

**Department of Environmental Quality
Land Quality Division**



Spent Nuclear Fuel Storage

**Joint Minerals, Business and Economic Development
Interim Committee Meeting**

August 11, 2016

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Summary



- What is consent based siting?
- Why is there a need for permanent storage of Nuclear Waste?
- Owl Creek Energy Project
- Why the Owl Creek Energy Project never moved forward



Consent Based Siting

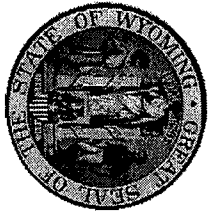
The Department of Energy (DOE) is trying to:

- Develop solutions for the long-term management of spent nuclear fuel (SNF) and high-level radioactive waste (HLRW) from commercial electricity generation, as well national defense activities.
- Create an integrated waste management system to transport, store, and dispose of those materials.

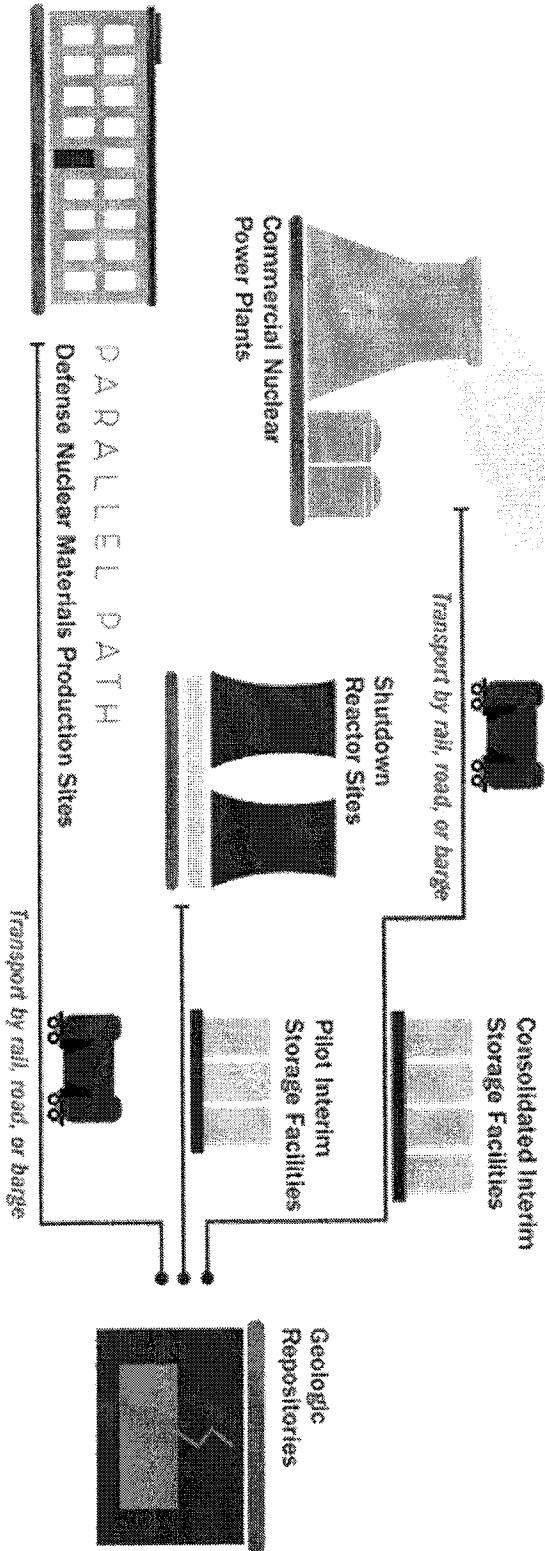
DOE's approach:

- Develop a process to site facilities collaboratively with the public, communities, stakeholders, and governments at the state, tribal, and local levels. We are seeking the help of all Americans in developing a consent-based approach to siting that is fair and reflective of public input.

