

WOLF CREEK NUCLEAR OPERATING CORPORATION

June 8, 2007

Terry J. Garrett
Vice President, Engineering

ET 07-0021

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

Reference: Westinghouse Letter LTR-LIS-07-312, dated May 14, 2007, 10 CFR 50.46 Reporting Text for LOCBART Version 37.0 Issues and Revised PCT Rackup sheets for Wolf Creek

Subject: Docket No. 50-482: 10 CFR 50.46 Thirty Day Report of ECCS Model Changes

Gentlemen:

In the above reference, Westinghouse Electric Company submitted to Wolf Creek Nuclear Operating Corporation (WCNOC) a mid-year notification of 10 CFR 50.46 reporting information pertaining to changes to and errors discovered in the Westinghouse Evaluation Model with BASH used for the Large Break Loss of Coolant Accident (LOCA) analyses for Wolf Creek Generating Station (WCGS). WCNOC has reviewed the reference, and has concluded that the cumulative effect of changes to, or errors in, the evaluation model on the limiting Large Break LOCA Peak Cladding Temperature (PCT) is significant, as defined in 10 CFR 50.46. Therefore, this report of the Emergency Core Cooling System (ECCS) Evaluation Model changes is being submitted within 30 days according to the reporting requirements set forth in 10 CFR 50.46(a)(3)(ii), as clarified in Section 5.1 of WCAP-13451, "Westinghouse Methodology for Implementation of 10 CFR 50.46 Reporting."

Attachment I provides an assessment of the specific changes to the Westinghouse ECCS Evaluation Model for Large Break LOCAs identified by Westinghouse in the reference.

Attachment II provides an update of the WCGS PCT margin utilization for the Large Break LOCA evaluation model. The PCT value determined in the Large Break LOCA analysis of record, combined with all of the PCT allocations, remains well below the 10 CFR 50.46 regulatory limit of 2200 degrees Fahrenheit. Therefore, WCGS is in compliance with 10 CFR 50.46 requirements. However, due to the age (1992) of the Large Break LOCA analysis of

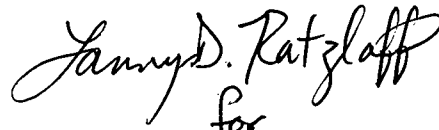
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record and the number of PCT assessments currently tracked on the Large Break LOCA PCT summary sheet, WCNOG is exploring options to perform a reanalysis. Depending on the option selected, a more definitive reanalysis schedule will be available in the 2nd quarter of 2008.

This letter contains no commitments. If you have any questions concerning this matter, please contact me at (620) 364-4084, or Mr. Kevin Moles at (620) 364-4126.

Sincerely,


for
Terry J. Garrett

TJG/rit

Attachment I – Assessment of Changes to the Westinghouse Emergency Core Cooling System (ECCS) Evaluation Model for Large Break Loss of Coolant Accidents (LOCA)

Attachment II – Large Break LOCA Peak Clad Temperature (PCT) Margin Utilization

cc: J. N. Donohew (NRC), w/a
V. G. Gaddy (NRC), w/a
B. S. Mallet (NRC), w/a
Senior Resident Inspector (NRC), w/a

**ASSESSMENT OF CHANGES TO THE WESTINGHOUSE EMERGENCY
CORE COOLING SYSTEM (ECCS) EVALUATION MODELS FOR LARGE
BREAK LOSS OF COOLANT ACCIDENTS (LOCA)**

Non-Discretionary Changes With Peak Cladding Temperature (PCT) Impact

LOCBART PELLETT VOLUMETRIC HEAT GENERATION RATE

Non-Discretionary Changes With No PCT Impact

LOCBART SPECIFIC HEAT MODEL FOR OPTIMIZED ZIRLO™ CLADDING

Enhancements/Forward-Fit Discretionary Changes

LOCBART OXIDE-TO-METAL RATIO

LOCBART PELLETT VOLUMETRIC HEAT GENERATION RATE
(Non-Discretionary Change With PCT Impact)

Background

The LOCBART code has been modified to correct an inverted term in the calculation of the pellet volumetric heat generation rate. This change affects the steady-state and transient heat generation for all three rods and could result in either an increase or decrease in peak cladding temperature for a given calculation. This change represents a Non-Discretionary Change in accordance with Section 4.1.2 of WCAP-13451.

