



# What Congress Needs to Know About Pending Nuclear Waste Legislation

Environmental and Energy Study Institute

November 13, 2020

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# Irradiated (“Spent”) Nuclear Power Fuel -deadly and long-lasting

**Irradiated Nuclear Power Fuel is the most radioactive part of the nuclear power and weapons fuel chain\* comprising over 90 % of all the radioactivity from nuclear power and weapons.**

Fuel Chain\* is not a ‘fuel cycle’ and includes all steps to make nuclear power and weapons from mining and milling uranium through conversion, enrichment, fuel fabrication, reactors, reprocessing and high and “low-level” waste management.

References: US DOE/RW-0006, Integrated Data Base IDB 1994 p. 15 and 1996 p. 137; Linking Legacies DOE 1997 p. 51

# Fuel Chain Waste

Black--Nuclear Power

White--Nuclear Weapons

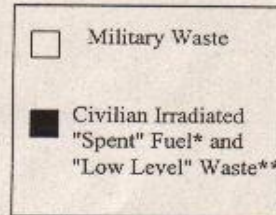
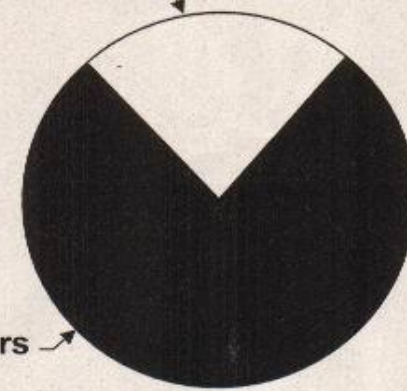
Top--by Volume

Bottom circle - by  
Radioactivity (in curies)

Refs: DOE Linking  
Legacies 1997; DOE  
Integrated DataBase  
IDB 1994, 1996

## Total US Nuclear Waste - Military and Civilian in Cubic Meters

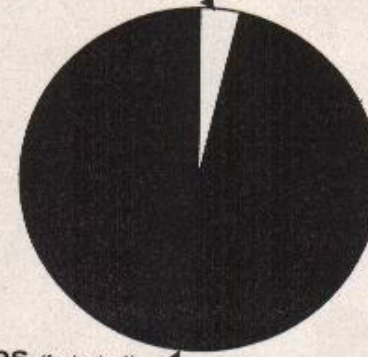
36,000,000 cubic meters  
(footnote 1)



121,000,000 cubic meters  
(footnote 2)

## Total US Nuclear Waste - Military and Civilian in Curies

1,000,000,000 curies (footnote 3)



27,000,000,000 curies (footnote 4)

\* Fuel rods.

\*\* Generally everything but fuel rods including waste from a few decommissioned reactors: However, about 100 reactors are not yet decommissioned and are not included in these figures. IEER Report, *High-Level Dollars, Low-Level Sense* (1992) p. 6, 29.

<sup>1</sup> US Department of Energy, Office of Environmental Management, *Linking Legacies: Connecting the Cold War, Nuclear Weapons Processes to their Environmental Consequences* (Washington, D.C. 1997) p. 58. (32,000,000 cubic meters of this total is waste produced in the milling and refining of uranium.)

<sup>2</sup> U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Integrated Data Base Report* (Washington, D.C. 1994) p. 15; (1996) pp. 13, 18, 117, 136-137, 139, 224. (119,000,000 cubic meters of this total are composed of waste produced in the milling of uranium.)

<sup>3</sup> *Linking Legacies*, p. 58.

<sup>4</sup> *Integrated Data Base Report* (1994) p. 15; (1996) p. 137.