From DOE's website <http://www.energy.gov/ne/consent-based-siting>

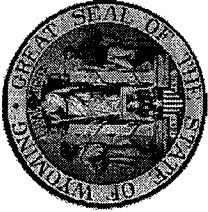


INTEGRATED WASTE MANAGEMENT SYSTEM



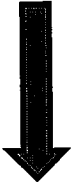
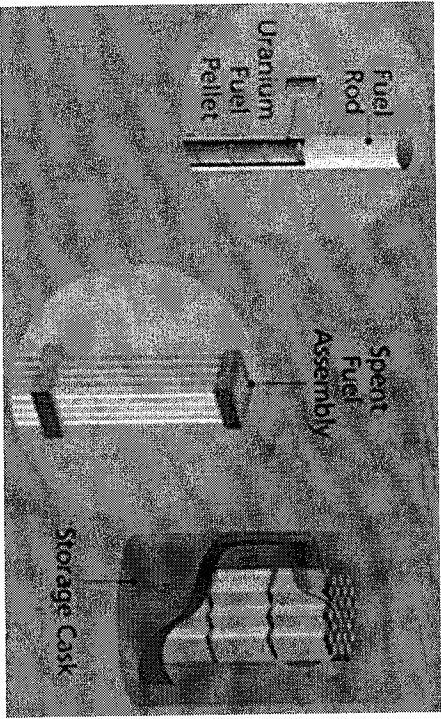
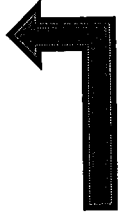
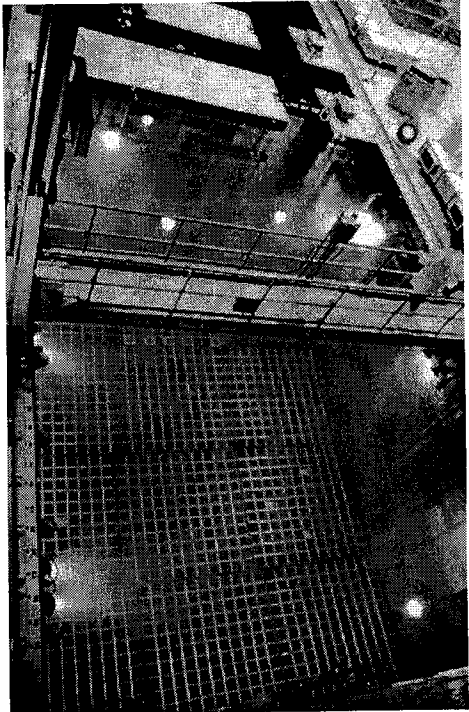
<http://www.energy.gov/ne/integrated-waste-management>



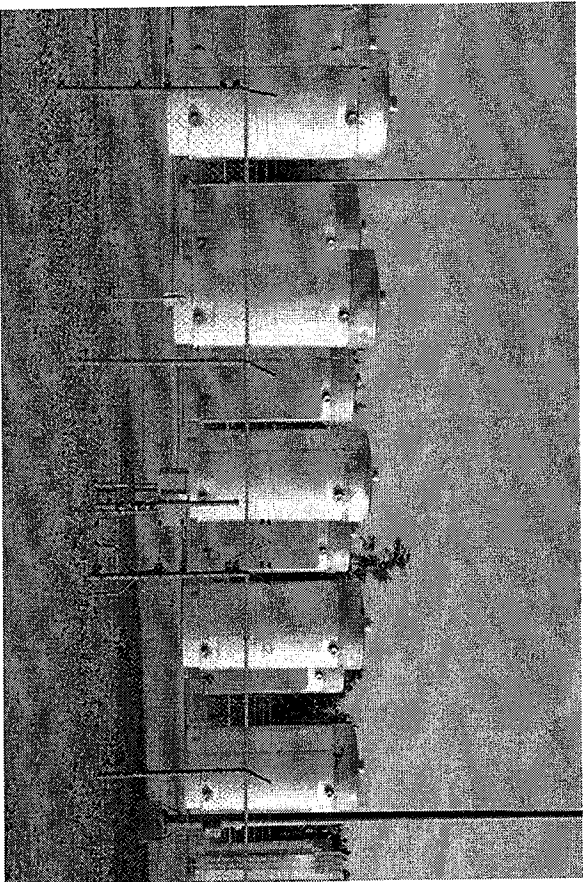


Why is There a Need for Nuclear Waste Storage?

