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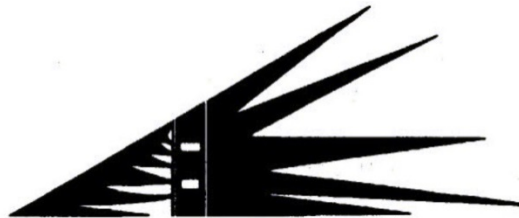
**Don Hancock
Nuclear Waste Program Director
Southwest Research and Information Center**

**“Statement for Oversight Hearing on Examining America's Nuclear
Waste Management, Storage, and the Need for Solutions”**

**Before the
United States House Committee on Oversight and Reform
Subcommittee on the Environment**

**Chet Holifield Federal Building
Laguna Niguel, CA 92677**

June 7, 2019



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I. Introduction and Summary

Mr. Chairman and Members of the Subcommittee:

Thank you for the opportunity to present my organization's views on this important, complex, and difficult subject. We very much appreciate the Committee's interest in exploring actions that can be taken by Congress to resolve this country's current nuclear waste storage problem.

Southwest Research and Information Center ("SRIC") is a private, nonprofit organization, incorporated in New Mexico. Since 1971, the organization, among many other environmental justice issues, has been involved nationally in various aspects of the nuclear waste problem.

My written testimony briefly discusses the history of U.S. nuclear waste policies and activities, and the lessons from that history that should inform addressing safety risks of storing commercial spent fuel, challenges to finding solutions, and suggestions for congressional action to address current nuclear waste storage problems.

Some important lessons from the past decades that must be well learned include:

1. Commercial spent fuel always has been generated without the essential scientifically sound, publicly accepted program for safe disposal of the very large amounts of radioactivity that endangers public health for thousands of generations. Since 1971, announced repository "solutions" have failed for technical reasons that generated substantial public opposition that have prevented such sites from being constructed and operated.
2. There is not consensus about whether commercial spent fuel is safe where it is and the health and safety requirements for long-term storage site or repositories. If waste is safe where it is, why move it? If it's not safe where it is, why would it be safe to transport through many other communities and to be safely stored elsewhere?
3. In our federal government system, storage and disposal facilities require consent. But no state has volunteered for spent fuel repository or Monitored Retrievable Storage ("MRS") sites. Many states have clearly not consented to hosting such facilities. Nevada has made very clear that its technical and legal objections will prevent Yucca Mountain from ever receiving spent fuel, so Congress should formally repeal the selection of Yucca Mountain as a repository site.
4. Thus, spent fuel will continue to stay at or near reactor sites for decades, including at closed reactors, unless the nuclear industry is willing to volunteer its own reactor storage sites. Improved storage measures are needed to better protect public health and the environment for that timeframe. For example, at the San Onofre Generating Station spent fuel should be moved away from the ocean to higher ground storage in a robust, atmospherically controlled building.
5. New Mexico, and especially its indigenous people, has borne a disproportionate share of negative impacts of the nuclear fuel chain, including contamination and resulting health impacts from:

* The world's first nuclear bomb test in 1945

- * Uranium mining and processing starting 70 years ago
- * Los Alamos National Laboratory, and
- * Hosting the nation's only geologic repository, the Waste Isolation Pilot Plant ("WIPP") for defense transuranic (plutonium-contaminated) waste.

New Mexico has never had a commercial nuclear power plant, and the 1992 WIPP Land Withdrawal Act explicitly prohibits any commercial waste, including spent fuel. New Mexicans, the majority of whom are people of color, and state officials do not consent and believe that promises were also made to prevent commercial spent fuel from coming to New Mexico. Yet a spent fuel storage site was proposed on the Mescalero Apache Reservation in the 1990s, and Holtec International seeks to have a site for more commercial spent fuel than currently exists. Continuing targeting of New Mexico is not scientifically sound, is not publicly accepted, and is an environmental injustice. We don't believe that efforts to bring commercial spent fuel to the state will have any greater success now than in the 1970s, 1980s, or 1990s.

II. Some history of nuclear waste policy

The search for the geologic repository "solution" for spent fuel has been going on for decades. Those failures are largely because there have never been standards for a scientific program that is implemented to examine multiple sites across the country and find the technically best sites, not the one(s) that are in states that currently have the least political power.

The first site, near Lyons, Kansas, was selected by the Atomic Energy Commission in 1971 and was to be operating by 1975.¹ Instead, by 1972, because of technical problems and public opposition, the Lyons site had been abandoned.

In 1979, President Carter's Interagency Review Group ("IRG") supported proceeding with a program for identifying "a number of potential sites in a variety of geologic environments...and insofar as technical and other considerations permit, in different regions of the country."²

Following some of the IRG recommendations, Congress passed the Nuclear Waste Policy Act ("NWPA") in 1982, which was signed into law on January 7, 1983.³ The law's schedule provided that by March 1, 1987, the first repository site would be chosen, and it would be operating by January 31, 1998, and that a second repository site would be chosen by March 31, 1990. Less than a month after NWPA became law, DOE Secretary Donald Hodel announced that sites in six states – Louisiana, Mississippi, Nevada, Texas, Utah, and Washington – were potentially acceptable for the first repository site. Secretary Hodel also notified 17 eastern and midwestern states that crystalline formations in those states would be considered for the second repository. In April 1985, DOE notified Tennessee that three sites in the state would be considered for the Monitored Retrievable Storage ("MRS") site that would store irradiated fuel before it went to the first repository.