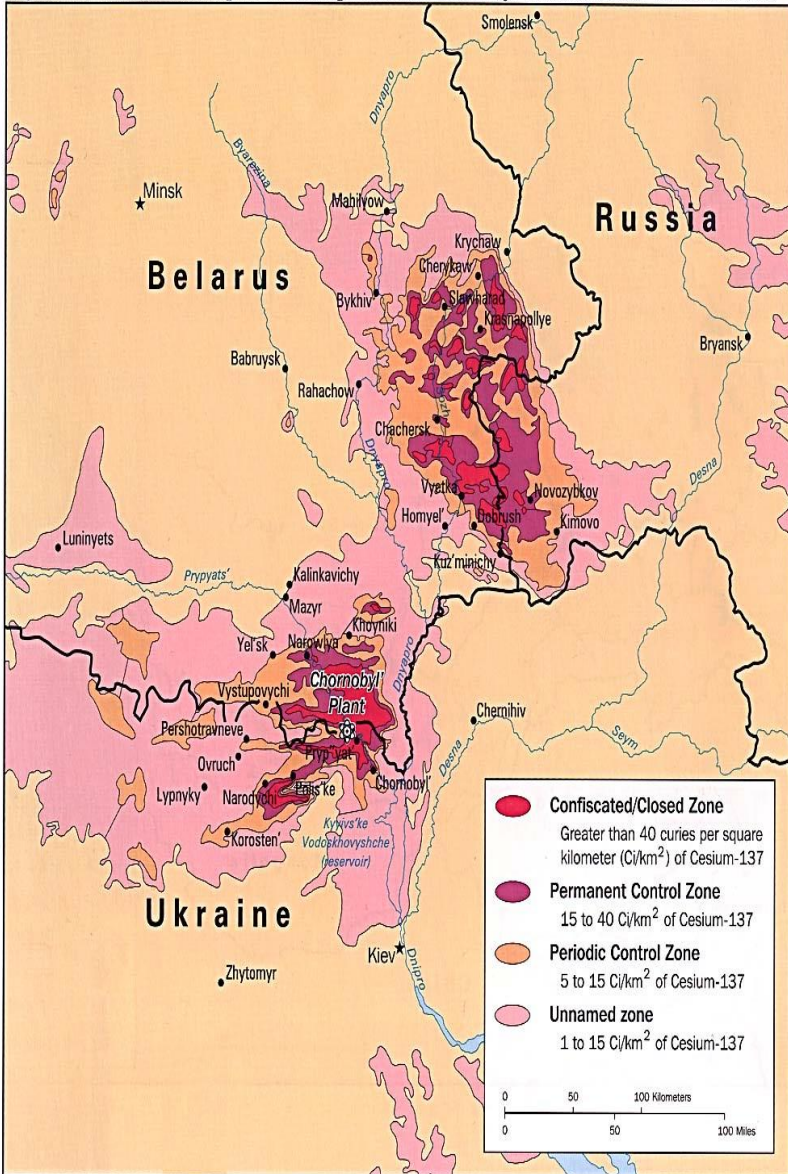
# Yucca Mountain Won't Work

- ▶ Chosen politically in 1987 in the 'Screw Nevada' Bill when Nevada was the weakest state in Congress with a candidate site for permanent repository
- ▶ Yucca Mountain Canceled administratively in 2009 as non-workable
- ▶ **Technically** - volcanoes, earthquakes, water, fractures and cracks, need for expensive titanium drip shields over every container (estimated cost \$9 Billion), required multiple rule-changes to prevent technical disqualification
- ▶ **Politically, Legally, Time-wise** – Nevada + Western Shoshone oppose it; NV + Native American Action Council have over 200 legal contentions against licensing which, if resumed, will take many years to litigate
- ▶ **Sovereignty and Environmental Justice**- Violates the Ruby Valley Treaty of 1863; Sacred Land for Western Shoshone
- ▶ **Economically** - throwing good money after bad; estimated cost would be \$100 Billion more than spent already, and requiring \$2-3 billion per year to resume licensing

