What is the DOE plan to resolve these major nuclear waste issues?

SUMMARY – DOE plan risks major short-term radiation releases

Each of the over 2000 U.S. spent nuclear fuel storage thin-walled canisters holds more Cesium-137 than released from Chernobyl and are vulnerable to short-term cracks and leaks. There are currently 51 at San Onofre and about 100 more planned.

The DOE plan is to transport and store existing thin-walled canisters with the assumption nothing will go wrong. However, thin canisters cannot be inspected, repaired, maintained, and are susceptible to short-term cracking and major radiation releases. They have no early-warning monitoring system prior to leaking. Canisters with even partial cracks cannot be transported (NRC 10 CFR §71.85). The Nuclear Waste Policy Act §141(b)(1) requires monitored retrievable maintainable storage; not promises of future solutions. Other countries such as Germany and Japan use thick-walled metal casks 10" to almost 20" thick that do not have these issues. We should accept no less.

How will the DOE demonstrate that the federal government can fund, transport and manage nuclear waste without significant radioactive leaks? How will they demonstrate that the federal government is able to comply with existing nuclear waste laws, contracts and agreements? They have done neither.

Short-Term Storage Risks

- **Thin-walled (1/2" to 5/8" thick) stainless steel welded canisters can crack, cannot be inspected, repaired, maintained or adequately monitored**. **Even a microscopic crack will release millions of curies of radioactivity into the environment**. NRC Mark Lombard *https://youtu.be/QtFs9u5Z2CA and* Holtec CEO Kris Singh: *http://youtu.be/euaFZt0YPi4*
- **According to the NRC, once cracks start they can penetrate the canister wall in 16 years**. Canisters are vulnerable to cracking from marine environments and other conditions, such as air pollution. A Koeberg nuclear plant waste water tank (similar to U.S. canisters) leaked in 17 years with cracks deeper (0.61") than U.S. thin-walled (0.50") canisters. Hotter containers will have faster crack growth. A two-year old Diablo Canyon canister has all the conditions for cracking. *http://bit.ly/SAND2015-2175R*
  http://pbadupws.nrc.gov/docs/ML1425/ML14258A081.pdf
- **The DOE and NRC have no plan to address failure of canisters or fuel assemblies.** The Nuclear Waste Policy Act requires monitored retrievable storage. The DOE plan does not comply with this. Pools or other in-place methods to retrieve fuel must be available. An early-warning monitoring system prior to a leak must be required.
- **Near real-time radiation monitoring with public access and emergency planning is needed.**
- **Most other countries use thick-walled (about 10" to 20" thick) metal spent nuclear fuel storage/transport casks that do not have these problems**, such as in Germany, and Japan at Fukushima. And these countries store their transportable irradiated spent nuclear fuel casks in hardened structures for additional protection.

Transport Risks

- **Cracked canisters cannot be transported and must be inspected before transport.** Existing canisters may have partial cracks, but cannot be inspected for cracks. *http://pbadupws.nrc.gov/docs/ML1411/ML14114A099.pdf*
- **Major transport infrastructure issues and the safety of transporting irradiated spent fuel** through our communities have not been adequately addressed.
- **Canisters need up to 45 years cooling (after removed from reactor) to meet transport safety regulations.**
  http://pbadupws.nrc.gov/docs/ML1411/ML14114A132.pdf *www.nwtrb.gov/meetings/2013/april/boyle.pdf*

Inadequate Funding and Legal Authority

- **Storage requirements must be based on short and long term safety needs, not annual Congressional funding limits.** The DOE's current recommendation reflects the latter. The federal government must guarantee that sufficient funds are allocated for as long as transport and/or storage of waste is need – up to 120 years for short-term storage (per NRC definition of short-term) and for long-term storage, which is basically forever.
- **States and Tribal Nations must have legal authority and funding** to establish and enforce higher standards for storage and transport, aging management, radiation levels, and emergency planning.
- **States and localities must be legally authorized to establish their own criteria for standing and volunteer status**. No further requirements may be set by the federal government except any expression of interest in storing nuclear waste must affirm that it is consistent with *Environmental Justice Executive Order 12898*.
- **Communities impacted by radioactive releases need to be guaranteed adequate financial compensation**.

http://bit.ly/SAND2015-2175R

Hotter canisters increase speed of cracking through canister wall.

Unknown when cracks will start.

