

Yucca Mountain as a Nuclear  
Waste Repository:  
Nevada's View

Office of the Governor  
Nevada Agency for Nuclear Projects

# Geologic Disposal and the Yucca Site

- The concept (that became known as deep geologic disposal) is a relatively simple and straightforward one:
- Find a location within the earth that, through an understanding of its geologic history, could be determined to have remained stable and undisturbed for millions of years.

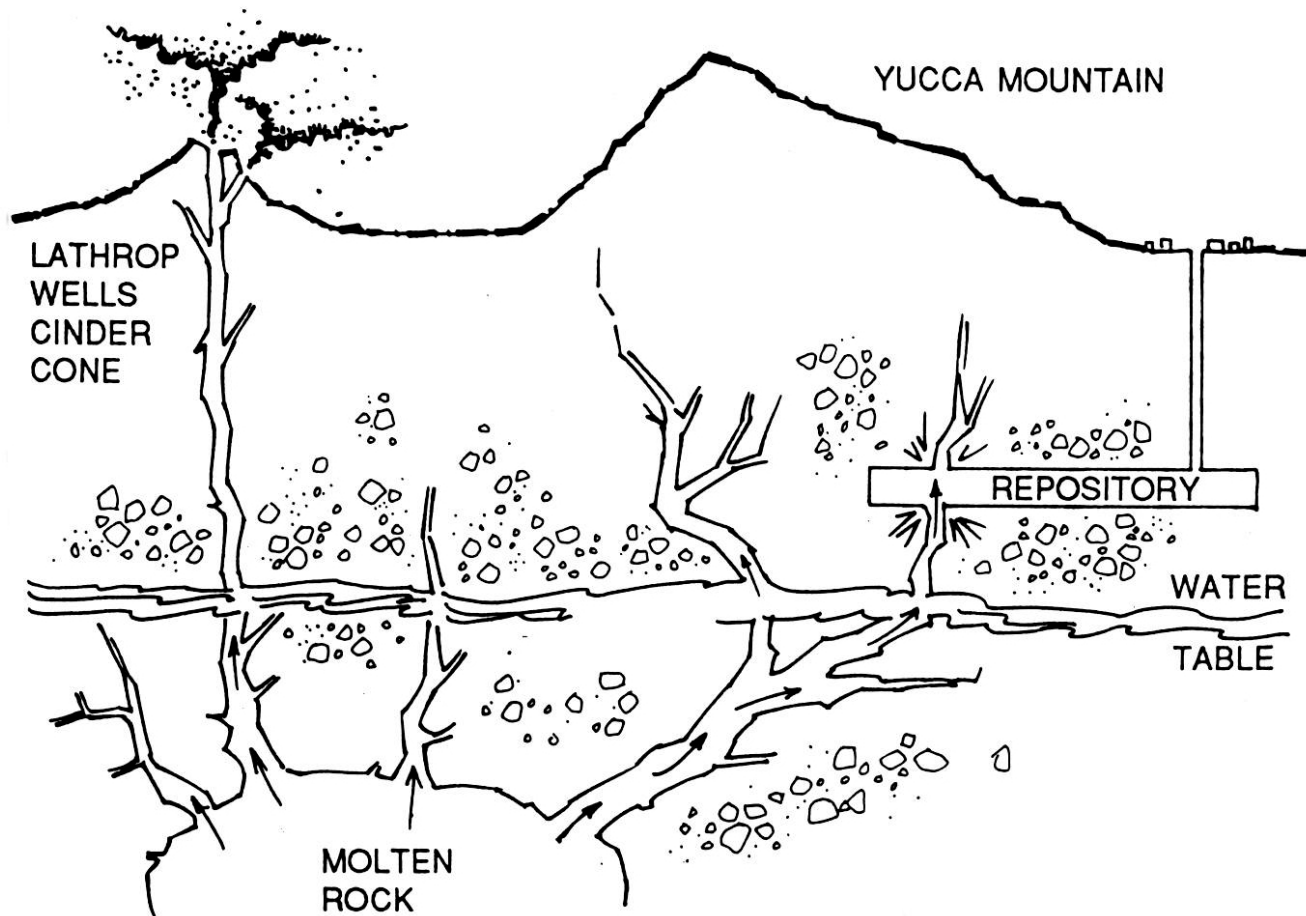
- Put the highly radioactive waste into that formation, seal it up, and allow the geology to assure that the material would be kept out of the environment for the time required.
- Human-built components to this geologic isolation system were not to be relied on for assuring waste isolation, only to provide redundancy and “defense-in-depth.”