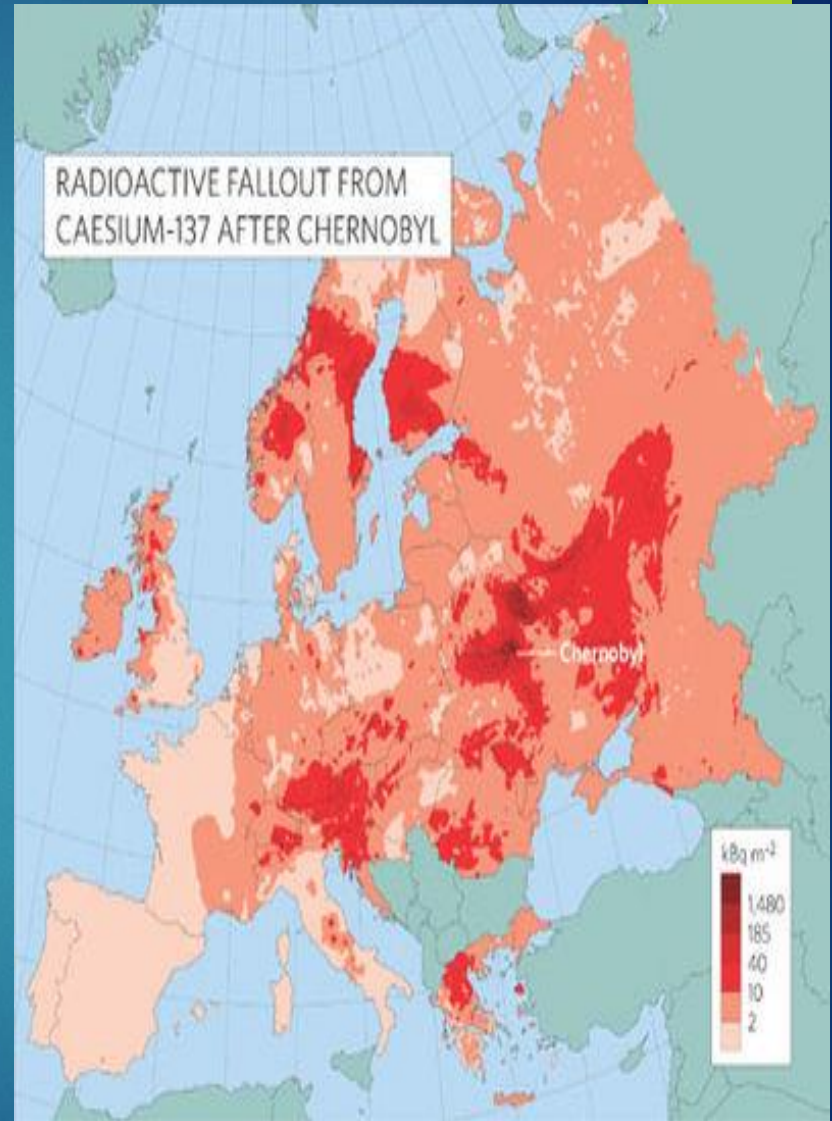
# Consolidated “Interim” Storage - CIS

- ▶ Previously called **MRS** - Monitored Retrievable Storage and **AFR** – Away From Reactor Storage, Consolidated “Interim” Storage **CIS** would be a centralized location to which irradiated fuel would be taken to store before going to a permanent site.
- ▶ IF truly “Interim, “ CIS will require **twice as many risky shipments** as moving the waste once to a permanent location.
- ▶ IF NOT “Interim” the sites will become **de facto permanent** without meeting any of the requirements for permanent isolation.
- ▶ Shipments would be enormous, heavy and intensely radioactive. Each shipment has more plutonium than the Nagasaki bomb and more radioactive cesium than the Chernobyl disaster is releasing.
- ▶ Consolidating waste is a big step toward dangerous, dirty and expensive **reprocessing** which makes the **waste problem worse** and enables **proliferation** of nuclear weapons materials.
- ▶ All attempts at opening such sites have been stopped since first proposed in 1979.

Figure 31. Radiation Hotspots Resulting From the Chernobyl' Nuclear Power Plant Accident



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# Risks of Consolidated “Interim” Storage

Consolidated “Interim” Storage would slow the transfer of waste to permanent isolation and inhibit efforts for safer on-site and near site storage, by taking resources intended for permanent isolation.

Transport casks full of waste are heavy and intensely radioactive and cannot completely shield the radiation coming from the waste.

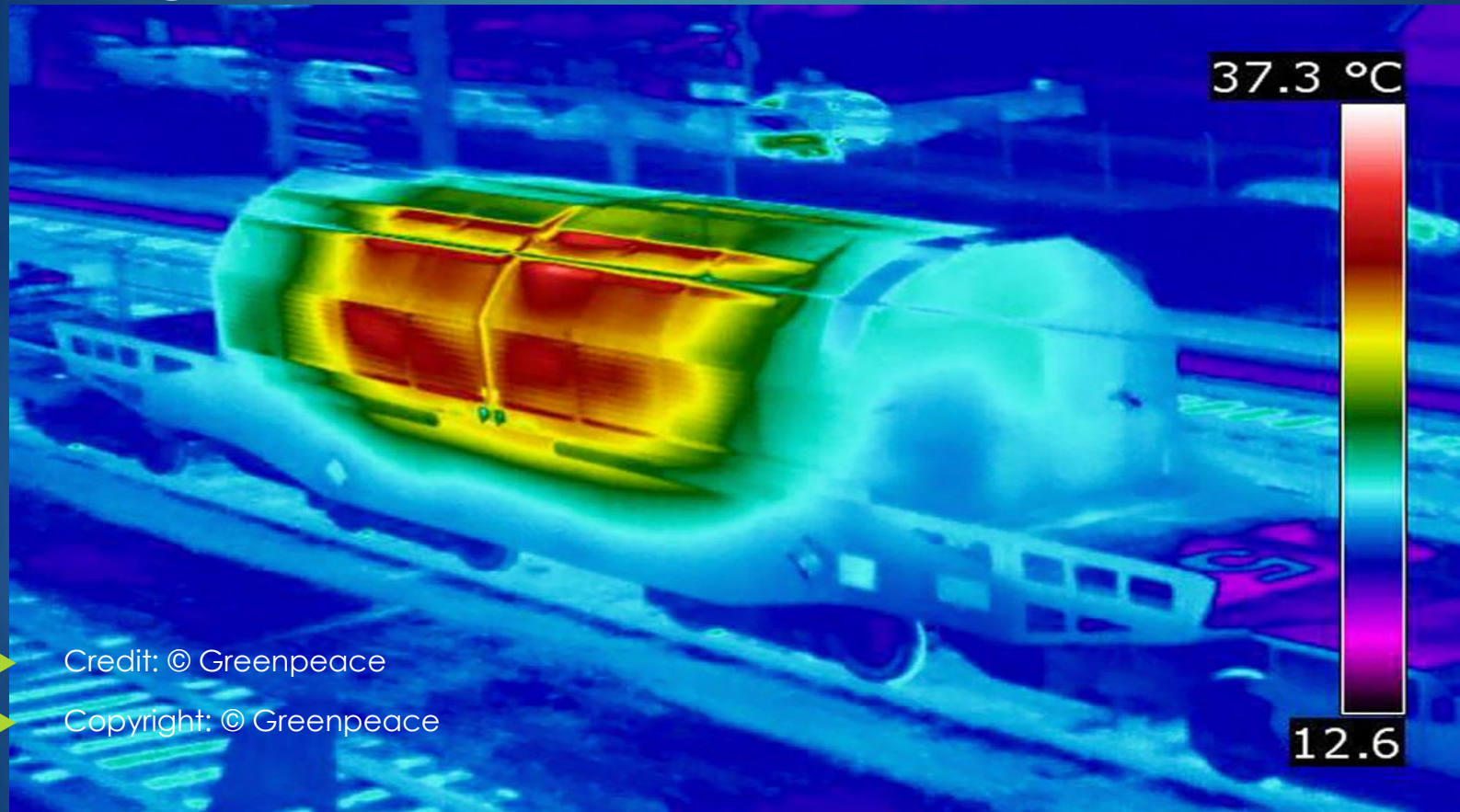
Even without an accident people will be exposed routinely along the routes...similar to multiple x-rays per hour.

