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Our ref: LTR-NRC-09-17, Rev. 1

April 7, 2011

**U. S. Nuclear Regulatory Commission
10 CFR 50.46 Annual Notification and Reporting for 2008**

Dear Mr. Ulses,

The purpose of this letter is to report the impact of changes or errors in the emergency core cooling system (ECCS) evaluation models used by Westinghouse Electric Company. A description of the changes to the Westinghouse small-break LOCA and large-break LOCA ECCS evaluation models for 2008 is provided as an attachment. Westinghouse has categorized these changes or errors into two separate groups:

- Non-Discretionary Changes
- Discretionary Changes

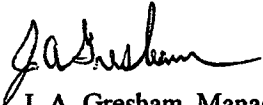
This annual notification is being provided since it affects information previously submitted in Westinghouse Topical Reports. It is noted that plant-specific peak cladding temperature (PCT) variations are not addressed in this letter. These should be treated, as appropriate, on a plant-specific basis in accordance with the applicable sections of 10 CFR 50. Westinghouse has notified licensees utilizing these Westinghouse ECCS evaluation models in their plant licensing basis of the appropriate reportable changes.

For future referencing convenience, the 2008 10 CFR 50.46 reportable changes provided in the attachment, together with the "2007 Formulation" offered in Reference 2 constitutes the "2008 Formulation" of the Westinghouse ECCS evaluation models.

References:

1. ET-NRC-92-3755, "W Methodology for Implementation of 10 CFR 50.46 Reporting," N. J. Liparulo, Westinghouse to NRC Document Control Desk, October 30, 1992. (WCAP-13451)
2. LTR-NRC-08-24, "U.S. Nuclear Regulatory Commission, 10 CFR 50.46 Annual Notification and Reporting for 2007," J. A. Gresham, May 15, 2008.

Sincerely,



J. A. Gresham, Manager
Regulatory Compliance

Attachment:

1. Standard Format Text for Changes and Enhancements to the Westinghouse Evaluation Models for 2008 (14 pages)

Attachment

Standard Format Text for Changes and Enhancements to the Westinghouse Evaluation Models for 2008

Discretionary Changes

Implementation of Optional Models for a Mixed Core Analysis and Deformed Grid Coolability Analysis
Update to the Oxidation Model User-Control Parameter Option to Perform Embrittlement Analysis
General Code Maintenance (Appendix K)
General Code Maintenance (Best Estimate)

Non-Discretionary Changes

Errors in Reactor Vessel Lower Plenum Surface Area Calculations
Discrepancy in Metal Masses Used From Drawings
Pump Input Errors in ASTRUM Analysis
Hotspot Burst Temperature Logic Errors
CCFL Global Volume Error
Upper Plenum Volume Underprediction
Lower Plenum Unheated Conductor
Modeling Errors in ASTRUM Analyses

**IMPLEMENTATION OF OPTIONAL MODELS FOR A MIXED CORE ANALYSIS AND DEFORMED GRID COOLABILITY ANALYSIS
(Discretionary Change)**

Background

The Appendix K ECCS Performance Analysis for LBLOCA for CE plants is performed with the 1999 Evaluation Model (1999 EM).

A new User-Controlled Interface (UCI) parameter ('mixed_core') is added to the UCI File Parameter List to facilitate the selection of optional model features for use in performing a non-licensing mixed core analysis. The mixed core analysis is used to analyze the effects of co-resident, thermal-hydraulically dissimilar, fuel assembly design types. This new UCI option is not intended for licensing applications of the 1999 EM, which must use a uniform core representation of one fuel assembly type for conformance to the 1999 EM licensed methodology. As required by the NRC in Limitations and Conditions for WCAP-16500, the Core Reference Report for the Implementation of the CE 16x16 Next Generation Fuel (NGF) assembly design, mixed core effects must be dispositioned. The mixed core UCI file parameter is designed to automate base deck input vector changes needed to perform analyses to disposition transition core configurations.

Also, a new UCI parameter ('deformed_grid') is added to the UCI File Parameter List to facilitate the selection of optional model features for use in performing a non-licensing Deformed Grid Coolability Analysis (DGCA) as part of the Seismic/LOCA fuel design qualification process. This new UCI option is not intended for licensing application of the 1999 EM, which is constrained by NRC imposed limitations/constraints to applications for ECCS Performance Analysis only. However, the DGCA analysis is permissible under NUREG 0800, SRP 4.2, Appendix A, Section D, where cases of deformed grids are acceptable for fuel assembly designs provided an ECCS Performance analysis confirms that 10 CFR 50.46 peak cladding temperature and maximum local cladding oxidation criteria are satisfied with the assumption of maximum credible grid deformation.

