

A Common Ground Consortium case study

Yucca Mountain siting process – The Willrich report

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Collaborative-Based Siting of Spent Nuclear Fuel

2021 Consolidated Appropriations Act allocated funds for ‘expenses necessary for nuclear waste disposal activities . . .’

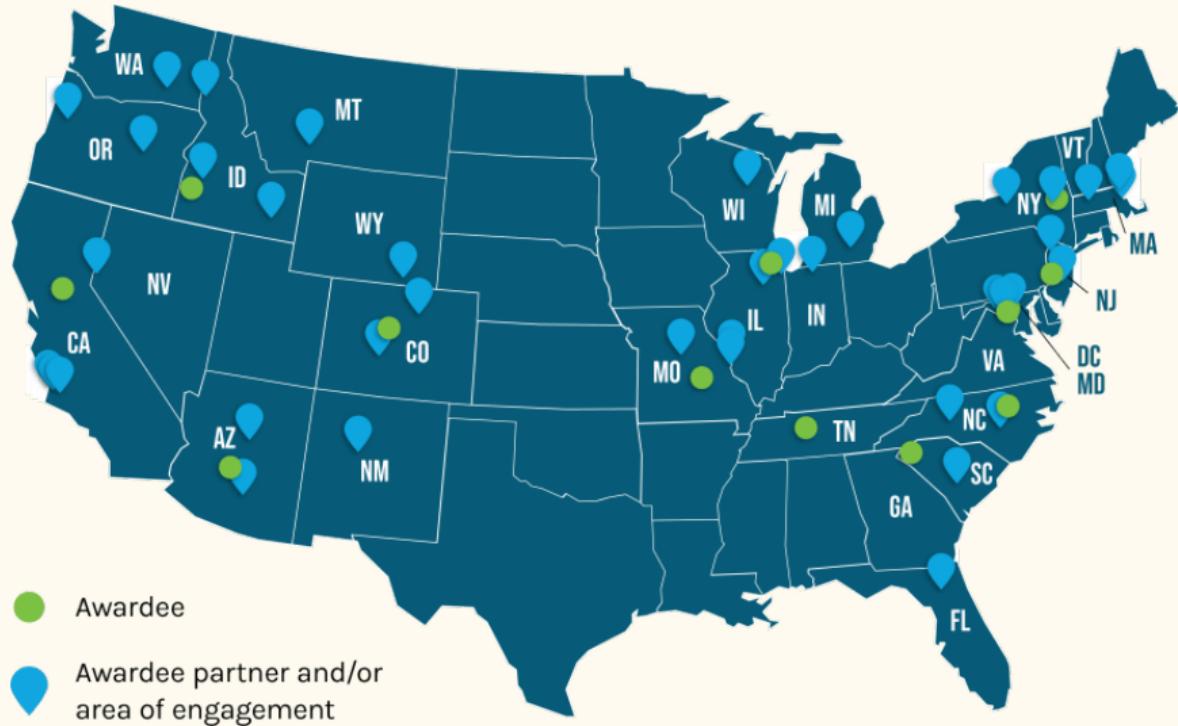
‘. . . including storage activities’

DOE awarded \$26M to thirteen (now twelve) consortia across the nation for building capacity in Collaborative-Based Siting (CBS)

Support more comprehensive community engagement to collaborate with stakeholders to manage SNF effectively

Not actual siting

Process and frameworks



[1] Department of Energy, 2023. DOE awards \$26 million to support consent-based siting for spent nuclear fuel.

The Common Ground Consortium (CGC)

CGC spans several institutions across the intermountain west and Denia at the University of Michigan

With Nation Tribal Energy Association

Centered on public input

Research focus on historical lessons (this presentation), types of public decision-making, and state-specific and/or cross-jurisdictional challenges in Collaborative-Based Siting of critical infrastructure

We have had a lot of public meetings over three states with more to come

Providing recommendations to DOE

More below

[2] Borrelli, R. A., et al., 2024. Consent based siting for Spent Nuclear Fuel. Las Vegas, Nevada: Proc., American Nuclear Society Annual Meeting.