¹ Atomic Energy Commission, 1971. *Environmental Statement Radioactive Waste Repository, Lyons, Kansas*, WASH-1503, June 1971.

² DOE, 1979. *Report to the President by the Interagency Review Group on Nuclear Waste Management*, March 1979, TID-29442, p. 62. (emphasis in original).

³ Public Law 97-425.

Strong, organized opposition in all states pointed out technical problems with the proposed sites and highlighted the political choices involved in the siting process and numerous lawsuits were filed. Citizen groups from the 14 designated states formed the National Nuclear Waste Task Force to share information, and to oppose the technical flawed, politically motivated program.

On May 28, 1986, President Reagan announced that the three top-ranked sites would be subjected to extensive surface and underground “site characterization,” and DOE announced that it was suspending the second-round program.⁴ Widespread public opposition to those decisions resulted in Congress cutting waste program funding from \$769 million to \$420 million and prohibiting underground work at the three sites or proceeding with the MRS.⁵

In December 1987, the congressional compromise was to amend NWPA so that only Yucca Mountain was considered for the first repository. The new law also repealed the requirement for a second repository, prohibited an MRS in Nevada, annulled the Tennessee MRS site, established a Monitored Retrievable Storage Review Commission, and established a nuclear waste negotiator to find a state willing to host a repository or MRS.⁶

Yucca Mountain did not open in 1998. The nuclear waste negotiators did not find any state willing to host a repository or MRS. Several utility companies did pursue having a private MRS site, first on the Mescalero Apache Reservation in New Mexico, which was rejected in a tribal referendum on January 31, 1995. The utilities later sought a license for Private Fuel Storage (“PFS”) on the Skull Valley Goshute Reservation in Utah, which was licensed by the Nuclear Regulatory Commission on February 21, 2006. But public and state opposition mean that the site will never receive waste as on January 6, 2006, Congress created the Cedar Mountain Wilderness⁷ that effectively prevented access to the site. Then the Bureau of Indian Affairs refused to approve the proposed lease and the Bureau of Land Management denied the needed transportation right-of-way.⁸

In January 2012, after reviewing some of that history, the Blue Ribbon Commission on America’s Nuclear Future concluded:

The approach laid out under the 1987 Amendments to the Nuclear Waste Policy Act (NWPA)—which tied the entire U.S. high-level waste management program to the fate of the Yucca Mountain site—has not worked to produce a timely solution for dealing with the nation’s most hazardous radioactive materials. The United States has traveled nearly 25 years down the current path only to come to a point where continuing to rely on the same approach seems destined to bring further controversy, litigation, and protracted delay.⁹

⁴ Federal Register, Vol. 51, pp. 19783-84 (June 2, 1986).

⁵ Public Law 99-500. Signed on October 18, 1986.

⁶ Public Law 100-202. Signed on December 22, 1987.

⁷ Public Law 109-163, Section 384. January 6, 2006.

⁸ Federal Register, Vol. 71, pp. 58629-58630, (October 4, 2006)-BIA. Federal Register, Vol. 71, pp. 57005-57006, (September 28, 2006)-BLM.

⁹ https://www.energy.gov/sites/prod/files/2013/04/f0/brc_finalreport_jan2012.pdf, p. vi.

In the years since the Blue Ribbon Commission (“BRC”) Report, Congress has provided no funding for Yucca Mountain. A first step to accepting the history lesson is to formally repeal the selection of Yucca Mountain as a repository site.

III. The scope of the commercial spent fuel problem

More than 80,000 metric tons of commercial spent fuel exists today, more than 90 percent of which was generated and is stored east of the 100th meridian. Approximately 2,000 metric tons of spent fuel continues to be generated each year. The BRC Report, using nuclear industry sources, estimated that there will be 133,000 metric tons of commercial spent fuel by 2050.¹⁰ But, until the U.S. has a policy and schedule to phase out nuclear power, the amounts of fuel – and the need for storage and disposal facilities – will persist in perpetuity.

The Nuclear Waste Technical Review Board has pointed out that 97 percent of the 23,800,000,000 curies of total radioactivity in spent fuel and high-level waste is in commercial spent fuel.¹¹ (Attachment 1). Even with substantial radioactive decay, this spent fuel will pose health and environmental risks for thousands of generations.

IV. There will not be consent from New Mexico for commercial spent fuel

While important Manhattan Project facilities were built in several states during World War II, the Los Alamos National Laboratory (“LANL”) in New Mexico designed and built the first atomic bomb, which was exploded over Trinity Site on July 16, 1945. Even though some compensation has been provided to other victims of later nuclear weapons testing through the Radiation Exposure Compensation Act,¹² Trinity Site survivors (and downwinders from other states and post-1971 uranium workers) continue to be excluded from the law.

