

Decommissioning: A New Era in the U.S. Nuclear Power Industry; a Critical Need for Congressional Oversight

*Highly Radioactive Irradiated Nuclear Fuel:
Need for Hardened On-Site Storage; Risks of Off-Site Transport*

*Kevin Kamps, Radioactive Waste Specialist, Beyond Nuclear
Room 2318, Rayburn House Office Building
Monday, May 13, 2019*

Reactor Shutdowns Are Very Good News

Record-breaking number (7) of reactor shutdowns since 2013

- Reactor meltdowns no longer possible
- No more high-level radioactive waste will be generated

1. Crystal River, FL, 2/20/13
2. Kewaunee, WI, 5/7/13
3. San Onofre (2), CA, 6/12/13
4. Vermont Yankee, 12/29/14
5. Fort Calhoun, NE, 10/24/16
6. Oyster Creek, NJ, 9/17/18

Announced Closure Dates

- Pilgrim, MA, by 6/1/19
- Three Mile Island Unit 1, PA, by 9/30/19
- Indian Point Unit 2, NY, 4/30/20
- Duane Arnold, IA, Sept. to “Late” 2020
- Indian Point Unit 3, NY, 4/30/21
- Palisades, MI, 10/1/22
- Diablo Canyon Unit 1, CA, 11/2/24
- Diablo Canyon Unit 2, CA, 8/26/25

“We Was Robbed”

- FitzPatrick, NY, was to have closed by 1/27/17
- Ginna, NY, was to have closed by March 2017
- Clinton, IL, was to have closed by 6/1/17
- Quad Cities 1&2, IL, was to have closed 6/1/18
- Palisades, MI was to have closed by 10/1/18

Will They Close?

- Davis-Besse, OH, 5/31/20 (“Radioactive Russian Roulette on the Great Lakes Shore”; “What Humpty Dumpty DOESN’T Want You to Know”)
- Perry, OH, 5/31/21
- Beaver Valley Unit 1, PA, 5/31/21
- Beaver Valley Unit 2, PA, 10/31/21

Just Transitions

- Workforce retention/re-training
- Municipal tax revenues
- Charitable donations
- NIRS, AGREE, NEIS

Effective and efficient?!



Holtec/ELEA CISF license application to NRC

- Submitted July 16, 2018
- NRC ASLB dismissed six legal interventions, totaling more than 50 contentions, May 7, 2019
- Many intervenors vow appeal (Commission, federal courts)
- Holtec brags 2020 rubber-stamp

Beyond Nuclear's Legal Objections

Mindy Goldstein, Dir., Turner Env'l Law Clinic, Emory U. School of Law

- Violation of Administrative Procedure Act
- An agency is prohibited from acting contrary to the law as issued by Congress and signed by the President
- “NRC may be an independent agency, but it is not above the law.”

Diane Curran, Harmon, Curran, Spielberg + Eisenberg, LLP

- Violation of Nuclear Waste Policy Act of 1982, as Amended: DOE can only assume ownership (title) and liability for commercial irradiated nuclear fuel at a licensed and operating permanent repository
- (NRC is not above the law, must act within congressionally approved aut

Env'l Coalition Legal & Technical Objections

Sierra Club, Wally Taylor, legal counsel

- Nuclear-Free Campaign core group
- Nation's oldest & largest enviro group
- NM chapter, 10,000 members
- Dozens of Concerns: Geological (hydrological, seismic); Container failure; Decommissioning trust fund inadequacy; many more
- Even NRC staff agreed a number of contentions were worthy of ASLB hearings

Don't Waste MI, et al., Terry Lodge, legal counsel

- 40+ year nuclear power watch-dog
- Transportation risks (accidents, attacks, "routine" exposures) – trucks, trains, barges through most states, 100+ major cities, 75%+ of U.S. congressional districts
- Risks of repackaging into TADs (Transport, Aging, and Disposal containers)
- Representing: Public Citizen, Citizens for Alternatives to Chemical Contamination (MI), Citizens Environmental Coalition (NY), Don't Waste Michigan (MI), San Luis Obispo Mothers for Peace (CA), Nuclear Energy Information Service (IL), Nuclear Issues Study Group (NM)

Holtec's many problems

Quality Assurance Violations (Year 2000 to present)

- Year 2000 QA audit: 9 categories of QA violations
- Oscar Shirani (Commonwealth Edison/Exelon): “nothing but garbage cans”; questioned structural integrity sitting still, at 0 mph, let alone going 60 mph+ (accident forces) on the rails

Dr. Ross Landsman, NRC Region 3 dry cask storage inspector (retired)

- Has compared NRC/Holtec decision making to NASA's, that led to “Space Shuttles hitting the ground”

Holtec's many problems

Bribery

- Shirani and Landsman both alleged that Holtec CEO Krishna Singh attempted to bribe them into silence
- Bribery conviction at TVA's Browns Ferry nuclear power plant in AL – Holtec was barred from doing business with TVA for a mere 60 days

WHYY: Protesters call Holtec CEO's comments on Camden workers 'racist'

- “They don't show up to work,” Singh said of Camden workers. “They can't stand getting up in the morning and coming to work every single day. They haven't done it, and they didn't see their parents do it. Of course, some of them get into drugs and things. So, it's difficult.”