Goals

The 1976 Willrich report offered predictions and recommendations for HLW management still relevant

Analyze key insights of the Willrich report within the context of the Yucca Mountain story

Bringing up the Willrich report as a jumping off point to analyze historical events

Focus is on *process* not whether Yucca Mountain can perform as designed

Tons of material but a lot cut out for time here

The Ford Administration saw a lot of activity

The Energy Research and Development Administration (precursor to DOE) proposed the National Waste Terminal Storage policy for national SNF management

This is the first time multiple barriers were proposed

Construct six facilities at multiple sites across the US so no one place ‘bore the burden’

*Very probably, a satisfactory solution to the problem of nuclear waste disposal will not be possible unless there is **public and political acceptance in the local areas** where geologic studies and facility development must proceed program to the people who need to know so that they have full information to base their decisions on. . . In other words, there must be an aggressive program of public affairs for best results. . . the **public perception of waste management might well determine its success** [3].*

[3] Zerby, C. D. et al., 1976. Denver, Colorado: Proc., International Symposium on the Management of Wastes from the LWR Fuel Cycle.

On to the Willrich report ('Willrich')

Willrich was the first comprehensive analysis for HLW management

'... assist in developing public policy and institutions which are necessary for the safe management of radioactive waste, currently and in the long term.' [4]

Criticized federal activities for a lack of HLW policies

Report is exhaustive

[4] Willrich, M., et al., 1976. Radioactive waste management and regulation. Energy Laboratory Report No. MIT-EL 76-011.

Willrich's key points I

- (1) Safe management of nuclear waste is already a present necessity and an irreversible long-term commitment

Main concern was accumulation of SNF at NPPs

Still somewhat of a (public, economic) concern today

Now we have dry storage option though, currently onsite

- (2) Existing structure for HLW management is unworkable

Was back then split between public and private sectors

Should be managed at the federal level

- (3) *Nevertheless, through **political means** and **legal and procedural delays**, a **state government** may effectively oppose attempts by the federal government to establish a federal repository within its borders without state consent.*

Willrich's key points II

- (4) A national Radioactive Waste Authority should be established as a federally chartered public corporation

This has been the case for most nations

We do have the added degree of complexity due to State and Tribal governments

But the Blue Ribbon Commission on America's Nuclear Future also advocated for this approach

- (5) Willrich was largely supportive of nuclear energy as a credible alternative to fossil fuels
- (6) Recommended NRC assume sole regulatory oversight for nuclear waste management
- (7) US did not have a long term vision for HLW management but *solvab*e

Ensuing key events

Nuclear Waste Policy Act 1982 & 1987

NWPA key features outside of the technical I

- (1) The 1982 NWPA built upon prior work and was a bipartisan bill
- (2) Regional distribution – meant for siting to be in west and east
- (3) *NWPA stipulated that DOE would take title of SNF on 1998.01.31*
- (4) Treasury would collect 1 mill per kWh of electricity generated into a Nuclear Waste Fund (NWF) ('Standard Contract')
- (5) Several mentions of 'consultation and cooperation' with governors of affected States and Tribes
- (6) Any affected State or Tribe was afforded a veto
- (7) *Congress could overrule the veto with a majority vote in both houses*
- (8) 1987 amendments were attached to the Omnibus Budget Reconciliation Act of 1987
- (9) We all know this was where Yucca Mountain was designated as the sole site
- (10) Explicitly terminated eastern siting activities

NWPA key features outside of the technical II

- (11) Rep. Al Smith (WA) – *What you are watching is an exercise in pure politics . . . I am participating in a nonscientific process – sticking it to Nevada [6]*

Courts shape policy

Nevada responds to the veto I

When Yucca Mountain was officially recommended in 2002, the expected Nevada veto was overridden and became law

Legal challenges to technical criteria and regulations

Refused to grant water access to drill bore holes [9]

Courts struck down a law based on state sovereignty to store HLW

Delayed progress on scientific investigations and site characterization

*Nevertheless, through **political means** and **legal and procedural delays**, a state government may effectively oppose attempts by the federal government to establish a federal repository within its borders without state consent.*

[9] Easley, M., 2012. Standing in Nuclear Waste: Challenging the Disposal of Yucca Mountain. Cornell Law Review 97, 659.

DOE was sued for breach of the Standard Contract

Willrich only talked about States but corporations got in on it too

DOE could not take title to SNF in 1998

Utilities were bearing storage costs

About 80 lawsuits filed over 1998 – 2012 for partial breach of contract

Basically, the utilities won and were awarded damages still being paid today

\$800M annually to the utilities

Yucca Mountain ‘ends’

In 2008 DOE submitted a construction license to NRC

With Harry Reid as Senate majority leader the FY2010 budget only provided funds to continue the licensing process

Funding was eliminated in FY2012 and closed the OCRWM (fellowship)

DOE withdrew the license and faced lawsuits over its authority to do so

Court ordered to complete licensing process with the available budget

NRC finally ruled that Yucca Mountain met post-closure requirements, but issues regarding land ownership and water rights for construction required further work

