

Calvert Cliffs Nuclear Power Plant Spent Fuel Pool Cooling – Shutdown Cooling Licensing Design Basis License Amendment Request Pre-submittal Meeting

NRC Pre-submittal Meeting Telecon
May 24, 2021



Agenda / Opening Remarks

- Introductions
- Expected outcome of meeting
- LAR Overview / Purpose
- Regulatory Requirements
- Technical Evaluation
- Precedent
- LAR Milestone Schedule
- Closing Remarks

Introductions

- Frank Mascitelli, Lead Licensing Engineer
- Ken Greene, Site Regulatory Engineer
- Larry Smith, Site Regulatory Manager
- Dave Helker, Licensing Manager
- Mohammad Ghaderi- Yeganeh, LAR Technical Lead
- Cecilie Broussard, SFPC Strategic Engineer
- John Singleton, Operations Senior Reactor Operator
- Chris Junge, Engineering Manager
- Jeff Lofton, Cycle Outage Manager
- John Massari, Nuclear Fuel Manager
- Eric Yin, Senior Staff Fuel Engineer
- Kurt Bodine, Engineering Senior Manager

Expected Outcome of Meeting

- NRC gains an understanding of the LAR and provides feedback for CCNPP, so that a timely six-month review can be accomplished in support of Feb 2022 U/1 refueling outage.
- Critical issues are identified early.
- All required regulatory and technical requirements are identified.
- Ensure a successful Acceptance Review and minimize significant Request for Additional Information (RAI) cycles.

LAR Overview / Purpose

- The proposed changes would revise the Updated Final Safety Analysis Report (UFSAR) Section 9.4, “Spent Fuel Pool Cooling System,” design basis to allow for a full core offload without being supplemented with one loop of Shutdown Cooling (SDC) system, if needed.
- In addition, the Technical Requirements Manual (TRM) 15.9.1, “Decay Time,” will be revised to provide for additional limits on operation based on number of fuel assemblies offloaded, time after shutdown and spent fuel pool heat load margins and Service Water temperature.
- Be able to support outage work on one train of SDC and overall outage length within schedule.

LAR Overview / Purpose

- During the next 2022 Unit 1 Refuel Outage (CC1R 26) which is planned to start early February 2022, a full core off load is scheduled to begin approximately day 6 of the Outage.
- One loop of SDC is required operable and in operation per TS 3.9.4, "Shutdown Cooling (SDC) and Coolant Circulation-High Water Level." The second SDC loop will be out of service for scheduled outage work (ASME OM Code required).
- This course of action without the additional heat removal capabilities of the supplemental loop of shutdown cooling may cause the spent fuel pool temperature to rise above current licensing bases limit of 130 °F.

Regulatory Requirements

- 10 CFR 50.36, Technical Specifications
- 10 CFR 50 Appendix A, General Design Criterion (GDC) 61, Fuel Storage and Handling and Radioactivity Control
- 10 CFR 50 Appendix A, General Design Criterion 44, Cooling Water
- Regulatory Guide (RG) 1.13 Rev 2, Spent Fuel Pool Storage Facility Design Basis
- NUREG 0800, Standard Review Plan (SRP) 9.1.3 Spent Fuel Pool Cooling and Cleanup System

Regulatory Requirements

- Embedded in existing regulatory requirements is that existing instantaneous spent fuel pool cooling always exceeds the instantaneous spent fuel decay heat rate. LAR will allow cooling capacity to be exceeded and pool bulk temperature to rise.
- Will exceed RG 1.13, Spent Fuel Storage facility Design Bases, Rev 2 limit of 140 °F.
 - The maximum allowed Spent Fuel Pool water temperature would be 150 °F for all heat load conditions, including full-core offloads during refueling.

Technical Evaluation

- Obtain margin in heat removal capability by raising the maximum SFP water temperature for 2022 full core offload from 130 F to 150 F (the design temperature of SFP cooling system)
- Methodology change to start crediting the time it takes for the bulk SFP water to heat up to 150 F
- Develop time dependent heat transfer model to calculate the maximum SFP temperature

