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10 CFR 50.46(a)(3)(ii)

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

SUBJECT:
Beaver Valley Power Station, Unit Nos. 1 and 2
Docket No. 50-334, License No. DPR-66
Docket No. 50-412, License No. NPF-73
10 CFR 50.46 Report of Changes or Errors in ECCS Evaluation Models

In accordance with 10 CFR 50.46(a)(3)(ii), FirstEnergy Nuclear Operating Company (FENOC) provides the attached report as annual notification of changes or errors in emergency core cooling system (ECCS) evaluation models for the Beaver Valley Power Station, Unit Nos. 1 (BVPS-1) and 2 (BVPS-2). Current information for both large and small break loss of coolant accident (LOCA) transients is provided to satisfy reporting requirements. The following attachments provide information as requested by 10 CFR 50.46.

Attachment 1 provides a listing of each change or error in an acceptable evaluation model that affects the peak cladding temperature (PCT) calculation for particular transients. It quantifies the effects of the changes that have occurred since the previous report (November 30, 2009) for the specified transients and provides an index to Attachment 2.

Attachment 2 provides a description for each model change or error.

The BVPS-1 large break LOCA PCT was calculated based on the large break LOCA evaluation model using Automated Statistical Treatment of Uncertainty Method (ASTRUM). The use of this methodology was allowed by the Nuclear Regulatory Commission in a letter dated July 1, 2010.

The PCT effects, listed in Attachment 1, result in PCTs for the large and small break LOCA transients as follows:

BVPS-1 Large Break LOCA – 2163°F
BVPS-1 Small Break LOCA – 1895°F
BVPS-2 Large Break LOCA – 2017°F
BVPS-2 Small Break LOCA – 1917°F

There are no regulatory commitments contained in this letter. If there are any questions or if additional information is required, please contact Mr. Thomas A. Lentz, Manager – Fleet Licensing, at (330) 761-6071.

Sincerely,

Paul A. Harden

Attachments:
1. Summary of PCT Effects for Beaver Valley Power Station LOCA Transients
2. Description of Model Changes or Errors

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

Summary of PCT Effects for Beaver Valley Power Station LOCA Transients
Page 1 of 1

Description	PCT Effect (°F)	Attachment 2 Page
BVPS-1 LARGE BREAK LOCA		
Error in ASTRUM Processing of Average Rod Burnup and Rod Internal Pressure	0	1
HOTSPOT Gap Heat Transfer Logic	0	2
HOTSPOT Statistical Output Logic	0	3
PBOT/PMID Evaluation for ASTRUM Implementation	0	4
PAD Data Evaluation for ASTRUM Implementation	2	5
General Code Maintenance	0	6
BVPS-1 SMALL BREAK LOCA		
No changes		
BVPS-2 LARGE BREAK LOCA		
HOTSPOT Gap Heat Transfer Logic	0	2
HOTSPOT Statistical Output Logic	0	3
General Code Maintenance	0	6
BVPS-2 SMALL BREAK LOCA		
No changes		

ERROR IN AUTOMATED STATISTICAL TREATMENT OF UNCERTAINTY METHOD (ASTRUM) PROCESSING OF AVERAGE ROD BURNUP AND ROD INTERNAL PRESSURE

Background

An error was discovered in the processing of the burnup and rod internal pressure for average core rods in ASTRUM analyses. The correction of this error has been evaluated for impact on current licensing-basis analyses and will be incorporated into the ASTRUM method at a future time. These changes represent 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 Evaluation Model(s)

2004 Westinghouse Realistic Large Break Loss of Coolant Accident (LOCA) Evaluation Model Using ASTRUM

Estimated Effect

This error was evaluated to have a negligible impact on peak cladding temperature (PCT), leading to an estimated impact of 0°F for 10 CFR 50.46 reporting purposes.