Holtec's CISF: EJ violation

Alliance for Env'l Strategies

- Majority Hispanic communities
- Mescalero Apache Indian Reservation previously targeted for CISF
- Legal counsel Nancy Simmons
- Expert witness Myrriah Gomez
- AFES co-founder Rose Gardner of Eunice, NM, 2019 recipient of the Dr. Judith H. Johnsrud "Unsung Hero" Award at ANA DC Days

Disproportionate pollution burden

- Permian Basin fossil fuel extraction (oil, natural gas fracking)
- Nuclear (WIPP; URENCO; WCS LLRW dump; International Isotopes DF6 U deconversion)
- NM: Los Alamos, Sandia, Trinity Atomic Bomb Test Blast, U mining/milling

Holtec's many problems

Chernobyl, Ukraine

- Tens to hundreds of millions of dollars in fines and fees, for missed deadlines, engineering errors, scandals, etc.

HBO Mini-Series: "What is the cost of lies?"



CISFs: 3X Yucca!

213,600 MT, v. 70,000 MT

Holtec, NM, 2.5X Yucca

- 173,600 MT, v. 70,000 MT

ISP, TX,

- 40,000 MT, compared to 70,000 MT

CISFs can and must be stopped!

Margene Bullcreek, OGD



- U.S. Senator Jeff Bingaman (D-NM), ENR Chair, 2012: Vital linkage between CIS and permanent repository in NWPA of 1982, as Amended – carefully crafted, precautionary wisdom
- PFS, LLC, UT (thank you NRC Commissioner Jaczko!)

Rufina Marie Laws, Mescalero Apache, NM



Grace Thorpe, Sauk and Fox, OK



Holtec + SNC-Lavalin = CDI

Comprehensive Decommissioning International

- Oyster Creek, NJ
- Pilgrim, MA?
- Palisades, MI?
- Indian Point, NY?

SNC-Lavalin scandals galore

- 2013: World Bank Debars SNC-Lavalin and its Affiliates for 10 years
- Newsweek, 2/28/19: “Justin Trudeau Faces Calls to Resign”
- Bribery, Corruption, Immigration Violations – Asia, Latin America, Africa, North America

NorthStar (Vermont Yankee)

**WCS (nat'l LLRW dump near/
above Ogallala Aquifer)**



Areva/Orano



(c) Greenpeace/Gleizes

Radioactive Kleptomania (and Trust Fund inadequacies to begin with!)

Decommissioning Trust Funds

- Indian Point, ~\$2 billion
- Oyster Creek, \$1 billion+
- Palisades, MI, Requires \$480 million; Raided (\$316 million in 2007) Trust Fund \$443 million
- Pilgrim, MA, Requires \$1.18 billion, Trust Fund \$1.043 billion
- Vermont Yankee, Requires \$668 million, Trust Fund \$498 million

SNC-Lavalin in Canada

- Several billion in decommissioning trust funds
- A couple billion already spent, with little to nothing to show for it
- (Compare to \$3 billion spent at Levy County, FL for proposed reactor new builds, later abandoned)

Refuse to Learn Lessons? Doomed to Repeat Mistakes

- Big Rock Point, MI: “Pre-Proto-Prompt” decommissioning, 1997-2006; 67 MW-e reactor, \$366 million decommissioning price tag; lingering, significant contamination
- Zion, IL: two 1,000+ MW-e reactors; \$1 billion Trust Fund, little to no financial accountability (EnergySolutions, UT)
- CT Yankee: unknown HLRW pool leak led to increase in decommissioning price tag by orders of magnitude

Bad Bills

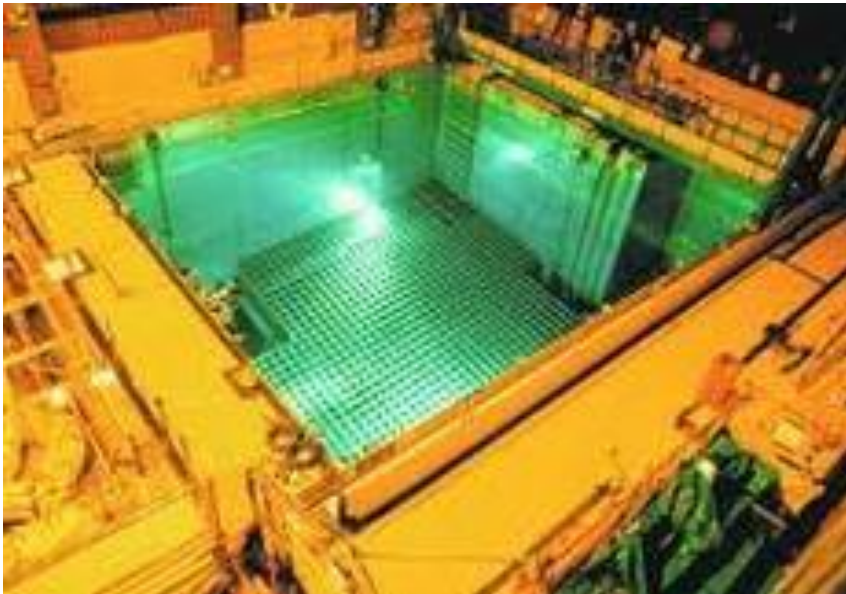
- Nuclear Waste Policy Amendments Act of 2019
- S. 1234
- CIS and Yucca funding in Energy & Water Approps

