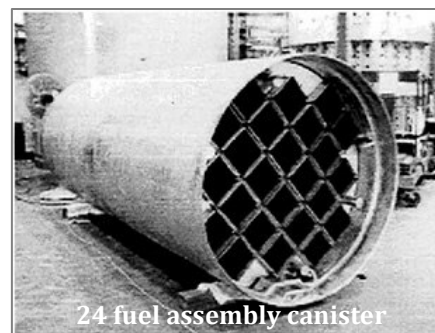


Choose Safety over Profits!

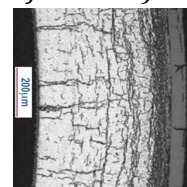
REDUCE number of spent fuel assemblies in each storage

canisters. This lowers heat and radiation levels, reduces risks of failure, reduces amount of potential radiation releases. **Edison's Plan:** Squeeze 32 fuel assemblies in a canister size similar to the current 24 fuel assembly canister (67.19" vs. 69.76" diameter). And load hotter fuel.¹

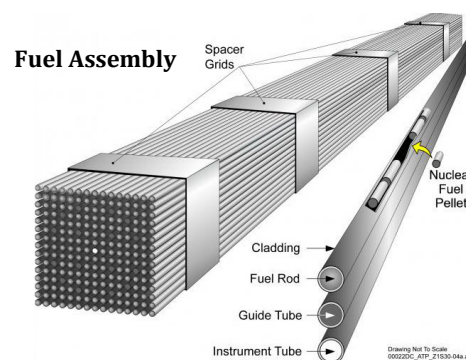
CAN each fuel assembly. Enclosing each fuel assembly in a stainless steel failed fuel can prior to loading into the dry canister improves retrievability of fuel assemblies and improves ability to transport the waste. **Edison's Plan:** Use new 32PTH2-DSC canisters that have NO capability to put damaged fuel assemblies into failed fuel cans. Areva created a new definition of "damaged fuel" just for this canister.² Reasons to can:



1. **Fuel can degrade the protective cladding as it cools in the canister.** The higher the burnup level, the higher likelihood of cladding failure.³ (Per Peterson was not aware of this, but now confirms this).
2. **NRC requires each fuel assembly be retrievable** so it can be transferred to another container when needed and/or transported. By canning each fuel assembly, it increases the likelihood the assembly will be retrievable if the cladding fails.⁴
3. **Fuel burnup levels as low as 30 GWd/MTU** are more likely to damage cladding.⁵
4. **No feasible method exists to fully inspect fuel assemblies for damage** prior to loading into dry canisters. Therefore, all fuel assemblies should be treated as damaged and canned.⁶
5. **Unknown damage to cladding** from extended storage. Fuel may remain on-site for 60+ years.⁷
6. **Higher risk of radiation release** from transportation accident, especially high burnup fuel.⁸
7. **No proven method to transfer damaged spent fuel assemblies** from a failed canister to another canister.
8. **Coastal environment** degrades stainless steel canisters, increasing risk of failure.⁹ This includes the canisters Edison plants to use with the 316L SS (stainless steel).
9. **Areva M5 protective cladding** shows higher evidence of failure with higher burnup fuel than previous Zirconium cladding material.¹⁰ Edison received NRC approval to use M5 cladding¹¹
10. **No technology to monitor inside dry canisters.**¹²
11. **No means of confirming the presence of helium in welded containers** or casks, nor is there a requirement for periodically inspecting the integrity of the closure welds for defects. If helium leaks and air enters the canister or cask, this, together with the moisture in the air, can result in corrosion of the fuel cladding, the canister, and the cask ¹³
12. **Unknown cladding damage from thermal heat.** Japan limit peak cladding temperature to 275°C, much lower than the 400°C peak cladding temperature limit in the United States. More realistic thermal calculations are needed.¹⁴



Cladding Damage



REMOTELY monitor spent fuel pool water level. Implement a system to monitor spent fuel pool water levels remotely as required by the NRC (after the Fukushima nuclear meltdown).¹⁵ **Edison's Plan:** requested exemption from this requirement.¹⁶

COOL spent fuel using most conservative cooling requirements. NUHOMS® dry canister specifications state up to 15+ years.¹⁷ **Edison's Plan:** Use shorter cooling periods (5-7 years).

ADD skilled staff. Adequate technical staff is needed in order to have expertise to make safe decisions and to adequately review vendor product claims. Major radiation dangers exist with spent fuel in pools and canisters. Senators requested the NRC cease exempting licensees of decommissioning nuclear reactors from its emergency response and security regulations.¹⁸ **Edison's Plan:** Eliminated 39 emergency response positions. Edison received an NRC Notice of Violation for this.¹⁹ Relies on vendor expertise. Requested exemption from staffing requirements (e.g., substitute "Fuel Handlers" for trained Operators).²⁰

CHOOSE SAFETY OVER PROFITS!

