



JAN 17 2005

L-PI-04-127
10 CFR 50.73

U S Nuclear Regulatory Commission
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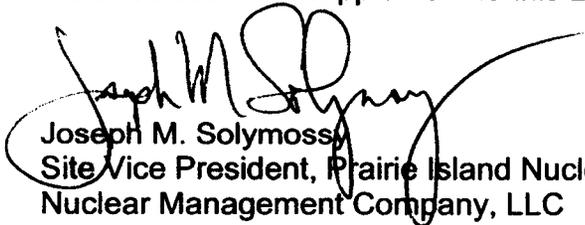
Prairie Island Nuclear Generating Plant Unit 2
Docket 50-306
License No. DPR-60

LER 2-04-01, Unit 2 Shutdown Required by Technical Specifications Due to Two Trains of Containment Cooling Inoperable

The Licensee Event Report for this occurrence is attached. This event was reported via the Emergency Notification System in accordance with 10 CFR Part 50, Section 50.72, on November 17, 2004. Please contact us if you require additional information related to this event.

Summary of Commitments

This letter contains one new commitment and no revisions to existing commitments. Specifically, NMC commits that, following completion of additional cause investigation, NMC will submit a supplement to this Licensee Event Report.



Joseph M. Solymossy
Site Vice President, Prairie Island Nuclear Generating Plant
Nuclear Management Company, LLC

Enclosure

cc: Administrator, Region III, USNRC
Project Manager, Prairie Island, USNRC
Resident Inspector, Prairie Island, USNRC
Glenn Wilson, State of Minnesota

ENCLOSURE

LICENSEE EVENT REPORT 2-04-01

4 pages follow

LICENSEE EVENT REPORT (LER)

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

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0066), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

FACILITY NAME (1) Prairie Island Nuclear Generating Plant Unit 2	DOCKET NUMBER (2) 05000 306	PAGE (3) 1 of 4
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TITLE (4)
Unit 2 Shutdown Required by Technical Specifications Due to Two Trains of Containment Cooling Inoperable

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
11	17	04	04	-- 01 --	0	1	17	05	FACILITY NAME	DOCKET NUMBER
OPERATING MODE (9)		1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) (11)							
POWER LEVEL (10)		100	20.2201(b)			20.2203(a)(3)(ii)			50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
			20.2201(d)			20.2203(a)(4)			50.73(a)(2)(iii)	50.73(a)(2)(x)
			20.2203(a)(1)			50.36(c)(1)(i)(A)			50.73(a)(2)(iv)(A)	73.71(a)(4)
			20.2203(a)(2)(i)			50.36(c)(1)(ii)(A)			50.73(a)(2)(v)(A)	73.71(a)(5)
			20.2203(a)(2)(ii)			50.36(c)(2)			50.73(a)(2)(v)(B)	OTHER Specify in Abstract below or in NRC Form 366A
			20.2203(a)(2)(iii)			50.46(a)(3)(ii)		X	50.73(a)(2)(v)(C)	
			20.2203(a)(2)(iv)		X	50.73(a)(2)(i)(A)			50.73(a)(2)(v)(D)	
			20.2203(a)(2)(v)		X	50.73(a)(2)(i)(B)			50.73(a)(2)(vii)	
			20.2203(a)(2)(vi)			50.73(a)(2)(i)(C)			50.73(a)(2)(viii)(A)	
			20.2203(a)(3)(i)			50.73(a)(2)(ii)(A)			50.73(a)(2)(viii)(B)	

LICENSEE CONTACT FOR THIS LER (12)

NAME Jeff Kivi	TELEPHONE NUMBER (Include Area Code) 651.388.1121
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)		
X	YES (If yes, complete EXPECTED SUBMISSION DATE).		NO	3	21	2005

ABSTRACT

On November 17, 2004, Prairie Island Nuclear Generating Plant (PINGP) Staff entered Unit 2 containment to investigate suspected leakage of the 23 containment fan coil unit (CFCU). The 23 CFCU was suspected to be leaking based on control room indication of condensate pot level and Sump A run times. The investigation identified two leaks on the 23 CFCU and also identified one leak on the 22 CFCU. The leaking CFCUs were isolated. Since the leaks affected one of two CFCUs in each of the two trains of containment cooling, and those CFCUs were isolated, both trains of containment cooling were declared inoperable and PINGP Technical Specification Limiting Condition of Operability (LCO) 3.0.3 was entered. The leaks could not be repaired in time to exit LCO 3.0.3 before a plant shutdown was required and a plant shutdown was initiated and completed.