Good Bills

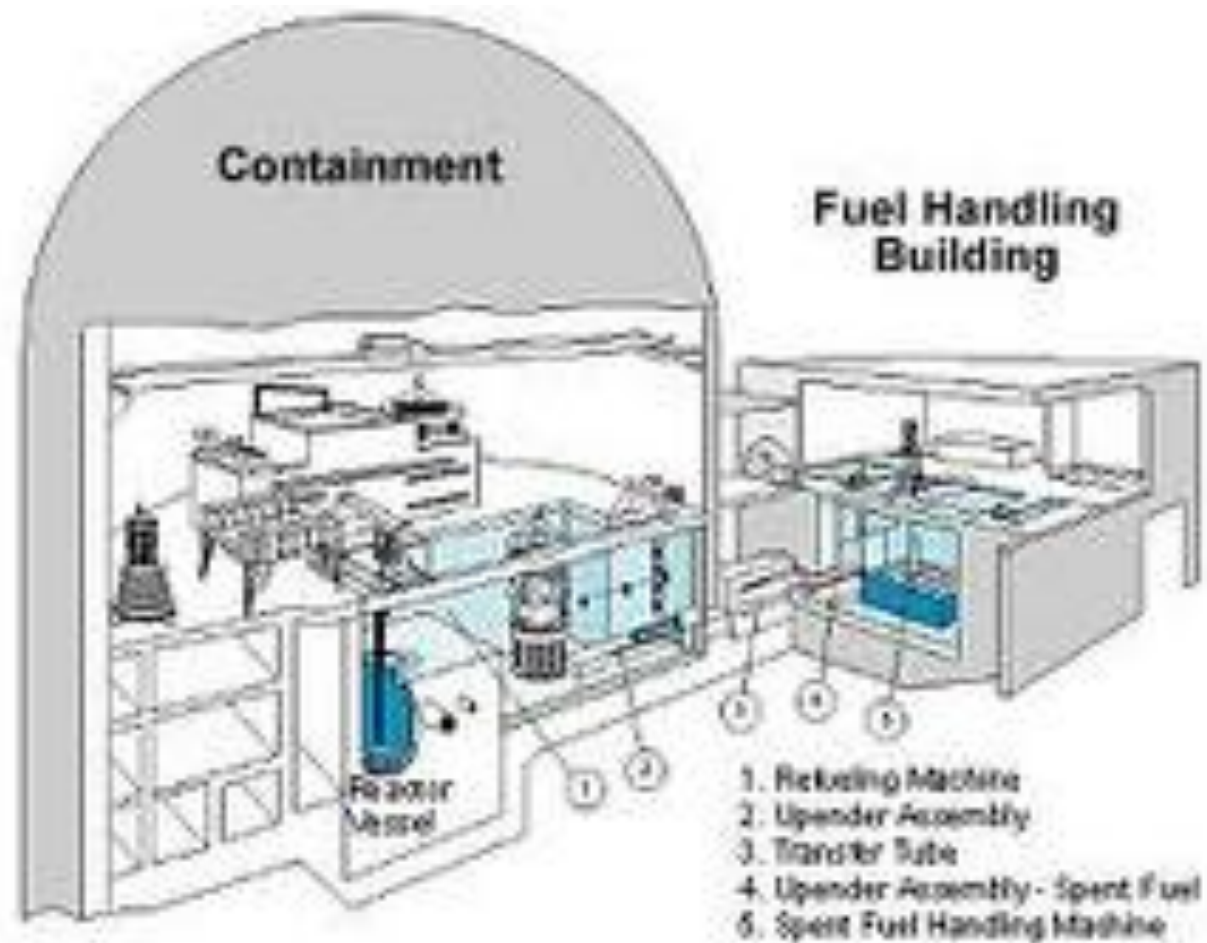
- STRANDED Act (Sen. Duckworth, D-IL)
- Consent-Based Siting (NV delegation)
- Expedited Transfer (contrast to Diablo Canyon)