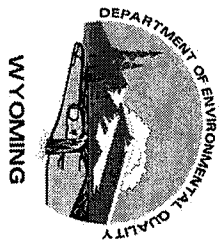
- 140,000 metric tons of SNF being stored on-site at nuclear power plants
- 90,000,000 gallons of HLRW being stored at DOE's Hanford and Idaho National Laboratory sites
- Where do we put this? By law, SNF cannot be recycled in the United States.
 - Geologic Repository
 - Interim Storage Facilities
 - Short-term solution until geologic repository can be built

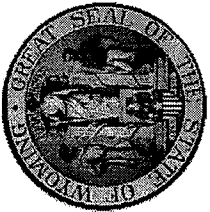


<http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/dry-cask-storage.html>



<http://www.forbes.com/sites/jamesconca/2014/08/29/confidence-what-does-it-mean-for-nuclear-waste/#1e4fb881200e>





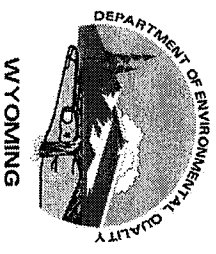
Nuclear Waste Policy Act of 1982 (NWPA)



- Stated that DOE would be taking this waste to a geologic repository by 1998
- Congress decided on Yucca Mountain, Nevada in 1987
- Pushback delayed approval of construction until 2002
- DOE license application to construct submitted 2008
- Yucca Mountain partially constructed but determined to be “unworkable”
 - Lack of political support and support from public
- Still no place to store SNF and HLRW



Why doesn't the waste stay where it is?



- The NWRPA committed the DOE to take the SNF and HLRW
- Nuclear Waste Fund – \$0.001 / kWh charge on nuclear-generated electricity to be used to pay for disposal of the SNF
 - By 2014 the fund had accumulated over \$40 billion
- Nuclear Utilities sued the DOE for inaction
 - \$4 billion had been paid, of an estimated total of \$20+ billion
- Because DOE has not met its obligation to take the SNF, the funds going to the Nuclear Waste Fund have ceased



DOE's Proposed Solution



- 2010 – Secretary of Energy established a Blue Ribbon Commission on America's Nuclear Future
- 2012 – Blue Ribbon Commission issued final paper
 - Recommended consent-based approach to siting nuclear waste facilities
- 2015 – DOE agrees to pursue consent based siting approach
- 2016 – DOE holds 9 public meetings on consent based siting
 - Information collected at these meetings to be published in a report at the end of 2016
 - DOE is only looking at how this process should go, no site selection yet



Past Attempts by DOE to Store Nuclear Waste



- During studies of Yucca Mountain, the DOE explored options to site interim storage facilities
- The United States Nuclear Waste Negotiator (USNWN) was created
 - Find a community to host an interim storage facility in exchange for economic benefit.
- Fremont County sought consideration for one of these sites in the Gas Hills region
- 1995 Wyoming passes W.S. 35-11-1501 through 1507