The 100 to 250 ton loads can damage roads, bridges, rails and basic infrastructure, causing derailments and accidents for subsequent travelers.

Accidents will happen. With thousands of shipments statistics project accidents--some with radioactive releases; some without. Casks are not designed for real world conditions.

There is NO insurance for nuclear contamination from accidents--check your policy for express exclusion.

# Irradiated Fuel is Thermally and Radioactively HOT—infrared (heat) image of train cask







# Consolidated “Interim” Storage Means Massive Transport For DECADES Through MOST Congressional Districts

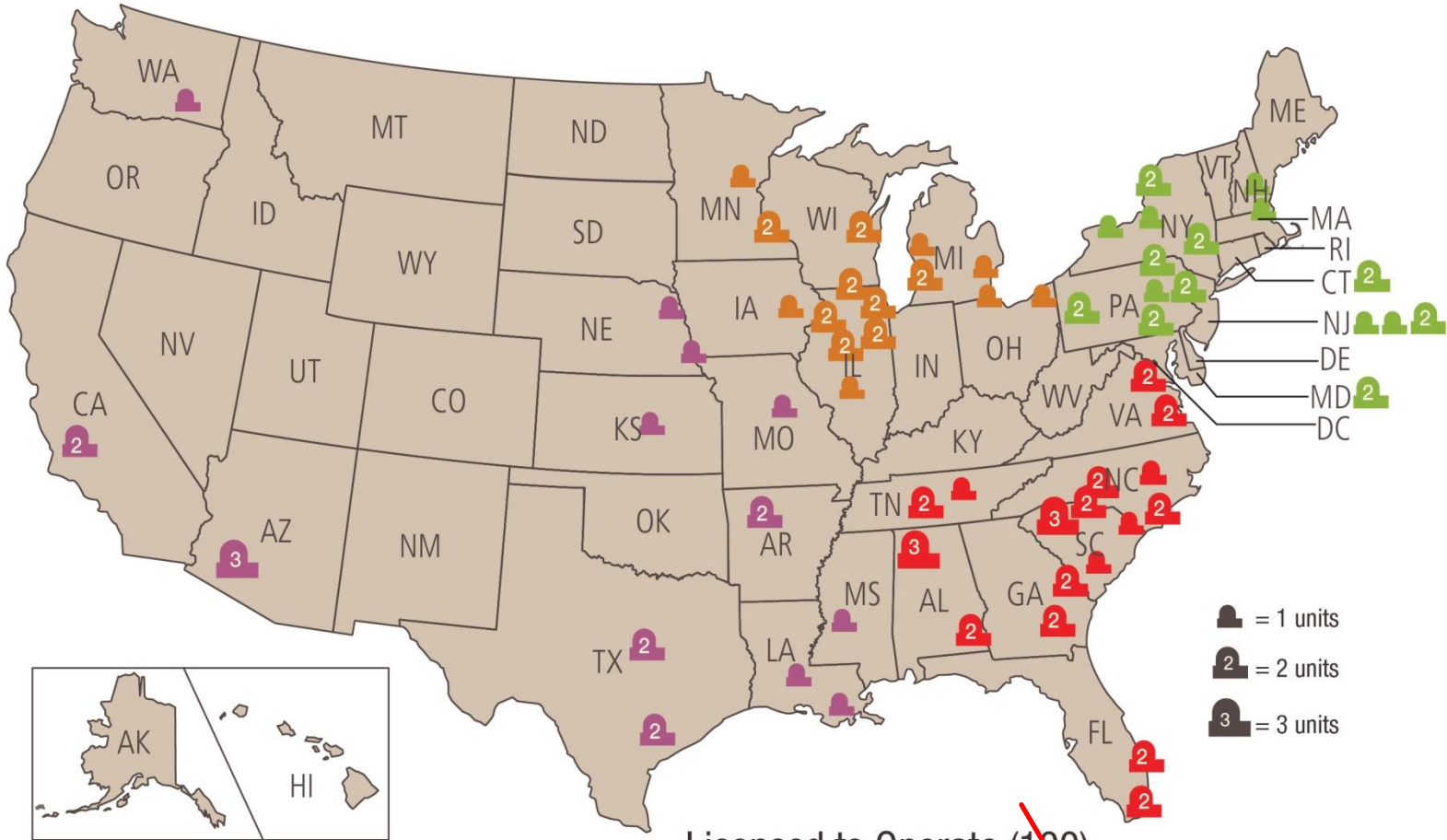
Regular shipments would move waste on roads, rails and  
waterways