During the Cold War, the majority of uranium mined and processed came from New Mexico and the Navajo Nation. In addition to uncompensated uranium workers, there remain hundreds of abandoned, unreclaimed uranium mines in New Mexico and the Navajo Nation that continue to pose health risks to nearby residents from soil and water contamination and air emissions. Some babies born now on the Navajo Reservation have significant levels of uranium that can cause health effects and developmental problems from the toxic and radioactive characteristics.

One result of that history was the passage of the Diné Natural Resources Protection Act of 2005 that bans uranium mining and milling on Navajo Nation land and Indian Country and supports cleanup of contamination of past uranium development.¹³

¹⁰ BRC Report, p. 34.

¹¹ https://www.nwtrb.gov/docs/default-source/facts-sheets/overview_snf_hlw.pdf?sfvrsn=15

¹² Public Law 101-426 (1990). <https://www.justice.gov/civil/common/reca>

¹³ <http://www.sric.org/voices/2005/v6n2/dnrpa.php>

LANL continues to operate as a key nuclear weapons laboratory and waste generation and storage site – and a source of radioactive and toxic contaminants. The lab also is on sacred land of indigenous people, which is a continuing environmental injustice.

After leaving the Lyons, Kansas site and having the governors of Michigan, Ohio, Pennsylvania, and New York reject repository siting in their states, the Atomic Energy Commission (“AEC”) was invited to New Mexico by a few people in southeastern New Mexico as “a way...to make a buck.”¹⁴ There were no standards for what a safe repository would be. There was no national search for the best site to meet health and safety standards. The 16-square mile site that eventually became WIPP is surrounded by hundreds of oil and natural gas wells and is underlain by oil and natural gas and a large pressurized brine reservoir.

A few points from the WIPP experience are:

1. The BRC Report called WIPP a success for the kind of consent-based siting process that the Commission supported, as compared with the Yucca Mountain process. “The crucial difference in the WIPP case was the presence—also from the outset—of a supportive host community and of a state government that was willing to remain engaged.”¹⁵ But the BRC did not emphasize that the consent to WIPP was heavily related to accepting only transuranic waste and the promises and law that specifically prohibited any commercial waste, including spent fuel, and defense high-level waste. Thus, New Mexico in some fashion consented to TRU waste, subject to standards and state permitting authority, but did not consent to commercial spent fuel.
2. WIPP could have increased public confidence in DOE’s ability to successfully carry out its mission to “Start Clean, Stay Clean” in disposing of up to 6.2 million cubic feet on TRU waste, safety transport waste through more than 20 states, meet commitments to clean up TRU waste at dozens of DOE sites, and safely close and decommission the site by 2034.

Transportation has so far been successful. But routine releases of toxic chemicals and the February 14, 2014 radiation release that shut down disposal operations for three years and left a significantly contaminated underground show that DOE and its contractors cannot meet the “start clean, stay clean” standard when it comes to less than 0.01 percent of the radioactivity in commercial spent fuel. DOE also now wants to operate the site for at least 25 more years, bring in more waste than the legal limit, and emplace high-level waste, surplus weapons-grade plutonium, and other waste not included in the mission.

As a result, there will likely be increased conflict and controversy with the public and state officials about the proposed expansions and even lesser public confidence in how DOE complies with legal and regulatory requirements.

3. As a test case of nuclear waste policy and its implementation, the role of Congress regarding WIPP is also carefully evaluated by New Mexicans and people throughout the nation. In 1979, Congress authorized WIPP and provided no real regulatory role for the state and specifically

¹⁴ Chuck McCutcheon. *Nuclear Reactions: The Politics of opening a radioactive waste disposal site*. Albuquerque: University of New Mexico Press, 2002, pp. 15-36.

¹⁵ BRC Report, p. 48.

rejected the “state veto” that DOE had promised the year before. After litigation and other actions, Congress changed the authorization so that New Mexico had regulatory authority under the Solid Waste Disposal Act, specified limits on the types and amounts of waste allowed at WIPP, and reiterated that there would be other repositories for commercial spent fuel and high-level waste. How Congress deals with future state regulatory decisions and whether it supports the DOE proposal to “dilute and dispose” of surplus plutonium and raise the legal capacity limits for WIPP will tell not only New Mexico, but other states, how Congress may deal with legal requirements for other nuclear waste sites.

In 1991, the Mescalero Apache Tribal Council announced that it would “explore and develop all opportunities for potential economic development of a Monitored Retrievable Storage Facility.”¹⁶ On April 20, 1994, the Tribe and Northern States Power announced that 33 utilities were interested in the private MRS. There was very significant opposition from tribal members, local communities, people around the state, and state officials. Tribal members organized a referendum vote on January 31, 1995 that voted against the MRS by 490 to 362. A second referendum was held on March 9, 1995 to reverse the previous referendum passed by 593 to 372. But in 1996, the project was abandoned, and some of the utilities became the Private Fuel Storage project on the Skull Valley Goshute Reservation in Utah.

