DOE's radioactive waste storage plan risks "Chernobyl" size leaks

Before seeking input on consent-based siting the Department of Energy (DOE) must resolve issues that will likely result in major radiation leaks into the environment. The existing over 2000 highly radioactive thin-walled spent fuel storage canisters, each containing about a Chernobyl's worth of Cesium-137, are not safe and the DOE's proposed pilot uses these canisters. The DOE must demonstrate that the federal government can fund, transport and manage nuclear waste without significant radiation leaks and demonstrate that the federal government can comply with existing nuclear waste laws, contracts and agreements. They have not done this.

Storage Risks

- **Existing thin (1/2" to 5/8" thick) stainless steel canisters can crack, cannot be inspected, repaired, maintained or adequately monitored**. The DOE must require systems that do not have these flaws and not accept promises of future solutions**.** NRC Mark Lombard: *https://youtu.be/QtFs9u5Z2CA*
- **Canisters cannot be inspected or repaired and even a microscopic crack will release millions of curies of radiation into the environment.** Holtec canister CEO Kris Singh: *http://youtu.be/euaFZt0YPi4*
- **Once cracks start they can penetrate hot canister walls in 5 years or less**. Canisters are vulnerable to cracking from marine environments and other conditions, such as air pollution (sulfites). A similar component at the Koeberg nuclear plant leaked in 17 years with numerous cracks, some thicker than most nuclear waste canisters. A two-year old Diablo Canyon canister has all the conditions for cracking to begin**.** *http://bit.ly/SAND2015-2175R http://pbadupws.nrc.gov/docs/ML1425/ML14258A081.pdf*
- **DOE plan assumes nothing will go wrong with the canisters or fuel, so no pools or other method to remediate problems has been addressed.** The current NRC approved remediation for a failed canister or fuel is to unload fuel in a spent fuel pool. The DOE requires no spent fuel pool nor any other plan.
- **Near real-time radiation monitoring with public access and emergency planning are needed**.
- **Most other countries use thick-walled (about 10" to 20" thick) irradiated spent fuel storage/transport casks that don't have these problems**, such as in Germany, and Japan at Fukushima. These countries store their irradiated spent fuel casks in hardened structures for additional protection.

Transport Risks

- **Cracked canisters cannot be transported** (NRC 10 CFR § 71.85). Existing canisters may have cracks.
- **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 regulations.** *http://pbadupws.nrc.gov/docs/ML1411/ML14114A132.pdf www.nwtrb.gov/meetings/2013/april/boyle.pdf*

Funding and Legal Authority Inadequate

- **Storage container requirements must be based on meeting short and long term needs, rather than on how much money Congress is willing to allocate each year**. The DOE's current recommendation is the latter (partially due to Congress redirecting existing funds originally designated for a permanent repository). The federal government must guarantee sufficient funds will be allocated for as long as the waste needs to be transported and needs be stored – 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 set 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, and no further requirements may be set by the federal government except that any expression of interest must affirm that it is consistent with the requirements of Executive Order 12898 regarding Environmental Justice**.
- **Communities impacted by radioactive releases need to be adequately financially compensated**.

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

Once started cracks can grow through canister wall in less than 5 years

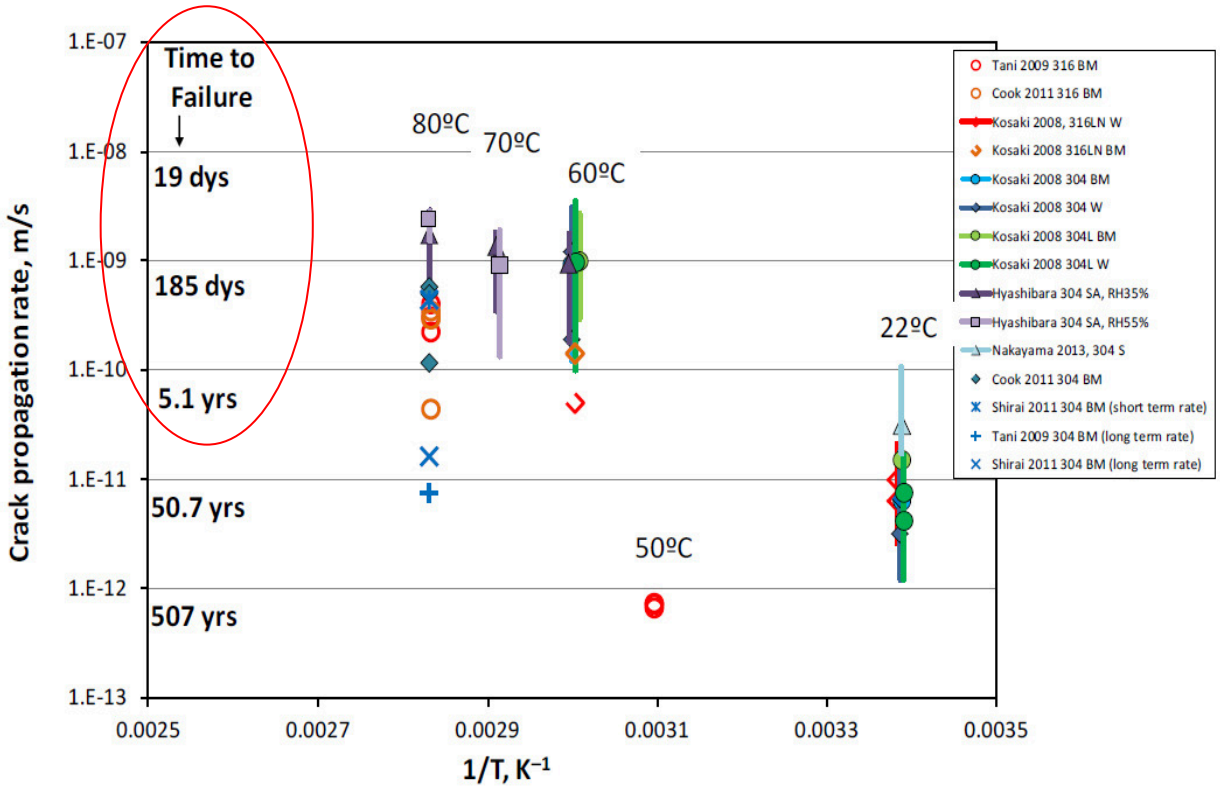

Figure E-5. SCC propagation rates for atmospheric corrosion of 304SS and 316SS. BM –base metal; W–weld sample; SA–solution annealed; S–sensitized. Bars represent reported ranges (if more than one), while symbols represent average values. Time to failure corresponds to the time required to penetrate a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

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

U.S. DEPARTMENT OF ENERGY
Nuclear Energy

Long-Term Performance Challenges

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

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