Irradiated Nuclear Fuel Transfer, from Pools to Casks

Indoor “Wet” Storage Pool → Outdoor Dry Casks



Pools are outside robust containment



Close call with catastrophe

Fukushima Daiichi Unit 4



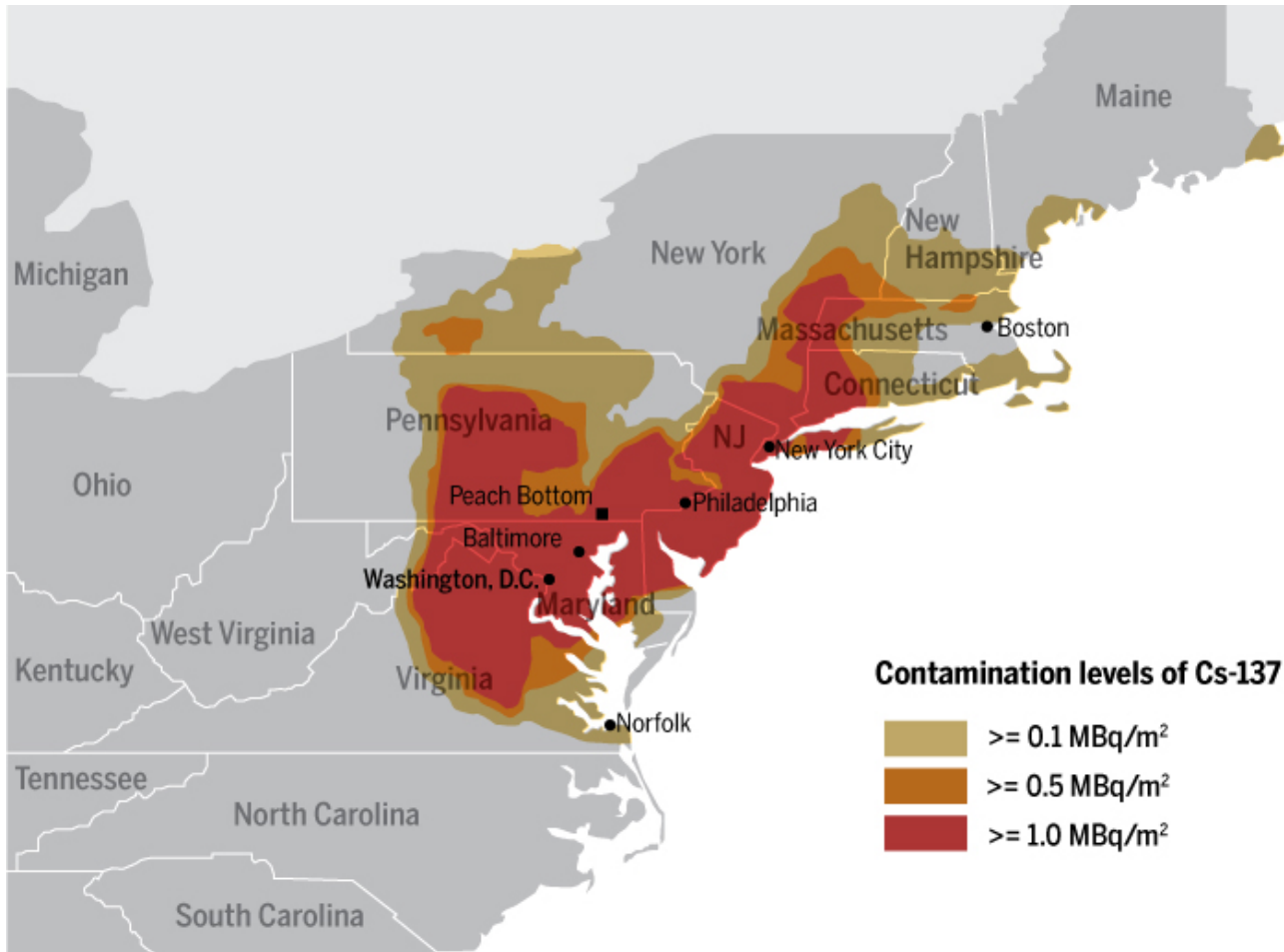
**Japanese Prime Minister
Naoto Kan**



Risks of Pool Storage, Transfers

- IP's long term (~early 1990s-present) pool leakage of radioactivity into soil, groundwater, Hudson River (tritium, Sr-90, radioactive cesium, cobalt, nickel)
- Heavy load drop risk of pool drain down, zirconium fire (Prairie Island, MN & Palisades, MI transfer cask crane dangles; Vermont Yankee crane slip)