On March 31, 2017, Holtec International submitted a license application¹⁷ to the Nuclear Regulatory Commission in which it states that it could ultimately store 100,000 metric tons of commercial spent fuel at the proposed site, which is about 12 miles from the WIPP site. There is substantial public opposition to the project, as demonstrated by more than 80 percent of speakers at NRC hearings in 2018 being opposed to the project, along with more than 20,000 written comments in opposition.

I think that it is clear that New Mexico will not consent to the Holtec International or other proposals to bring spent fuel to New Mexico. State officials and citizens will use many methods to prevent such waste from coming to the state, as Nevada has done with Yucca Mountain and Utah has done with Private Fuel Storage.

V. There likely will not be consent to spent fuel facilities from other states

In addition to the history of states opposing repository and MRS proposals since the 1970s, more recent examples show that continuing opposition. In 2017, under contract with the Natural Resources Defense Council (“NRDC”), I sent a survey to officials in 48 states with nuclear waste responsibilities. In February 2018, NRDC released the results of the survey.¹⁸ While there were a wide variety of results, there was much opposition to consenting to nuclear waste sites, including by state officials that participated in DOE’s 2016 consent-based siting process. The survey identified a wide range of state laws related to nuclear waste, and, importantly, a very large majority of officials responding agree that states should have additional regulatory authority—similar to the authority they have with hazardous waste laws—over nuclear waste storage and

¹⁶ Mescalero Apache Tribe Resolution 91-26, August 23, 1991.

¹⁷ <https://www.nrc.gov/waste/spent-fuel-storage/cis/holtec-international.html>

¹⁸ <https://www.nrdc.org/sites/default/files/nuclear-waste-survey-ib.pdf>

disposal sites (85 percent) and nuclear waste transportation (67 percent). Future legislation must provide for much more state regulatory authority.

This year, the North Dakota Legislative passed SB 2037 which states: “The placement, storage, exploration, testing, or disposal of high-level radioactive waste within the exterior boundaries of North Dakota is prohibited.” The Governor signed the prohibition into law on April 23.¹⁹

That history and recent examples show the enduring state (and tribal) opposition to spent fuel storage and disposal facilities. The lesson is not that Congress should not require consent for such facilities. Rather, the lesson should be that consent is necessary, whether or not provided by federal law, because of our federal republic provides many mechanisms that citizens, states, and tribes can use to stop unwanted spent fuel facilities.

VI. A new repository program

Repealing the Yucca Mountain repository designation and establishing a technical sound, publicly accepted, consent-based repository program requires new legislation.

SRIC believes that developing such a program will take years of consideration by Congress, informed by much public, state, and tribal involvement. The subcommittee is providing an important service by being a part of that initial process.

SRIC generally agrees with the five recommendations included in the testimony of NRDC to the Senate Environment and Public Works Committee on May 1, 2019.²⁰

SRIC also believes that a number of other provisions of the NWPA must be addressed, including:

- establishing new standards for storage and disposal facilities
- enhancing tribal participation, unless tribal lands are excluded from consideration
- transportation, including how states and local governments are meaningfully involved, because any large-scale transportation program will be technically difficult and costly and very controversial
- adequate funding from nuclear utilities for the repository program
- addressing congressional budgeting requirements
- establishing a new entity to be in charge of federal disposal responsibilities, since DOE has demonstrated that it cannot carry out such responsibilities
- providing for how DOE high-level waste and spent fuel will be disposed.

VII. What to do about commercial spent fuel storage for several decades?

Of course, part of the history is that many communities are concerned about health and environmental impacts of commercial spent fuel storage. For many years, SRIC and more than

¹⁹ <https://www.legis.nd.gov/lcn/council/billtracking/pub/viewBillInformation.htm?sessionYear=2019&viewBillNumber=fb90227a4c621cb7adf5ced2b30cd3c2>

²⁰ https://www.epw.senate.gov/public/_cache/files/4/6/460c517c-edce-41cd-a7df-a37accf8f9f4/AE893E1E168B3648E465F050D50880AF.05.01.2019-fettus-testimony.pdf

200 other non-governmental organizations have supported the “Principles of Safeguarding Nuclear Waste at Reactors.”²¹ (Attachment 2).

While the Principles describe common issues that should be addressed at all storage sites, each site has its own unique history and circumstances that must be adequately addressed, including by meaningful participation from local communities, as well as utilities, states, tribes, and federal officials.

This hearing is being held near the San Onofre Generating Station (“SONGS”), so it is appropriate to briefly discuss our views about spent fuel storage there.

