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Indiana Michigan Power
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August 11, 2006

AEP:NRC:6046

10 CFR 50.46

Docket Nos: 50-315
50-316

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop O-P1-17
Washington, D. C. 20555-0001

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

- References:
1. Letter from Joseph N. Jensen, Indiana Michigan Power Company (I&M), to U. S. Nuclear Regulatory Commission (NRC) Document Control Desk, "Donald C. Cook Nuclear Plant Unit 1, Thirty-Day Report of Loss-of-Coolant Accident Evaluation Model Changes," AEP:NRC:5046, dated April 29, 2005.
 2. Letter from Joseph N. Jensen, I&M, to NRC Document Control Desk, "Donald C. Cook Nuclear Plant Units 1 and 2, 10 CFR 50.46 Loss-of-Coolant Accident Reanalysis Schedule," AEP:NRC:4046-01, dated December 28, 2004.

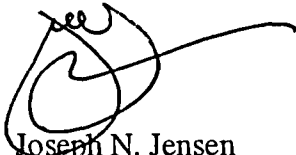
Pursuant to 10 CFR 50.46, Indiana Michigan Power Company (I&M), the licensee for Donald C. Cook Nuclear Plant (CNP), is transmitting an annual report of loss-of-coolant accident (LOCA) model changes affecting the peak cladding temperature (PCT) for CNP Units 1 and 2 and a 30-day report of PCT calculation code changes affecting the calculated PCT for the CNP Unit 1 large break LOCA (LBLOCA) analysis. Attachment 1 to this letter contains the 30-day report data, which describes the recent assessment against the Unit 1 LBLOCA analysis of record. Attachment 2 provides the Unit 1 and Unit 2 large break and small break LOCA analyses of record PCT values and error assessments.

By Reference 1, I&M submitted a schedule for reanalysis of the Unit 1 LBLOCA analysis of record. By Reference 2, I&M submitted a schedule for reanalysis of the Unit 1 and Unit 2 small break LOCA and the Unit 2 LBLOCA analyses of record. These schedules remain unchanged.

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There are no new commitments in this submittal. Should you have any questions, please contact Ms. Susan D. Simpson, Regulatory Affairs Manager, at (269) 466-2428.

Sincerely,

A handwritten signature in black ink, appearing to read 'J. Jensen', with a long horizontal flourish extending to the right.

Joseph N. Jensen
Site Support Services Vice President

DB/rdw

Attachments

- c: J. L. Caldwell, NRC Region III
K. D. Curry - AEP Ft. Wayne, w/o attachments
J. T. King - MPSC, w/o attachments
MDEQ - WHMD/RPMWS
NRC Resident Inspector
P. S. Tam - NRC Washington, DC

ATTACHMENT 1 TO AEP:NRC:6046

ASSESSMENT AGAINST THE UNIT 1 LARGE BREAK LOSS-OF-COOLANT ACCIDENT ANALYSIS OF RECORD

Indiana Michigan Power Company is submitting a 30-day report of peak clad temperature (PCT) calculation code changes affecting the calculated PCT for the Donald C. Cook Nuclear Plant (CNP) Unit 1 large break loss of coolant accident (LBLOCA) analysis. The calculations for 15 x 15 fuel, using the PAD version 4.0 code, show a 57 degree Fahrenheit (°F) increase in PCT. These calculations have been performed as part of a separate evaluation for future changes. Attachment 2, Table 1, demonstrates that the PCT value remains within the 2200°F PCT limit specified in 10 CFR 50.46(b)(1).

Assessment Against the Unit 1 LBLOCA Analysis of Record

Rebaseline Using PAD 4.0

Background

A 57°F penalty was identified when the rebaseline analysis, with the BASH evaluation model using PAD 4.0 data, was performed for the CNP Unit 1 LBLOCA analysis.

Affected Evaluation Models

1981 Westinghouse LBLOCA Evaluation Model with BASH using the PAD version 4.0 code.

Estimated Effect

The calculated PCT with assessments for the Unit 1 LBLOCA is 2175°F and remains below the maximum limit value of 2200°F. The impact on PCT was estimated using a plant-specific LOCBART calculation. As indicated in the PCT accounting in Attachment 2, the effect of the rebaseline using PAD 4.0 data is a 57°F penalty.