TO the “Interim” site(s) and again

FROM the “Interim” site(s) to Permanent Sites

Better storage is needed at and/or near the reactors that  
generate the waste

# U.S. Operating Commercial Nuclear Power Reactors



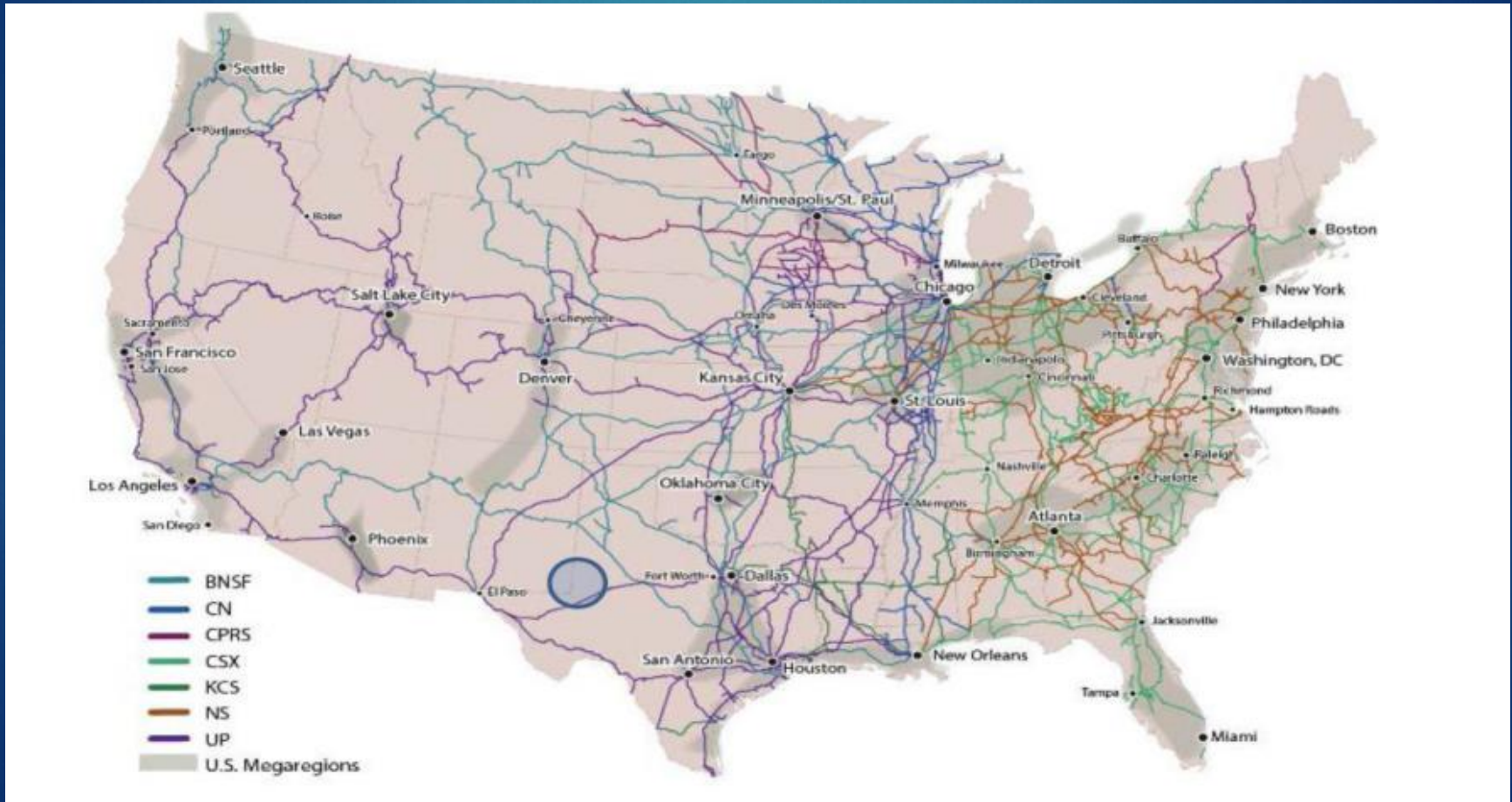
Licensed to Operate (100)

