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AEP-NRC-2013-32
10 CFR 50.46

Docket Nos.: 50-315
50-316

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

Donald C. Cook Nuclear Plant Units 1 and 2
ANNUAL REPORT OF LOSS-OF-COOLANT ACCIDENT
EVALUATION MODEL CHANGES

References:

1. Letter from J. P. Gebbie, Indiana Michigan Power Company (I&M), to U. S. Nuclear Regulatory Commission (NRC), "Response to Information Request Pursuant to 10 CFR 50.54(f) Related to the Estimated Effect on Peak Cladding Temperature Resulting from Thermal Conductivity Degradation on the Westinghouse-Furnished Realistic Emergency Core Cooling System Evaluation," AEP-NRC-2012-13, dated March 19, 2012, (ADAMS Accession No. ML 12088A104).

2. Letter from M. H. Carlson, I&M, to NRC, "Donald C. Cook Nuclear Plant Units 1 and 2 Response to Request for Information 10 CFR 50.46 Report for Emergency Core Cooling System Model Change or Error Associated with Thermal Conductivity Degradation," dated June 11, 2012, (ADAMS Accession No. ML 12173A025).

3. Letter from P. S. Tam, NRC, to Lawrence J. Weber, I&M, "D. C. Cook Nuclear Plant (DCCNP), Units 1 and 2 – Closeout of Information Request Pursuant to 50.54(f) Related to the Estimated Effect on Peak Cladding Temperature Resulting from Thermal Conductivity Degradation in the Westinghouse-Furnished Realistic Emergency Core Cooling System Evaluation," dated April 2, 2012, (ADAMS Accession No. ML 12088A376).

4. Letter from T. J. Wengert, NRC, to L. J. Weber, I&M, "Donald C. Cook Nuclear Plant, Units 1 and 2 – Evaluation of Report concerning Significant Emergency Core Cooling System Evaluation Model Error Related to Nuclear Fuel Thermal Conductivity Degradation (TAC NOS. ME8322 and ME8323)," dated March 7, 2013, (ADAMS Accession No. ML13077A137).

A002
NRR

Pursuant to 10 CFR 50.46, Indiana Michigan Power Company, the licensee for Donald C. Cook Nuclear Plant (CNP), is transmitting an annual report of loss-of-coolant accident (LOCA) evaluation model changes affecting the peak cladding temperature (PCT) for CNP Unit 1 and Unit 2. CNP is providing, as an enclosure to this letter, the Unit 1 and Unit 2 Large Break and Small Break LOCA Analyses-of-Record PCT values and error assessments for calendar year 2012.

The impacts to Large Break LOCA PCT due to fuel pellet thermal conductivity degradation were previously reported to the Nuclear Regulatory Commission (NRC) in Reference 1 and supplemented by Reference 2. NRC staff review and acceptance of the impact to PCT due to fuel pellet thermal conductivity degradation was documented in Reference 4. These impacts to the LOCA analyses are discussed in the enclosure, and are included on the PCT reporting sheets.

Several other changes were made to the Large Break LOCA and Small Break LOCA evaluation models during the reporting period. The specific details of these changes were evaluated as having no impact on the calculated PCTs. Since there was no PCT impact due to these changes, they are not included in the PCT reporting sheets.

There are no new or revised commitments in this letter. Should you have any questions, please contact Mr. Michael K. Scarpello, Regulatory Affairs Manager, at (269) 466-2649.

Sincerely,

Joel P. Gebbie
Site Vice President

DMB/kmh

Enclosure: Donald C. Cook Nuclear Plant Units 1 and 2, Large and Small Break Loss-of-Coolant Accident Peak Clad Temperature Summary

c: J. T. King, MPSC
S. M. Krawec, AEP Ft. Wayne, w/o enclosures
MDEQ – RMD/RPS
NRC Resident Inspector
C. D. Pederson, NRC Region III
T. J. Wengert, NRC Washington, DC

ENCLOSURE TO AEP-NRC-2013-32

DONALD C. COOK NUCLEAR PLANT UNITS 1 AND 2
LARGE AND SMALL BREAK LOSS-OF-COOLANT ACCIDENT
PEAK CLAD TEMPERATURE SUMMARY

Abbreviations:

CNP	Donald C. Cook Nuclear Plant
°F	degrees Fahrenheit
ECCS	emergency core cooling system
EM	evaluation methodology
FdH	nuclear enthalpy rise hot channel factor
FQ	heat flux hot channel factor
HHSI	high head safety injection (Safety Injection System at CNP)
I&M	Indiana Michigan Power Company
LOCA	loss of coolant accident
MWt	megawatts – thermal
NRC	Nuclear Regulatory Commission
PCT	peak cladding temperature
RHR	Residual Heat Removal
SGTP	steam generator tube plugging
TCD	thermal conductivity degradation

Summary:

By letter dated March 19, 2012, (ADAMS Accession No. ML12088A104), and supplemented by letter dated June 11, 2012, (ADAMS Accession No. ML12173A025), I&M, the licensee for CNP Units 1 and 2, submitted a report describing the impact of fuel pellet TCD on the Large Break LOCA ECCS evaluation model, and an estimate of the effect on the predicted PCT for CNP Units 1 and 2. This report was submitted pursuant to Title 10 of the Code of Federal Regulations (10 CFR) Part 50, Section 50.46, Paragraph (a)(3), and referred to a letter from Westinghouse Electric Company dated March 7, 2012 (ADAMS Accession No. ML12072A035). The report was subsequently found to be acceptable by NRC letter dated March 7, 2013 (ADAMS Accession No. ML13077A137).

