



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

June 28, 2017

LICENSEE: Entergy Operations, Inc.

FACILITY: Waterford Steam Electric Station, Unit 3

SUBJECT: SUMMARY OF JUNE 1, 2017, PUBLIC MEETING WITH ENTERGY OPERATIONS, INC., REGARDING PLANNED LICENSE AMENDMENT REQUEST TO REVISE TECHNICAL SPECIFICATION (TS) TABLE 3.7-3 AND TS 3/4.7.4, "ULTIMATE HEAT SINK" FOR WATERFORD STEAM ELECTRIC STATION, UNIT 3 (CAC NO. MF9700)

On June 1, 2017, a Category 1 public meeting was held between the U.S. Nuclear Regulatory Commission (NRC) and representatives of Entergy Operation, Inc. (Entergy, the licensee). The meeting notice and agenda, dated May 15, 2017, are available in the Agencywide Documents Access and Management System (ADAMS) at Accession No. ML17151A314. For the meeting, the licensee provided a slide presentation, which is available at ADAMS Accession No. ML17151A295. A list of attendees is enclosed.

The ultimate heat sink (UHS) at Waterford Steam Electric Station, Unit 3 (Waterford 3) is provided, in part, by dry cooling towers (DCTs). Each DCT contains vertical cooling coils filled with hot component cooling water, which is cooled by outside ambient air provided by three two-speed fans. Entergy is planning to install a modification to the DCTs in order to capture additional cooling efficiency of these DCTs. The purpose of the June 1, 2017, pre-submittal meeting was for the licensee to discuss with NRC staff a planned license amendment request (LAR) to credit the additional cooling efficiency provided by the modification to the DCTs. Specifically, the proposed LAR would revise Technical Specification (TS) Table 3.7-3, "Ultimate Heat Sink Minimum Fan Requirements Per Train Dry Cooling Tower," and TS 3/4.7.4, "Ultimate Heat Sink" (UHS).

During the public meeting, the licensee discussed a heat recirculation effect in the DCTs, which had been observed during startup testing conducted in 1982, before the initial operation of the plant. The recirculation effect decreases the ability of the DCTs to dissipate heat, and represents an adverse condition compared to the plant's design basis. The licensee discussed the general design of a planned recirculation barrier, which consists of a rooflike structure partially covering both Train A and Train B of the DCT wells. The licensee then presented the preliminary results of an ANSYS computational fluid dynamics (CFD) calculation model demonstrating that this barrier will decrease the recirculation effect, thereby increasing the cooling efficiency of the DCTs.

The LAR, which is planned to be submitted by the licensee in August 2017, will credit this increased efficiency to revise TS Table 3.7-3 and TS 3/4.7.4, which describe the requirements for the UHS. At the meeting, the licensee presented preliminary TS markups for TS Table 3.7-3 and TS 3/4.7.4. The revised Surveillance Requirement (SR) 4.7.4 would require additional monitoring of the dry bulb temperature, and would require a certain number of DCT tube bundles and fans be operable when a tornado watch is in effect. The revised TS Table 3.7-3

would decrease the required minimum number operable fans per train as a function of ambient dry bulb temperature. In addition, the proposed revised TS Table 3.7-3 would add a new chart describing the required minimum number of DCT fans to be operable if backflow preventers for the fans were operable.

The licensee stated that the proposed LAR would include include an analysis of the effects of the revised TS on calculation ECM95-008, "Ultimate Heat Sink Design Basis." The analysis would focus on the effect of the revised TS during normal operations, normal shutdown, normal refueling, and during design-basis events as required by Regulatory Guide (RG) 1.27, "Ultimate Heat Sink for Nuclear Power Plants" (ADAMS Accession No. ML14107A411). The analysis would use site-observed bounding meteorological parameters.

During and after the presentation, the NRC staff and licensee discussed specific features of the presentation and the proposed LAR. The NRC staff expressed the following concerns regarding the proposed LAR, and requested that the following information be included with the amendment application:

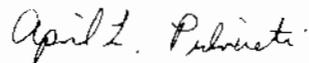
- The UHS thermohydraulic model must contain an analysis of containment heat loads under normal conditions and under accident conditions. In addition, the model should analyze the worst heat load on component cooling water during design-basis events and compare the maximum component cooling water heat exchange outlet temperature to the maximum allowed temperature.
- Include information about the effect of the proposed amendment on the emergency diesel generators (EDGs), and include the temperature at which the EDGs will be qualified.
- Because the CFD calculations will be performed using limited data points observed during initial plant startup testing conducted in the 1980s, the results of the calculation will be driven by the ANSYS CFD model. Therefore, provide information about the ANSYS code, including a description of the mesh size for the DCTs, and the sensitivity of the mesh size. Describe the verification and validation and benchmarking of the CFD code.
- The proposed markup of TS Limiting Condition for Operation (LCO) 3.7.4 references a 3-day average temperature forecast. Per RG 1.27, typical minimum water inventory requirements for a wet cooling tower (WCT) are based on looking at the meteorological conditions over the past 30 years and determining the worst consecutive 30-day period (for water inventory loss) at any time during that 30-year period, and using those meteorological conditions for the minimum water inventory calculation. The application should discuss the basis for the 3-day average temperature.
- The proposed markup of TS LCO 3.7.4c references a 7-day average ambient dry-bulb temperature. The application should explain why this timeframe was chosen.
- The proposed markup of SR 4.7.4 states that "Each train of UHS shall be determined OPERABLE:... In accordance with the Surveillance Frequency Control Program." Include the initial surveillance frequency for SR 4.7.4c and the current surveillance frequencies for SR 4.7.4a and SR 4.7.4b as stated in the current surveillance frequency control program.

- The proposed markup of TS Table 3.7-3 contains conditional statements for the number of DCT fans/WCT fans which must be operable (e.g., "14/ \geq 5 or 15/ \geq 4"). The proposed markup for TS Table 3.7-3 does not explain the meaning of the "or" in the table. This information should be included in the table where it is readily available and subject to NRC review.
- The proposed Table 3.7-3 contains fan requirements based on ambient temperature intervals of 1 degree Fahrenheit. Because the required minimum number of fans is sensitive to such narrow temperature ranges, the application should include the instrument tolerance of the thermometers used to measure ambient temperature, including uncertainties.
- The proposed markup of TS Table 3.7-3 contains a subtable titled "With DCT Backflow Preventers." This is a table of DCT fan requirements, which will be used if DCT backflow preventers are operable. The licensee presentation for the meeting contained no description of these backflow preventers, and during the meeting the licensee stated that the design of the backflow preventers had not yet been finalized. If this portion of TS Table 3.7-3 is approved as part of the LAR, then the licensee will be permitted to employ the backflow preventers without further NRC review. Therefore, the planned LAR should contain sufficient information about the backflow preventers for review by NRC staff to determine whether there is reasonable assurance that the number of fans specified in the subtable titled, "with DCT backflow preventers," will provide sufficient UHS capacity.

The licensee proposes to submit the application for this license amendment on August 4, 2017.

No regulatory decisions were reached at this meeting. No member of the public called in to listen or provide comments to the NRC staff after the business portion of the meeting and, thus, no Public Meeting Feedback forms were received.

Please direct any inquiries to me at 301-415-1390 or via e-mail at April.Pulvirenti@nrc.gov.



April L. Pulvirenti, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-382

Enclosure:
List of Attendees

cc w/enclosure: Distribution via Listserv

LIST OF ATTENDEES

JUNE 1, 2017, PUBLIC MEETING WITH ENTERGY OPERATIONS, INC.

REGARDING REVISION OF TECHNICAL SPECIFICATION TABLE (TS) 3.7-3

AND TS 3/4.7.4, "ULTIMATE HEAT SINK"

FOR WATERFORD STEAM ELECTRIC STATION, UNIT 3

Entergy Operations, Inc

John Jarrell, Regulatory Assurance Manager
Jason McGowan, Project Manager
Alex Tojeiro, Design Engineer
Dale Gallodoro, Entergy Contract Support
William Steelman, Entergy Contract Support
Gregory Zysk, LPI
*Maria Zamber
*John Cooper
*Leia Milster

U.S. Nuclear Regulatory Commission

Robert Pascarelli, Branch Chief, Operating Reactor Licensing
Eric Oesterle, Branch Chief, Reactor Systems
Jennifer Whitman, Branch Chief (Acting), Technical Specifications
April Pulvirenti, Project Manager
Matthew Hamm, Reactor Systems Engineer, Technical Specifications
*Tarico Sweat, Reactor Systems Engineer, Technical Specifications
Gerard Purciarello, Senior Reactor Systems Engineer, Balance of Plant
Ahsan Sallman, Senior Reactor Systems Engineer, Reactor Systems

Public

None

*by phone

Enclosure

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ADAMS Accession No.: ML17174B226

OFFICE	NRR/DORL/LPL4/PM	NRR/DORL/LPL4/LA	NRR/DORL/LPL4/BC	NRR/DORL/LPL4/PM
NAME	APulvirenti	PBlechman	RPascarelli	APulvirenti
DATE	06/23/17	06/27/17	06/27/17	06/28/17

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