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September 20, 2016
L-16-018

10 CFR 50.61(c)(3)

ATTN: Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT:
Beaver Valley Power Station, Unit No. 1
Docket No. 50-334, License No. DPR-66
Report of Information That Significantly Improves Accuracy of RT_{PTS} Value

Pursuant to 10 CFR 50.61(c)(3), FirstEnergy Nuclear Operating Company (FENOC) is hereby reporting information that significantly improves the accuracy of the pressurized thermal shock reference temperature (RT_{PTS}) for Beaver Valley Power Station, Unit No. 1 (BVPS-1). As a result of a more accurate evaluation, the value for the initial (unirradiated) nil ductility reference temperature for the limiting reactor vessel material ($RT_{NDT(U)}$) improved, as described below. The accuracy of RT_{PTS} is expected to improve when re-calculated using the revised value for $RT_{NDT(U)}$.

On July 30, 2013, FENOC submitted a license amendment request to implement 10 CFR 50.61a "Alternate fracture toughness requirements for protection against pressurized thermal shock events" (ADAMS Accession No. ML13212A027). A December 11, 2014 Nuclear Regulatory Commission (NRC) staff letter (ADAMS Accession No. ML14218A762) requested FENOC to: "Identify the specific methodology in MTEB 5-2 and provide the calculations used to determine $RT_{NDT(U)}$ for each of the plate materials in Table 3.3-1."

Consistent with the standard practice when the $RT_{NDT(U)}$ values were originally determined, a hand-drawn curve was graphed through the minimum Charpy V-notch test data points in accordance with American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) Section III, "Rules for the Construction of Nuclear Power Plant Components," Subarticle NB-2331, Paragraph (a)(4). While re-evaluating the $RT_{NDT(U)}$ of the reactor vessel in response to the NRC staff request, the original material test data was graphed using computer code CVGRAPH, Version 6.0, with a symmetric hyperbolic tangent curve fit through the minimum data points in accordance with ASME Code Section III, Subarticle NB-2331, Paragraph (a)(4).

Use of the symmetric hyperbolic tangent curve fit is considered to be appropriate because it follows the current industry practice for fitting surveillance capsule Charpy V-notch test data. The symmetric hyperbolic tangent curve fit is used in the credibility assessment and to determine the measured upper-shelf energy decrease and 30 foot-pound shift values of the surveillance capsule material. Additionally, the current embrittlement correlations that are used for various reactor vessel integrity calculations contained in Regulatory Guide 1.99, "Radiation Embrittlement of Reactor Vessel Materials," Revision 2, and the Pressurized Thermal Shock (PTS) Rule (10 CFR 50.61, "Fracture toughness requirements for protection against pressurized thermal shock events"), were based on a symmetric hyperbolic tangent curve fit to the data. Therefore, use of the symmetric hyperbolic tangent curve fit for the $RT_{NDT(U)}$ determination is consistent with the current industry practice regarding reactor vessel integrity Charpy V-notch test data applications.

The initial $RT_{NDT(U)}$ values for the BVPS-1 reactor vessel materials improved as a result of fitting the original material test data with the hyperbolic tangent curve instead of the hand-drawn curve. Table 1 identifies the $RT_{NDT(U)}$ values that were determined using the hand-drawn curve fit and the hyperbolic tangent curve fit through the minimum data points. In order to verify the re-evaluated $RT_{NDT(U)}$ values, an industry consultant was contracted to perform an independent verification of the results. Using the symmetric hyperbolic tangent curve fitting computer code, the consultant determined the same results as shown in Table 1.

Table 1
Comparison of $RT_{NDT(U)}$ Values for BVPS-1 Beltline Plate Materials
Using Hand-Drawn and Hyperbolic Tangent Curve Fits

Reactor Vessel Beltline Material	Hand Drawn Curve Fit $RT_{NDT(U)}$ (°F)	Hyperbolic Tangent Curve Fit $RT_{NDT(U)}$ (°F)
Intermediate Shell Plate B6607-1	43	26.8
Intermediate Shell Plate B6607-2	73	53.6
Lower Shell Plate B7203-2	20	0.4
Lower Shell Plate B6903-1	27	13.1

Because $RT_{NDT(U)}$ is an input into the calculation for RT_{PTS}, it is expected that the accuracy of RT_{PTS} will improve and the value of RT_{PTS} will be reduced when re-calculated using the revised value for $RT_{NDT(U)}$. Based on the expected reduction in the RT_{PTS} value, the July 30, 2013 license amendment request to authorize implementation of the alternate PTS rule (that is, 10 CFR 50.61a) was not expected to be needed. Therefore, FENOC withdrew the July 30, 2013 license amendment request by letter dated February 5, 2015 (ADAMS Accession No. ML15036A424).

FENOC intends to use the revised $RT_{NDT(U)}$ values as input to the next revision of the pressure-temperature limit curves for BVPS-1, which are scheduled to be implemented prior to July 2017.

There are no regulatory commitments contained in this submittal. If there are any questions or if additional information is required, please contact Mr. Thomas A. Lentz, Manager – Fleet Licensing, at 330-315-6810.

Sincerely,

Marty L. Richey

cc: NRC Region I Administrator
NRC Resident Inspector
NRC Project Manager
Director BRP/DEP
Site BRP/DEP Representative