Conclusion

This transmittal satisfies the annual reporting requirement and 30-day reporting requirement of 10 CFR 50.46(a)(3)(ii). Attachment 2 demonstrates that the PCT value remains within the 2200°F PCT limit specified in 10 CFR 50.46(b)(1).

ATTACHMENT 2 TO AEP:NRC:6046

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

TABLE 1
CNP UNIT 1
LARGE BREAK LOCA

Evaluation Model: BASH			
$F_Q=2.15$	$F_{\Delta H}=1.55$	SGTP=15%	Break Size: $C_d=0.4$
Operational Parameters: RHR System Cross-Tie Valves Closed, 3250 ¹ MWt Reactor Power			
Notes: ZIRLO clad, IFM grids			

LICENSING BASIS

Analysis-of-Record, November 2000

PCT = 2038°F

MARGIN ALLOCATIONS (Delta PCT)

A.	PREVIOUS 10 CFR 50.46 ASSESSMENTS	
1.	LOCBART Cladding Emissivity Errors	-11°F
2.	Spacer Grid Blocked Area Ratio/Open Area Fraction	+37°F
B.	PLANNED 50.59 PLANT CHANGE EVALUATIONS	
1.	Reduced Containment Spray Temperature	+23°F
C.	NEW 10 CFR 50.46 ASSESSMENTS	0°F
D.	OTHER	
1.	Transition Core Penalty ²	+31°F
2.	Rebaseline Using PAD 4.0	+57°F
E.	LICENSING BASIS PCT+ MARGIN ALLOCATIONS	PCT = 2175°F

¹ The 3250 MWt power level used in the reanalysis is acceptable because it bounds the Unit 1 3304 MWt steady state power limit in the operating license after adjusting for recapture of feedwater flow measurement and power calorimetric uncertainty.

² This penalty will be dropped once all fuel assemblies include the Intermediate Flow Mixing (IFM) Grids.

TABLE 2
CNP UNIT 1
SMALL BREAK LOCA

Evaluation Model: NOTRUMP			
$F_Q=2.32$	$F_{\Delta H}=1.55$	SGTP=30%	3" cold leg break
Operational Parameters: SI System Cross-Tie Valves Closed, 3250 ³ MWt Reactor Power			
Notes: ZIRLO clad, IFM grids			

LICENSING BASIS

Analysis-of-Record, December 2000

PCT = 1720°F

MARGIN ALLOCATIONS (Δ PCT)

A.	PREVIOUS 10 CFR 50.46 ASSESSMENTS	
1.	Asymmetric HHSI Delivery	+50°F
2.	Reduction in Turbine Driven Auxiliary Feedwater Flow	+109°F
3.	Burst and Blockage / Time in Life	+111°F
B.	NEW 10 CFR 50.46 ASSESSMENTS	0°F
C.	OTHER	0°F
		<hr/>
D.	LICENSING BASIS PCT+ MARGIN ALLOCATIONS	PCT = 1990°F

³ The 3250 MWt power level used in the reanalysis is acceptable because it bounds the Unit 1 3304 MWt steady state power limit in the operating license after adjusting for recapture of feedwater flow measurement and power calorimetric uncertainty.

TABLE 3
CNP UNIT 2
LARGE BREAK LOCA

Evaluation Model: BASH			
$F_Q=2.335$	$F_{\Delta H}=1.644$	$SGTP=15\%$	Break Size: $C_d=0.6$
Operational Parameters: RHR System Cross-Tie Valves Closed, 3413 MWt Reactor Power ⁴			

LICENSING BASIS

Analysis-of-Record, December 1995

PCT = 2051°F

MARGIN ALLOCATIONS (Δ PCT)

A. PREVIOUS 10 CFR 50.46 ASSESSMENTS		
1.	ECCS double disk valve leakage	+8°F
2.	BASH current limiting break size reanalysis to incorporate LOCBART spacer grid single phase heat transfer and LOCBART zirc-water oxidation error	+58°F
3.	Cycle 13 ZIRLO Fuel Evaluation	-50°F
B. PLANNED 50.59 PLANT CHANGE EVALUATIONS		
1.	Reduced Containment Spray Temperature	+47°F
C. NEW 10 CFR 50.46 ASSESSMENTS		
D. OTHER		
E. LICENSING BASIS PCT+ MARGIN ALLOCATIONS		
		PCT = 2114°F

