: DOE Stops Work On Key Parts of Yucca Mountain," *The Energy Daily*, Volume 34, Number 6, January 10, 2006.

⁵ National Research Council of the National Academies, *Going the Distance? The Safe Transport of Spent Nuclear Fuel and High-Level Radioactive Waste in the United States*, 2006.

direct access to future revenue into the Nuclear Waste Fund, and allows an unlimited amount of waste to be dumped at the site, despite the lack of scientific site characterization information necessary to support such a decision.

This bill should not be enacted, as it would be another failed attempt to prop up this failed project.

Reprocessing

When the Global Nuclear Energy Partnership (GNEP) was first announced in February of this year, the U.S. Department of Energy presented it as “a comprehensive strategy to increase U.S. and global security, encourage clean development around the world, reduce the risk of nuclear proliferation, and improve the environment.”⁶ The program was presented to Congress largely as a research and development program to develop “advanced recycling technologies” that would postpone the need to license additional geologic repositories for the nation’s high-level waste until the next century. The key components of a reprocessing and reuse program include reprocessing plants, fuel fabrication facilities, and fast reactors, none of which have proven to be commercially successful technologies in the United States or abroad.

Since then, the program has morphed several times. In the most recent reincarnation announced in August, DOE is now proposing two tracks:

1. Building a commercial-scale reprocessing plant and a fast neutron reactor that uses plutonium fuel with existing or soon-to-be-developed technologies.
2. Researching and developing transmutation fuel and its use in fast reactors.

In other words, DOE is proposing to jettison most of its research on “advanced recycling technologies” and to skip demonstration facilities using what DOE claimed would be cleaner and “proliferation-resistant” technologies.

U.S. and international experience clearly shows that reprocessing is not going to solve our nation’s radioactive waste problem. Rather, reprocessing would dramatically increase the threat from, and complexity of dealing with, nuclear waste from power plants; undermine U.S. global nonproliferation efforts; and cost U.S. taxpayers at least \$100 billion.

Reprocessing was first used in the United States in the 1940s, as part of the government’s program to separate plutonium for nuclear weapons. The U.S. Department of Energy estimates that it will cost over \$100 billion to clean up the reprocessing waste at three nuclear weapons sites in the states of Washington, Idaho, and South Carolina.⁷ This waste threatens to contaminate the Columbia River and the Savannah River, two of the most important water resources in the country. The only U.S. commercial reprocessing facility was located in West

⁶ U.S. Department of Energy, *The Global Nuclear Energy Partnership: Greater Energy Security in a Cleaner, Safer World*, <http://www.gnep.energy.gov/pdfs/06-GA50035b.pdf>.

⁷ United States General Accounting Office, Report to the Chairman, Subcommittee on Oversight and Investigations, Committee on Energy and Commerce, House of Representatives, Nuclear Waste: Challenges to Achieving Potential Savings in DOE’s High-Level Waste Cleanup Program, GAO-03-593, June 2003.

Valley, N.Y. It was an economic and environmental failure, closing in 1972 after taking six years to reprocess spent fuel that was initially expected to take one year. It left behind a \$5.2 billion cleanup project that is still on-going more than 30 years later.⁸

International experience is no better. France, England, Russia, India, and soon Japan are the only countries in the world that have commercial reprocessing facilities. China is in the design phase of a pilot facility. All of these programs are heavily subsidized by their governments. A July 2000 report commissioned by the French government concluded that reprocessing and plutonium fuel are uneconomical, costing nearly \$1 billion more each year for plutonium fuel use (in 20 of its 58 reactors) compared to a “once-through” fuel cycle.⁹ Last year, 20 tons of uranium and plutonium leaked from a pipe at the U.K. government-owned THORP reprocessing plant. The plant, which was losing money even when operational, remains closed and its future is uncertain. Meanwhile, the Japanese company, Japan Nuclear Fuel Ltd., recently started up its Rokkasho reprocessing plant, which took 15 years to build and cost US \$20 billion, three times more than initially estimated.