SRIC strongly supports the principle of storing wastes as safely as possible as close to the site of generation as possible. But, as many people here have correctly stated, storing tons of spent fuel at SONGS right by the Pacific Ocean is not safe enough. The waste should be moved to higher ground near the plant, stored in a robust, atmospherically controlled building where the salt in the ocean air can be removed to reduce corrosion risks, and where, in case of a failed container, the building ventilation can be shut down to prevent radioactivity releases to the environment. There should also be a hot cell or similar facility to be able to inspect, repair, or repack potentially damaged fuel containers. Real-time monitoring with results publicly available, and NRC and state regulation and citizen involvement is essential.

SRIC understands the desire of some for consolidation of spent fuel storage at fewer sites. However, it is only the nuclear utilities have the trained workforce in handling the waste, the need for safe storage, and licensed, operating storage sites. Thus, consolidated storage could be achieved at multiple reactor sites, but up to now, the utilities have been unable (as at Private Fuel Storage) or unwilling to seriously propose such storage.

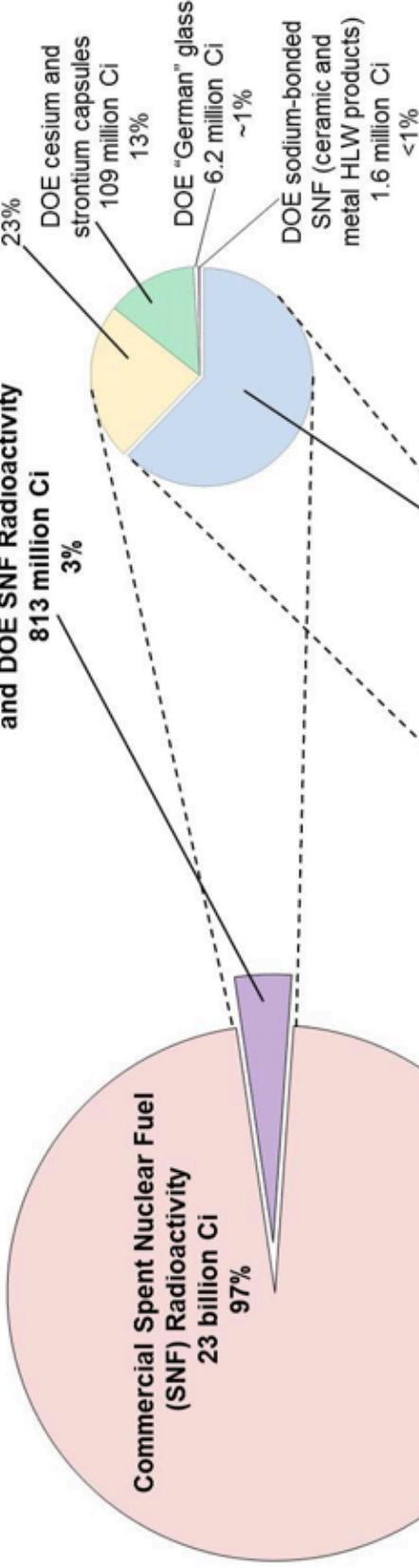
VIII. Conclusion

I hope that we can all agree that any “solution” to highly radioactive waste that will be dangerous for thousands of generations is an unprecedented problem that deserves the best scientific resources and publicly accepted policies that are appropriately implemented. I hope that the lessons and recommendations that I have provided will be helpful in your considerations about what Congress can do to resolve this country’s current nuclear waste storage problem. SRIC very much appreciates the opportunity to testify today. We will continue to be involved in this important endeavor.

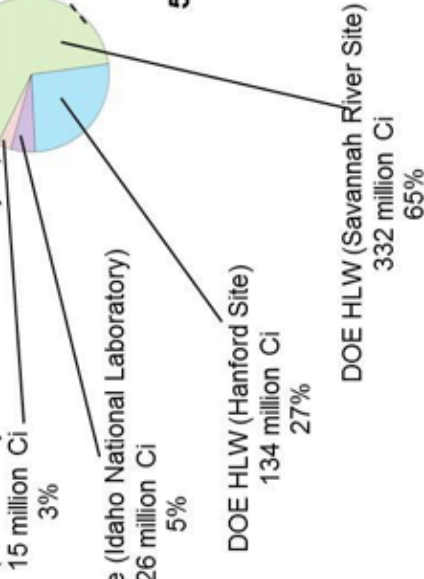
I’m happy to respond to your questions.

²¹ https://www.eesi.org/files/Principles_for_Safeguarding_Nuclear_Waste_at_Reactors.pdf

Total Radioactivity (23.8 billion Ci)



Commercial HLW glass (West Valley Demonstration Project)



HLW 506 million Ci 62%

Notes:

- (1) Data from Carter et al. (2012) and SNL (2014).
- (2) Radioactivity is for the following years: commercial SNF 2011; HLW 2017; DOE SNF 2010; capsules 2006; and "German" glass and sodium-bonded SNF 2000.
- (3) Radioactivity for DOE SNF represents the inventory proposed for disposal as SNF. Radioactivity for DOE sodium-bonded SNF is the projected radionuclide inventory of ceramic and metal HLW products that will be created from electro-chemical processing of all DOE sodium-bonded SNF.