⁴ Power level used as basis for PCT acceptance is 3413 MWt due to the reanalysis (see Item A.2) to provide an integrated error effect on the limiting case. This reanalysis (Item A.2) is not considered the analysis-of-record due to the spectrum of break sizes not being reanalyzed to ensure that the limiting break size at 3413 MWt with the errors incorporated would not change. Thus, the analysis-of-record remains as the 1995 analysis at a power level of 3588 MWt. The difference between the limiting case PCT (2051°F) and the PCT from the reanalysis of that limiting break size at 3413 MWt is the 58°F being reported. The 3413 MWt power level used in the reanalysis is acceptable because it bounds the Unit 2 3468 MWt steady state power limit in the operating license after adjusting for recapture of feedwater flow measurement and power calorimetric uncertainty.

TABLE 4
CNP UNIT 2
SMALL BREAK LOCA

Evaluation Model: NOTRUMP			
$F_Q=2.45$	$F_{\Delta H}=1.666$	SGTP=15%	3" cold leg break
Operational Parameters: SI System Cross-Tie Valves Closed, 3250 MWt Reactor Power ⁵			

LICENSING BASIS

Analysis-of-Record, March 1992

PCT = 1956°F

MARGIN ALLOCATIONS (Δ PCT)

A. PREVIOUS 10 CFR 50.46 ASSESSMENTS

- | | | |
|----|--|--------|
| 1. | Limiting NOTRUMP and SBLOCA analysis | -214°F |
| 2. | Burst and blockage/time in life | +95°F |
| 3. | Asymmetric HHSI Delivery | +50°F |
| 4. | NOTRUMP mixture level tracking/region depletion errors | +13°F |
| 5. | NOTRUMP Bubble Rise/Drift Flux Model Inconsistency | +35°F |

Corrections

B. PLANNED 50.59 PLANT CHANGE EVALUATIONS

- | | | |
|----|--------------------|-------|
| 1. | Artificial Leak-By | +12°F |
|----|--------------------|-------|

C. NEW 10 CFR 50.46 ASSESSMENTS

0°F

D. OTHER

0°F

E. LICENSING BASIS PCT+ MARGIN ALLOCATIONS

PCT = 1947°F

⁵ Unit 2 is licensed to a 3468 MWt steady-state power level. However, 3304 MWt is assumed for the small break LOCA analysis with the safety injection (SI) system cross-tie valves closed. This is because Unit 2 Technical Specification 3.5.2 limits thermal power to 3304 MWt with an SI cross-tie valve closed. The 3250 MWt power level used in the reanalysis is acceptable because it bounds the Unit 2 3304 MWt steady state power limit in the operating license after adjusting for recapture of feedwater flow measurement and power calorimetric uncertainty.

TABLE 5
CNP UNIT 2
SMALL BREAK LOCA

Evaluation Model: NOTRUMP			
$F_Q=2.32$	$F_{AH}=1.62$	SGTP=15%	4" cold leg break
Operational Parameters: SI System Cross-Tie Valves Open, 3588 MWt Reactor Power			

LICENSING BASIS

Analysis-of-Record, August 1992

PCT = 1531°F

MARGIN ALLOCATIONS (Δ PCT)

A. PREVIOUS 10 CFR 50.46 ASSESSMENTS

1.	Effect of SI in Broken Loop	+150°F
2.	Effect of Improved Condensation Model	-150°F
3.	Drift Flux Flow Regime Errors	-13°F
4.	LUCIFER Error Corrections	-16°F
5.	Containment Spray During SBLOCA	+20°F
6.	Boiling Heat Transfer Correlation Error	-6°F
7.	Steam Line Isolation Logic Error	+18°F
8.	Axial Nodalization, and SBLOCA correction	+3°F
9.	NOTRUMP Specific Enthalpy Error	+20°F
10.	SBLOCA Fuel Rod Initialization Error	+10°F
11.	Loop Seal Elevation Error	-38°F
12.	NOTRUMP Mixture Level Tracking/Region Depletion Errors	+13°F
13.	NOTRUMP Bubble Rise/Drift Flux Model Inconsistency Corrections	+35°F

B. PLANNED 50.59 PLANT CHANGE EVALUATIONS

1.	Artificial Leak-By	+12°F
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C. NEW 10 CFR 50.46 ASSESSMENTS

0°F

D. OTHER

0°F

E. LICENSING BASIS PCT+ MARGIN ALLOCATIONS

PCT = 1589°F