Commercial reprocessing worldwide has resulted in about 250 metric tons of separated plutonium, which is vulnerable to theft.¹⁰ This is equivalent to more than 30,000 nuclear bombs. When GNEP was first proposed in February 2006, DOE stated that it did not want to use reprocessing technology that results in separated plutonium. According to Clay Sell, Deputy Secretary of Energy, on February 16, 2006:

It is our goal to develop a technology that allows us to recycle in a way that is proliferation resistant. And when I say proliferation resistant, what I mean is pure plutonium is not separated as part of the recycling process; *it is bound together with the other long-life actinides which makes the material of a sufficient quantity and of a sufficient heat load that concerns about diversion as a proliferation matter are greatly reduced*, so that is a key technology that we seek to develop in partnership with our international partners -- advanced recycling.¹¹ [Emphasis added]

The two reprocessing technologies (UREX+ and pyroprocessing) that DOE is researching are not “proliferation-resistant,” because the resulting plutonium mixes from these technologies are not sufficient to prevent theft. Moreover, both technologies can easily be undone to obtain pure plutonium using the old, 1940s technology (PUREX). Now, however, DOE is proposing to use a technology that results in a mix of plutonium with uranium, which is even less proliferation-

⁸ U.S. Department of Energy, West Valley Demonstration Project Draft Waste Management Environmental Impact Statement, May 2003.

⁹ Annie Makhijani, “French Report Doubts Merits of Reprocessing and MOX,” *Science for Democratic Action* Vol.9 No.2, February 2001, http://www.ieer.org/sdfiles/vol_9/9-2/charpin.html.

¹⁰ Steve Fetter and Frank N. von Hippel, “Is U.S. Reprocessing Worth the Risk?”, *Arms Control Today*, September 2005, p. 6-12. Irradiated fuel is extremely radioactive, which acts as a protective barrier to theft of plutonium. Separated commercial plutonium can be used to make nuclear weapons and so-called “dirty bombs.”

¹¹ Clay Sell and Robert Joseph, Presentation on the Global Nuclear Energy Partnership (GNEP) at the Foreign Press Center Briefing, Washington, DC, February 16, 2006, <http://fpc.state.gov/fpc/61808.htm>.

resistant than UREX+. According to the International Atomic Energy Agency, plutonium-uranium mixtures are “direct use materials” and must be secured like separated plutonium.¹²

According to a 1996 report by the National Research Council, costs of reprocessing and transmutation of spent fuel that has already been discharged by existing U.S. reactors “easily could be more than \$100 billion” (1996 dollars).¹³ The French reprocessing firm Areva hired The Boston Consulting Group to issue a report on the cost of reprocessing and plutonium fuel use in light-water reactors. The report concludes that reprocessing is economically comparable to the once-through cycle, but it relies on unrealistic assumptions that do not reflect real-world experience, such as assuming that the facility will continuously operate at full capacity with no technical problems or other delays and that its capacity can be increased significantly without a large increase in capital or operating costs.¹⁴ Notably, the Boston report contains the following disclaimer:

This report was prepared by The Boston Consulting Group at the request of AREVA. BCG reviewed publicly available information and proprietary data provided by AREVA, but did not undertake any independent verification of the facts contained in those source materials. Changes in these facts or underlying assumptions could change the results reported in this study. *Any other party using this report for any purpose, or relying on this report in any way, does so at their own risk. No representation or warranty, express or implied, is made in relation to the accuracy or completeness of the information presented herein or its suitability for any particular purpose.* [Emphasis added.]

DOE is proposing to use fast reactors to convert long-lived waste into shorter-lived waste in order to reduce the amount of time that the radioactive waste is dangerous and must be stored in a geologic repository. But this process, called transmutation, is plagued by serious technical problems, such as low rates of conversion from long- to short-lived waste, unproven fuel fabrication systems, and dangers to workers making the fuel.