94

# Texas and New Mexico are Targeted for Nuclear Reactor Waste - as are all routes from reactors, to and from these sites

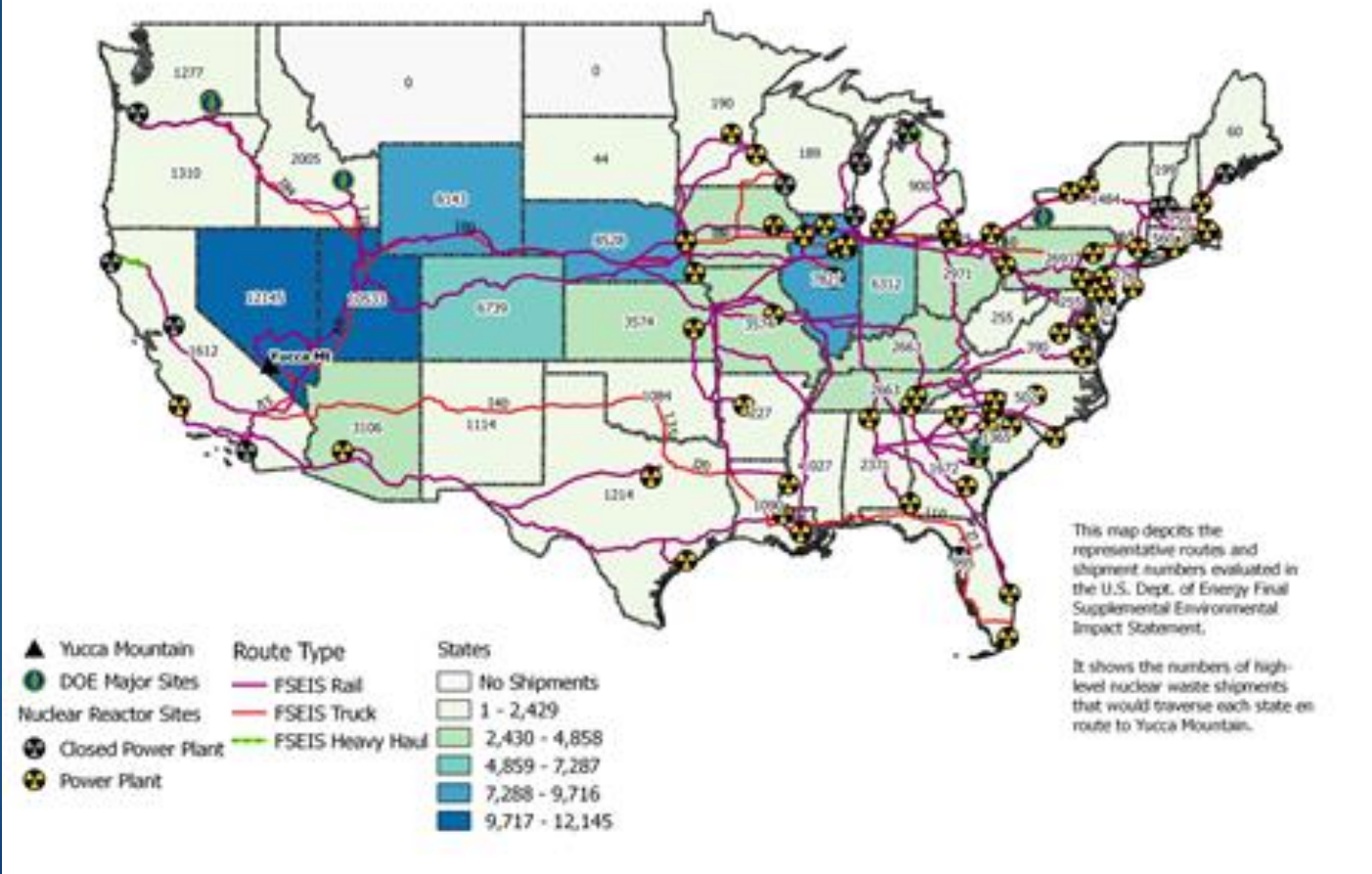
- ▶ Two companies have applied to the Nuclear Regulatory Commission (NRC) for a Consolidated Interim Storage (CISF) License.
- ▶ **ISP-Interim Storage Partners** has applied for a license to store 40,000 metric tons (MTHM) of high-level radioactive waste above-ground in Andrews County, Texas for 40 years with plans to extend this timeframe. ISP, is the name for WCS-Waste Control Specialist together with their partner, Orano.
- ▶ **Holtec** wants to store over 173,000 metric tons (MTHM) of this deadly waste for up to 120 years at a site in between Hobbs and Carlsbad, New Mexico. The waste would be slightly below ground, with the tops of casks exposed.

Transport Routes to ISP/WCS TX site -  
similar to Holtec NM site (>3x more  
waste than to Yucca)



# Shipment Routes to Yucca Mt; similar to proposed CIS sites (70,000 MTHM)

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



# Transporting Radioactive Waste = High Level Risks

- ▶ Transport to the ISP and Holtec sites would require routine shipments every few days for decades.
- ▶ Even a small radiation release from a serious accident could contaminate 42 square miles of land.
- ▶ **Clean up costs could exceed \$620 million in a rural area, in an urban area, it could cost up to \$9.5 billion to raze and rebuild the most heavily contaminated square mile.**

(<http://www.state.nv.us/nucwaste/yucca/trfact01.htm> - section 4)



65 mph head-on train collision in Panhandle, TX – June 2016



Derailment in Oct. 2015 due to flooding in Corsicana

# TCEQ Study – March 2014



## Assessment of Texas's High Level Radioactive Waste Storage Options

This report warned about potential sabotage of high-level radioactive waste, especially in highly populated areas.

- “...arguments against centralized interim storage are that
- **the risk** of transporting the irradiated fuel **is greater than the benefits** of centralized interim storage; the waste would be transported twice - from the reactor to the storage site and from the storage site to the disposal site - which would result in **greater risks, cost and worker exposures,**
  - and **the interim storage may become a permanent** solution since pressure for a geological repository would diminish if the DOE takes title to all of the SNF while in storage.”