Affected Evaluation Model(s)

1981 Westinghouse Large Break LOCA Evaluation Model with BASH

Estimated Effect

The effect of this change was determined on a plant-by-plant basis. However, due to the vintage of the Wolf Creek analysis-of-record, a plant-specific assessment could not be performed. As such, the LOCBART Pellet Volumetric Heat Generation Rate assessment for Wolf Creek was determined using the bounding value of 45° F from available non-plant-specific sensitivity calculations.

LOCBART SPECIFIC HEAT MODEL FOR OPTIMIZED ZIRLO™ CLADDING
(Non-Discretionary Change With No PCT Impact)

Background

An option has been added to the LOCBART code to model the specific heat of Optimized ZIRLO™ cladding. The model is described in the response to Request for Additional Information (RAI) #21 in Section D of Reference 1 and will facilitate compliance with Condition and Limitation #9 of the Safety Evaluation Report for plants with a peak cladding temperature that occurs during blowdown or early reflood. (Note that the extrapolation algorithm described in the RAI response was replaced with an error message and code abort for temperatures below 73°F or above 2400°F.) This change represents a Non-Discretionary Change in accordance with Section 4.1.2 of WCAP-13451.

Affected Evaluation Model(s)

1981 Westinghouse Large Break LOCA Evaluation Model with BASH

Estimated Effect

No domestic plant with a BASH-EM analysis maintained by Westinghouse has both Optimized ZIRLO™ cladding and a peak cladding temperature that occurs during blowdown or early reflood, so there is no impact on any existing analysis results.

Reference

1. WCAP-12610-P-A and CENPD-404-P-A, Addendum 1-A, "Optimized ZIRLO™," July 2006.

LOCBART OXIDE-TO-METAL RATIO

(Enhancements/Forward-Fit Discretionary Change)

Background

An option has been added to the LOCBART code to convert the user-specified zirconium-oxide thickness to equivalent cladding reacted. This adjustment is made during problem initialization, and the cladding outside diameter is modified accordingly. This change represents a Discretionary Change 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

Estimated Effect

This change is expected to produce a minimal effect on the limiting peak cladding temperature, leading to an estimated effect of 0°F.

**EMERGENCY CORE COOLING SYSTEM (ECCS) EVALUATION MODEL PEAK CLADDING
 TEMPERATURE (PCT) MARGIN UTILIZATION**

***** LARGE BREAK LOCA PEAK CLAD TEMPERATURE (PCT) MARGIN UTILIZATION *****

Evaluation Model:	1981 EM with BASH
Fuel:	17x17 V5H w/IFM, non-IFBA, 275 psig
Peaking Factor:	FQ=2.50, FdH=1.65
SG Tube Plugging:	10%
Power Level:	3565 MWth
Limiting transient:	Cd=0.4, Min. SI, Reduced Tav _g

LICENSING BASIS

Analysis of Record PCT	Clad Temp (°F)	Ref.	Notes
	1916°F	1	(a)

MARGIN ALLOCATIONS (ΔPCT)

A. PRIOR PERMANENT ECCS MODEL ASSESSMENTS

1.	Structural Metal Heat Modeling	-25	8
2.	LUCIFER Error Corrections	-6	10
3.	Skewed Power Shape Penalty	152	11
4.	Hot Leg Nozzle Gap Benefit	-136	11
5.	SATAN-LOCTA Fluid Error	15	2
6.	LOCBART Spacer Grid Single-Phase Heat Transfer Error	15	9
7.	LOCBART Vapor Film Flow Regime Heat Transfer Error	9	12
8.	LOCBART Cladding Emissivity Errors	6	13
9.	LOCBART Radiation to Liquid Logic Error Correction	17	14

B. PLANNED PLANT CHANGE EVALUATIONS

1.	Loose Parts Evaluation	20	3
2.	Effects of Containment Purging	0	4
3.	Cycle 10 Fuel Assembly Design Changes	95	5
4.	Fuel Rod Crud	0	6

C. 2007 ECCS MODEL ASSESSMENTS

1.	LOCBART Pellet Volumetric Heat Generation Rate	45	15
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D. TEMPORARY ECCS MODEL ISSUES

0

E. OTHER

1.	Cold Leg Streaming Temperature Gradient	0	8	(b)
2.	Rebaseline of AOR (12/96)	-63	9	(c)
3.	LOCBART Zirc-Water Oxidation Error	28	7	(d)