References

- ¹ Support for NRC Review of Transnuclear Inc. Application for Amendment 3 to the Standardized Advanced NUHOMS® Certificate of Compliance No. 1029, San Onofre Nuclear Generating Station, Units 2 and 3 and Independent Spent Fuel Storage Installation Docket Nos. 50-36, 50-362 and 72041, February 10, 2012 <http://pbadupws.nrc.gov/docs/ML1204/ML12046A013.pdf>
- ² Revision 3 to Transnuclear, Inc. (TN) Application for Amendment 3 to Standardized Advanced NUHOMS® Certificate of Compliance No. 1029, Response to Request for Additional Information (Docket No. 72-1029; TAC No.L24607), Sept 7, 2012 , Enclosure 2 to E-33290 RAIs and Responses, p.1. <http://pbadupws.nrc.gov/docs/ML1225/ML12254B039.pdf>
- ³ Declaration of Dr. Arjun Makhijani regarding the Waste Confidence Proposed Rule and Draft Generic Environmental Impact Statement, December 20, 2013, Page 14 4.5. Billone <http://www.nirs.org/radwaste/exhibitaarjundeclaration122013.pdf>
- ⁴ NRC Request for Comment on Retrievalability, Cladding Integrity and Safe Handling of Spent Fuel at an Independent Spent Fuel Storage Installation and During Transportation <http://pbadupws.nrc.gov/docs/ML1229/ML12293A434.pdf>
- ⁵ DOE A Project Concept for Nuclear Fuels Storage and Transportation, June 15, 2013, page 29. <http://sanonofresafety.files.wordpress.com/2013/06/nps59-062013-01.pdf>
- ⁶ NWTRB Evaluation of the Technical Basis for Extended Dry Storage and Transportation of Used Nuclear Fuel, Dec 2010, pp 57-60 http://www.nwtrb.gov/reports/eds_rpt.pdf
- ⁷ Declaration of Dr. Arjun Makhijani regarding the Waste Confidence Proposed Rule and Draft Generic Environmental Impact Statement, December 20, 2013 <http://www.nirs.org/radwaste/exhibitaarjundeclaration122013.pdf>
- ⁸ High Burnup Nuclear Fuel – Pushing the Safety Envelope, M. Resnikoff and D. Gilmore, January 2014 <http://sanonofresafety.org/2014/01/08/high-burnup-fuel-fact-sheet-2/>
- ⁹ NRC's NUREG/CR-7030 states atmospheric corrosion of sea salt can lead to stress corrosion cracking within 32 and 128 weeks in austenitic [corrosion resistant] stainless steel canisters. See Atmospheric Stress Corrosion Cracking Susceptibility of Welded and Unwelded 304, 304L, and 316L Austenitic Stainless Steels Commonly Used for Dry Cask Storage Containers Exposed to Marine Environments, NUREG/CR-7030, October 2010. <http://pbadupws.nrc.gov/docs/ML1031/ML103120081.pdf>
- ¹⁰ DOE Ductile-to-Brittle Transition Temperatures for High-Burnup PWR Cladding Alloys. Mike Billone and Yung Liu Argonne National Laboratory, U.S. NWTRB Winter Meeting, November 20, 2013 <http://www.nwtrb.gov/meetings/2013/nov/billone.pdf>
- ¹¹ Edison request to NRC to use Areva M5 cladding, July 29, 2011, <http://pbadupws.nrc.gov/docs/ML1121/ML11215A090.pdf>
- ¹² DOE Review of Used Nuclear Fuel Storage and Transportation Technical Gap Analyses July 31, 2012 <http://energy.gov/sites/prod/files/Gap%20Comparison%20Rev%200.pdf>
- ¹³ NWTRB Evaluation of the Technical Basis for Extended Dry Storage and Transportation of Used Nuclear Fuel, Dec 2010, p.11 http://www.nwtrb.gov/reports/eds_rpt.pdf
- ¹⁴ DOE Review of Used Nuclear Fuel Storage and Transportation Technical Gap Analyses, July 31, 2012. Page 27 <http://energy.gov/sites/prod/files/Gap%20Comparison%20Rev%200.pdf>
- ¹⁵ Plant-Specific Actions in Response to the Japan Nuclear Accident: San Onofre Nuclear Generating Station, Unit 2 <http://www.nrc.gov/reactors/operating/ops-experience/japan/plants/sano2.html>
<http://pbadupws.nrc.gov/docs/ML1306/ML13064A353.pdf>
- ¹⁶ Edison Request for Relaxation of Commission Order Number EA-12-049, EA-12-051 and First 6 Month Status Report on Implementation of EA-12-049 and EA-12-051, San Onofre Nuclear Generating Station, Units 2 and 3, Docket Nos. 50-361 and 50-362, August 26, 2013 <http://pbadupws.nrc.gov/docs/ML1324/ML13240A125.pdf>
- ¹⁷ Technical Specifications, Table 2-12 PWR FUEL Qualification Table for 0.9 kW/Assembly for NUHOMS 24PT4-DSC <http://sanonofresafety.files.wordpress.com/2013/06/table2-12fuelcoolingtimetable24pt4-dsc.jpg>
- ¹⁸ Senators Urge NRC: Deny Exemptions from Emergency Response and Security Measures for Decommissioning Nuclear Reactors, May 2, 2014 http://www.epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=0176e8c7-3237-459d-4ddd-215e0a353ece
- ¹⁹ NRC San Onofre Inspection Report, March 26, 2014 <http://pbadupws.nrc.gov/docs/ML1408/ML14085A502.pdf>
- ²⁰ Edison Request for Exemption from Requirements of 10 CFR 50.54(m) and 10 CFR 55 Dockets Nos. 50-361 & 50-362, San Onofre Units 2 & 3, September 11, 2013 <http://pbadupws.nrc.gov/docs/ML1326/ML13268A143.pdf>; Edison Docket No. 50-361 and 50-362, Amendment Application Numbers 265 and 250 Responsibility, Organization, and Qualifications, San Onofre Units 2 and 3, October 21, 2013, Table 5.2.2-1 <http://pbadupws.nrc.gov/docs/ML1329/ML13296A013.pdf>