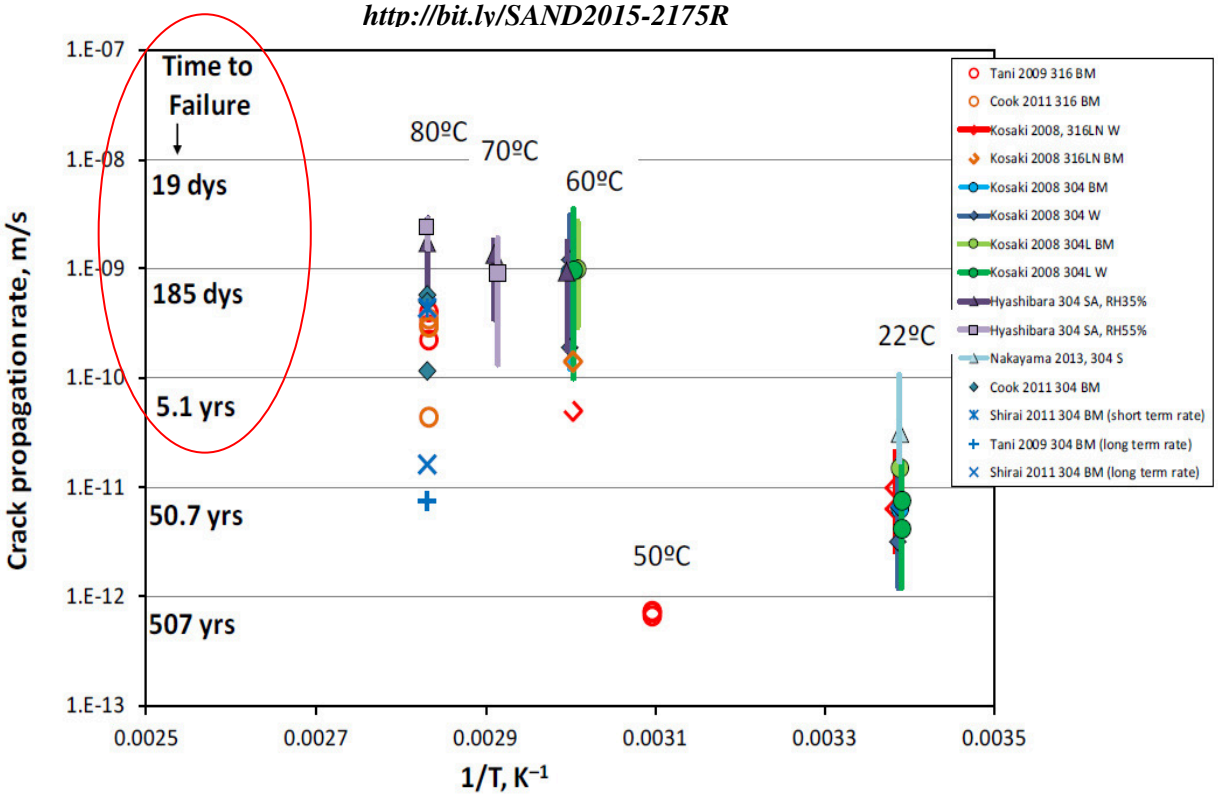

Figure E-5. SCC propagation rates for atmospheric corrosion of 304SS and 316SS. BM –base metal; W–weld sample; SA–solution annealed; S–sensitized. Bars represent reported ranges (if more than one), while symbols represent average values. Time to failure corresponds to the time required to penetrate a 0.625" thick canister wall.

U.S. DEPARTMENT OF ENERGY
Nuclear Energy

Long-Term Performance Challenges

www.nwtrb.gov/meetings/2013/april/boyle.pdf

Up to 45 years cooling required before meets DOT safety transport regs (~20kW)

Thermal Load Management

- DPCs are now loaded at about 20 kW
- Canister design storage limits are typically 24 kW, maximum currently available is rated to 40.8 kW for storage
- Hottest waste packages considered for Yucca Mountain emplacement were 18 kW
- Other repository design concepts call for much cooler waste packages (e.g., SKB calls for initial load per package ≤ 1.7 kW)

Other performance considerations

- Engineered barrier performance at elevated temperatures (e.g., clay-based backfill/buffer performance)
- Criticality control

Estimated Cooling Time for PWR fuel to Reach Specified Thermal Power, as a Function of Canister Size and Burnup