- It has become increasingly apparent that Yucca Mountain does not possess any of the waste isolation characteristics required for long-term waste isolation.
- DOE has been studying the Y.M. site for over 20 years.
- As each new failing of the Nevada site is uncovered, DOE simply institutes an engineering fix intended to substitute for the shortcomings of the geologic setting.

## Yucca Mountain “Issues”

- Active geologic environment
- Oxidizing/Corrosive subsurface environment
- High seismic/earthquake activity
- Relatively young volcanic activity
- Evidence of ground stretching – magma nearer the surface
- Rapid water movement
- Not exactly an ideal location for “geologic disposal”

# Renewed Volcanism?



**Potential for Sub-Surface Volcanic Activity**

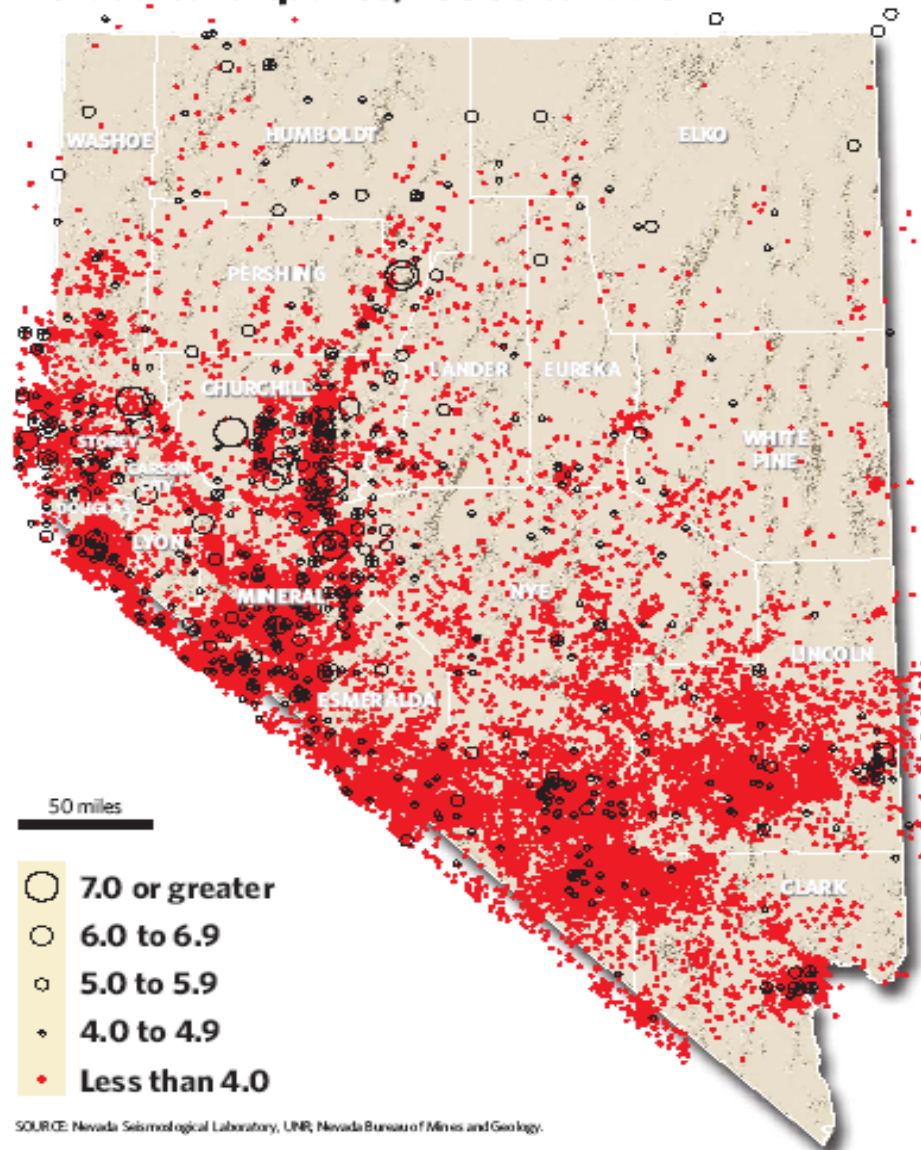
# Past Volcanic Activity



**Volcanic Cinder Cones as Seen from the Top of Yucca Mountain**

# Earthquakes

## Nevada earthquakes, 1850s to 1998

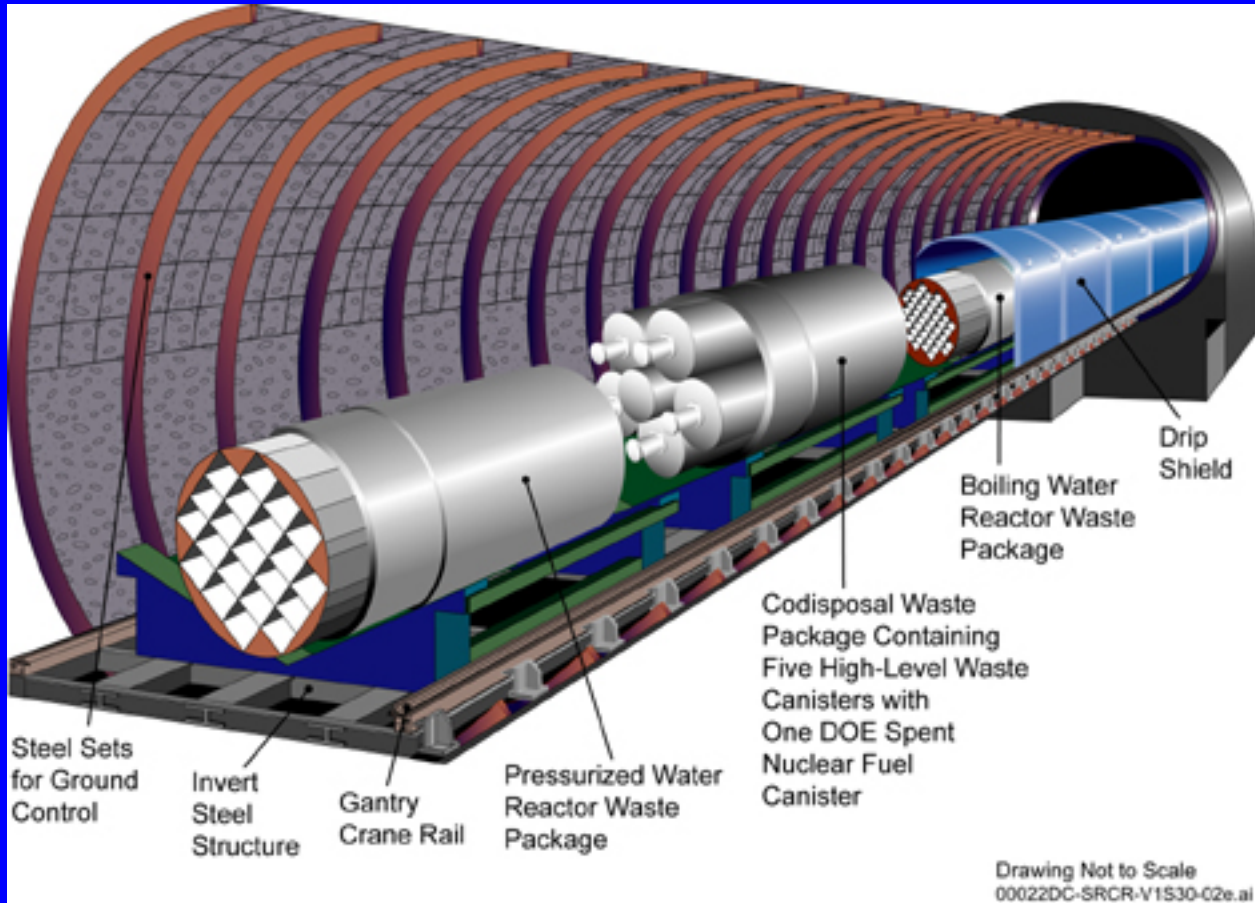




- The “deep geologic repository” has been transformed into an engineered facility that relies almost exclusively on human-built components to keep wastes isolated from people and the environment for tens of thousands of years
- Yucca Mountain is not being looked at as a geologic repository at all.
- The site itself is incapable of isolating spent fuel and high-level radioactive wastes.

