Ameren MISSOURI

Callaway Plant

March 1, 2011

ULNRC-05769

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

10 CFR 50.46

Ladies and Gentlemen:

DOCKET NUMBER 50-483
CALLAWAY PLANT
UNION ELECTRIC COMPANY
10 CFR 50.46 ANNUAL REPORT
ECCS EVALUATION MODEL REVISIONS

References: 1) ULNRC-05260 dated 3-9-06
2) ULNRC-05378 dated 3-7-07
3) ULNRC-05475 dated 3-4-08
4) ULNRC-05600 dated 3-4-09
5) ULNRC-05683 dated 3-1-10

Ameren Missouri hereby submits the annual report required per 10 CFR 50.46(a)(3) for Callaway Plant. Attachment 1 to this letter describes changes to the Westinghouse ECCS Large Break and Small Break Loss of Coolant Accident (LOCA) Evaluation Models which have been implemented for Callaway during the time period from March 2010 to March 2011. Attachment 2 provides an ECCS Evaluation Model Margin Assessment which accounts for all peak cladding temperature (PCT) changes resulting from the resolution of prior issues as they apply to Callaway. No new PCT penalties are included in these attachments. References 1 through 5 provided annual 10 CFR 50.46 reports that were issued after the LOCA analyses were revised to reflect the installation of the replacement steam generators in 2005.

The PCT values determined in the Large Break and Small Break LOCA analyses of record, when combined with all PCT margin allocations, remain below the 2200°F regulatory limit. As such, no reanalysis is planned by Ameren Missouri.

This letter does not contain any new commitments. If you have any questions on this report, please contact Mr. Tom Elwood at (314) 225-1905.

Very truly yours,

Scott M

Scott Maglio
Regulatory Affairs Manager

GGY/nls
Enclosure

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Our ref: LTR-LIS-11-40

January 26, 2011

Callaway
10 CFR 50.46 Annual Notification and Reporting for 2010

Dear Sir or Madam:

This is a notification of 10 CFR 50.46 reporting information pertaining to the Westinghouse Electric Company Evaluation Models/analyses. As committed to in WCAP-13451, Westinghouse Methodology for Implementation of 10 CFR 50.46 Reporting, Westinghouse is providing an Annual Report for Emergency Core Cooling System (ECCS) Evaluation Model changes and errors for the 2010 model year. Standardized reporting pages for all changes and errors for the Evaluation Models utilized for your plant(s) are enclosed, consistent with the commitment following the NUPIC audit in early 1999. Peak Clad Temperature (PCT) sheets are enclosed. All necessary revisions for any non-zero, non-discretionary, PCT change to Section C have been included. Non-discretionary PCT impacts of 0°F will generally not be presented on the PCT sheet. Any plant-specific errors in the application of the model for 2010 will also be provided in Section C with discussion enclosed or cited. The Evaluation Model changes and errors (except any plant-specific errors in the application of the model) will be provided to the NRC via Westinghouse letter.

This information is for your use in making a determination relative to the reporting requirements of 10 CFR 50.46. The information that is provided in this letter was prepared in accordance with Westinghouse's Quality Management System (QMS).

Author: (Electronically Approved)*
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LOCA Integrated Services I

Verified: (Electronically Approved)*
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LOCA Integrated Services I

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Attachment

*Electronically approved records are authenticated in the electronic document management system.

URANIA-GADOLINIA PELLET THERMAL CONDUCTIVITY CALCULATION (Non-Discretionary Change)

Background

Two errors were discovered in the pellet thermal conductivity calculation for urania-gadolinia pellets in the SBLOCTA code. First, the calculation did not include the terms required to adjust for pellet densities other than 95% of the theoretical density. Second, the conversion from Fahrenheit to Rankine used an adder of 459 instead of 459.67. These errors have been corrected and evaluated for impact on existing Small Break LOCA 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)

1985 Westinghouse Small Break LOCA Evaluation Model with NOTRUMP

Estimated Effect

SBLOCTA sensitivity calculations led to an estimated PCT effect of 0°F for existing Small Break LOCA analysis results.

PELLET CRACK AND DISH VOLUME CALCULATION (Non-Discretionary Change)

Background

Two errors were discovered in the calculation of the normalized pellet crack and dish volumes in the SBLOCTA code. First, an incorrect operator was used to select between two tables of normalized volume vs. linear heat generation rate. Second, the normalized volume at 18 kW/ft was incorrectly programmed in one of the tables as 1.58 instead of 1.59. These errors have been corrected in the SBLOCTA code and will be corrected (where applicable) in future versions of the BASH and LOCBART codes. 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)

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

Estimated Effect

A combination of SBLOCTA sensitivity calculations and engineering judgment led to an estimated PCT effect of 0°F for existing Large and Small Break LOCA analysis results.

TREATMENT OF VESSEL AVERAGE TEMPERATURE UNCERTAINTY (Non-Discretionary Change)

Background

Historically, the overall vessel average temperature uncertainty calculated by Westinghouse considered only "-" instrument uncertainties, corresponding to the indicated temperature being lower than the actual temperature. This uncertainty was then applied as a "+/-" uncertainty in some LOCA analyses, rather than using specific "+" and "-" uncertainties. This discrepancy has been evaluated for impact on existing Large and Small Break LOCA analysis results, and its resolution represents a Non-Discretionary Change in accordance with Section 4.1.2 of WCAP-13451.

Affected Evaluation Model(s)

1985 Westinghouse Small Break LOCA Evaluation Model with NOTRUMP
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

This issue was judged to have a negligible impact on existing Large and Small Break LOCA analysis results, leading to an estimated PCT impact of 0°F.