And that was it

While terminated de facto, Yucca Mountain is still legally the designated site for the repository

The Nuclear Waste Fund suspended

DOE ordered to suspend collection of fees in 2013 due to license termination

Legally, the fee was not eliminated but reduced to zero

At the time of suspension, \$750 million was collected annually

Currently, there is about \$50 billion with \$1.5 billion added annually in interest

Main takeaways

Willrich stated HLW management was a solvable problem

The Ford–Carter Administrations and Congress deserve credit for the groundwork and study leading up to and then crafting and passage of the NWPA in 1982

Ensuing top down approach did not work

Speaker of the House & House Majority Leader pushed for Yucca Mountain in 1987

Senate Majority leader pushed for termination in 2008

Public not really an active participant beyond public comment

Not much consultation and cooperation

The most telling prediction was the use of the courts to delay process

Can we craft better policy?

Siting processes will always be inherently political I

NWPA will have to be amended to designate a new site, construct other sites

Better processes obviates the influence of the courts, optimistically because everyone will feel involved

Still need to address federal v state relationships, and including Tribes

HLW management was recognized as a bipartisan issue before and it can be again

Willrich had policy recommendations that were incorporated into the BRC report

Both are still relevant today

Public involvement is essential but needs to have real agency

Soliciting public comment is good but cannot be the only participation

Public opinion and attitudes will vary regionally and locally

Collaboration across all stakeholders has to move deeper than just a top-down approach

A veto should be binding but also clearly defined and agreed upon (go/no-go)

We do have a success story in WIPP

Wrapping up

What can we do going forward?

The federal government has the legal responsibility for HLW management

Top-down approaches have not worked

Bottom up engagement must be developed to take advantage of 'on the ground expertise'

Include local officials or community leaders early on in the process

Mayor Casper of Idaho Falls told the Nuclear Waste Technical Review Board that local leaders should be an essential part of the siting process

Include other groups that have not historically been part of the siting process in an effort to co-produce new knowledge

Even if a locality is interested in hosting a site but eventually cannot, either technically or veto, they can pass on the new expertise to other communities

Could engage on a more granular level than DOE cannot



References

1. Department of Energy, 2023. DOE awards \$26 million to support consent-based siting for spent nuclear fuel.
2. Borrelli, R. A., et al., 2024. Consent based siting for Spent Nuclear Fuel. Las Vegas, Nevada: Proc., American Nuclear Society Annual Meeting.
3. Zerby, C. D. et al., 1976. Denver, Colorado: Proc., International Symposium on the Management of Wastes from the LWR Fuel Cycle.
4. Willrich, M., et al., 1976. Radioactive waste management and regulation. Energy Laboratory Report No. MIT-EL 76-011.
5. Reagan, R., 1983. Remarks on Signing the Nuclear Waste Policy Act of 1982. Ronald Reagan Presidential Library & Museum.
6. Church, F., 1990. Federal Report: Nuclear Waste – Can Nevada Keep America's Sizzling Nuclear Waste Out of Its Backyard.
7. Merkhofer, M. W. et al., 1987. A multiattribute utility analysis of alternative sites for the disposal of nuclear waste. Risk Analysis 7, 173.
8. Halstead, R. J., et al., 2015. Remaking the US Nuclear Waste Program. Phoenix, Arizona: Proc., Waste Management Conference.
9. Easley, M., 2012. Standing in Nuclear Waste: Challenging the Disposal of Yucca Mountain. Cornell Law Review 97, 659.

Acronyms I

ANS American Nuclear Society.

BRCA Blue Ribbon Commission on America's Nuclear Future.

CAA Consolidated Appropriations Act.

CBS Collaborative-Based Siting.

CGC Common Ground Consortium.

DOE United States Department of Energy.

ERDA Energy Research and Development Administration.

FY Fiscal Year.

HLW High-Level Radioactive Waste.

IHLRWM International High Level Radioactive Waste Management.

Acronyms II

kWh Kilowatt-Hour.

NPP Nuclear Power Plant.

NRC Nuclear Regulatory Commission.

NWF Nuclear Waste Fund.

NWPA Nuclear Waste Policy Act.

NWTRB Nuclear Waste Technical Review Board.

NWTS National Waste Terminal Storage.

OCRWM Office of Civilian Radioactive Waste Management.

SNF Spent Nuclear Fuel.

UM University of Michigan.

US United States.

WIPP Waste Isolation Pilot Plant.

YM Yucca Mountain.