

WOLF CREEK

NUCLEAR OPERATING CORPORATION

November 4, 2015

Cynthia R. Hafenstine
Manager Regulatory Affairs

RA 15-0080

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

- Reference: 1) Letter RA 15-0025, dated March 20, 2015, from S.R. Koenig, WCNOG to USNRC
- 2) Letter from C. F. Lyon, USNRC, to A. C. Heflin, WCNOG, "Wolf Creek Generating Station – Issuance of Amendment re: Revise Technical Specification 5.6.5, "CORE OPERATING LIMITS REPORT (COLR)," to Add ASTRUM to the List of Analytical Methods (TAC NO. MF3518)," dated August 28, 2015

Subject: Docket No. 50-482: 10 CFR 50.46 Thirty Day Report of Emergency Core Cooling System (ECCS) Model Changes

Gentlemen:

In accordance with 10 CFR 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," paragraph (a)(3)(ii), Wolf Creek Nuclear Operating Corporation (WCNOG) is submitting the attached information to fulfill the 30-day reporting requirement for the Wolf Creek Generating Station (WCGS).

In Reference 1, WCNOG reported the WCGS peak cladding temperature (PCT), calculated based on an acceptable evaluation model. A new best-estimate large break loss-of-coolant (LOCA) methodology was approved for WCGS in Reference 2, known as Automated Statistical Treatment of Uncertainty Method (ASTRUM). The license amendment was implemented at WCGS on October 26, 2015. The new analysis resulted in changes of greater than 50 °F in the PCT from those previously reported to the NRC in the last 10 CFR 50.46 report (Reference 1). The calculated PCT for the WCGS large break LOCA remains within the acceptance criteria set forth in 10 CFR 50.46. Additional reanalysis is not required.

Attachment I provides an assessment of the specific changes to the Westinghouse ECCS evaluation model for large break LOCAs.

A002
NRR

Attachment II provides an update of the WCGS PCT margin utilization for the large break LOCA evaluation model.

This letter contains no commitments. If you have any questions concerning this matter, please contact me at (620) 364-4204.

Sincerely,



Cynthia R. Hafenstine

CRH/rlt

Attachment I Assessment of Changes to the Westinghouse Emergency Core Cooling System (ECCS) Evaluation Model for Large Break Loss-of-Coolant Accident (LOCA)
II Emergency Core Cooling System (ECCS) Evaluation Model Peak Cladding Temperature (PCT) Margin Utilization Rack-up Form

cc: M. L. Dapas (NRC), w/a
C. F. Lyon (NRC), w/a
N. H. Taylor (NRC), w/a
Senior Resident Inspector (NRC), w/a

Assessment of Changes to the Westinghouse Emergency Core Cooling System (ECCS) Evaluation Model for Large Break Loss-of-Coolant Accident (LOCA)

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

2004 Westinghouse Realistic Large Break LOCA Evaluation Model Using ASTRUM

Estimated Effect

The nature of these changes leads to an estimated peak cladding temperature (PCT) impact of 0 °F.

ERRORS IN DECAY GROUP UNCERTAINTY FACTORS

Background

Errors in the calculation of decay heat were discovered in the WCOBRA/TRAC code. The decay group uncertainty factors for each fissile isotope are provided in Table 8-14 of WCAP-16009-P-A. The uncertainty factors for ^{239}Pu were applied to ^{238}U , and those for ^{238}U were applied to ^{239}Pu . This error causes an over-prediction of the uncertainty in decay power from ^{239}Pu and an under-prediction of the uncertainty in decay power from ^{238}U . Further, the decay group uncertainty factor for Decay Group 6 of ^{235}U was erroneously coded as 2.5% instead of 2.25%. Correction of these errors impacts the application of the sampled decay heat uncertainty, which may result in small changes to the decay heat power. These issues have been evaluated to estimate the impact on Automated Statistical Treatment of Uncertainty Method (ASTRUM) best-estimate large break LOCA analysis results. The resolution of these issues represents a closely-related group of Non-Discretionary Changes in accordance with Section 4.1.2 of WCAP-13451.

Affected Evaluation Model

2004 Westinghouse Realistic Large Break LOCA Evaluation Model Using ASTRUM

Estimated Effect

The issues described above were evaluated to account for the correction of these errors. The plant-specific sensitivity study resulted in an estimated PCT impact of -10°F for Wolf Creek Generating Station (WCGS).

WCGS CONTAINMENT COOLING CAPACITY

Background

Wolf Creek Nuclear Operating Corporation (WCNOC) identified an error in the containment fan cooler capacity transmitted for use in the best-estimate ASTRUM evaluation model analysis. This issue has been evaluated to estimate the impact on existing PCT results. The resolution of this issue represents a Non-Discretionary Change in accordance with Section 4.1.2 of WCAP-13451.

Affected Evaluation Models

2004 Westinghouse Realistic Large Break LOCA Evaluation Model Using ASTRUM

Estimated Effect

The estimated effect was determined for the large break LOCA evaluation model based on the change in calculated containment pressure resulting from the correct containment cooling capacity. The change in calculated containment pressure leads to an estimated effect of 0°F for the ASTRUM evaluation model analysis.

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

***** LARGE BREAK LOCA PCT MARGIN UTILIZATION *****

Evaluation Model:	ASTRUM (2004)
Fuel:	RFA-2
Peaking Factor:	FQ=2.50, FdH=1.65
SG Tube Plugging:	10%
Power Level:	3565 MWth
Limiting Break Size:	DEG

LICENSING BASIS

	Clad Temp (°F)	Ref.	Notes
Analysis of Record (AOR) PCT	1900 °F	1	
MARGIN ALLOCATIONS (ΔPCT)			
A. PRIOR PERMANENT ECCS MODEL ASSESSMENTS			
1. None	0		
B. PLANNED PLANT CHANGE EVALUATIONS			
1. Containment Fan Cooler Capacity	0	2	(a)
C. 2014 PERMANENT ECCS MODEL ASSESSMENTS			
1. Containment Fan Cooler Capacity	0	2	
2. Decay Group Uncertainty Factors Errors	-10	3	
D. OTHER			
1. None	0		

LICENSING BASIS PCT + MARGIN ALLOCATIONS PCT = 1890 °F

References:

1. WCAP-17107-P, Revision 1, "Best-Estimate Analysis of the Large-Break Loss-of-Coolant Accident for the Wolf Creek Nuclear Power Plant Using the ASTRUM Methodology," January 2014.
2. LTR-LIS-14-400, "10 CFR 50.46 Report for the Wolf Creek Large Break LOCA Evaluation of the Change in Containment Cooling Capacity," August 2014.
3. LTR-LIS-14-492, "Wolf Creek Unit 1 10 CFR 50.46 Report for the Correction of the Decay Group Uncertainty Factors Errors," November 2014.

Notes:

- (a) This effect was estimated based on a cooling capacity intended to bound future implementation of replacement tube bundles in the containment fan coolers.