Affected Evaluation Model(s)

Non-Licensing Applications using the Appendix K LBLOCA Evaluation Model, 1999 EM

Estimated Effect

This process improvement is for non-licensing applications. Therefore, this change has no impact on the licensed methodology for the 1999 EM and does not conflict with the SER limitation/constraints imposed on the methodology by NRC for licensing applications. For licensing applications, there is no impact on PCT for 10 CFR 50.46 reporting purposes since these changes are intended only for use in non-licensing calculations.

**UPDATE TO THE OXIDATION MODEL USER-CONTROL PARAMETER OPTION TO
PERFORM EMBRITTLEMENT ANALYSIS
(Discretionary Change)**

Background

An update to the Oxidation Model UCI parameter ('oxidation_model') has been added to activate the calculation of the new NRC Embrittlement Model as described in the NRC's Research Information Letter (RIL) 0801. RIL 0801 is the NRC's announcement to the industry of planned regulatory modifications to the cladding embrittlement criteria of 10 CFR 50.46. The details of the ECCS Acceptance Criteria change have not been finalized by the NRC, but the essential elements of NRC's planned change are known. The purpose of this update to the STRIKIN-II computer code is to modify the code logic to implement the preliminary capabilities that are necessary to calculate the new embrittlement model. This update to the Oxidation Model UCI parameter is a non-licensing option that is added to the 1999 EM to facilitate scoping studies and various advanced model calculations.

Affected Evaluation Model(s)

Non-Licensing Applications using the Appendix K LBLOCA Evaluation Model, 1999 EM

Estimated Effect

This process improvement is for non-licensing applications. Therefore, this change has no impact on the licensed methodology for the 1999 EM and does not conflict with the SER limitation/constraints imposed on the methodology by NRC for licensing applications. For licensing applications, there is no impact on PCT for 10 CFR 50.46 reporting purposes since these changes are intended only for use in non-licensing calculations.

ERRORS IN REACTOR VESSEL LOWER PLENUM SURFACE AREA CALCULATIONS (Non-Discretionary Change)

Background

Two errors were discovered in the calculations of reactor vessel lower plenum surface area. The corrected values have been evaluated for impact on current licensing-basis analysis results and will be incorporated on a forward-fit basis. These changes represent a closely-related group of Non-Discretionary Changes in accordance with Section 4.1.2 of WCAP-13451.

Affected Evaluation Model(s)

1981 Westinghouse Large Break LOCA Evaluation Model with BASH
1985 Westinghouse Small Break LOCA Evaluation Model with NOTRUMP

Estimated Effect

The differences in vessel lower plenum surface area are relatively minor and would be expected to produce a negligible effect on large and small break LOCA analysis results, leading to an estimated PCT impact of 0°F for 10 CFR 50.46 reporting purposes.

**DISCREPANCY IN METAL MASSES USED FROM DRAWINGS
(Non-Discretionary Change)**

Background

Discrepancies were discovered in the use of metal masses from drawings. The updated reactor vessel metal masses and fluid volumes have been evaluated for impact on current licensing-basis analysis results and will be incorporated on a forward-fit basis. These changes represent a closely-related group of Non-Discretionary Changes in accordance with Section 4.1.2 of WCAP-13451.

Affected Evaluation Model(s)

1981 Westinghouse Large Break LOCA Evaluation Model with BASH
1985 Westinghouse Small Break LOCA Evaluation Model with NOTRUMP

Estimated Effect

The differences in the reactor vessel metal mass and fluid volume are relatively minor and would be expected to produce a negligible effect on large and small break LOCA analysis results, leading to an estimated PCT impact of 0°F for 10 CFR 50.46 reporting purposes.

**GENERAL CODE MAINTENANCE
(Discretionary Change)**

Background

Various changes have been made to enhance the usability of the codes and to help preclude errors in analyses. This includes items such as 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.

Affected Evaluation Model(s)

1981 Westinghouse Large Break LOCA Evaluation Model with BASH
1985 Westinghouse Small Break LOCA Evaluation Model with NOTRUMP

Estimated Effect

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

GENERAL CODE MAINTENANCE
(Discretionary Change)

Background

A number of coding changes were made as part of normal code maintenance. Examples include additional information in code outputs, improved automation and diagnostics in the codes, increased code dimensions, and general code cleanup. All of these changes are considered to be Discretionary changes in accordance with Section 4.1.1 of WCAP-13451.

Affected Evaluation Model(s)

1996 Westinghouse Best Estimate Large Break LOCA Evaluation Model

1999 Westinghouse Best Estimate Large Break LOCA Evaluation Model, Application to PWRs with Upper Plenum Injection

2004 Westinghouse Realistic Large Break LOCA Evaluation Model Using ASTRUM

Estimated Effect

The nature of these changes leads to an estimated PCT impact of 0°F for 10 CFR 50.46 reporting purposes.

