

## LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Prairie Island Nuclear Generating Plant Unit 1	DOCKET NUMBER (2) 05000 282	PAGE (3) 1 OF 3
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TITLE (4) Excessive Pressurizer Cooldown Rate and Excessive Spray/Pressurizer Delta-T Caused by Procedure Inadequacy
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EVENT DATE (5)			LER NUMBER (6)			REPORT NUMBER (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
01	17	90	90	002	01	04	22	93		05000
OPERATING MODE (9) N			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
POWER LEVEL (10) 000			20.402(b)		20.405(c)		50.73(a)(2)(iv)		73.71(b)	
			20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(iv)		73.71(c)	
			20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)		OTHER	
			20.405(a)(1)(iii)		X 50.73(a)(2)(i)		50.73(a)(2)(viii)(A)		(Specify in Abstract below and in Text, NRC Form 366A)	
			20.405(a)(1)(iv)		50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)			
			20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)			

LICENSEE CONTACT FOR THIS LER (12)		TELEPHONE NUMBER (Include Area Code)
NAME Arne A Hunstad		612-388-1121

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)									
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On January 17, 1990, Unit 1 was shutdown for the Cycle 13-14 refueling outage. On January 19, 1990, review of the cooldown data showed that the cooldown rate of the pressurizer had exceeded the Technical Specification limit of 200°F/hr, and the temperature difference between the pressurizer auxiliary spray and the pressurizer had exceeded the Technical Specifications limit of 320°F.

Procedure inadequacy is designated as the root cause of the event. Pressurizer steam space temperature was used to determine the cooldown rate. Pressurizer water space temperature should have been used to determine the cooldown rate. The maximum cooldown rate over a one-hour period, for the pressurizer water space temperature was 265°F. Procedures do not explicitly require use of pressurizer water space temperature for determining heatup and cooldown rates. The operators verified that the temperature difference between the pressurizer and the pressurizer spray was less than 320°F using control board indication. However, a more precise determination of the temperature difference obtained from the Emergency Response Computer System indicates that the actual temperature difference was 349°F.

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TEXT CONTINUATION**

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FACILITY NAME (1)		DOCKET NUMBER (2)		LER NUMBER (6)			PAGE (3)
Prairie Island Unit 1		05000 282		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 3
				90	- 002	- 01	

TEXT (if more space is required, use additional copies of NRC Form 365A) (17)

**EVENT DESCRIPTION**

On January 17, 1990, Unit 1 was shutdown for the Cycle 13-14 refueling outage. On January 19, 1990, review of the cooldown data revealed that the cooldown rate of the pressurizer (EIIIS Component Identifier: PZR) had exceeded the Technical Specifications limit of 200°F/hr, and that the temperature difference between the pressurizer auxiliary spray and the pressurizer exceeded the Technical Specifications limit of 320°F. These actions were in violation of Technical Specification 3.1.B.4.

**CAUSE OF THE EVENT**

Procedure inadequacy is designated as the root cause of the event. The operators were well aware of the 200°F/hr cooldown limit in the Technical Specifications and in the Unit Shutdown Procedure. They considered the pressurizer steam space temperature to be more representative of the actual overall pressurizer temperature and considered the pressurizer water space temperature to be a more localized indication and subject to transient effects. Therefore, the operators used the steam space temperature to monitor the pressurizer cooldown rate. The pressurizer steam space temperature cooldown rate remained below the Technical Specification limit. The procedures do not explicitly require use of pressurizer water space temperature for determining heatup and cooldown rates. However, the thermal stress analysis for the pressurizer lower head and surge nozzle uses pressurizer water space temperature for determining thermal fatigue effects. The maximum cooldown rate over a one-hour period for the pressurizer water space temperature was 265°F. The Emergency Response Computer utilizes pressurizer water space temperature.

The operators verified the temperature difference between the pressurizer and the pressurizer auxiliary spray, was less than 320°F using control board indication. However, a more precise determination of the temperature difference obtained from the Emergency Response Computer System indicates that the actual temperature difference was 349°F.

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TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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Prairie Island Unit 1	05000 282	90	002	01	3 OF 3

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

ANALYSIS OF THE EVENT

This event is reportable pursuant to 10 CFR 50.73(a)(2)(i)(B) since Technical Specification 3.1.B.4 was violated.

The occurrence of such temperature cycles causes an increase in the fatigue usage for the pressurizer surge nozzle, the inner surface of the lower head and shell, and for the pressurizer spray nozzle. Based on the recorded temperature data from this cooldown, the operating history of the unit, and similar evaluations performed for several other plants, it is the judgment of Westinghouse that the allowable pressurizer fatigue life has not been approached, and that the pressurizer structural integrity has not been compromised. Westinghouse is performing a detailed engineering evaluation, including fatigue and fracture analysis, to determine the specific effect of this type of pressurizer cooldown on the design life of the plant.

CORRECTIVE ACTION

Corrective actions given in Revision 0 of this report included procedure revisions to require use of pressurizer water space temperature for determining heatup and cooldown rates, and to require use of the Emergency Response Computer System to monitor pertinent temperatures. Though these actions would reduce the likelihood of exceeding any of the cooldown pressure/temperature limits, a more effective method was developed. The revised procedures now implement a new cooldown philosophy that minimizes thermal stresses in all parts of the reactor coolant system during the entire cooldown evolution. Cooldowns are now accomplished by establishing and maintaining subcooling of the reactor coolant system between 50 and 100 degrees F while also maintaining pressurizer level at a constant 30%.

FAILED COMPONENT IDENTIFICATION

None.

PREVIOUS SIMILAR EVENTS

There have been no previous similar events reported at Prairie Island.