Countries, including the US, have been trying to develop fast reactors for 50 years and the results have all been technical and economic failures. Over twenty fast reactors have been built since 1951 in seven countries, all of which have been funded through government programs. Eleven of the reactors were large-scale designs (over 100 megawatt-thermal), eight of which have been shut down as of 2006. Only three reactors still operate: the French Phènix reactor, the Russian BN-600 reactor, and the small experimental Joyo reactor in Japan.

Fast reactors are more prone to accidents than light water reactors because they operate with faster-moving neutrons than light water reactors, making them more difficult to control. In the United States, the Fermi 1 fast reactor near Detroit had a partial nuclear meltdown in October

¹² IAEA Safeguards Glossary 2001 Edition, http://www-pub.iaea.org/MTCD/publications/PDF/nvs-3-cd/PDF/NVS3_prn.pdf.

¹³ U.S. National Research Council, Committee on Separations Technology and Transmutation Systems, *Nuclear Wastes: Technologies for Separations and Transmutation*, National Academy Press, Washington DC (1996), <http://newton.nap.edu/catalog/4912.html>

¹⁴ *Economic Assessment Of Used Nuclear Fuel Management In The United States*, Prepared by the Boston Consulting Group for AREVA, July 2006, <http://www.bcg.com/publications/files/2116202EconomicAssessmentReport24Jul0SR.pdf>

1966 and a sodium explosion in 1970. The reactor was closed in 1972. The French and Russian reactors also have had safety problems, such as leaking highly flammable sodium. A serious accident at the fuel fabrication facility for the Japanese plant resulted in the death of two workers in 1999. Except for the Russian reactor, fast reactors have operated less than 50 percent of the time as a result of the ongoing safety problems.

More than \$100 billion has been spent globally in the past 50 years on fast reactor construction, reprocessing and other efforts to make plutonium a viable reactor fuel.¹⁵ More than \$25 billion of that has been spent in building fast reactors.¹⁶ Due to the materials and the complexity of the design, the cost of building fast reactors is significantly higher than the cost of light water reactors. The Superphénix reactor in France cost \$9.1 billion to construct; the smaller Monju reactor in Japan cost \$5.9 billion.

To achieve GNEP's goal to reduce the volume of waste that must be stored in a geologic repository, the U.S. would need approximately one fast reactor to every three light water reactors. This would cost an additional \$80 to \$100 billion for 20 to 25 fast reactors to transmute the waste from the current 103 operating reactors.¹⁷ Given the \$12 billion in subsidies and tax breaks, along with other incentives, that it has taken to convince U.S. utilities to build new reactors (and not a single utility has fully committed at this point), these fast reactors would require massive taxpayer subsidies.

I would like to thank the House of Representatives for cutting \$130 million for GNEP in the FY2007 Energy and Water Development Appropriations Act (H.R. 5427). Existing technology and our current level of knowledge do not provide direct paths to nuclear recycling. For the foreseeable future, GNEP is not a program that will reduce amounts of high-level nuclear waste. Rather than being a part of the nuclear waste disposal solution, GNEP will be a costly new problem for the future.

Private Fuel Storage

Without a permanent repository available in the near-term, attention has turned to dry cask interim storage of spent fuel. The only site to be licensed by the Nuclear Regulatory Commission for away-from-reactor dry cask interim storage of spent fuel, Private Fuel Storage located on Skull Valley Goshute Native American Reservation land in Utah, appears now unlikely to open. On September 7, 2006, the Bureau of Land Management denied a right-of-way for a rail line to the site and a proposal to transport the waste with heavy-haul trucks. More than 4,500 letters, primarily from people from Utah opposed to the facility, were sent to the BLM.

¹⁵ Arjun Makhijani, *Plutonium End Game Managing Global Stocks of Separated Weapons-Usable Commercial and Surplus Nuclear Weapons Plutonium*, Institute for Energy and Environmental Research, January 2001, p.27, <http://www.ieer.org/reports/pu/index.html>.

¹⁶ *Ibid.*, p.21.