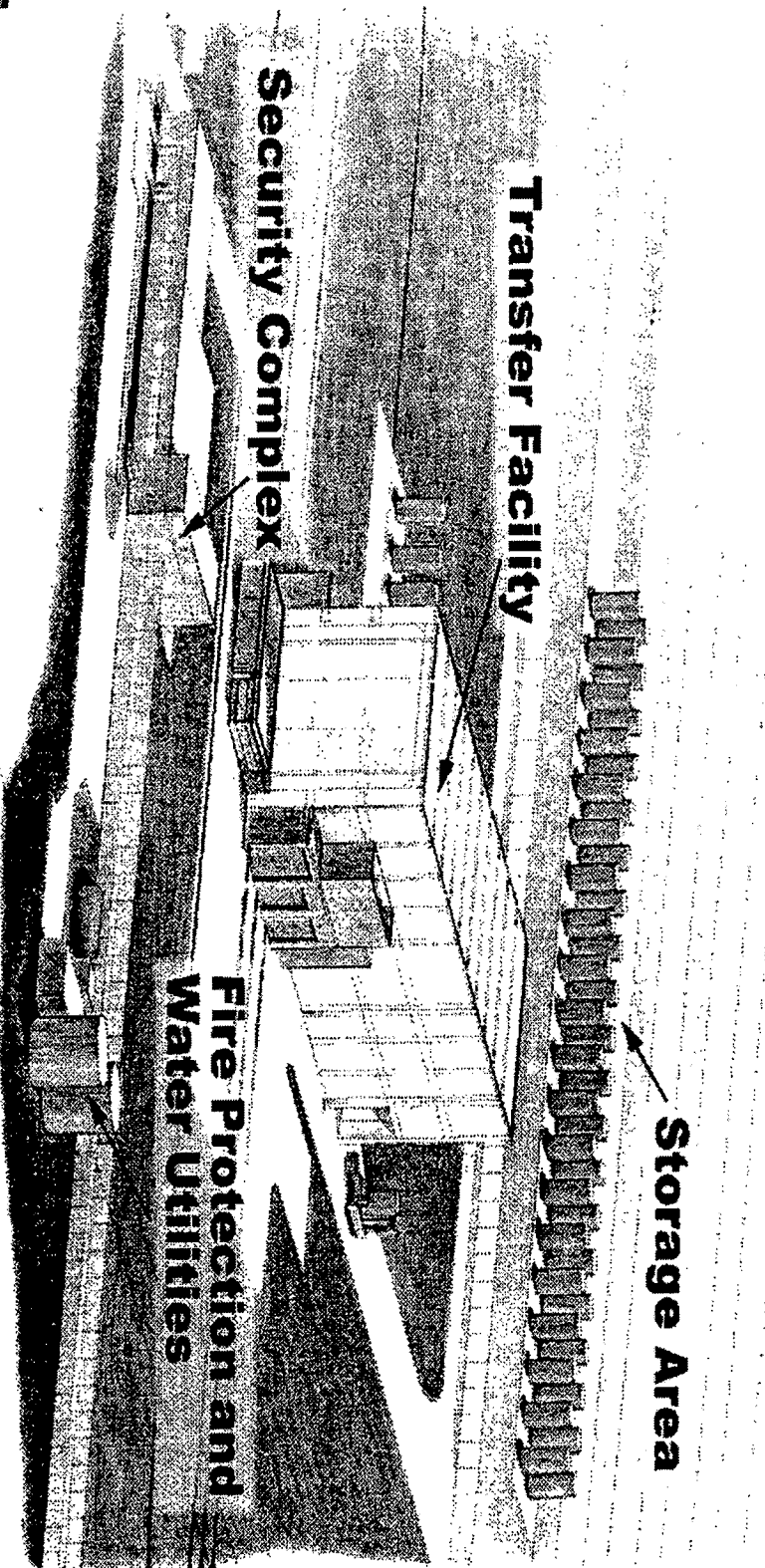
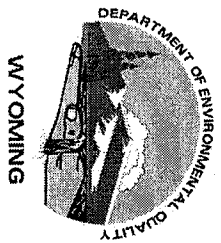
Owl Creek Energy Project

- Early 1990's – Interim storage facility proposed by industry
 - Fremont County received a \$100, 000 Phase 1 grant from DOE to learn more about siting a SNF storage facility
- To be located in Fremont County
 - 25 miles from Riverton by road
- Facility size 100–200 acres
- Design based on DOE's Central Interim Storage Facility Design
 - 40 year lifetime
 - Would only hold SNF
 - Shipping only via rail
 - Requirement to reclaim facility

From Calculated Risks: Highly Radioactive Waste and Homeland Security By Kenneth A. Rogers, Marvin G. Kingsley



Owl Creek Energy Project Proposed Design



OWL CREEK ENERGY PROJECT: A SOLUTION TO THE SPENT FUEL TEMPORARY STORAGE ISSUE;
WM'99 CONFERENCE, FEBRUARY 28 - MARCH 4, 1999

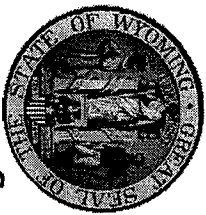


Owl Creek Energy Project Estimated Economic Benefits



- State annual fee assessed on each kilogram of spent fuel stored at the facility
 - Estimated amount (in 1998 dollars) of \$20 million annually when the facility is filled to capacity
- Estimated \$1 million in property taxes (in 1998 dollars)
- Jobs created
 - Rail transportation, retail and wholesale trade, eating and drinking establishments, banking, health care, and state and local governments
 - Study has been done by a former University of Wyoming professor looking at the economic benefits this project would have
- These were just estimates specifically for the Owl Creek Energy Project
 - If a project were to take place in Wyoming now, these numbers might be drastically different