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)
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.

CONSIDERATION OF SAFETY INJECTION PUMP HEAT
(Discretionary Change)

Background
SCP-10-21 (Reference 1) is a Westinghouse issued Technical Bulletin documenting an evaluation for the consideration of the addition of auxiliary feedwater (AFW) pump heat on various non-LOCA transients. The Callaway plant has subsequently requested that Westinghouse also address the impact of Safety Injection (SI) pump heat addition on their Appendix K Small Break LOCA (SBLOCA) and Appendix K Large Break LOCA (LBLOCA) analyses of record.

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 effect of SI pump heat was considered for the Callaway Appendix K SBLOCA and Appendix K LBLOCA analyses. It was determined that the inclusion of SI pump heat will produce a negligible effect on the results of the large break and small break LOCA analyses, leading to an estimated PCT impact of 0°F for 10 CFR 50.46 reporting purposes.

Reference
1. SCP-10-21, "TB-09-4, Rev. 1 – Impact of Auxiliary Pump Heat on Westinghouse and Combustion Engineering Analyses/Methodologies," April 13, 2010.

Westinghouse LOCA Peak Clad Temperature Summary for Appendix K Large Break

Plant Name: Callaway
Utility Name: Ameren UE
Revision Date: 1 /14/11

Analysis Information

EM:	BASH	**Analysis Date:**	6/6/03	**Limiting Break Size:**	Cd=0.6
FQ:	2.5	**FdH:**	1.65		
Fuel:	Vantage 5	**SGTP (%):**	5		
Notes:					

	Clad Temp (°F)	Ref.	Notes
LICENSING BASIS			
Analysis-Of-Record PCT	**1939**	**1,4,5**	
PCT ASSESSMENTS (Delta PCT)			
A. PRIOR ECCS MODEL ASSESSMENTS			
1 . LOCBART Pellet Volumetric Heat Generation Rate	14	7	
B. PLANNED PLANT MODIFICATION EVALUATIONS			
1 . Fuel Rod Crud	0	2,3	(a)
2 . Increased Sump Screen Metal Mass	3	6	
C. 2010 ECCS MODEL ASSESSMENTS			
1 . None	0		
D. OTHER*			
1 . None	0		
LICENSING BASIS PCT + PCT ASSESSMENTS	**PCT =** 1956		

* It is recommended that the licensee determine if these PCT allocations should be considered with respect to 10 CFR 50.46 reporting requirements.

References:

1 . SCP-04-73/SCP-RSG-04-30, "Transmittal of Final Engineering Report for NSSS RSG Analyses," July 16, 2004.

2 . SCP-99-111, "Ameren U. E., Callaway Project, 10 CFR 50.46 Annual Notification and Reporting for 1998," March 5, 1999.

3 . SECL-99-036, "Safety Evaluation for Cycle 10 Axial Offset Anomaly at Callaway," April 1999.

4 . SCP-05-44, "LTR-MPG-05-69 P-Attachment (Proprietary) & LTR-MPG-05-69 NP-Attachment (Non-Proprietary), "Responses to NRC Request for Additional Information on WCAP-16265-P, Rev. 0, 'Callaway Replacement Steam Generator Program NSSS Licensing Report,'" June 15, 2005.

5 . NF-SCP-05-49, Rev. 1, "Cycle 15 Final RSE with Revised PCT Rackup," July 27, 2005.

6 . SCP-07-27, Rev. 1, "Large Break LOCA Evaluation for Increased Sump Screen Mass," March 2007.

7 . LTR-LIS-07-313, "10 CFR 50.46 Reporting Text for LOCBART Version 37.0 Issues and Revised PCT Rackup Sheets for Callaway," May 2007.

Notes:

(a) This 0 °F has been assessed for 4.0 mils of crud.

Attachment to LTR-LIS-11-40 January 26, 2011

Westinghouse LOCA Peak Clad Temperature Summary for Appendix K Small Break

Plant Name: Callaway
Utility Name: Ameren UE
Revision Date: 1 /14/11

Analysis Information

EM:	NOTRUMP	**Analysis Date:**	10/8/03	**Limiting Break Size:**	4 inch
FQ:	2.5	**FdH:**	1.65		
Fuel:	Vantage 5	**SGTP (%):**	5		

Notes:

	Clad Temp (°F)	Ref.	Notes
LICENSING BASIS			
Analysis-Of-Record PCT	**1043**	**1**	
PCT ASSESSMENTS (Delta PCT)			
A. PRIOR ECCS MODEL ASSESSMENTS			
1 . None	0		
B. PLANNED PLANT MODIFICATION EVALUATIONS			
1 . None	0		
C. 2010 ECCS MODEL ASSESSMENTS			
1 . None	0		
D. OTHER*			
1 . None	0		
LICENSING BASIS PCT + PCT ASSESSMENTS	**PCT =** 1043		

* It is recommended that the licensee determine if these PCT allocations should be considered with respect to 10 CFR 50.46 reporting requirements.

References:

1 . SCP-04-73/SCP-RSG-04-30, "Transmittal of Final Engineering Report for NSSS RSG Analyses," July 16, 2004.

Notes:

None

RACKUP eRoom Check:

EMs applicable to Callaway:
Appendix K Large Break – BASH
Appendix K Small Break – NOTRUMP

2010 Issues

Transmittal Letter	Issue Description
LTR-LIS-10-304	Consideration Of Safety Injection Pump Heat - Appendix K Small Break LOCA And Appendix K Large Break LOCA Evaluation
LTR-LIS-10-708	Treatment of Vessel Average Temperature Uncertainty