¹⁷ Thomas Cochran and Christopher Paine, *Peddling Plutonium: Nuclear Energy Plan Would Make the World More Dangerous*, Natural Resources Defense Council, March 2006.

The Bureau of Indian Affairs also denied approval of the PFS lease of the tribal land, listing among other concerns:

- inadequate law enforcement support for the site,
- the lack of a transportation alternative,
- uncertainty about the availability of a permanent repository, and
- the lack of an analysis on the environmental impacts of a terrorist attack.

In a recent federal court decision, *San Luis Obispo Mothers for Peace, et al. v. United States*, the Ninth Circuit Court rejected the NRC's claim that the National Environmental Policy Act (NEPA) does not require consideration of the environmental effects of potential terrorist attacks. The four grounds that the NRC used to justify its claim were based on factors it used in rejecting the State of Utah's contention that the environmental impacts of terrorism should be analysed in the PFS EIS. The NRC had ruled that (1) the possibility of a terrorist attack is far too removed from the natural or expected consequences of agency action; (2) because the risk of a terrorist attack cannot be determined, the analysis is likely to be meaningless; (3) NEPA does not require a "worst-case" analysis; and (4) NEPA's public process is not an appropriate forum for sensitive security issues. The Ninth Circuit Court concluded:

In sum, none of the four factors upon which the NRC relies to eschew consideration of the environmental effects of a terrorist attack satisfies the standard of reasonableness.

In its decision on the PFS lease, the BIA reviewed the Ninth Circuit Court decision and concluded that "the court's sweeping rejection of the same factors NRC relied on in rejecting the State of Utah's contention in the PFS licensing proceedings leaves us distinctly unsatisfied at best that the effects of a terrorist-initiated event have been given adequate consideration."¹⁸

Interim storage proposals in the FY2007 Energy and Water Appropriations Bills

According to a 2006 study on spent nuclear fuel storage by the National Research Council, "dry casks were designed to ensure safe storage of spent fuel, not to resist terrorist attacks."¹⁹ The NRC has not analyzed the environmental impacts of a terrorist attack for any of the 42 sites for which it has granted dry cask storage licenses. The current proposals in the Senate and House FY2007 Energy and Water Appropriations bills also fail to address the security threats posed by dry cask storage.

The Senate version of the FY2007 Energy and Water Appropriations bill (H.R. 5427) contains an authorizing provision that requires states with nuclear reactors to designate at least one site in that state for 25-year interim waste storage, called a Consolidation and Preparation (CAP) facility. The House FY2007 Energy and Water Appropriations bill (H.R. 5427) requires DOE to "conduct a voluntary, competitive process to select one or more interim storage sites" by either

¹⁸ Bureau of Indian Affairs, *Record of Decision for the Construction and Operation of an Independent Spent Fuel Storage Installation (ISFSI) on the Reservation of the Skull Valley Band of Goshute Indians (Band) in Tooele County, Utah*, September 7, 2006, page 22.

¹⁹ National Research Council of the National Academies, *Safety and Security of Commercial Spent Nuclear Fuel Storage: Public Report*, 2006, page 64.

re-issuing Request for Expressions of Interest for GNEP (interim storage at the “integrated recycling facilities”) or issuing a new Request for Proposals for interim storage alone.

There are numerous reasons why away-from-reactor storage is not even a temporary waste solution. First, creating away-from-reactor surface storage sites would not meaningfully reduce the number of locations where high-level radioactive waste is stored, as long as most commercial nuclear power plants remain in operation for decades to come. Nuclear waste generated at nuclear power plants must be stored on site for at least five years to thermally cool and radioactively decay before it can be transported off site. Thus, any operating reactor will inevitably have at least five years’ worth of irradiated nuclear fuel – approximately 100 tons – stored on site.