Pool Fire Risk



Crane Risks



Independent Spent Fuel Storage Installation (ISFSI) Configurations

Vertical

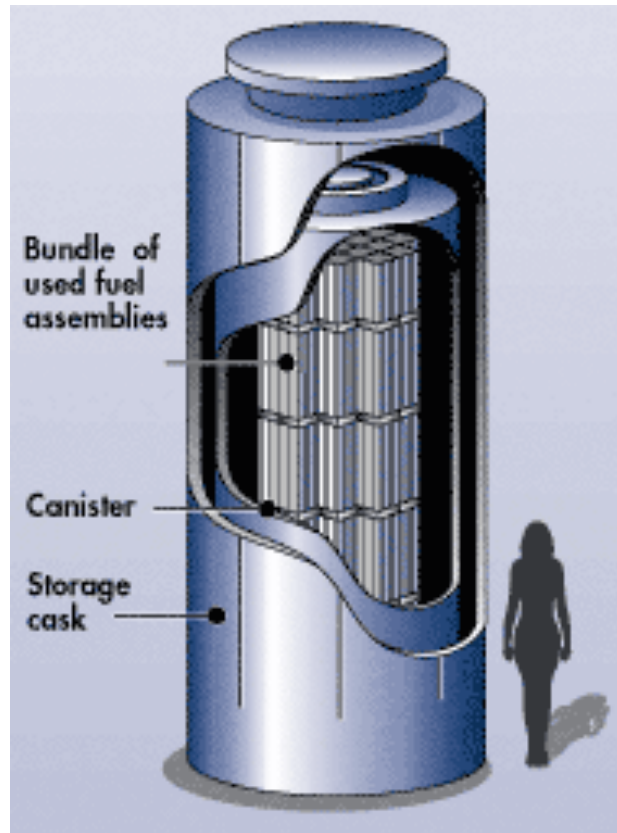


Horizontal

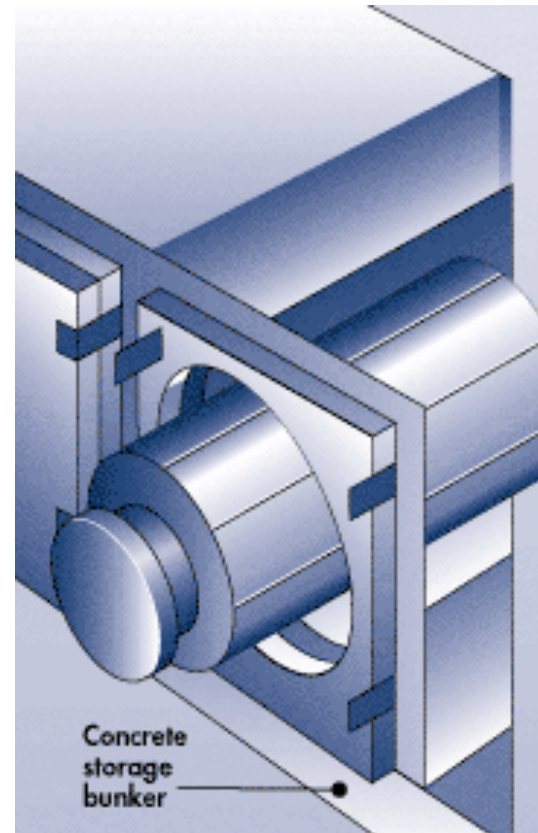


ISFSIs (Cask/Canister issues)

Vertical

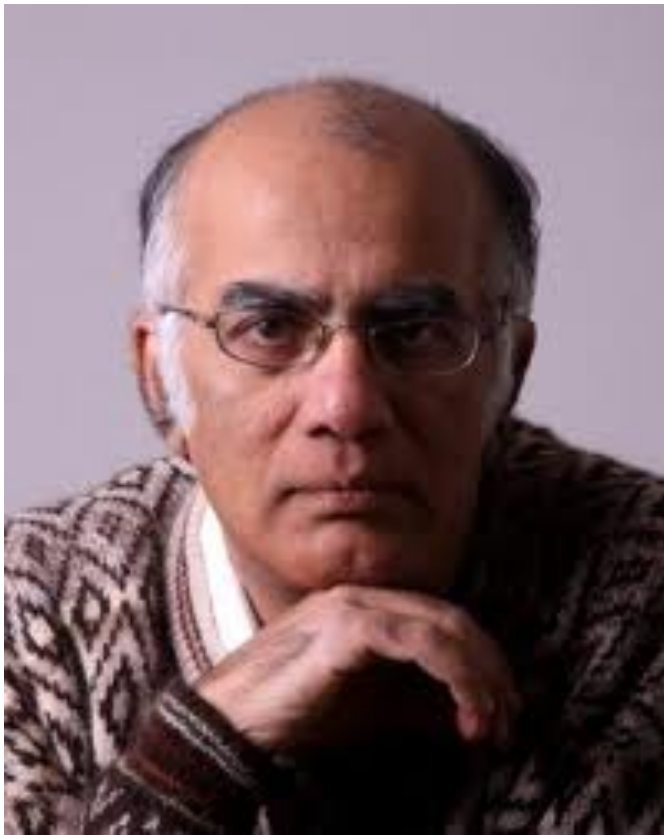


Horizontal



Need for Robust, or Hardened On-Site Storage (HOSS)

Dr. Arjun Makhijani, IEER



Dr. Gordon Thompson, IRSS



Statement of Principles for Safeguarding Nuclear Waste at Reactors (HOSS)—2006; 2010; 2016; 2018

- Require a low-density, open-frame layout for fuel pools (to provide convection air current cooling) – *that is, empty the pools as much, and as soon, as possible (a.k.a. “expedited transfer”)*);
- Establish hardened on-site storage (retrievability; real-time monitoring for radiation, temperature, pressure; as close as possible, as safely as possible, to point of generation);
- Protect fuel pools;
- Require periodic review of HOSS facilities and fuel pools;
- Dedicate funding to local and state governments to independently monitor the sites;
- Prohibit reprocessing (*something Holtec/ELEA wants to do at its CISF in southeastern NM*).

Statement of Principles for Safeguarding Nuclear Waste at Reactors (HOSS)—2006; 2010; 2016; 2018