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 currently have a national policy for the permanent storage of high-level nuclear waste. The Obama administration has determined that the Yucca Mountain site, which has been mired in bad science and mismanagement, is not an option for geologic storage of nuclear waste. Unfortunately, reprocessing proponents have used this opportunity to promote reprocessing as the solution for managing our nuclear waste. Contrary to their claims, however, reprocessing is extremely expensive, highly polluting, and a proliferation threat, and will actually complicate the management of irradiated fuel. Nor will reprocessing obviate the need for, or “save space” in, a geologic repository.

The United States has a unique opportunity to re-evaluate our nuclear waste management plan. We can make wise decisions about safeguarding radioactive waste or go down the risky, costly, and proliferation prone path towards reprocessing.

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.

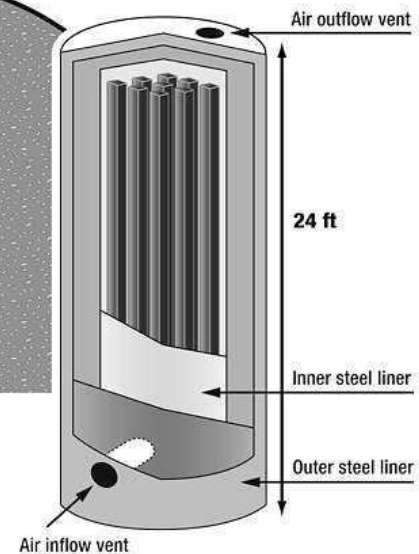
- **Dedicate funding to local and state governments to independently monitor the sites:** Funding for monitoring the HOSS facilities at each site must be provided to affected local and state governments. The affected public must have the right to fully participate.
- **Prohibit reprocessing:** The reprocessing 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.

Schematic representation of HOSS

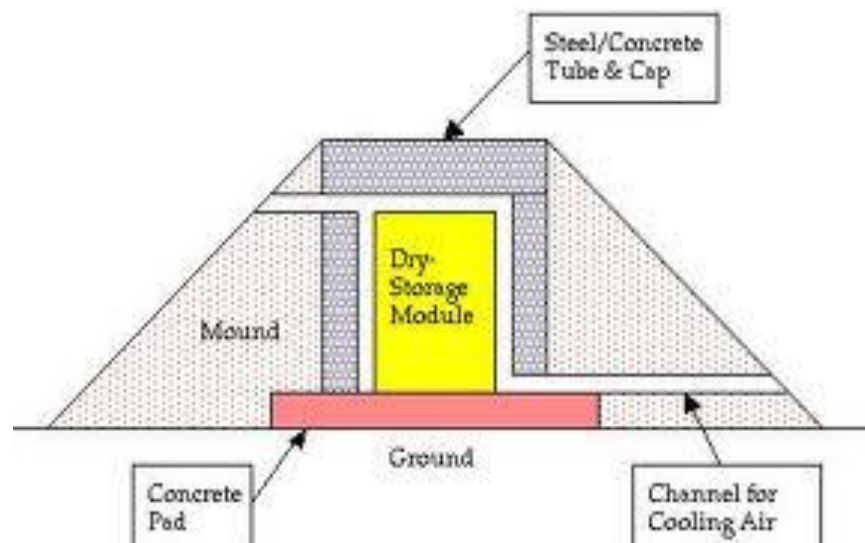
Earth/gravel berms should surround each cask and hide from ground-level view.



Nuclear rods cooled by simple air convection.



**Potential Target: 24 to 36
Bundles of Nuclear Rods**



This diagram is from the Jan. 2003 report, "Robust Storage: A Neglected Issue of Homeland Security" by Dr. Gordon Thompson of the Institute for Resource and Security Studies (IRSS), which was commissioned by the Citizens Awareness Network of the Northeast (CAN).

National

Leonor Tomero, Center for Arms Control and Non-Proliferation

John Issacs, Council for a Liveable World

Kevin Kamps, Beyond Nuclear

Lynn Thorp, Clean Water Action

Erich Pica, Friends of the Earth

Michele Boyd, Physicians for Social Responsibility

Jim Riccio, Greenpeace

Diane Kreiger, Nuclear Peace Age Foundation

Kevin Martin, Peace Action

Tyson Slocum, Public Citizen

Susan Gordon, Alliance for Nuclear Accountability

Arjun Makhijani, Institute for Energy and Environmental Research

Ken Bossong, SUN Day Campaign

Michael Mariotte, Nuclear Information and Resource Service

Anna Aurilio, Environment America

Winona La Duke, Honor the Earth

Dan Becker, Safe Climate Campaign

Dave Hamilton, Sierra Club

Geoffrey Fettus, Natural Resources Defense Council

Ed Lyman, Union of Concerned Scientists

Susan Shaer, Women's Action for New Directions (WAND)

Alabama

Garry Morgan, Bellefonte Efficiency and Sustainability Team, Alabama Chapter of BREDL