Second, rather than reduce risks, centralized interim storage would increase transport risks to public health, safety, and security. Centralized interim storage would double the number of waste shipments required, and greatly increase the number of shipment miles to be driven, because the waste would eventually need to be transported from the interim site to a permanent site. According to a February 2006 National Academy of Sciences study on the transport of nuclear waste, “an independent examination of the security of spent fuel and high-level waste” needs to be performed “*prior to the commencement of large-quantity shipments.*”²⁰ [Emphasis added] The NAS report also concluded that “extreme accident conditions involving very-long-duration fires could compromise” waste shipping containers and advised that the U.S. Nuclear Regulatory Commission (NRC) do additional analyses of such accident scenarios.

Third, interim storage at DOE sites would be contrary to legal agreements made with States and tribes. DOE has committed to cleaning up these sites, not adding more pollution to them. In addition, DOE sites are not licensed by the NRC for commercial nuclear waste storage. The only exception is at the Idaho National Engineering Laboratory, which has a storage license limited to nuclear fuel debris from the Three Mile Island nuclear reactor accident.

Fourth, given the extreme difficulty faced in opening this country’s first permanent repository, it is unlikely that additional or alternative repository space will be available soon. Thus, “interim” storage sites would become long-term “overflow parking” for high-level radioactive wastes with nowhere else to go. In its decision to reject the lease for PFS, the Bureau of Indian Affairs concluded that the “uncertainty concerning when the SNF [Spent Nuclear Fuel] might *leave* trust land, combined with the [Interior] Secretary’s practical inability to remove or compel its removal once deposited on the reservation, counsel disapproval of the proposed lease.”²¹

Tucked into a large appropriations bill, the Senate’s CAP provision would result in a sweeping change to the country’s nuclear waste policy without hearings or public debate. It also provides an unreasonably short timeline: only 9 months to choose sites, potentially in all 31 states with nuclear power reactors, and a total of only 3½ years for siting and licensing of those sites. The

²⁰ National Research Council of the National Academies, *Going the Distance? The Safe Transport of Spent Nuclear Fuel and High-Level Radioactive Waste in the United States*, 2006.

²¹ Bureau of Indian Affairs, *Record of Decision for the Construction and Operation of an Independent Spent Fuel Storage Installation (ISFSI) on the Reservation of the Skull Valley Band of Goshute Indians (Band) in Tooele County, Utah*, September 7, 2006, page 29.

bill also limits the scope of NEPA review to the 25-year license period, which is contrary to 35 years of NEPA practice and does not represent the actual long-term effects that could occur.

The bill also codifies the NRC's Waste Confidence Rule by concluding that a permanent disposal for the waste would be available "in a timely manner." As described in the section on the Administration's proposed Yucca legislation, codifying Waste Confidence would not change the reality that we do not have a viable, permanent solution for nuclear waste. In its decision on PFS, the BIA found that "The Commission's 1999 Waste Confidence Decision restated the 1990 prediction that a permanent facility might be available sometime within the first quarter of the 21st Century, but cited no compelling additional support for that contention."²²

Thus far, at least four Governors, the Coalition of Northeastern Governors, and 10 Attorneys General have sent letters in opposition to the Senate provision. The National Conference of State Legislators, the National Association of Counties, the National League of Cities, and the U.S. Conference of Mayors have also urged that the Senate CAP provision be removed from the final bill.

Moving commercial irradiated nuclear fuel to indefinite "interim" surface storage at DOE or other sites would simply create the illusion of a waste solution. Instead, the safety and security of waste storage at reactor sites across the U.S. should be improved. Away-from-reactor storage of spent fuel, as proposed in both the House and Senate versions of the FY2007 Energy and Water Appropriations bill, should be rejected.

So what should be done to protect the public from the threats posed by the current vulnerable storage of commercial spent fuel? Public interest groups from around the country have developed *Principles for Safeguarding Nuclear Waste at Reactors*, which are being released for the first time today. The Spent Nuclear Fuel On-Site Storage Security Act of 2005, introduced in both the House (H.R. 4538) and Senate (S. 2099) by the Nevada and Utah delegations, is a good basis for incorporating these principles into law.