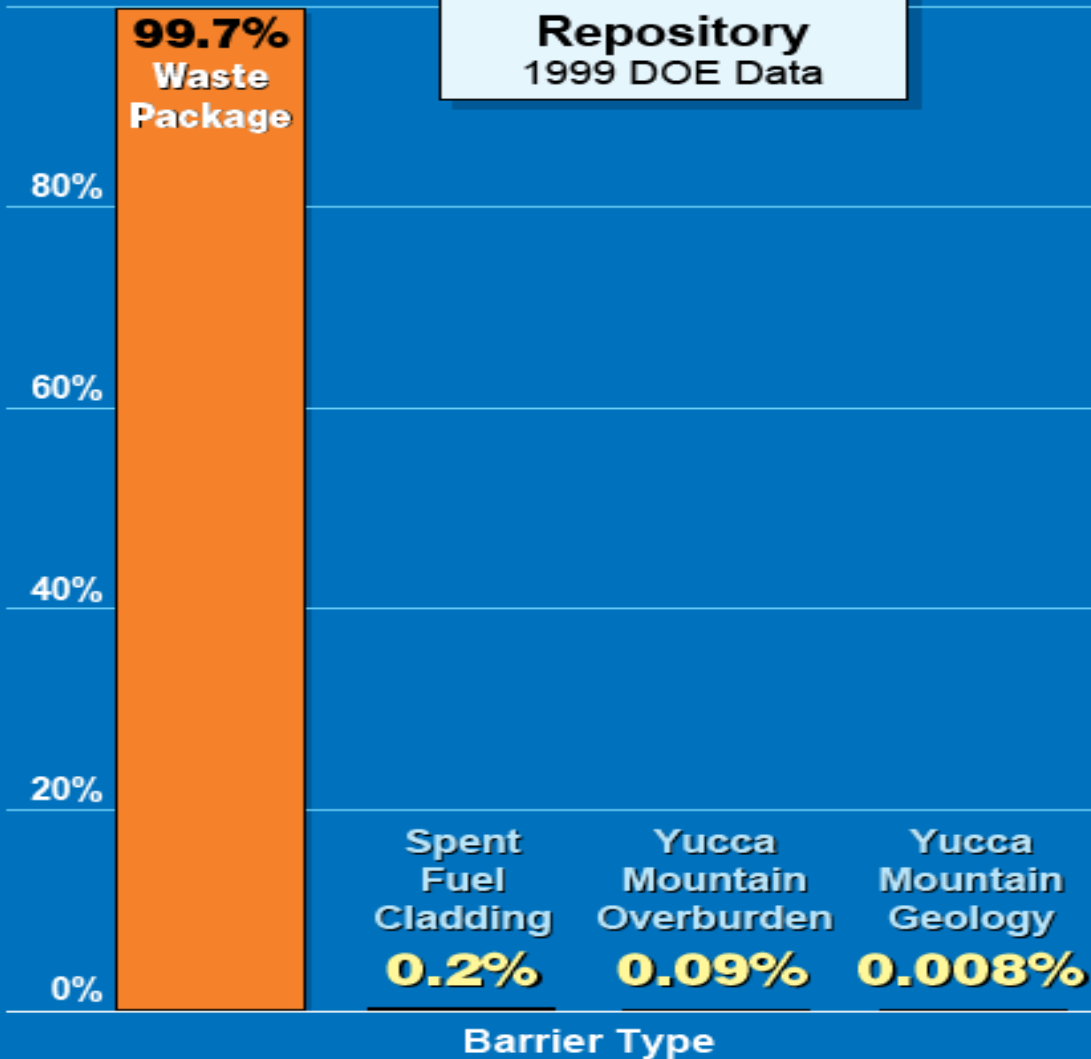
# Exclusive Reliance on Magic Metal Waste Package

- DOE's performance models assume that the waste disposal packages will remain intact for at least 10,000 years to as many as 750,000 years underground
- This also requires miles and miles of titanium drip shields over the waste packages