**PUMP INPUT ERRORS IN ASTRUM ANALYSIS
(Non-Discretionary Change)**

Background

Several errors were discovered in the pump two-phase degraded homologous curve for an ASTRUM Best-Estimate Large Break LOCA analysis of record. In addition, minor errors were also found in the pump inputs resulting in a slight loop to loop asymmetry. The corrected pump inputs have been evaluated for impact on the current licensing-basis analysis results. These changes represent a closely-related group of Non-Discretionary Changes in accordance with Section 4.1.2 of WCAP-13451.

Affected Evaluation Model(s)

2004 Westinghouse Realistic Large Break LOCA Evaluation Model Using ASTRUM

Estimated Effect

The impact of this error was estimated on a plant-specific basis.

HOTSPOT BURST TEMPERATURE LOGIC ERRORS (Non-Discretionary Change)

Background

The HOTSPOT code has been updated to incorporate the following corrections to the burst temperature logic: (1) change the rod internal pressure used to calculate the cladding engineering hoop stress from the value in the previous time step to the value in the current time step; (2) revise the average cladding heat-up rate calculation to reset selected variables to zero at the beginning of each trial and use the instantaneous heat-up rate when fewer than five values are available; and, (3) reflect the assumed saturation of ramp rate effects above 28°C/s for Zircaloy-4 cladding from Equation 7-66 of Reference 1. These changes represent a closely-related group of Non-Discretionary Changes in accordance with Section 4.1.2 of WCAP-13451.

Affected Evaluation Model(s)

1996 Westinghouse Best Estimate Large Break LOCA Evaluation Model
1999 Westinghouse Best Estimate Large Break LOCA Evaluation Model, Application to PWRs with Upper Plenum Injection
2004 Westinghouse Realistic Large Break LOCA Evaluation Model Using ASTRUM

Estimated Effect

Sample calculations for each change showed no effect on peak cladding temperature, leading to an estimated impact of 0°F for 10 CFR 50.46 reporting purposes.

Reference(s)

1. WCAP-12945-P-A, Volume 1 (Revision 2) and Volumes 2-5 (Revision 1), "Code Qualification Document for Best Estimate LOCA Analysis," S. M. Bajorek et al., March 1998.

**CCFL GLOBAL VOLUME ERROR
(Non-Discretionary Change)**

Background

An error was identified during the course of a recent Best Estimate Large Break LOCA analysis in which the volume between the core barrel and the baffle plates in the CCFL region above the active fuel length was modeled incorrectly. The corrected values have been evaluated for impact on the current licensing-basis analysis results. This error represents a non-discretionary change in accordance with Section 4.1.2 of WCAP-13451.

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 CCFL global volume modeling error has been generically evaluated to have a negligible impact on PCT for affected analyses and a penalty of 0 °F is assigned.

**UPPER PLENUM VOLUME UNDERPREDICTION
(Non-Discretionary Change)**

Background

An approximation in plant-specific WCOBRA/TRAC input deck calculations was to model the upper head volume (Section 8) portion of the eight Low Power Guide Tubes in Section 7. However, the calculation modeled only the Section 7 proper outline volume. An evaluation of the impact was performed on the current licensing-basis analysis results. This error represents a non-discretionary change in accordance with Section 4.1.2 of WCAP-13451.

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

This error was evaluated to have a negligible impact on the Large Break LOCA analysis results, leading to an estimated PCT impact of 0°F for 10 CFR 50.46 reporting purposes.

**LOWER PLENUM UNHEATED CONDUCTOR
(Non-Discretionary Change)**

Background

A modeling discrepancy was discovered in the lower plenum of a plant's Analysis of Record (AOR) vessel model. This discrepancy resulted in the under-prediction of the metal mass in the lower plenum. This change represents a non-discretionary change in accordance with Section 4.1.2 of WCAP-13451.

Affected Evaluation Model(s)

2004 Westinghouse Realistic Large Break LOCA Evaluation Model Using ASTRUM

Estimated Effect

Based on a plant-specific evaluation, the estimated impact of the lower plenum metal mass under-prediction on the AOR peak cladding temperature (PCT) is 0 °F.

MODELING ERRORS IN ASTRUM ANALYSES (Non-Discretionary Change)

Background

Several small modeling errors in the plant models were identified during the course of a recent Best Estimate Large Break LOCA analysis. These errors include a small difference in modeled accumulator line losses, the splitting of core average assembly rods into average core channels, and a discrepancy in the volume modeled in the CCFL inner global channel. The impact of each of these modeling errors was assessed individually on a plant-specific basis. These changes represent Non-Discretionary Changes in accordance with Section 4.1.2 of WCAP-13451, and are only applicable to the 2006 OFA ASTRUM analyses.

Affected Evaluation Model(s)

2004 Westinghouse Realistic Large Break LOCA Evaluation Model Using ASTRUM

Estimated Effect

Each of these issues was individually evaluated to have a negligible impact on the PCT. Therefore, a 0°F peak cladding temperature (PCT) impact is assigned to each issue for 10 CFR 50.46 reporting purposes.