



Northern States Power Company

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May 1, 1996

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

10 CFR part 50  
Section 50.46

Prairie Island Nuclear Generating Plant  
Docket Nos. 50-282 License Nos. DPR-42  
50-306 DPR-60

Report of Corrections to ECCS Evaluation Models

Attached is the annual report of corrections to Northern States Power Company's (NSP) Emergency Core Cooling System (ECCS) Evaluation Models for the calendar year of 1995. This report is being submitted in accordance with the provisions of 10 CFR 50, Section 50.46.

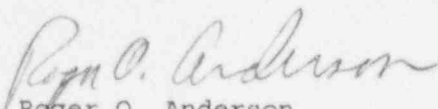
Furthermore, in compliance with 10 CFR 50.46(a)(3)(ii), this serves as a notification of a "significant change" to the Large Break ECCS analysis of record; whereas, the "change or error is one which results in a calculated peak fuel cladding temperature different by more than 50 °F". It is noted that submittal of this letter is more than 30 days since the receipt of the referenced Westinghouse letter.

It is NSP's intent to not submit a proposed schedule to quantify the "estimated effect", as specified in 10 CFR 50.46(a)(3)(ii), because the "significant change" is based upon an actual WCOBRA/TRAC run with approved methodology. Furthermore, including the "significant change" to the analysis of record, the "new" analysis of record continues to demonstrate compliance to 10 CFR 50.46.

The applicable corrections noted in Attachment 1 have been applied to NSP's current ECCS analyses of record, and all analyses were found to be in compliance with the applicable acceptance criteria (Attachment 2).

As noted previously, the thirty day submittal time for a "significant change", as per 10 CFR 50.46(a)(3)(ii), has lapsed. In order to facilitate a more timely response for changes considered "significant", NSP will ensure that a more direct distribution be utilized for future corrections to ECCS Evaluation Models.

Please contact Mel Opstad (612-295-1653) if you require further information related to this submittal.

  
Roger O. Anderson  
Director  
Licensing and Management Issues

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cc: Regional Administrator-III, NRC  
NRR Project Manager, NRC  
Senior Resident Inspector, NRC  
State of Minnesota  
Attn: Kris Sanda  
J E Silberg

Attachments:

- #1 50.46 Summary Report of Emergency Core Cooling System  
Evaluation Model Changes and Errors for the 1995 Calendar Year
- #2 Prairie Island Units 1 & 2 LOCA Peak Clad Temperature (PCT)  
Margin Utilization Sheets

Reference:

Westinghouse letter NSP-96-202 from T W Wallace to R L Lindsey (NSP)  
dated February 20, 1996.

## **ATTACHMENT 1**

50.46 Annual Report of Emergency Core Cooling System  
(ECCS) Evaluation Model Changes and Errors  
for the 1995 calendar year

Prairie Island Units 1 & 2

**NOTRUMP** Specific Enthalpy Error

**WCOBRA/TRAC** Fixed Transfer Node Assignment Error

**WCOBRA/TRAC** Accumulator Water Injection Error

## NOTRUMP SPECIFIC ENTHALPY ERROR

### Affected Evaluation Model

1985 Westinghouse Small Break LOCA Evaluation Model Using NOTRUMP

### Background

A typographical error was found in a line of coding in the NOTRUMP code. This line of coding was intended to model the calculation found in Equation L-127 of WCAP-10079-P-A. Although the equation in the topical report is correct, the coding represented the last term as a partial derivative with respect to the fluid node mixture region total energy instead of the mixture region total mass. This correction is a Non-Discretionary Change in accordance with Section 4.1.2 of WCAP-13451.

### Estimated Effect

Representative plant calculations have led to an estimated effect of +20°F for this error correction.

## FIXED HEAT TRANSFER NODE ASSIGNMENT ERROR

### Affected Evaluation Models

SECY UPI WCOBRA/TRAC Large Break LOCA Evaluation Model

### Background

During development efforts on the best estimate version of WCOBRA/TRAC, MOD 7A, an error was discovered a error in the fixed heat transfer node assignment logic. A correction was incorporated into the code, along with a recommendation for input changes.

### Estimated Effect

Incorporation of the suggested input changes along with the corrected code had an impact on the amount of liquid bypassed out the break during blowdown for two representative UPI Appendix K plant calculations. Since the liquid bypass is linked to the accumulator water injection, the quantification of this fixed heat transfer node assignment effect is combined with the accumulator water injection correction effect.

## ACCUMULATOR WATER INJECTION ERROR

### Affected Evaluation Models

SECY UPI WCOBRA/TRAC Large Break LOCA Evaluation Model

### Background

It was found that during the final phases of accumulator water injection that a small amount of vapor being discharged from the accumulator was counted as liquid injection. This resulted in a small amount of excess mass being injected into the primary system.

### Estimated Effect

Calculations were performed on two representative UPI Appendix K analyses, combining the correction to the fixed heat transfer node assignment and the accumulator water injection correction. The results of these calculations have shown varying effects on the calculated peak cladding temperature, depending on the plant type. Assessment of the PCT effects have been assigned individually.

