CoC 1042 Amendment 3
Pre-Application Meeting

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Non-Proprietary

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Purpose of the Meeting/Agenda

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- To discuss plans for Amendment 3 to CoC 1042 License
- Obtain NRC feedback and facilitate NRC planning

Agenda

- General Overview/Amendment scope
- Impacts for each technical discipline
- Submittal schedule
- Discussion/Questions

EOS Amendment 3 Scope Overview

1) **EOS-89BTH Updates**
   - Increase maximum heat load to 48.2 kW
   - Use graded approach to define maximum allowable heat loads in TS in lieu of Heat Load Zoning Configurations (HLZCs)
   - Add a variable-lead thickness option for the EOS-TC125 for transfer of the EOS-89BTH DSC
   - Increase the enrichment limits for EOS-89BTH up to 5 wt%
   - Add ATRIUM 11 fuel as an allowable content in the EOS-89BTH DSC

2) **Utilize a single pass high amperage GTAW (HA-GTAW) weld outer top cover plate**

3) **Ultrasonic Testing (UT) on outer top cover plate**

4) **Eliminate redundant pressure test**

Increase maximum heat load of the EOS-89BTH DSC

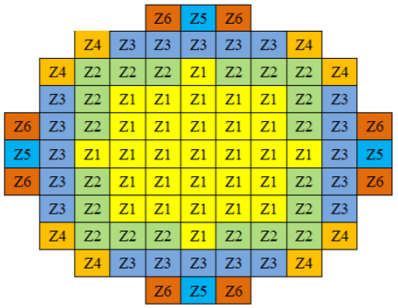
- **Higher maximum heat loads for HSM-MX and EOS-HSM**
  - **48.2 kW in the EOS-HSM/ Lower Compartment of HSM-MX**
  - **41.8 kW in the upper compartment of the HSM-MX**
  - **Maximum heat load: 1.7 kW per fuel assembly, minimum cooling time 1 year for BWR fuel**
  - **No physical changes**
- **Amendment 0 to CoC 1042, approved EOS-89BTH DSC for a maximum heat load of 43.6 kW in EOS-HSM**
- **Amendment 1 to CoC 1042, approved EOS-89BTH DSC for maximum heat load of 34.4 kW in HSM-MX**
  - **Heat load in Amendment 0 and Amendment 1 to CoC 1042 for EOS-89BTH DSC was limited to ensure most of the thermal evaluations for EOS-89BTH were bounded by EOS-37PTH DSC with 50 kW.**

Use graded approach for maximum allowable EOS-89BTH heat loads

- **Define maximum allowable heat loads in Tech Specs**
  - **Actual HLZCs in the UFSAR based on the maximum heat loads in TS**
  - **Additional loading patterns can be added in 72.48**
  - **Meets 10 CFR 72.236 (a) which requires that heat load limits be defined in the TS**
  - **Thermal evaluation in 72.48, Shielding evaluation is performed in Amd 3 for the maximum allowable heat load configuration**

EOS-89BTH Updates

Technical Specification

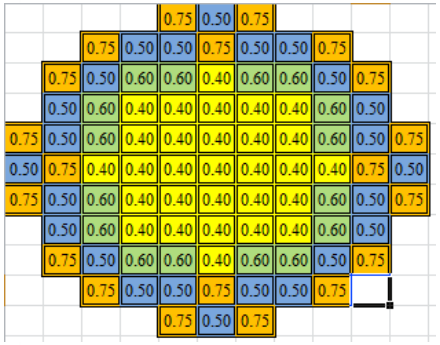


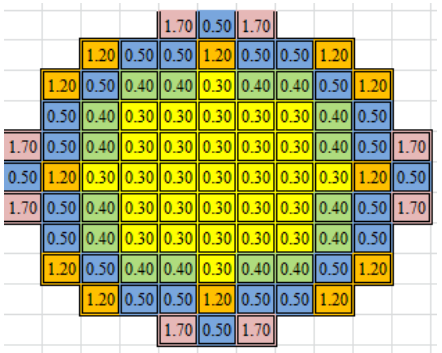
Zone No.	Z1	Z2	Z3	Z4	Z5	Z6
Max. Decay Heat per SFA (kW)	0.400	0.600	1.300	1.700	1.300	1.700
No. of Fuel Assemblies	29	20	20	8	4	8
Heat Load Per Zone	11.6	12	26	13.6	5.2	13.6
Max. Decay Heat per DSC (kW)	See Note 1 for EOS-HSM and Note 2 for HSM-MX					

Notes:

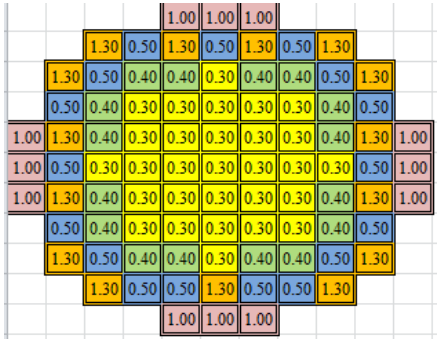
1. Maximum heat load for EOS-89BTH DSC during Storage is 48.2 kW in EOS-HSM.
2. Maximum heat load for EOS-89BTH DSC during Storage is 48. 2 kW in lower compartment of HSM-MX and 41.8 kW in upper compartment of HSM-MX
3. See Chapter 2, Section X of the UFSAR for HLZCs approved based on the maximum heat loads permitted per this configuration.