# More Protective Cask Standards Needed

- **NRC requirements for Storage and Transport containers are INADEQUATE for real world conditions.**

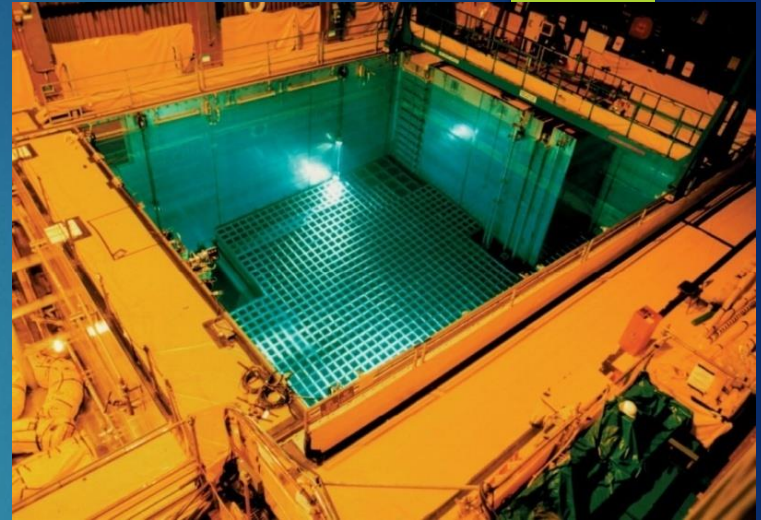
No matter where casks are, they need to be designed and built to last and to enable monitoring and inspection in advance of failure

- Criteria for certifying transport containers in 10 CFR 71 ignore the realities that:
  - ▶ fires can burn hotter and longer than half an hour at 1475 degrees F
  - ▶ bridges are higher than the 30-foot drop that containers are supposed to withstand
  - ▶ trains and trucks travel faster than 30 MPH
  - ▶ bodies of water in which casks could be submerged are deeper than 3 feet and often 65 feet and it would take longer than 1- 3 hours to locate and retrieve such heavy massive containers



# No plan for cracking or leaking canisters

- ▶ License requires returning fuel to pool, but it has never been done with thin-walled canisters
- ▶ Hotter fuel cannot be unloaded back into pool
  - ▶ Results in “reflooding” problem, yet NRC is ignoring this
- ▶ Plan to destroy empty fuel pools
  - ▶ NRC falsely assumes nothing can go wrong in dry storage
  - ▶ Pool is the only on-site option currently available to replace defective canisters
- ▶ Hot cell (dry fuel handling/transfer facility) is only other option – there is none in the country large enough for irradiated fuel



# Hardened On-Site Storage - (HOSS) plus More Protective Minimum Requirements for Storage are needed

Rather than weakening protections and granting exemptions at closed reactors, the NRC must refocus on storage, management, monitoring and isolating waste and on meaningfully including local, tribal and state input into decisions on storage, decommissioning and decommissioning plans.

# HOSS Principles (1)

- ▶ Irradiated fuel must be stored as safely as possible as close to the site of generation as possible;
- ▶ HOSS facilities must not be regarded as a permanent waste solution, and thus should not be constructed underground and the waste must be retrievable;
- ▶ The facility must have real-time radiation and heat monitoring for early detection of problems with containers;
- ▶ 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;
- ▶ Placement of individual canisters that makes detection difficult from outside the site boundary.

## HOSS Principles (2)

- ▶ Hardened On-Site Storage (HOSS) is supported by organizations in all 50 states. It would provide better security at reactor sites with robust dry storage and community oversight, including real-time monitoring of heat and radiation. HOSS is rooted in values of community protection and environmental justice and will provide increased protection from human or natural disasters, like terrorist attacks and earthquakes
- ▶ HOSS facilities are **not permanent** waste solutions, and therefore should not be constructed deep underground as the waste must be retrievable. However, they are a workable solution that will allow us to explore scientifically sound, and socially and environmentally just long-term management systems.
- ▶ <https://www.nirs.org/wp-content/uploads/radwaste/policy/hossprinciples3232010.pdf>

# NRC Must Improve Waste Management at and near the sites of generation

Common sense dictates that storage and transport casks be designed so that they:

Won't crack

Can be repaired, seals replaced and waste re-containerized

Are monitored in real time to **prevent** failure

Meet ASME NE pressure vessel code for nuclear vessels

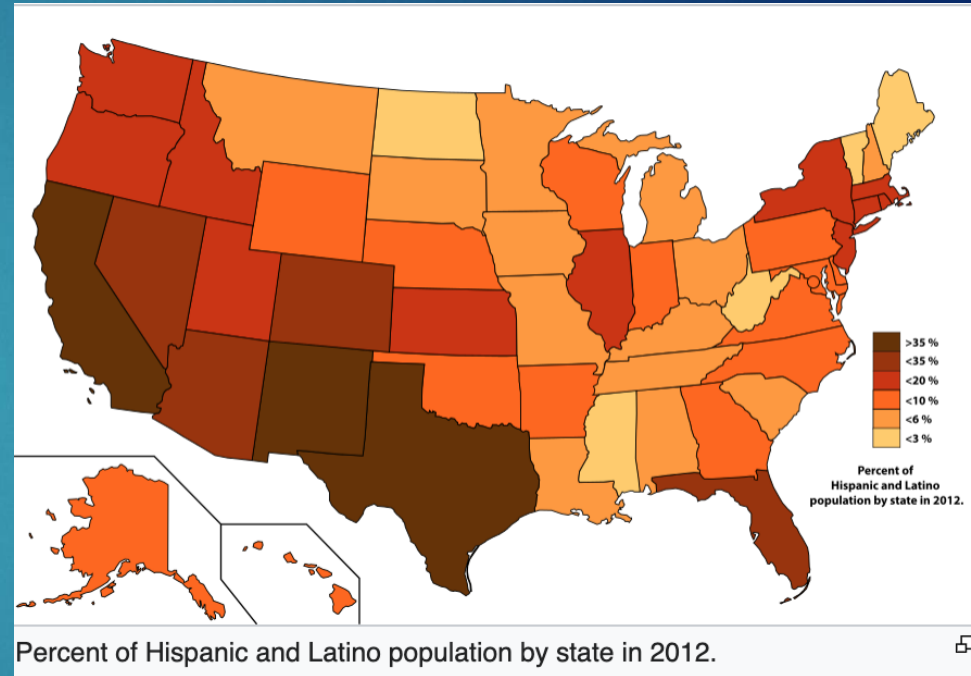
Meet defense in depth standards (redundancy)