HOTSPOT GAP HEAT TRANSFER LOGIC

Background

The HOTSPOT code has been updated to incorporate the following changes to the gap heat transfer logic: (1) change the gap temperature from the pellet average temperature to the average of the pellet outer surface and cladding inner surface temperatures; (2) correct the calculation of the pellet surface emissivity to use a temperature in °R (as specified in Equation 7-28 of WCAP-12945-P-A, "Code Qualification Document for Best Estimate LOCA Analysis, Volume I: Models and Correlations") instead of °F; and (3) revise the calculation of the gap radiation heat transfer coefficient to delete a term and temperature adder not shown in or suggested by Equation 7-28 of WCAP-12945-P-A. These changes represent 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 Evaluation Model(s)

1996 Westinghouse Best Estimate Large Break LOCA Evaluation Model
2004 Westinghouse Realistic Large Break LOCA Evaluation Model Using ASTRUM

Estimated Effect

Sample calculations showed a minimal impact on PCT, leading to an estimated effect of 0°F.

HOTSPOT STATISTICAL OUTPUT LOGIC

Background

The HOTSPOT code has been updated to incorporate the following changes to the statistical output logic for calculations using the Code Qualification Document methodology: (1) revise one of the three methods for calculating the standard deviation of cladding temperature to correctly identify the bin containing the 97.5th percentile value; and (2) change the 50th, 95th, and 97.5th percentile bin values from the lower end of the range to the upper end. These changes represent 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 Evaluation Model(s)

1996 Westinghouse Best Estimate Large Break LOCA Evaluation Model

Estimated Effect

Sample calculations suggested a minimal impact on the 95th percentile PCT, leading to an estimated effect of 0°F.

PBOT/PMID EVALUATION FOR ASTRUM IMPLEMENTATION

Background

PBOT and PMID are parameters that define power limits in the bottom (PBOT) and middle (PMID) part of the core. It was determined during the BVPS-1 Cycle 21 reload design process that the PBOT/PMID box documented in the ASTRUM analysis to be implemented was not adequate to bound the core design. An expanded PBOT/PMID box that showed acceptability in core design space was evaluated for its impact on the ASTRUM analysis of record PCT. This change represents a Discretionary Change in accordance with Section 4.1.1 of WCAP-13451, "Westinghouse Methodology for Implementation of 10 CFR 50.46 Reporting."

Affected Evaluation Model(s)

2004 Westinghouse Realistic Large Break LOCA Evaluation Model Using ASTRUM

Estimated Effect

A plant-specific evaluation was performed. The results of the evaluation determined a 0°F impact on PCT.

PERFORMANCE ANALYSIS AND DESIGN (PAD) DATA EVALUATION FOR ASTRUM
IMPLEMENTATION

Background

It was determined that the PAD data documented in the ASTRUM analysis to be
implemented was not accurate. Revised fuel rod average temperatures and rod internal
pressure PAD data was evaluated. This change represents a Non-Discretionary
Change in accordance with Section 4.1.2 of WCAP-13451, "Westinghouse Methodology
for Implementation of 10 CFR 50.46 Reporting."

Affected Evaluation Model(s)

2004 Westinghouse Realistic Large Break LOCA Evaluation Model Using ASTRUM

Estimated Effect

A plant-specific evaluation was performed using the revised fuel rod average
temperatures and rod internal pressure PAD data. The results of the evaluation
determined a 2°F impact on PCT.

GENERAL CODE MAINTENANCE

Background

Various changes have been made to enhance the usability of codes and to streamline future analyses. Examples of these changes include modifying input variable definitions, units and defaults; improving the input diagnostic checks; enhancing the code output; optimizing active coding; and eliminating inactive coding. These changes represent Discretionary Changes that will be implemented on a forward-fit basis in accordance with Section 4.1.1 of WCAP-13451, "Westinghouse Methodology for Implementation of 10 CFR 50.46 Reporting."

Affected Evaluation Model(s)

1996 Westinghouse Best Estimate Large Break LOCA Evaluation Model
2004 Westinghouse Realistic Large Break LOCA Evaluation Model Using ASTRUM

Estimated Effect

The nature of these changes leads to an estimated 0°F impact on PCT.