Chapter 2, UFSAR: HLZCs 4 and 5





Chapter 2, UFSAR: HLZC 6



Add a variable-lead thickness EOS-TC125 for EOS-89BTH transfer

- **Vary lead thickness**
  - Vary shielding and weight for weight management, site-specific limitations
  - Geometric changes resulting from lead reduction
- **Update the thermal and shielding evaluations**
  - Structural unaffected- bounded by structural approach in the SAR
  - Criticality unaffected- bounded by EOS-TC108

EOS-89BTH Updates-Thermal Impacts

- **Detailed evaluations similar to those for EOS-37PTH DSC with 50 kW will be presented for EOS-89BTH DSC for**
  - **Storage in EOS-HSM and HSM-MX (MATRIX)**
  - **Transfer Operations in EOS-TC125 based on modified lead shielding**
  - **Heat load in Amendment 0 and Amendment 1 to CoC 1042 for EOS-89BTH DSC was limited to ensure most of the thermal evaluations for EOS-89BTH were bounded by EOS-37PTH DSC with 50 kW**
- **Three loading patterns will be presented in the UFSAR based on the maximum allowable heat loads in TS to:**
  - **Establish the maximum heat load of the DSC and include methodology for adding additional loading patterns in the future**

EOS-89BTH Updates-Shielding Impacts

- **Generate new bounding source terms**
  - Maximum heat load for each basket compartment from the Technical Specifications used as a “shielding HLZC” (non-physical but conservative), minimum cooling time of 1 year
  - Incorporating a lesson learned from Amendment 2 RAIs, reconstituted fuel assemblies containing irradiated stainless steel rods are explicitly accounted for in the peripheral region
- **Revise EOS-TC125 (with minimum lead), EOS-HSM, HSM-MX, and site dose shielding calculations with updated source terms**

Add ATRIUM 11 fuel as an allowable content in the EOS-89BTH

Currently licensed for storage in NUH-61BTH Type 2 DSC in CoC 1042 and CoC 1004

Criticality and structural evaluations are affected. Shielding and thermal analyses remain bounded.

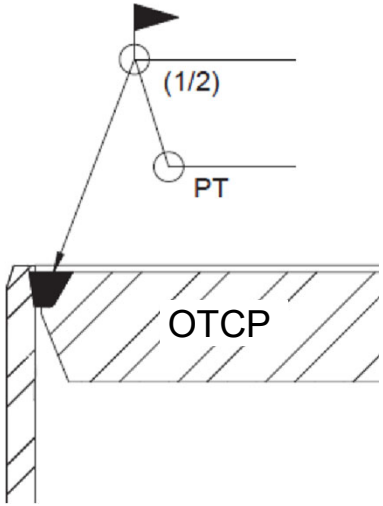
Increase enrichment for EOS-89BTH to 5.0 wt%

- For all BWR fuel, including ATRIUM 11, up to 5.0 wt% with metal matrix composite (MMC)
- Short-loading configurations to increase enrichment
- Only criticality evaluations are affected. Thermal and shielding analyses remain bounded. Structural unaffected

EOS Amendment 3 Criticality Impacts

- **For all contents, including ATRIUM 11 develop short-loading scenarios with 88, 87, and 84 fuel assemblies to increase the enrichment limits**
  - **No new depletion models- use existing B-10 content and fresh fuel assumptions**

Utilize single pass HA-GTAW on outer top cover plate

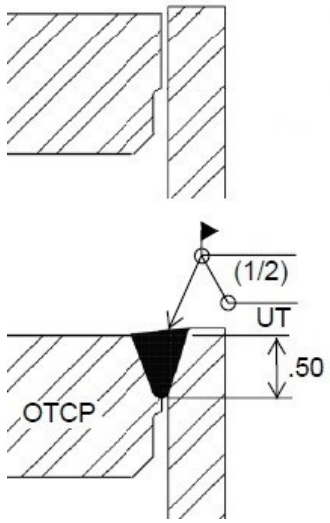


Current OTCP weld

	Current	Proposed
Weld depth	0.5	0.5
NDE	Multi pass PT	UT
Joint Efficiency	0.8	0.8 (1)
Acceptance	NB-5300	Note 2

1. Existing weld stress analyses are unchanged
2. UT criteria
   a. Rounded defects per NB-5331(a)
   b. (weld depth – planar defects) ≥ 0.30 inch

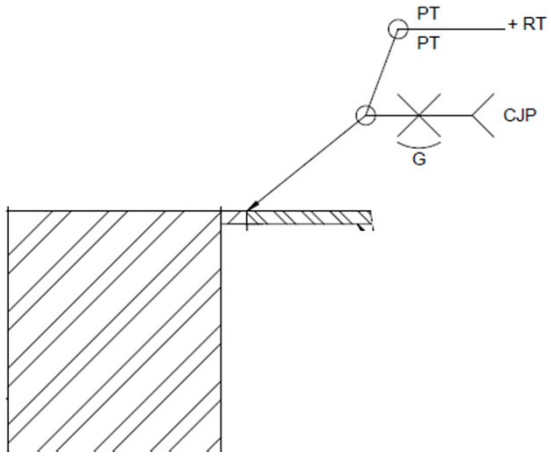
(NB-3000 minimum with weld quality factor = 1.0)



Proposed OTCP weld

Remove fabrication pressure test on bottom forging

- **For Single bottom forging EOS-DSCs only**
- Low test pressure
- Sensitivity of helium leak test
- In-field pressure test and helium leak test
  - **Tests the entire confinement boundary**



Submittal Schedule

Application Submittal- 1st Quarter 2021

Requested Approval- 3rd Quarter 2022

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Giving nuclear energy its full value