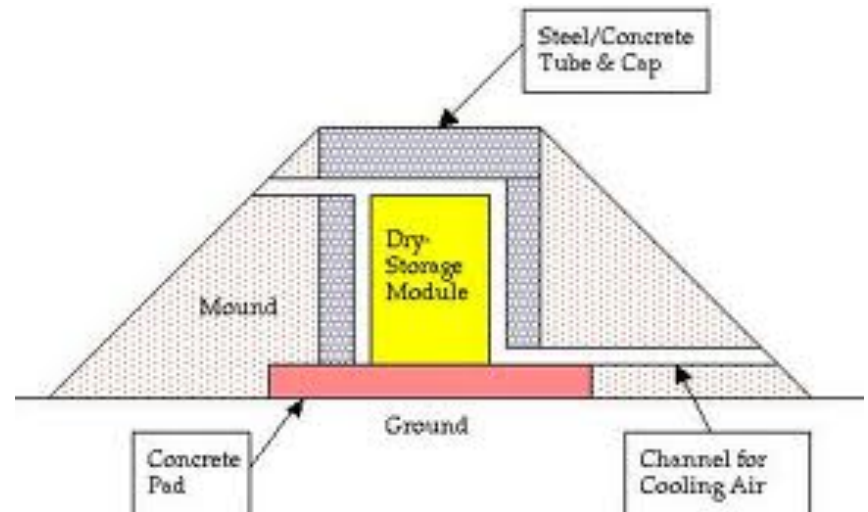
- https://www.eesi.org/files/Principles_for_Safeguarding_Nuclear_Waste_at_Reactors.pdf
- Many hundreds of public interest and environmental organizations, representing all 50 states, including from NY State:

Coalition on West Valley Nuclear Wastes; Center for Health, Environment, and Justice; For a Clean Tonawanda Site (FACTS); Citizen's Environmental Coalition; Riverkeeper; Central New York Citizens Awareness Network; IPSEC (Indian Point Safe Energy Coalition); Public Health and Sustainable Energy (PHASE); Council on Intelligent Energy & Conservation Policy (CIECP); Hudson River Sloop Clearwater.

Dispersed/Concealed HOSS v. Plain View/Clustered Configuration

“Bowling Pins”

Graphic from “Robust Storage” by
Dr. Gordon Thompson, Jan. 2003



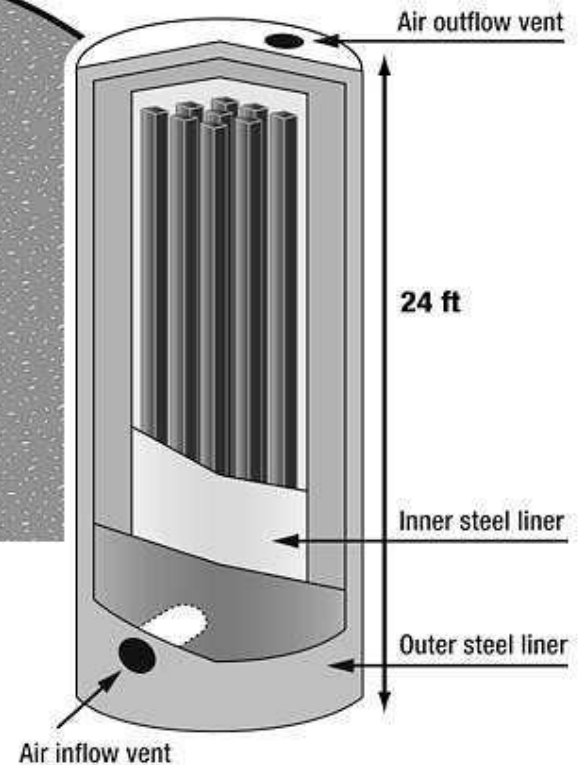
Schematic representation of HOSS

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



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

Nuclear rods cooled by
simple air convection.