# Relative Contribution of Waste Isolation Barriers

Percent of Capability  
100%

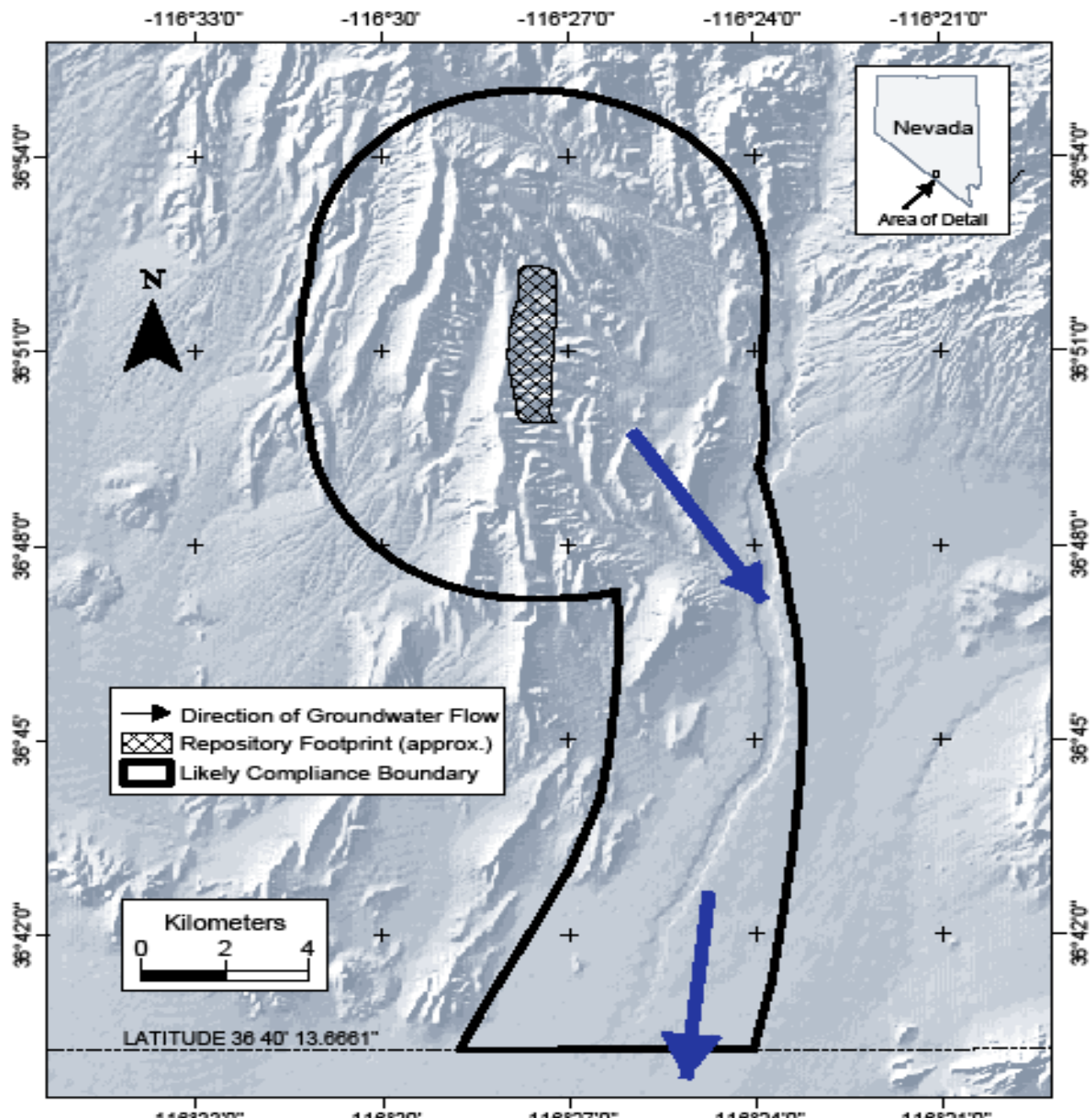


Source: DOE Presentation to NWTRB, 1/25/99.