Principles for Safeguarding Nuclear Waste at Reactors

The following principles are based on the urgent need to protect the public from the threats posed by the current vulnerable storage of commercial irradiated fuel. The United States does not have a near-term solution for the permanent storage of high-level nuclear waste. The proposed Yucca Mountain site is unsafe for geologic storage of nuclear waste and the program remains mired in bad science, mismanagement, and yet another design overhaul. Even if licensed, Yucca Mountain could not legally contain all of the waste produced by existing reactors. Under the U.S. Department of Energy's unrealistically optimistic scenario, Yucca Mountain is not predicted to begin receiving waste until at least 2017 and transporting waste to the site would take more than 30 years. Meanwhile, irradiated fuel at reactor sites remains vulnerable to accidents and attacks.

²² Bureau of Indian Affairs, *Record of Decision for the Construction and Operation of an Independent Spent Fuel Storage Installation (ISFSI) on the Reservation of the Skull Valley Band of Goshute Indians (Band) in Tooele County, Utah*, September 7, 2006, page 28.

The undersigned organizations' support for improving the protection of radioactive waste stored at reactor sites is a matter of security and is in no way an indication that we support nuclear power and the generation of more nuclear waste.

- ◆ **Require a low-density, open-frame layout for fuel pools:** Fuel pools were originally designed for temporary storage of a limited number of irradiated fuel assemblies in a low density, open frame configuration. As the amount of waste generated has increased beyond the designed capacity, the pools have been reorganized so that the concentration of fuel in the pools is nearly the same as that in operating reactor cores. If water is lost from a densely packed pool as the result of an attack or an accident, cooling by ambient air would likely be insufficient to prevent a fire, resulting in the release of large quantities of radioactivity to the environment. A low-density, open-frame arrangement within fuel pools could allow enough air circulation to keep the fuel from catching fire. In order to achieve and maintain this arrangement within the pools, irradiated fuel must be transferred from the pools to dry storage within five years of being discharged from the reactor.
- ◆ **Establish hardened on-site storage (HOSS):** Irradiated fuel must be stored as safely as possible as close to the site of generation as possible. Waste moved from fuel pools must be safeguarded in hardened, on-site storage (HOSS) facilities. Transporting waste to interim away-from-reactor storage should not be done unless the reactor site is unsuitable for a HOSS facility and the move increases the safety and security of the waste. HOSS facilities must not be regarded as a permanent waste solution, and thus should not be constructed deep underground. The waste must be retrievable, and real-time radiation and heat monitoring at the HOSS facility must be implemented for early detection of radiation releases and overheating. The overall objective of HOSS should be that the amount of releases projected in even severe attacks should be low enough that the storage system would be unattractive as a terrorist target. Design criteria that would correspond to the overall objective must include:
 - Resistance to severe attacks, such as a direct hit by high-explosive or deeply penetrating weapons and munitions or a direct hit by a large aircraft loaded with fuel or a small aircraft loaded with fuel and/or explosives, without major releases.
 - Placement of individual canisters that makes detection difficult from outside the site boundary.
- ◆ **Protect fuel pools:** Irradiated fuel must be kept in pools for several years before it can be stored in a dry facility. The pools must be protected to withstand an attack by air, land, or water from a force at least equal in size and coordination to the 9/11 attacks. The security improvements must be approved by a panel of experts independent of the nuclear industry and the Nuclear Regulatory Commission.
- ◆ **Require periodic review of HOSS facilities and fuel pools:** An annual report consisting of the review of each HOSS facility and fuel pool should be prepared with meaningful participation from public stakeholders, regulators, and utility managers at each site. The report must be made publicly available and may include recommendations for actions to be taken.

- ◆ **Dedicate funding to local and state governments to independently monitor the sites:** Funding for monitoring the HOSS facilities at each site must be provided to affected local and state governments. The affected public must have the right to fully participate.
- ◆ **Prohibit reprocessing:** The reprocessing of irradiated fuel has not solved the nuclear waste problem in any country, and actually exacerbates it by creating numerous additional waste streams that must be managed. In addition to being expensive and polluting, reprocessing also increases nuclear weapons proliferation threats.