Tom Moss, North Alabama Peace Network

Alaska

Stacy Fritz, No Nukes North

Arizona

Stephen M. Brittle, Don't Waste Arizona

Jack and Felice Cohen-Joppa, Nuclear Resister

Patricia Birnie, GE Stockholder's Alliance

Russell Lowes, SafeEnergyAnalyst.org

Barbara Warren, Arizona Physicians for Social Responsibility

Arkansas

Pat Youngdahl, Arkansas WAND

California

Rochelle Becker, Alliance for Nuclear Responsibility CA

David Hartsough, PEACEWORKERS

Jane Williams, California Communities Against Toxics

Roland Valentine, Desert Citizens Against Pollution

Mary Beth Brangan, Ecological Options Network (EON)

Betty Winholz, SAVE THE PARK

Jacqueline Cabasso, Western States Legal Foundation

Molly Johnson, Grandmothers for Peace-San Luis Obispo County Chapter

Linda Seeley, Terra Foundation

Jane Swanson, San Luis Obispo Mothers For Peace Action Committee

Marylia Kelley, Tri-Valley CARES

Michael Welch, Redwood Alliance

Enid Schreibman, Center for Safe Energy

Jennifer Olarana Viereck, Healing Ourselves and Mother Earth

Dan Hirsch, Committee to Bridge the Gap

Pamela Meidell, Atomic Mirror

Colorado

Bob Kinsey, Colorado Coalition for the Prevention of Nuclear War

Sharyn Cunningham, Colorado Citizens Against Toxic Waste, Inc.

Judith Mohling, Rocky Mountain Peace and Justice Center

Connecticut

Nancy Burton, Connecticut Coalition Against Millstone

Judi Friedman, People's Action for Clean Energy

Sal Mangiagli, Connecticut Citizens Action Network, Haddam Chapter

Washington, DC

Louis Clark, Government Accountability Project

Delaware

Alan Muller, Green Delaware

Florida

Bob Krasowski, Florida Alliance for A Clean Environment, The Zero Waste Collier County Group

Georgia

Tom Ferguson, Foundatoin for A Global Community

Bobbie Paul, Georgia WAND

Glenn Carroll, Nuclear Watch South

Bob Darby, Food Not Bombs, Atlanta

Hawaii

Henry Curtis, Life of the Land

Idaho

Beatrice Brailsford, Snake River Alliance

Chuck Broschious, Environmental Defense Institute

Illinois

Dave Kraft, Nuclear Energy Information Service

Carolyn Treadway, No New Nukes

Indiana

Grant Smith, Citizens Action Coalition of Indiana

John Blair, ValleyWatch, Inc.

Iowa

Maureen McCue, PSR Iowa

Kansas

Dave Pack, Kansas City Peaceworks

Anne Suellentrop, Kansas City PSR

Kentucky

Mary Davis, Earth Island Institute

Louisiana

Nathalie Walker, Advocates for Environmental Human Rights

Maine

William S. Linnell, Cheaper, Safer Power

Bruce Gagnon, Global Network Against Weapons & Nuclear Power in Space

Maryland

Dagmar Fabian, Crabshell Alliance

Johanna Neumann, Maryland PIRG

Max Obuszewski, Baltimore Nonviolence Center

Lucy Duff, Peace and Justice Coalition-Prince George's County

Massachusetts

Debbie Grinnell, C-10 Research and Education Foundation

Deb Katz, Citizens Awareness Network

Mary Lampert, Pilgrim Watch

Michigan

Keith Gunter, Citizens Resistance at Fermi Two

Michael Keegan, Coalition for a Nuclear Free Great Lakes

Georgia Donovan, Izaak Walton League-Dwight Lydell Chapter

Terry Miller, Lone Tree Council

Patricia Gillis, Voices for Earth Justice

Alice Hirt, Don't Waste Michigan

Nancy Seubert, IHM Justice, Peace, and Sustainability Office

Lynn Howard Ehrle, International Science Oversight Board-Organic Consumers Association

Kay Cumbow, Citizens for Alternatives to Chemical Contamination

Ronald and Joyce Mason, Swords Into Plowshares Peace Center and Gallery

David Gard, Michigan Environmental Council
Steve Senesi, Kalamazoo Non-Violent Opponents of War

Minnesota

Danene Provencher, West Metro Global Warming Action Group, Inc.