*OWL CREEK ENERGY PROJECT: A SOLUTION TO THE SPENT FUEL TEMPORARY STORAGE ISSUE;
WM '99 CONFERENCE, FEBRUARY 28 - MARCH 4, 1999*



The Proposed Project was Stopped



Several reasons cited:

- Need for further education
 - Why is the site necessary
 - What are the safety risks
 - What is the science behind this
- No assurance that Yucca Mountain would be the final repository, so would the site actually be temporary
- Uncertainty
 - How to protect the process and the project in an every changing political climate
- Boxes of letters from concerned citizens were received

From Governor Sullivan's opening remarks at the DOE public meeting in Denver, CO on May 24, 2016



Conclusions

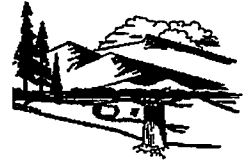
- Consent Based Siting
 - DOE is attempting to create a process to find storage sites
 - Economic incentives are not yet being considered
 - Site locations are not yet being proposed through consent based siting
 - Years out from anything tangible





Department of Environmental Quality

To protect, conserve and enhance the quality of Wyoming's environment for the benefit of current and future generations.



Matthew H. Mead, Governor



Todd Parfitt, Director

Department of Energy Interim Storage of Spent Nuclear Fuel Public Meeting Summary

On Wednesday, May 24, 2016, Wyoming Department of Environmental Quality (DEQ) representatives attended a Department of Energy (DOE) public meeting in Denver, Colorado. The purpose of this meeting was to discuss DOE's strategy to manage its spent nuclear fuel and high-level radioactive waste. DOE is considering a consent-based siting approach for finding both interim and permanent storage sites, and we were tasked with identifying details of the approach DOE will use and any economic incentives they may be offering.

During the meeting it was made clear that the consent-based siting approach is still in its infancy, and there is no concrete information available as the process has not yet been decided upon. The purpose of the meeting was simply for the DOE to hear from the public on how they think the consent-based approach should be conducted. They have planned nine public meetings in which they are taking public comments. The input from these nine meetings will be published in late 2016 and will be used to help DOE design the content-based process.

Currently, voluntary efforts to site a consolidated waste storage facility have emerged in Texas and New Mexico, where a private waste management company and a consortium of local governments, respectively, have indicated interest in developing such a facility.

Currently, there are 140,000 metric tons of spent nuclear fuel, all of which are stored on site at nuclear power plants. Additionally, there are 90 million gallons of high-level radioactive waste generated by reprocessing for nuclear defense activities being stored at DOE's Hanford and Idaho National Laboratory Sites. The Nuclear Waste Policy Act of 1982 (NWPA) set forth the nation's nuclear spent fuel and high-level radioactive waste management strategy by giving DOE the ability to establish a geological repository for the waste and begin taking this waste by 1998. DOE has failed to meet these objectives which has caused civil liabilities to the DOE and no clear path forward to establishing a geological repository. In an effort to regroup, DOE is mimicking France, Sweden, Finland, and Canada which are establishing geological repositories.

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ADMIN/OUTREACH (307) 777-7937	ABANDONED MINES (307) 777-6145	AIR QUALITY (307) 777-7391	INDUSTRIAL SITING (307) 777-7369	LAND QUALITY (307) 777-7756	SOLID & HAZ. WASTE (307) 777-7752	WATER QUALITY (307) 777-7781
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The Nuclear Waste Policy Act of 1982 (NWPA) set forth the nation's nuclear spent fuel and high-level radioactive waste management strategy by giving DOE the ability to establish a geological repository for the waste and begin taking this waste by 1998. DOE has failed to meet these objectives which has caused civil liabilities to the DOE and no clear path forward to establishing a geological repository. In an effort to regroup, DOE is mimicking France, Sweden, Finland, and Canada which are establishing geological repositories.

