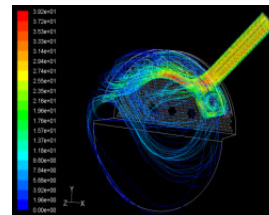
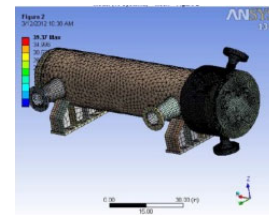
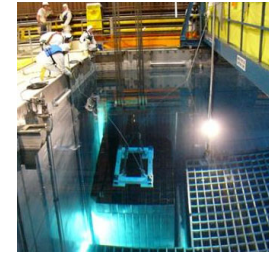


Use of Topical Reports to Risk Inform Spent Fuel Licensing



Topical Reports

- Topical reports are intended to increase the efficiency of other licensing actions
 - ✔ Allow streamlined review of a subject that multiple subsequent licensing actions can reference
 - ✔ Allow easier introduction of risk-informed approaches
 - ✔ Allow licensees to develop appropriate restrictions and requirements based on NRC-approved methodology, without the need for license amendments
- Used extensively in operating reactors, but has not been widely used for spent fuel storage and transport systems
- Holtec is trying the approach with two different topical reports for dry storage

Thermal Topical Report

- Spent fuel storage casks are designed to passively dissipate heat from the stored fuel to ensure that temperature limits are met.
- To date, the NRC has reviewed and approved individual heat load patterns as part of license amendments
- While working on plant decommissioning, it was determined that based on a specific site's fuel inventory and operating history, a site could benefit from more optimal loading patterns
- Optimal loading patterns can improve defueling speed AND result in lower dose
- Introducing such patterns through license amendments causes schedule difficulties and a burdensome number of reviews

		0.65 (D/F)	0.65	0.65 (D/F)		
	0.65 (D/F)	3.5	0.65	3.5	0.65 (D/F)	
0.85 (D/F)	2.6	0.65	0.75	0.65	2.6	0.85 (D/F)
0.85	0.65	0.75	0.65	0.75	0.65	0.85
0.85 (D/F)	2.6	0.65	0.75	0.65	2.6	0.85 (D/F)
	0.65 (D/F)	3.5	0.65	3.5	0.65 (D/F)	
		0.65 (D/F)	0.65	0.65 (D/F)		

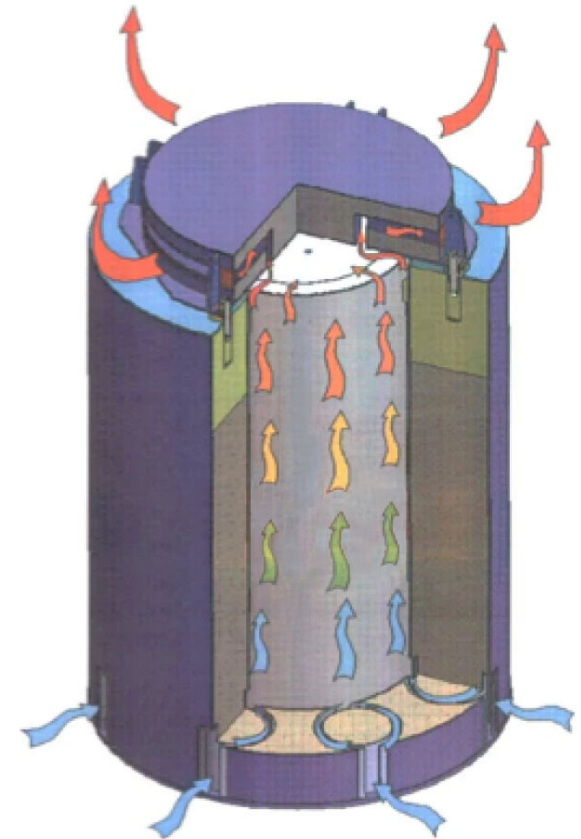
Thermal Topical Report



- Holtec submitted an application for a generic method to establish allowable heat load patterns
- The topical report sets specific acceptance criteria and lays out a method to demonstrate that a licensee is within those acceptance criteria
- This process allows NRC approval of the underlying criteria, but allows performance of calculations by a licensee / vendor under and NRC approved QA program
- Focuses on the underlying goal of ensuring temperature remains within acceptable limits, which protects system materials – fuel cladding, concrete, etc

Thermal Topical Report Review Process

- Submitted in March 2020
- Received Final SER in September 2021
- Review proceeded extremely efficiently
- Approach is based on Holtec's existing approved FSARs
- NRC utilized regulatory audits where technical experts were able to have discussions and address questions



Thermal Topical Report Implementation Challenge



- To utilize the topical report approval, it must be rolled into the CoC
- Holtec submitted this in late 2021, and NRC expects a 22 month review time
 - ✔ Entire process until first use is now in excess of 40 months, much longer than anticipated
- Implementation difficulties based on topical report SER limitations
 - ✔ Change control and 72.48 provisions
 - ✔ Lessons learned for future topical reports

Shielding MOE Topical Report

- Dry storage systems are also designed to provide shielding to workers and the public
- Current CoCs have complicated fuel qualification tables (FQTs) – sometimes expressed in equation form
- FQTs establish allowable combinations of burnup, enrichment, and cooling time



Shielding MOE Topical Report

- The underlying criteria is the dose rates, and many different combinations of fuel parameters could generate the same dose rates
- MOE topical report risk informs the process by focusing on the dose rate criteria as the acceptance criteria, subject to NRC review
- Licensees can then determine combinations of fuel that meet those criteria

Shielding MOE Topical Report Review

- Submitted in May 2022, as generic for whole industry
- Currently under review by NRC
- Expecting to finish review later this year
- Current challenge: RAIs prescribe a level of detail for the TR that exceeds that in the corresponding FSARs. This appears contrary to the risk-informed principle, and may also limit the TR's applicability



Lessons Learned on Topical Reports

- Topical reports have a benefit in risk informed reviews – can focus on the underlying safety criteria for the systems
- Efficiency in reviews hasn't yet been realized
 - ✔ Combination of topical report review and CoC implementation review is more time consuming than an amendment – may see improvements once implemented
 - ✔ Limitations and overly specified methodologies may limit the usefulness
- Can the same principles be applied just within CoC?
 - ✔ In the CoC, define direct safety goals (Temperature, Dose Rate), instead of surrogate limits (heat loads, burnup, enrichment, cooling time, etc)
 - ✔ Avoid need for multiple applications to achieve the same result
 - ✔ May need further discussions with staff

Thank You



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