# Dilution is the Solution

- But even that's not enough
- DOE lobbied EPA to assure that Safe Drinking Water Standards do NOT apply to Yucca because the site can't meet them
- DOE plans to rely on the dilution of waste escaping from Yucca Mountain in the aquifer beneath the site as a waste management tool in order to make the site appear to meet exposure limits
- And DOE had to gerrymander the site boundaries to make even this work

# Likely Groundwater Standards Compliance Boundary for Spread of Radioactive Contamination at the Yucca Mountain Project



# Weakening Health Protection Standards

- Even with all of the engineered fixes, DOE, the nuclear industry, and Congress still sought even more lenient health and safety standards for Yucca Mountain
- Why? The site cannot meet a truly protective dose standard after waste packages fail (which could be in as short a time as several hundred years).

- On three different occasions, the State of Nevada has demonstrated, using DOE's own data, that the site should have been disqualified under both the EPA standard and DOE's own internal site screening regulations.
- Each time, either DOE or Congress changed – or sought changes to – the regulations so that Yucca Mountain would not be disqualified.



# Geologic isolation is doable – Just NOT at Yucca

- There are sites where geology alone can isolate the waste
- The WIPP facility near Carlsbad, NM is a prime example
- No exotic manmade “fixes” needed

- WIPP takes no credit for engineered barriers
- WIPP meets the EPA's existing radiation protection standard for the life of the facility (100,000s to millions of years)

# NRC Licensing

- In 2008 DOE submitted a license application (LA) to build Yucca
- Nevada filed 229 technical challenges or contentions demonstrating Yucca's unsuitability; all but 4 were admitted
- Most extensive challenge in any NRC license, *ever*
- When DOE announced it was withdrawing the LA, Nevada was making excellent progress in opposing the application

# So, Why Yucca?

- Political science pure and simple
- Selection of Yucca Mountain in 1987 was entirely political and not based on the site's scientific merit
- 2 other sites – Deaf Smith County (TX) and Hanford (WA)
- Jim Wright (TX) – Speaker of the House
- Tom Foley (WA) – House Majority Leader
- Nevada in 1986-87 – no political clout

# Poetic Justice?

- 2006 – Democrats gain control of Congress
- Sen. Harry Reid (NV) becomes Majority Leader
- 2008 – Barack Obama elected President: During the campaign, Obama promised to terminate Yucca Mountain.
- Feb. 2010 – DOE announces it intends to withdraw the Y.M. license application and terminate the program.

# But it ain't over 'til it's over!

- Several states and industry groups filed suit in federal court to stop DOE from terminating the project;
- The licensing board eventually DENIED DOE's withdrawal motion;
- The initial case was thrown out as not ripe for judicial review; but a new one, filed in September 2012, has forced NRC to restart the licensing process even though there are not sufficient funds to complete it

# Nevada's Position

- “... a nuclear waste repository should not be built until it can be shown, beyond the shadow of a doubt, that the facility can, in fact ... isolate radioactive materials from the biosphere for more than 10,000 years - and that ... such a repository will be benign in its effects upon the people, the environment and the economy of the state or region within which it would be located.”

**Gov. Grant Sawyer, Chairman  
Nevada Commission on  
Nuclear Projects  
Commission Report, 1986**

# What's Nevada's Answer?

- Nevada endorses recommendations by the Blue Ribbon Commission
- Dry cask on-site storage at nuclear reactor locations for the near term – 100 years
- On-Site storage is the best, most economical, least risky and most practical short- term approach
- Eliminates costs and risks of a massive and unproven national shipping campaign
- Future facility siting efforts must be voluntary.



- On-site dry storage keeps waste in safe, highly secure locations and gets it out of the pools
- Dry storage buys time to develop waste reduction and reprocessing technologies – keeps wastes safe but accessible
- There is no crisis that requires movement of waste to an unsafe disposal site in Nevada or elsewhere.

- “We cannot promise our own children-- never mind those who follow them hundreds or thousands of years hence--that the wastes [disposed of in a repository] will be safe. *So long as that is so, we may not be taking the problem out of their hands so much as we are taking the solution out of their hands, in effect making it as hard as we can for them to protect themselves.*”

**Kai Erikson, E. William Colglazier, and Gilbert F. White on behalf of the State of Nevada Yucca Mountain Technical Review Committee (1994)**