These countries have had more success in developing these sites due to their abilities to effectively engage the communities, consent-based siting, before they begin the siting process. DOE is moving forward this year to gather information, through public meetings and written comments, to determine the important aspects of a consent-based siting framework. Later this year DOE will publish these findings and begin developing a draft consent-based siting effort. This is an important process, and to understand the full complexity of the issue a brief history provided below.

Nuclear technologies have been used in the United States since the early 1940s for national defense, research and development, and electrical power generation. These activities have produced a large quantity of spent (or used) nuclear fuel and high-level radioactive waste. Efforts to find a long-term solution for managing spent nuclear fuel and high level radioactive waste date back to 1957, when the National Academy of Science recommended burying radioactive waste in geologic formations as the best permanent disposal option.

Congress endorsed this approach when they enabled the NWPA. The NWPA established procedures for evaluating and selecting sites for geological repositories and set a milestone of 1998 as the date the DOE would begin accepting spent nuclear fuel and high-level radioactive waste. By 1986 DOE had recommended three (3) sites for depositories, and in 1987 Congress amended the NWPA to focus solely on Yucca Mountain in Nevada. In addition to studying Yucca Mountain, the Nuclear Waste Fund was created that put one-tenth of a cent per kilowatt-hour charge on nuclear-generated electricity to be set aside to pay for disposal of the spent nuclear fuel. By 2014 the Nuclear Waste Fund had accumulated over \$40 billion dollars. Due to controversy, cost escalation, and legal challenges, formal DOE recommendation of the Yucca Mountain site to the President, the President's recommendation of Yucca Mountain to Congress, and subsequent congressional approval of the site were delayed until 2002, four years past the date DOE was supposed to be accepting waste. DOE submitted a license application to the NRC to construct Yucca Mountain in 2008. The State of Nevada strongly opposed each of these steps, and the selection of the Yucca Mountain site itself remained highly controversial. In 2009, with the timeline for opening a repository pushed back by two decades and no end to opposition in sight, DOE determined the geological repository at Yucca Mountain to be unworkable.



During the studies of Yucca Mountain, the DOE explored options to site and develop federally managed interim storage facilities pending availability of a disposal repository in order to meet the NWPA deadline. They created the United States Nuclear Waste Negotiator (USNWN) to find a host community that would take spent nuclear fuel in exchange for economic benefits. Fremont County, Wyoming, was one of these communities that initially sought consideration for interim monitored retrievable storage (MRS) in the Gas Hills Region. In 1992, Governor Mike Sullivan vetoed the process by sending his disapproval to locate the site in Wyoming to the NRC. The reasoning behind vetoing the proposal was:

- 1) There were no assurances that Yucca Mountain would be the final depository and the time frame of storage was uncertain;
- 2) At the time, there was no clear understanding of the safety and/or technology; and
- 3) It was uncertain how the site would handle shifts in public opinion in regards to the site.

The options for locating a temporary site ultimately failed in Wyoming, based on Governor Sullivan's concerns, and other sites nationwide failed due to their State concerns. In 1995 W.S. 35-11-1501 through 1507 were created to establish requirements for siting high-level radioactive waste storage facilities in Wyoming.

DOE's inability to meet the NWPA's objective of developing a geological repository and accepting spent nuclear fuel and high-level radioactive waste has led utility companies to seek compensation for the federal government's failure to meet its waste management obligations. As a result, the fees that fed into the NWPS were ceased until the DOE repository program is restarted or another waste program is developed. Additionally, through litigation, DOE assumed a \$20-billion-dollar liability of which \$4 billion dollars has been paid.

In 2010, in an effort to reanalyze the DOE's nuclear waste management, the Secretary of Energy (Steven Chu) established the Blue Ribbon Commission on America's Nuclear Future to recommend a new plan of action for the management and disposal of the nation's spent nuclear fuel and high-level waste. The Blue Ribbon Commission issued a final report in 2012 in which it recommended a consent-based approach to siting nuclear waste facilities, including consolidated interim storage and geological disposal sites. In 2015, DOE agreed to pursue a consent-based approach to siting facilities for interim storage, as well as disposal of defense and commercial waste.