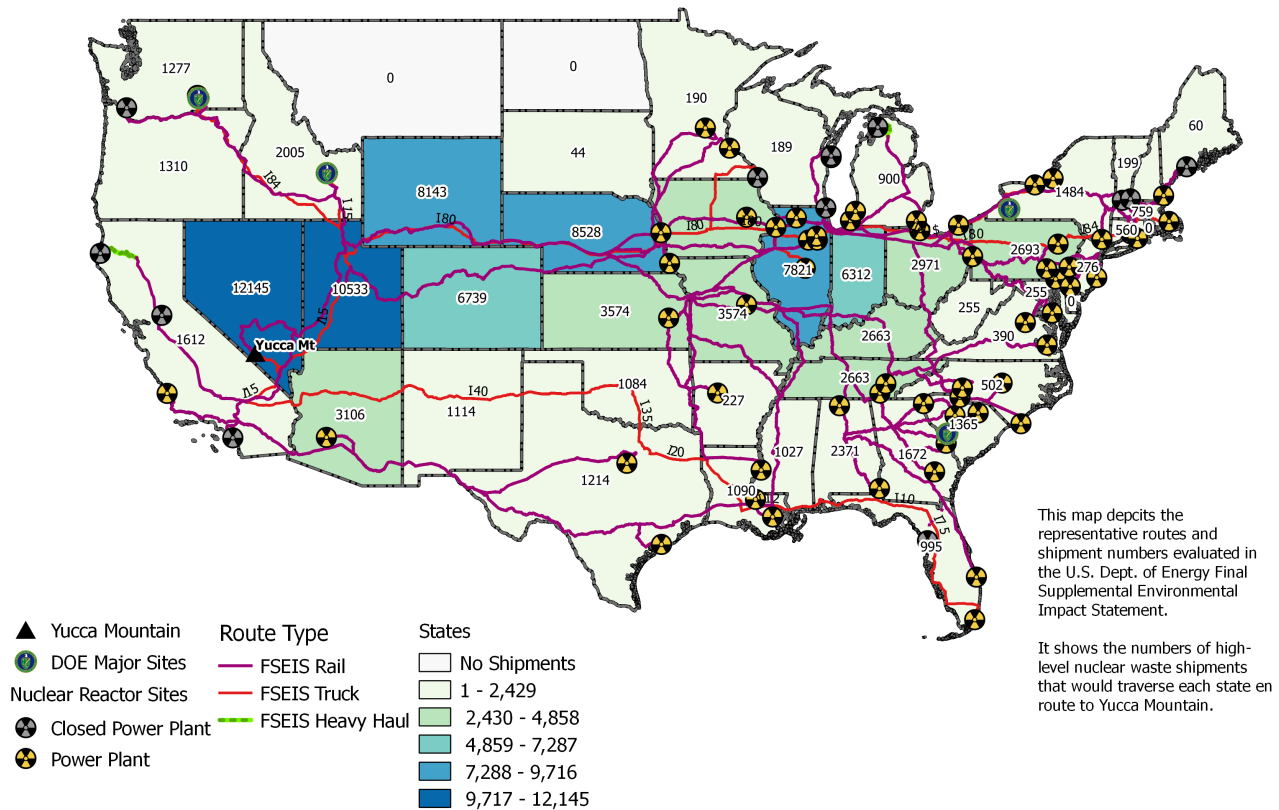


SanO: What's to be done?!



Mobile Chernobyls

Representative Transportation Routes to Yucca Mountain and Transportation Impacts (Cask Shipments by State)



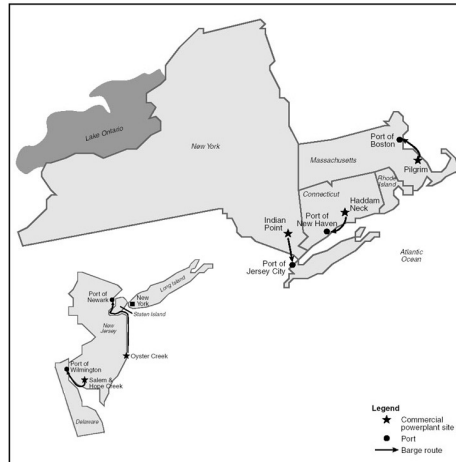
This map depicts the representative routes and shipment numbers evaluated in the U.S. Dept. of Energy Final Supplemental Environmental Impact Statement.

It shows the numbers of high-level nuclear waste shipments that would traverse each state en route to Yucca Mountain.

Transport Risks

Barge Shipments of High-Level Radioactive Waste on the Waters of NJ, NY, and CT Surrounding New York City

Proposed by U.S. Dept. of Energy under its Yucca Mountain Plan



Map taken from Figure J-9, Routes analyzed for barge transportation from sites to nearby railheads, page J-78 and J-81.

<u>Nuclear Reactor</u>	<u>Location</u>	<u># of Shipments Proposed</u>	<u>Barges offloaded at:</u>
Oyster Creek	Forked River, NJ	Up to 111, along NJ shore	Port of Newark, NJ
Indian Point	Buchanan, NY	Up to 58, down Hudson River	Port of Jersey City, NJ
CT Yankee	Haddam Neck, CT	Up to 42, on Long Is. Sound	Port of New Haven, CT
Total		Up to 211	

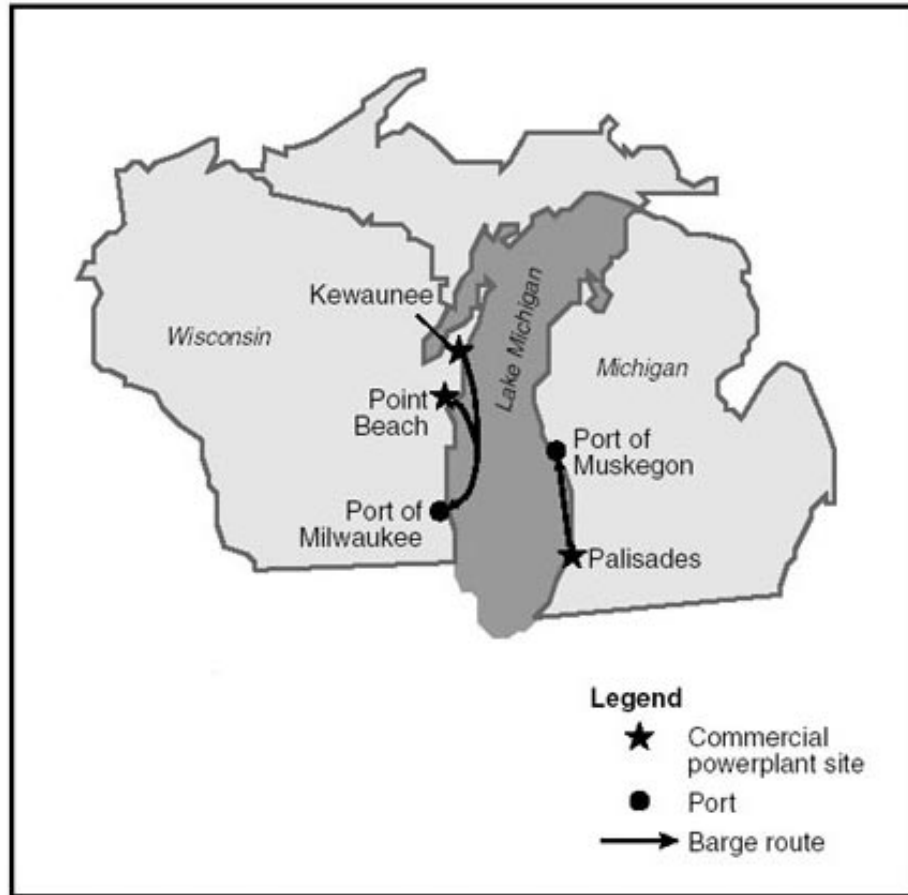
Table taken from Table J-27, Barge shipments and ports, page J-83.