**ATTACHMENT 2**

**Prairie Island Units 1 & 2  
LOCA Peak Clad Temperature (PCT)  
Margin Utilization Sheets**

Small Break Peak Clad Temperature Margin Utilization

Revision Date: 01/30/96

Plant Name: Prairie Island Units 1 and 2  
 Utility Name: Northern States Power

Eval. Model: NOTRUMP  
 Fuel: 14x14 OFA ZIRLO(TM)  
 FQ=2.80      FdH=2.00      SGTP=25%

	Reference*	Clad Temperature	Notes
A. ANALYSIS OF RECORD (7/93)	1	PCT= 1195 °F	1
B. PRIOR PERMANENT ECCS MODEL ASSESSMENTS	2	ΔPCT= -49 °F	
C. 10 CFR 50.59 SAFETY EVALUATIONS	Table A	ΔPCT= 0 °F	
D. 1995 10 CFR 50.46 MODEL ASSESSMENTS (Permanent Assessment of PCT Margin)			
1. NOTRUMP Specific Enthalpy Error		ΔPCT= 20 °F	
E. TEMPORARY ECCS MODEL ISSUES**			
1. None		ΔPCT= 0 °F	
F. OTHER MARGIN ALLOCATIONS			
1. None		ΔPCT= 0 °F	
 LICENSING BASIS PCT + MARGIN ALLOCATIONS		PCT= 1166 °F	

- \* References for the Peak Clad Temperature Margin Utilization summary can be found in Table B.
- \*\* It is recommended that these temporary PCT allocations which address current LOCA model issues not be considered with respect to 10 CFR 50.46 reporting requirements.

Notes:  
 1. Includes annular pellet evaluation.



Large Break Peak Clad Temperature Margin Utilization

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Revision Date: 01/30/96

Plant Name: Prairie Island Units 1 and 2  
 Utility Name: Northern States Power

Eval. Model: WC/T, Add. 4  
 Fuel: 14x14 OFA ZIRLO(TM)  
 FQ=2.40      FdH=1.77      SGTP=15%

	Reference*	Clad Temperature	Notes
A. ANALYSIS OF RECORD (3/95)	3	PCT= 2180 °F	1
B. PRIOR PERMANENT ECCS MODEL ASSESSMENTS	3	ΔPCT= 0 °F	
C. 10 CFR 50.59 SAFETY EVALUATIONS	Table A	ΔPCT= 0 °F	
D. 1995 10 CFR 50.46 MODEL ASSESSMENTS (Permanent Assessment of PCT Margin)			
1. Fixed Heat Transfer Node Assignment Error/Accumulator Water Injection Error		ΔPCT= -175 °F	2
E. TEMPORARY ECCS MODEL ISSUES**			
1. None		ΔPCT= 0 °F	
F. OTHER MARGIN ALLOCATIONS			
1. None		ΔPCT= 0 °F	
 LICENSING BASIS PCT + MARGIN ALLOCATIONS		 PCT= 2005 °F	

\* References for the Peak Clad Temperature Margin Utilization summaries can be found in Table B.

\*\* It is recommended that these temporary PCT allocations which address current LOCA model issues not be considered with respect to 10 CFR 50.46 reporting requirements.

Notes:

1. P-bar-HA increased from 1.57 to 1.59
2. This PCT assessment is the result of an actual analysis.

Table A - 10 CFR 50.59 Safety Evaluations

Revision Date: 01/30/96

Plant Name: Prairie Island Units 1 and 2  
 Utility Name: Northern States Power

	Reference	Clad Temperature	Notes
I. SMALL BREAK ECCS SAFETY EVALUATIONS		$\Delta$ PCT=	0 °F
A. None			
<b>TOTAL 10 CFR 50.59 SMALL BREAK ASSESSMENTS</b>		PCT=	0 °F
II. LARGE BREAK ECCS SAFETY EVALUATIONS		$\Delta$ PCT=	0 °F
A. None			
<b>TOTAL 10 CFR 50.59 LARGE BREAK ASSESSMENTS</b>		PCT=	0 °F

Notes:  
 None

Table B - References

1. NSP-93-521, "Northern Power Company Prairie Island Units 1 and 2 Small Break Loss-of-Coolant Accident Final Engineering Report for the ZIRLO(TM) Fuel Upgrade," July 30, 1993.
2. NSP-94-202, "Northern Power Company Prairie Island Units 1 and 2 10 CFR 50.46 Notification and Reporting Information," February 3, 1994.
3. 95NS-G-0021, "Updated UPI LBLOCA," March 24, 1995.

TRANSMITTAL MANIFEST

NORTHERN STATES POWER COMPANY

NUCLEAR LICENSING DEPARTMENT

PRAIRIE ISLAND NUCLEAR GENERATING PLANT

Report of Corrections to ECCS Evaluation Models

Manifest Date: May 3, 1996

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*NRR Project Mgr	1	Keith Higar		1
Sr Resident Inspector	1	Paras Shah		1
Safety Audit Committee		Kirk Schnoebelen		1
T M Amundson	1	Monti Plant		
R O Anderson	1	Monti Site Licensing		1
*A B Cutter	1	Dan Wegener		1
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*W C Rothert	1	Mel Opstad		1
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R L Lindsey	1			
Tom Breene	1			
Jim Hill	1			
PI Site Licensing	2			
Records Management Copy	1			

\*Non-NSP

Correspondence Date: May 1, 1996