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10 CFR 50.46

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

Prairie Island Nuclear Generating Plant Units 1 and 2
Dockets 50-282 and 50-306
License Nos. DPR-42 and DPR-60

Corrections to Emergency Core Cooling System (ECCS) Evaluation Models

Enclosed please find enclosure 1, "Westinghouse Loss of Coolant Accident (LOCA) Evaluation Model Changes," which is the 2010 annual report of corrections to the Prairie Island Nuclear Generating Plant (PINGP) Units 1 and 2 ECCS evaluation models. This report is submitted in accordance with the provisions of 10 CFR 50.46 and summarizes changes made to both the large break LOCA (LBLOCA) and small break LOCA (SBLOCA) analyses.

The SBLOCA and LBLOCA peak clad temperature (PCT) assessment sheets for Unit 1 and Unit 2 are included in enclosure 2. The limiting LOCA analysis PCT for PINGP Unit 1 and Unit 2, with consideration of all 10 CFR 50.46 assessments, remains the LBLOCA analysis as summarized in enclosure 2.

Neither enclosure 1 nor enclosure 2 need be withheld from public disclosure.

Summary of Commitments

This letter contains no new commitments and no revisions to existing commitments.

A handwritten signature in black ink that reads 'Mark A. Schimmel'.

Mark A. Schimmel
Site Vice President, Prairie Island Nuclear Generating Plant
Northern States Power Company - Minnesota

Enclosures (2)

cc: Administrator, Region III, USNRC
Project Manager, PINGP, USNRC
Resident Inspector, PINGP, USNRC

ENCLOSURE 1

Westinghouse LOCA Evaluation Model Changes

**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.

TREATMENT OF INTERFACIAL DRAG MULTIPLIERS IN UPPER PLENUM INJECTION PLANTS

(Non-Discretionary Change)

Background

For Upper Plenum Injection (UPI) plants, condensation and interfacial drag multipliers which affect the simulated draining of the upper plenum are modeled within WCOBRA/TRAC. The interfacial drag multipliers are applied in the upper plenum and the Counter-Current Flow Limitation (CCFL) region of the vessel. For some licensing-basis analyses, these multipliers were not ranged as intended. This discrepancy has been evaluated for impact on existing licensing-basis analysis results, and its resolution represents a Non-Discretionary Change in accordance with Section 4.1.2 of WCAP-13451.

Affected Evaluation Model(s)

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 Break LOCA analysis results, leading to an estimated PCT impact of 0°F.

ENCLOSURE 2

LBLOCA and SBLOCA Peak Clad Temperature Assessment Sheets

Westinghouse LOCA Peak Clad Temperature Summary for ASTRUM Best Estimate Large Break

Plant Name: Prairie Island Unit 1
Utility Name: Xcel Energy, Inc
Revision Date: 1/14/11

Analysis Information

EM: ASTRUM (2004) **Analysis Date:** 11/30/07 **Limiting Break Size:** Split
FQ: 2.5 **FdH:** 1.77
Fuel: 422 Vantage + **SGTP (%):** 10

Notes:

	Clad Temp (°F)	Ref.	Notes
LICENSING BASIS			
Analysis-Of-Record PCT	1765	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 = 1765		

* 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 . WCAP-16890-P, Revision 1, "Best-Estimate Analysis of the Large-Break Loss-of-Coolant Accident for the Prairie Island Nuclear Plant Unit 1 Using ASTRUM Methodology," June 2008.

Notes:

None

Westinghouse LOCA Peak Clad Temperature Summary for Appendix K Small Break

Plant Name: Prairie Island Unit 1
Utility Name: Xcel Energy, Inc
Revision Date: 1/14/11

Analysis Information

EM: NOTRUMP **Analysis Date:** 1/21/08 **Limiting Break Size:** 3 inch
FQ: 2.5 **FdH:** 1.77
Fuel: 422 Vantage + **SGTP (%):** 10
Notes: Zirlo® (14X14), Framatome RSG

	Clad Temp (°F)	Ref.	Notes
LICENSING BASIS			
Analysis-Of-Record PCT	959	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 =** 959

* 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 . LTR-LIS-08-158, "Transmittal of Future Prairie Island Units 1 and 2 PCT Summaries," February 2008.

Notes:

None

Westinghouse LOCA Peak Clad Temperature Summary for ASTRUM Best Estimate Large Break

Current

Plant Name: Prairie Island Unit 2
Utility Name: Xcel Energy, Inc
Revision Date: 1/14/11

Analysis Information

EM: ASTRUM (2004) **Analysis Date:** 11/30/07 **Limiting Break Size:** Split
FQ: 2.5 **FdH:** 1.77
Fuel: 422 Vantage + **SGTP (%):** 25
Notes:

	Clad Temp (°F)	Ref.	Notes
LICENSING BASIS			
Analysis-Of-Record PCT	1623	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 = 1623		

* 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 . WCAP-16891-P, "Best-Estimate Analysis of the Large-Break Loss-of-Coolant Accident for the Prairie Island Nuclear Plant Unit 2 Using ASTRUM Methodology," 6/2008.

Notes:

None

Westinghouse LOCA Peak Clad Temperature Summary for Appendix K Small Break

Current

Plant Name: Prairie Island Unit 2
 Utility Name: Xcel Energy, Inc
 Revision Date: 1/14/11

Analysis Information

EM:	NOTRUMP	Analysis Date:	1/21/08	Limiting Break Size:	2 inch
FQ:	2.5	FdH:	1.77		
Fuel:	422 Vantage +	SGTP (%):	25		
Notes:	Zirlo® (14X14)				

	Clad Temp (°F)	Ref.	Notes
LICENSING BASIS			
Analysis-Of-Record PCT	965	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 = 965

* 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 . LTR-LIS-08-158, "Transmittal of Future Prairie Island Units 1 and 2 PCT Summaries," February 2008.

Notes:

None