Map and table taken from U.S. Department of Energy, "Final Environmental Impact Statement for Yucca Mountain," Appendix J ("Transportation"), Feb. 2002.

Where is Congress?!



Lake Michigan barge shipments



IL road and rail routes

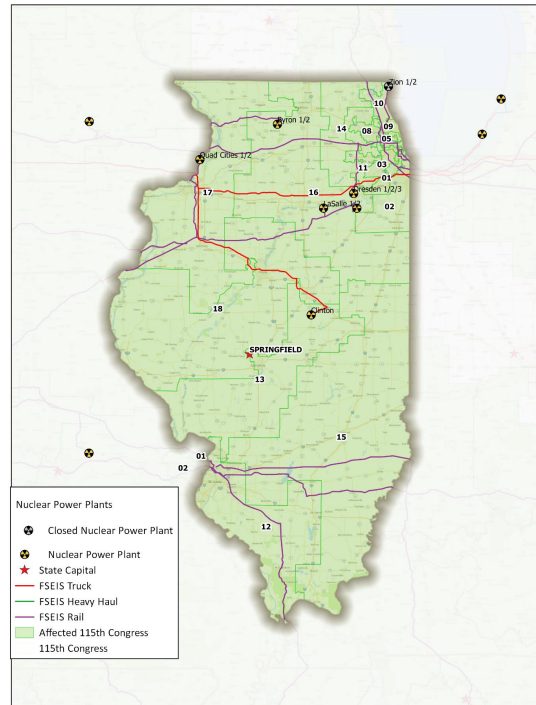
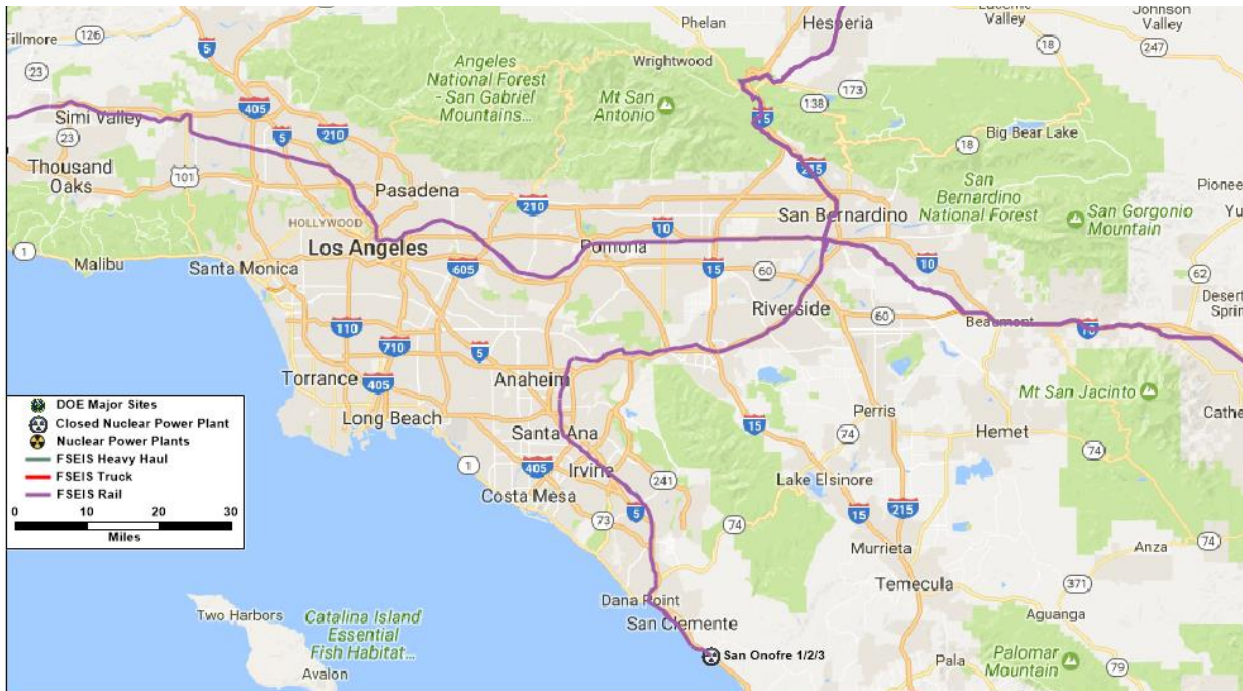


Figure 11 FSEIS Routes through Illinois

LA road and rail routes



We Do NOT Consent!