A new small break LOCA analysis of record was implemented for CNP Unit 1 in 2012. The revised small break LOCA was provided to the NRC by letter dated August 31, 2012 (ADAMS Accession No. ML12256A685). The enclosure to the letter provides a report of the revised analysis. The results of the revised small break LOCA analysis conform to the emergency core cooling system acceptance criteria of 10 CFR 50.46. The calculated peak cladding temperature of 1725°F is below the 10 CFR 50.46 limit of 2200°F.

The following pages summarize the impact of TCD, peaking factor burndown, and plant modification evaluations on the CNP Units 1 and 2 Large Break LOCA analyses of record. In addition, pages are included that summarize the small break LOCA PCT analyses of record for CNP Units 1 and 2.

CNP UNIT 1

LOCA Peak Clad Temperature Summary for ASTRUM Best Estimate Large Break

Evaluation Model: ASTRUM (2004)			
F_Q = 2.15	FdH = 1.55	SGTP = 10%[a.]	Break Size: Split
Analysis Date: November 20, 2007			

LICENSING BASIS		
	Analysis-of-Record	PCT = 2128°F
MARGIN ALLOCATIONS (Delta PCT)		
A.	PREVIOUS 10 CFR 50.46 ASSESSMENTS	
	1. None	0°F
B.	PLANNED PLANT MODIFICATION EVALUATIONS	-381°F(a)
C.	NEW 10 CFR 50.46 ASSESSMENTS	384°F(a)
D.	OTHER	0°F
LICENSING BASIS PCT + MARGIN ALLOCATIONS		PCT = 2131°F

Notes:

a. These assessments are coupled via an evaluation of burnup effects which include thermal conductivity degradation, peaking factor burndown and design input changes (e.g., reduction in the maximum allowed steam generator tube plugging from 10% to 2% and maximum FdH reduced to 1.545). Evaluation details provided in a letter dated March 19, 2012, (ADAMS Accession No. ML12088A104), and supplemented by letter dated June 11, 2012, (ADAMS Accession No. ML12173A025), and subsequently found acceptable by NRC letter dated March 7, 2013 (ADAMS Accession No. ML13077A137).

CNP UNIT 1

LOCA Peak Clad Temperature Summary for Appendix K Small Break

Evaluation Model: NOTRUMP
F_Q=2.32 FdH=1.55 SGTP=10% 3.25 inch cold leg break
Analysis Date: January 6, 2012

Notes: 3304 MWt (plus 0.34% calorimetric uncertainty)

LICENSING BASIS		
	Analysis-of-Record	PCT = 1725°F
MARGIN ALLOCATIONS (Delta PCT)		
A.	PREVIOUS 10 CFR 50.46 ASSESSMENTS	
	1. None	0°F
B.	PLANNED PLANT MODIFICATION EVALUATIONS	0°F
C.	NEW 10 CFR 50.46 ASSESSMENTS	0°F
D.	OTHER	0°F
LICENSING BASIS PCT + MARGIN ALLOCATIONS		PCT = 1725°F

CNP UNIT 2

LOCA Peak Clad Temperature Summary for ASTRUM Best Estimate Large Break

Evaluation Model: ASTRUM (2004)
F_Q = 2.335 FdH = 1.644 SGTP = 10%[a.] Break Size: Split
Analysis Date: February 9, 2009

LICENSING BASIS		
	Analysis-of-Record	PCT = 2107°F
MARGIN ALLOCATIONS (Delta PCT)		
A.	PREVIOUS 10 CFR 50.46 ASSESSMENTS	
	1. None	0°F
B.	PLANNED PLANT MODIFICATION EVALUATIONS	-239°F(a)
C.	NEW 10 CFR 50.46 ASSESSMENTS	73°F(a)
D.	OTHER	0°F
LICENSING BASIS PCT + MARGIN ALLOCATIONS		PCT = 1941°F

Notes:

a. These assessments are coupled via an evaluation of burnup effects which include thermal conductivity degradation, peaking factor burndown and design input changes (e.g., reduction in the maximum allowed steam generator tube plugging from 10% to 1% and maximum FdH reduced to 1.61). Evaluation details provided in a letter dated March 19, 2012, (ADAMS Accession No. ML12088A104), and supplemented by letter dated June 11, 2012, (ADAMS Accession No. ML12173A025), and subsequently found acceptable by NRC letter dated March 7, 2013 (ADAMS Accession No. ML13077A137).

CNP UNIT 2

LOCA Peak Clad Temperature Summary for Appendix K Small Break

Evaluation Model: NOTRUMP F_Q = 2.32 FdH = 1.62 SGTP = 10% 4 inch cold leg break Analysis Date: April 25, 2011

Notes: 3600 MWt

LICENSING BASIS

Analysis-of-Record	PCT = 1274°F (a)

MARGIN ALLOCATIONS (Delta PCT)

A.	PREVIOUS 10 CFR 50.46 ASSESSMENTS	
	1. None	0°F
B.	PLANNED PLANT MODIFICATION EVALUATIONS	0°F
C.	NEW 10 CFR 50.46 ASSESSMENTS	0°F
D.	OTHER	0°F
LICENSING BASIS PCT + MARGIN ALLOCATIONS		PCT = 1274°F

Notes:

a. The 3600 MWt power level used in this analysis bounds the Unit 2 3468 MWt steady state power limit in the operating license.