NRR-DMPSPEm Resource

From: Venkataraman, Booma
Sent: Thursday, January 18, 2018 4:35 PM
To: Lashley, Phil H.
Cc: Danna, James
Subject: Beaver Valley Unit No. 1: Request for Additional Information - Modified RTPTS Values and Reactor Vessel Surveillance Capsule Withdrawal Schedule (EPID: L-2017-LLL-0024)
Attachments: Request For Additional Information Beaver Valley 1 RTPTS approval.docx

Expires: Monday, March 19, 2018 12:00 AM

Mr. Lashley,

By letter dated October 6, 2017 (Agencywide Documents Access and Management System Accession No. ML17284A195), FirstEnergy Nuclear Operating Company (FENOC, the licensee), in accordance with 10 CFR 50.61(b)(1) and 10 CFR 50.61(c)(3), submitted a request for approval of the modified pressurized thermal shock reference temperature values (RT_{PTS}) for Beaver Valley Power Station (Beaver Valley), Unit No. 1, reactor vessel beltline and extended beltline region materials. In accordance with the surveillance criteria of 10 CFR 50, Appendix H, Section III.B.3, FENOC also requested approval of the proposed changes to Beaver Valley Unit No. 1 reactor vessel material irradiation surveillance capsule withdrawal schedule in the letter.

A draft request for information (RAI) was sent to you on January 9, 2018. You indicated by phone on January 16, 2018, that no clarification call is needed. Further you requested a RAI response period of 90 days due to additional time it will take for you to revise certain calculations. The final RAI is attached to this e-mail. The NRC agrees to your request and requests FENOC to respond to the attached RAI with a supplement by April 18, 2018.

Please treat this e-mail as transmittal of formal RAIs. If circumstances result in the need to revise the requested response date, please contact me at (301) 415-2934 or via email at Booma.Venkataraman@nrc.gov.

Sincerely, Booma,

Booma Venkataraman, P.E.
Project Manager, NRR/DORL/LPL1
Office of Nuclear Reactor Regulation
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301.415.2934

Hearing Identifier: NRR_DMPS
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Subject: Beaver Valley Unit No. 1: Request for Additional Information - Modified RTPTS Values and Reactor Vessel Surveillance Capsule Withdrawal Schedule (EPID: L-2017-LLL-0024)
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From: Venkataraman, Booma

Created By: Booma.Venkataraman@nrc.gov

Recipients:
"Danna, James" <James.Danna@nrc.gov>
Tracking Status: None
"Lashley, Phil H." <phlashley@firstenergycorp.com>
Tracking Status: None

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REQUEST FOR ADDITIONAL INFORMATION

MODIFIED PRESSURIZED THERMAL SHOCK REFERENCE VALUES AND SURVEILLANCE CAPSULE WITHDRAWAL SCHEDULE

FIRSTENERGY NUCLEAR OPERATING COMPANY

BEAVER VALLEY POWER STATION, UNIT NO. 1

DOCKET NO. 50-334

By letter dated October 6, 2017 (Ref. 1), pursuant to 10 CFR 50.61(b)(1) and (c)(3), FirstEnergy Nuclear Operating Company (FENOC, the licensee) requested approval of modified pressurized thermal shock reference temperature (RT_{PTS}) values for Beaver Valley Power Station (Beaver Valley), Unit No. 1, and reactor vessel materials for the period of extended operation. This submittal also requested approval of a modified reactor vessel surveillance capsule withdrawal schedule pursuant to 10 CFR 50, Appendix H, Section III, Paragraph 8.3.

RAI 1

The pressurized thermal shock (PTS) evaluation for Beaver Valley Unit No. 1, is contained in Appendix E to WCAP-18102-NP, Revision 0, “Beaver Valley Unit 1 Heatup and Cooldown Limit Curves for Normal Operation," which is Enclosure C of the licensee’s submittal (Ref. 1).

With regard to determination of the RT_{PTS} values, Appendix E cited U.S. NRC Technical Letter Report TLR-RES/DE/CIB-2013-01, "Evaluation of the Beltline Region for Nuclear Reactor Pressure Vessels," Office of Nuclear Regulatory Research [RES], dated November 14, 2014 (Ref. 2) as a basis for not considering the shift due to irradiation for reactor pressure vessel (RPV) materials for which the predicted shift in the reference temperature (ΔRT_{NDT}) is less than 25 degrees Fahrenheit ($^{\circ}$F). Section 4 of TLR-RES/DE/CIB-013-01 concluded that:

1. The beltline is defined as the region of the RPV adjacent to the reactor core that is projected to receive a neutron fluence level of $1xl0^{17}$ n/cm^2 [neutrons per square centimeter] (E > 1.0 MeV [energy > 1 megaelectronvolt]) or higher at the end of the licensed operating period.
2. Embrittlement effects may be neglected for any region of the RPV if either of the following conditions are met: (1) neutron fluence is less than $1x10^{17}$ n/cm^2 (E > 1.0 MeV) at EOL, or (2) the mean value of ΔT_{30} estimated using an ETC acceptable to the staff is less than 25°F at EOL. The estimate of ΔT_{30} at EOL shall be made using best-estimate chemistry values

Using this basis, the licensee did not add a shift due to irradiation for several beltline materials, including the reactor pressure vessel inlet and outlet nozzles, the inlet and outlet nozzle-to-vessel welds, and certain weld metal heats used in the upper shell-to-intermediate shell girth weld.

Discounting the shift in RT_{NDT} due to irradiation if the predicted shift is less than 25 ˚F does not meet the NRC regulation in 10 CFR 50.61. 10 CFR 50.61 (a)(4) states that for the reactor vessel beltline materials, RT_{NDT} must account for the effects of neutron radiation. 10 CFR 50.61(c) details how ΔRT_{NDT} must be calculated. The staff notes that RIS 2014-11, "Information On Licensing Applications For Fracture Toughness Requirements For Ferritic Reactor Coolant Pressure Boundary Components," (Ref. 3) clarifies that the 10 CFR 50 Appendix G and 10 CFR 50 Appendix H define the beltline as including all RPV materials that will receive a neutron fluence greater than or equal to $1x10^{17}$ n/cm^2 (E> 1 MeV).

The staff also notes that TLR-RES/DE/CIB-2013-01 is not NRC guidance, and the recommendation that the shift due to irradiation can be discounted if it is less than 25 ˚F is not endorsed in any NRC guidance document or regulation. Therefore, to apply the recommendation of the TLR that the shift in RT_{NDT} may be discounted if it is less than 25 ˚F, the licensee would need to submit a request for exemption accompanied by a detailed technical basis. The staff therefore requests that, unless it plans to submit an exemption, the licensee:

1. Revise its PTS evaluation to include RT_{PTS} values for all RPV beltline and extended beltline materials calculated in accordance with 10 CFR 50.61.
2. Revise its submittal to remove the reference to TLR-RES/DE/CIB-2013-01.

References

1. Beaver Valley, Unit 1 - Modified RT PTS Values and Reactor Vessel Surveillance Capsule Withdrawal Schedule, October 6, 2017 (ADAMS Accession No. ML17284A195)
2. U.S. NRC Technical Letter Report TLR-RES/DE/CIB-2013-01, "Evaluation of the Beltline Region for Nuclear Reactor Pressure Vessels," Office of Nuclear Regulatory Research [RES], dated November 14, 2014. (ADAMS Accession No. ML14318A177)
3. NRC Regulatory Issue Summary 2014-11, "Information on Licensing Applications for Fracture Toughness Requirements for Ferritic Reactor Coolant Pressure Boundary Components." October 14, 2017 (ADAMS Accession No. ML14149A165)