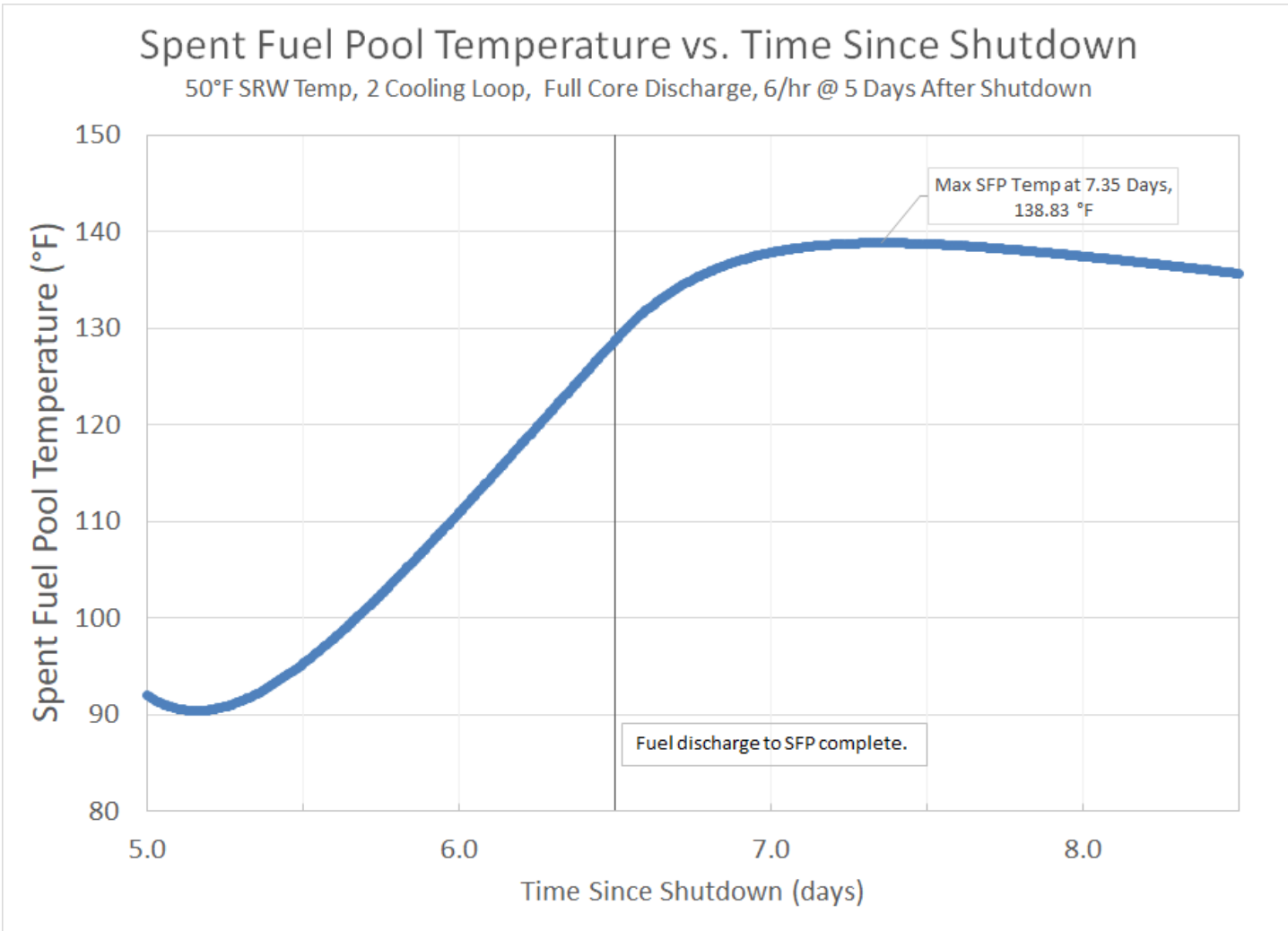
Technical Evaluation

- Impact on the design of the SFP cooling system / purification system
- Analyze the time-to-boil using representative refueling practices and identify make-up water sources
- Structural integrity of the SFP and impact of raising SFP temperature to 150F
- Analyze the impact of SFP temperature raise on the criticality

Technical Evaluation

- Demonstrate radiological consequences during a fuel handling event are within acceptable dose criteria specified in 10CFR50.67 including control room operator dose

Technical Evaluation



Precedent

- Turkey Point Units 3 and 4 – Issuance of Amendments Regarding Reduction in Decay Time from 100 to 72 hours (TAC NOS. MB6549 AND MB6550), dated March 4, 2003 (ML0306207460), provides relevant insights and review criteria as the reduction in decay time resulted in an increase in heat load to the SFPC system and SFP bulk temperature.
- Calvert Cliffs Units 1 and 2 TS Amendment Nos. 47 and 30, respectively, permitted an increase in the spent fuel storage capability up to a maximum of 1760 fuel assemblies in the spent fuel pool through the use of high density borated spent fuel racks, dated September 19, 1980 (ML003773029). Section 3.2 (Spent Fuel Cooling) of the Safety Evaluation Report provides relevant insights and review criteria for original licensing design bases for the SFPC System.

LAR Milestone Schedule

- Pre-submittal meeting 05/24/21
- PORC (Plant Operations Review Com.) 06/11/21
- Submit LAR to NRC 06/15/21
- Requested approval date 12/17/21

Closing Remarks

- Additional Questions/Observations
- Summarize critical insights
- Next Steps

Thank you