Gladys Schmitz, Mankato Area Environmentalists

George Crocker, North American Water Office

Bruce Drew, Prairie Island Coalition

Mississippi

Louie Miller, Mississippi Sierra Club

Missouri

Mark Haim, Missourians for Safe Energy

Kat Logan Smith, Missouri Coalition on the Environment

Montana

Florence Chessin, Missoula Women for Peace, a branch of Women's International League for Peace and Freedom

Nevada

Judy Treichel, Nevada Nuclear Waste Taskforce

Jim Haber, Nevada Desert Experience

New Hampshire

Will Hopkins, New Hampshire Peace Action

New Jersey

Paula Gotsch, Grandmothers, Mother and More for Energy Safety

Norm Cohen, Coalition for Peace and Justice-UNPLUG Salem Campaign

New Mexico

Mervyn Tilden, Sovereign Dine' Foundation

Janet Greenwald, Citizens for Alternatives to Radioactive Dumping

Joni Arends, Concerned Citizens for Nuclear Safety

Scott Kovac, Nuclear Watch of New Mexico

Greg Mello, Los Alamos Study Group

Don Hancock, Southwest Research and Information Center

New York

Joanne Hameister, Coalition on West Valley Nuclear Wastes

Anne Rabe, Center for Health, Environment, and Justice

James Rauch, For a Clean Tonawanda Site (FACTS)

Barbara Warren, Citizen's Environmental Coalition

Phillip Musegaas, Riverkeeper NY

Tim Judson, Central New York Citizens Awareness Network

Manna Jo Greene, Hudson River Sloop Clearwater, Inc.

Marilyn Elie, IPSEC (Indian Point Safe Energy Coalition)

Susan Shapiro, Public Health and Sustainable Energy (PHASE)

Michel Lee, Council on Intelligent Energy & Conservation Policy (CIECP).

North Carolina

Lewis Patrie, Western North Carolina Physicians for Social Responsibility

E.M.T O’Nan, Protect All Children’s Environment

Avram Friedman, The Canary Coalition

Jim Warren, North Carolina Waste Awareness and Reduction Network

Janet Marsh, Blue Ridge Environmental Defense League

North Dakota

Kandi L. Mossett, Indigenous Environmental Network

Jodie L. White, The Environmental Awareness Committee, Save Our Sacred Earth Campaign Nebraska

Buffalo Bruce, Western Nebraska Resources Council

Tim Rinne, Nebraskans for Peace

Ohio

Chris Trepal, Earth Day Coalition

Terry Lodge, Toledo Coalition for Safe Energy

Sharon Cowdrey, Miamisburg Environmental Safety and Health Network

Oklahoma

Marilyn McCulloch, The Carrie Dickerson Foundation

Oregon

Dona Hippert, Oregon Toxics Alliance

Charles K. Johnson, Center for Energy Research

Nina Bell, Northwest Environmental Advocates

Kelly Campbell, Oregon Physicians for Social Responsibility

Gerry Pollet, Heart of America Northwest

Pennsylvania

David Hughes, Citizen Power

Katherine Dodge, Northwest Pennsylvania, Audobon Society

Gene Stilp, Taxpayers and Ratepayers United
Ernest Fuller, Concerned Citizens for SNEC Safety

Patricia Harner, Philadelphia Physicians for Social Responsibility

Dr. Lewis Cuthbert, Alliance for a Clean Environment

Rhode Island

Sheila Dormandy, Clean Water Action Rhode Island

South Carolina

Susan Corbett, South Carolina Sierra Club

Dr. Finian Taylor, Hilton Head for Peace

South Dakota

Deb McIntyre, South Dakota Peace and Justice Center

Charmaine White Face, Defenders of the Black Hills

Tennessee

Donald B. Clark, Network for Economic and Environmental Responsibility, United Church of Christ

Rev. Charles Lord, Caney Fork Headwaters Association

Rev. Douglas B. Hunt, Interfaith Power & Light

Ralph Hutchinson, Oak Ridge Environmental Peace Alliance

Rev. Walter Stark, Cumberland Countians for Peace and Justice

Ann Harris, We the People, Inc.

Texas

Eliza Brown, SEED Coalition

Mavis Belisle, JustPeace

Gary Stuard, Interfaith Environmental Alliance

Craig Tounet, Austin Physicians for Social Responsibility

Jill Johnston, Southwest Workers Union

Utah

Margene Bullcreek, Ohngo Guadedah Devia Awareness

Vanessa Pierce, HEAL Utah

Vermont

Arnie Gundersen, Fairewinds Associates, Inc.

Clay Turnbull, New England Coalition on Nuclear Pollution

Chris Williams, Vermont Citizens Awareness Network

Margaret Harrington Tamulonis, Women's International League for Peace

Virginia

Scott Sklar, The Stella Group, Inc.

Elena Day, People's Alliance for Clean Energy

Washington

Tom Carpenter, Hanford Challenge

Wisconsin

Charlie Higley, Citizens Utility Board

Bonnie Urfer and John LaForge, Nukewatch Wisconsin

Al Gedicks, Wisconsin Resources Protection Council

Judy Miner, Wisconsin Network for Peace and Justice

West Virginia

Gary Zuckett, West Virginia Citizens Action Group

Wyoming

Mary Woolen, Keep Yellowstone Nuclear Free

The original statement of *Principles for Safeguarding Nuclear Waste at Reactors* was published in Sept., 2006. It was then updated in March, 2010 and again in 2016. Diagrams were added for the **Congressional Briefing on Decommissioning Nuclear Power Plants: What Congress, Federal Agencies and Communities Need to Know**, held Monday, July 16 2018; Room HC-8, U.S. Capitol Building, Washington, DC .