

Eric A. Larson
Site Vice President724-682-5234
Fax: 724-643-8069February 25, 2014
L-14-074

10 CFR 50.46

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

SUBJECT:

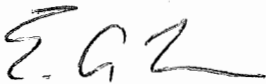
Beaver Valley Power Station, Unit No. 2
Docket No. 50-412, License No. NPF-73
10 CFR 50.46 Report of Changes or Errors in ECCS Evaluation Models

By correspondence dated July 31, 2013, FirstEnergy Nuclear Operating Company (FENOC) was notified of changes and errors in the emergency core cooling system (ECCS) evaluation model for the Beaver Valley Power Station, Unit No. 2 (BVPS-2). When reviewed, the changes and errors did not meet the criterion of a significant change or error as defined by 10 CFR 50.46(a)(3)(i).

By electronic mail dated January 31, 2014, FENOC was notified of an error in the ECCS evaluation model for the BVPS-2. When collectively reviewed with information from the July 31, 2013 letter, the summation of the absolute values of the changes and errors results in a value that meets the criterion for a significant change or error. In accordance with 10 CFR 50.46(a)(3)(ii), FENOC is required to report significant changes or errors to the Nuclear Regulatory Commission (NRC) within 30 days. The required report and a schedule for reanalysis are attached.

There are no new 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,



Eric A. Larson

Attachment: 10 CFR 50.46 Report of Significant Changes or Errors

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

Notification from July 31, 2013: Revised Heat Transfer Multiplier Distributions

Background

For BVPS-2, several changes and error corrections were made to the thermal hydraulic computer code WCOBRA/TRAC and the impacts of these changes on the heat transfer multiplier uncertainty distributions were investigated. During the investigation, errors were discovered in the development of the original multiplier distributions, including errors in the grid locations specified in the WCOBRA/TRAC models for the G2 refill and G2 reflood tests, and errors in processing test data used to develop the reflood heat transfer multiplier distribution. Therefore, the blowdown heatup, blowdown cooling, refill, and reflood heat transfer multiplier distributions were redeveloped. For the reflood heat transfer multiplier development, the evaluation time windows for each set of test experimental data and each test simulation were separately defined based on the time at which the test or simulation exhibited dispersed flow film boiling heat transfer conditions characteristic of the reflood time period. The revised heat transfer multiplier distributions have been evaluated for impact on existing analyses. Resolution of these issues represents a closely related group of non-discretionary changes in accordance with Section 4.1.2 of WCAP-13451, "Westinghouse Methodology for Implementation of 10 CFR 50.46 Reporting."

Affected BVPS-2 Evaluation Model

1996 Westinghouse Best Estimate Large Break LOCA Evaluation Model

Estimated Effect

The changes and errors result in a maximum estimated peak cladding temperature (PCT) change of -35 degrees Fahrenheit (-35°F); the revised PCT is 1802°F.

Notification from January 31, 2014: Error in Burst Strain Application

Background

For BVPS-2, an error in the application of the burst strain was discovered in HOTSPOT. The equation for the application of the burst strain is given as Equation 7-69 in WCAP-12945-P-A, "Code Qualification Document for Best Estimate LOCA Analysis, Volume I: Models and Correlations." The outer radius of the cladding after burst occurs should be calculated based on the burst strain, and the inner radius of the cladding should be calculated based on the outer radius. In HOTSPOT, the burst strain is applied to the calculation of the cladding inner radius. The cladding outer radius is then calculated based on the inner radius. As such, the burst strain is incorrectly applied to the inner radius rather than the outer radius, which impacts the resulting cladding geometry at the burst elevation after burst occurs. Correction of the erroneous

calculation results in thinner cladding at the burst node and more fuel relocating into the burst node, leading to an increase in the estimated PCT at the burst node. This issue has been evaluated to estimate the impact on existing best-estimate (BE) large-break loss-of-coolant accident (LBLOCA) analysis results. The resolution of this issue represents a non-discretionary change in accordance with Section 4.1.2 of WCAP-13451.

Affected BVPS-2 Evaluation Model

1996 Westinghouse Best Estimate Large Break LOCA Evaluation Model

Estimated Effect

This error results in a maximum estimated PCT change of 30 degrees Fahrenheit (30°F); the revised PCT is 1832°F.

Collective Review of Changes and Errors

As a result of incorporating these changes and errors, the PCT is 1832°F and continues to satisfy the 10 CFR 50.46(b)(1) criterion of PCT not to exceed 2200°F.

As shown below, the summation of absolute values of the changes and errors results in a value of 65°F, which meets the "greater than 50°F" criterion for a significant change or error as defined by 10 CFR 50.46(a)(3)(i). In accordance with 10 CFR 50.46(a)(3)(ii), a report to the NRC is required.

$$|-35^{\circ}\text{F}| + |30^{\circ}\text{F}| = 65^{\circ}\text{F}$$

Schedule for Reanalysis

By correspondence dated March 16, 2012 (Accession No. ML12079A111), FENOC committed to submit to the NRC for review and approval LBLOCA analyses that apply NRC-approved methods that include the effects of fuel pellet thermal conductivity degradation. This commitment is due on or before December 15, 2016. The changes and errors documented within this report will be included in the reanalysis for BVPS-2.