LICENSING BASIS PCT + MARGIN ALLOCATIONS

PCT = 2088°F

**CUMULATIVE ABSOLUTE MAGNITUDE OF PCT CHANGES
 SINCE LAST 30-DAY REPORT (LETTER ET 99-0045)**

Σ | ΔPCT | = 77°F

References:

1. Westinghouse Topical Report WCAP-13456, "Wolf Creek Generating Station NSSS Rerating Licensing Report," October 1992.
2. Westinghouse to WCNOC letter SAP-97-102, "Wolf Creek Nuclear Operating Corporation, Wolf Creek Generating Station, 10 CFR 50.46 Annual Notification and Reporting," February 17, 1997.
3. Westinghouse to WCNOC letter SAP-90-148, "Wolf Creek Nuclear Operating Corporation, RCS Loose Parts Evaluation," April 18, 1998.
4. Westinghouse to WCNOC letter SAP-94-102, "Containment Mini purge Isolation Valve Stroke Time Increase," January 12, 1994.
5. Westinghouse to WCNOC letter 97SAP-G-0009, "Wolf Creek Nuclear Operating Corporation, Wolf Creek Generating Station, Safety Assessment for the Wolf Creek Generating Station with ZIRLO™ Fuel Assemblies," February 7, 1997.
6. Westinghouse to WCNOC letter 97SAP-G-0075, "Wolf Creek Nuclear Operating Corporation, Wolf Creek Generating Station, Wolf Creek Crud Deposition/Axial Offset Anomaly Safety Evaluation," September 29, 1997.
7. Westinghouse to WCNOC letter 00SAP-G-0006, "Wolf Creek Nuclear Operating Corporation, Wolf Creek Generating Station, Wolf Creek Cycle 12 LOCA Current Limits," February 10, 2000.
8. Westinghouse to WCNOC letter SAP-93-701, "Wolf Creek Nuclear Operating Corporation, Wolf Creek Generating Station, 10 CFR 50.46 Notification and Reporting Information," January 25, 1993.
9. Westinghouse to WCNOC letter SAP-99-148, "Wolf Creek Nuclear Operating Corporation, Wolf Creek Generating Station, 10 CFR 50.46 BART/BASH Evaluation Model Mid-Year Notification and Reporting for 1999," September 22, 1999.
10. Westinghouse to WCNOC letter SAP-94-703, "Wolf Creek Nuclear Operating Corporation, Wolf Creek Generating Station, 10 CFR 50.46 Notification and Reporting," February 8, 1994.
11. Westinghouse to WCNOC letter SAP-95-716, "Wolf Creek Nuclear Operating Corporation, Wolf Creek Generating Station, LOCA Axial Power Shape Sensitivity Model," August 14, 1995.
12. Westinghouse to WCNOC letter SAP-00-118, "Wolf Creek Nuclear Operating Corporation, Wolf Creek Generating Station, 10 CFR 50.46 Appendix K (BART/BASH/NOTRUMP) Evaluation Model, Mid-Year Notification and Reporting for 2000," June 30, 2000.
13. Westinghouse to WCNOC letter SAP-00-150, "Wolf Creek Nuclear Operating Corporation, Wolf Creek Generating Station, 10 CFR 50.46 BART/BASH Evaluation Model Mid-Year Notification and Reporting for 2000," December 2000.
14. Westinghouse to WCNOC letter SAP-02-32, "10 CFR 50.46 BART/BASH Evaluation Model Mid-Year Notification and Reporting for 2002," June 2002.
15. Westinghouse to WCNOC letter LTR-LIS-07-312, "10 CFR 50.46 Reporting Text for LOCBART Version 37.0 Issues and Revised PCT Rackup sheets for Wolf Creek," May 14, 2007

Notes:

- (a) An evaluation was performed to support removal of the transition core penalty for Cycle 12 (Ref. 7).
- (b) A PCT benefit of $< 2.5^{\circ}\text{F}$ was assessed, however, a benefit of 0°F will be tracked for reporting purposes.
- (c) This previously unclaimed benefit was realized through prior rebaseline of the limiting case.
- (d) This assessment is a function of analysis PCT plus certain margin allocations and as such may increase/decrease with margin allocation changes.