Have gamma/ neutron protection

# We Must Prevent Massive Environmental Injustice

Environmental racism - “the deliberate targeting of communities of color for toxic waste facilities, the official sanctioning of the life-threatening presence of poisons and pollutants in our communities...”

Dumping the nation's deadliest of radioactive waste on communities in Nevada, West Texas and New Mexico would be massive environmental injustice.



This map shows Texas and New Mexico to be among the states with the highest LatinX populations. There are many indigenous people in the region as well.

# Bills in the 2019-2020 Congress on CIS and / or Yucca Mountain

- ▶ HR 2699 / S 2917 Nuclear Waste Policy Amendments Act of 2019 (legalizes CIS and restarts the canceled Yucca Mountain licensing process)
- ▶ S1234 Nuclear Waste Administration Act of 2019 (major push for CIS )
- ▶ HR 3136 Storage and Transportation of Residual and Excess Nuclear Fuel Act of 2019 (legalizes and directs CIS)
- ▶ HR 8258 Spent Nuclear Fuel Solutions R&D Act (supports new reactors AKA more waste, reprocessing, CIS + more)

HR 2699/ S 2917

The Nuclear Waste Policy  
Amendments Act of  
2019



HR 3136

Storage and Transport of Residual  
and Excess Nuclear Fuel Act of  
2019

§ 1234

# Nuclear Waste Administration Act of 2019

# Bills that could move in Lame Duck Session



Appropriations (see Hancock presentation)

Continuing Resolutions would not CIS beyond DOE Integrated Waste Management Plans, nor do they fund Yucca Mountain

S 903 HR 3306 **Nuclear Energy Leadership Act NELA** would lead to making more nuclear waste; subsidizes new nuclear power/waste production by reversing existing requirement for government agencies to get the best price for electricity (among other provisions) could be added to the must-pass National Defense Authorization Act HR 2500

# Bills in the 2019-2020 Congress with Public Interest Support

- ▶ S 947 /HR 3783 Radiation Exposure Compensation Act of 2019\*\*\*
- ▶ HR 1544 /S 649 Nuclear Waste Informed Consent Act
- ▶ HR 8277 /S \_\_\_ Nuclear Plant Decommissioning Act of 2020
- ▶ S 1985 /HR 5608 Stranded Act

*[the last 4 compensate communities with closed reactors and waste]*

# S 947 / HR 3783 Radiation Exposure Compensation Act of 2019

The bill would extend compensation under the Radiation Exposure Compensation Act until 2045- It is due to expire in 2022.

It would extend this compensation to radiation victims and survivors in New Mexico, Idaho, Guam, and the Northern Mariana Islands, and to uranium miners/workers who started working in the uranium mining industry after 1971.

Proponents are calling on House Judiciary Chair Nadler to hold a hearing and VOTE before end of year and on Senate Judiciary Chair Graham to take a vote so it can pass this year.

This bill is necessary to compensate the victims of nuclear weapons tests and uranium workers for their medical costs and pain and suffering. Thousands of Americans have suffered for decades due to our Cold War nuclear weapons tests and programs, but have never been compensated.

# VLLW- Very Large Lies about Nuclear Waste

The NRC is considering allowing vast amounts of radioactive decommissioning and operations waste to go to regular waste landfills instead of the licensed nuclear sites.

Congress revoked NRC's efforts to do this—then called Below Regulatory Concern-- in the Energy Policy Act of 1992. But NRC keeps trying.

Now NRC proposes even MORE and higher contaminated nuclear waste to go to unregulated places. Thousands commented against VLLW this year.

Nuclear waste other than the irradiated fuel – including contaminated and activated metal, concrete base mats and containment domes with radioactivity in the pores, plastics, wood, asphalt, equipment, soil, pipes and more could go to landfills that request it. Could get into recycling for consumer goods.

NRC would authorize the sites as “specific exempt” and let them release as much radiation as an operating nuclear power reactor! No one would ever even know.

**Congress must stop this recurring threat.**

## **BACKGROUND and RESOURCES**

### **Nuclear Waste Transportation Routes**

*(based on Yucca Mountain – similar for CIS)*

[Estimated Shipments for Each State](#)

[State Transport Route Maps](#)

[City Transport Route Maps](#)

[List of Congressional Districts with Transport Routes](#)

### **Backgrounders on Nuclear Waste**

[Nuclear Basics: High Level Radioactive Waste](#)

[Hot Cargo: Radioactive Waste Transportation](#)

[Yucca Mountain in Brief](#)

[Consolidated “Interim” Storage of High-Level Radioactive Waste](#)