Repair of the leaks on the 22 and 23 CFCUs was completed on November 18, 2004 and Unit 2 returned to power operation on November 19, 2004.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Prairie Island Nuclear Generating Plant Unit 2	05000306	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 of 4
		04	-- 01	-- 0	

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

EVENT DESCRIPTION

On November 17, 2004, Prairie Island Nuclear Generating Plant (PINGP) Staff entered Unit 2 containment to investigate suspected leakage of the 23 containment fan coil unit¹ (CFCU). The 23 CFCU was suspected to be leaking based on control room indication of condensate pot level and Sump A pump² run times. The investigation identified two leaks on the 23 CFCU and also identified one leak on the 22 CFCU. The lack of control room indication of the leak on 22 CFCU is believed to be due to the leak spraying beyond the catch tray such that condensate pot level was not affected, but is under investigation.

The leaking CFCUs were isolated. Since the leaks affected one of two CFCUs in each of the two trains of containment cooling, and those CFCUs were isolated, both trains of containment cooling were declared inoperable and PINGP Technical Specification Limiting Condition of Operability (LCO) 3.0.3 was entered. The leaks could not be repaired in time to exit LCO 3.0.3 before a plant shutdown was required, thus, a plant shutdown was initiated and completed.

EVENT ANALYSIS

The containment cooling system³ is a closed system in containment. Integrity of the tubes in the CFCUs is required for containment integrity. The CFCU tubes are American Society of Mechanical Engineers (ASME) Code Class 2 and support two safety functions: (1) circulating cooling water for containment cooling in the event of a loss of coolant accident (LOCA) or main steam line break in containment, and (2) serving as a containment boundary during the first hours of a LOCA when containment pressure will exceed the pressure of the cooling water in the CFCUs.

The leakage was identified at H-bends in the faces of the affected CFCUs. The faces are multi-pass heat exchangers. The H-bends are brazed copper elbows which redirect cooling water flow through the CFCU faces.

Each CFCU has four faces and each containment has four CFCUs. Thus, there are 32 faces between Unit 1 and Unit 2. The original faces were supplied by Westinghouse. Subsequently, 24 of the faces have been replaced with a new design Aerofin coil. The eight remaining faces are original design, but are replacement faces that were installed in the 1988 to 1993 time frame. The leaks on the 22 and 23 CFCUs were all on Westinghouse design faces (the Aerofin coils do not have H-bends).

¹ (EIS Component Identifier: FCU)

² (EIS Component Identifier: P)

³ (EIS System Identifier: BK)

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Impact on Safety System Functional Failure Performance Indicator

The CFCUs contain an air-to-water heat exchanger supplied with water from the cooling water system in order to remove containment heat. In this event, three of the tubes in the heat exchanger portion of 22 and 23 CFCUs were found to have pin-hole leaks - one leak on 22 CFCU and two leaks on 23 CFCUs. The leaks would not have impacted the ability of the fan coil unit to provide its containment heat removal function following any accident. However, the leaks would adversely impact the ability of the CFCUs to maintain the containment boundary following an accident. The design accident pressure for the containment structure is 46 psig. Due to head losses in the piping and high elevation of the FCU cooling water lines, the cooling water system can experience negative pressures in the return piping from the CFCUs. As a result, the leaks in the 22 and 23 CFCU H-bends represent a potential failure to maintain the containment boundary function following a postulated accident. To assure that the CFCU maintained their containment boundary function, the leaking CFCUs were isolated, rendering them incapable of performing their heat-removal function. However, following initial identification of the leak and prior to isolating the CFCUs, the containment boundary function could not be assured; therefore, this event is reportable per 10 CFR 50.73(a)(2)(v)(C) as a Unit 2 Safety System Functional Failure.

SAFETY SIGNIFICANCE

As noted above, prior to isolating the leaking CFCUs, the containment heat removal function of each train was not adversely impacted by the leaks in the 22 and 23 CFCUs; however, the containment function was adversely affected during the short time prior to isolating the affected CFCUs. After isolation, the system design is such that containment leakage is precluded – the pressure on outboard side of the isolation valves for both the inlet and the outlet of the CFCUs is greater than containment pressure. There is no current analysis that quantifies the potential impact of this bypass leakage on the offsite or control room dose analyses, however by comparison with a previous analysis and engineering judgment this leakage is viewed as not significant. Based on the above, the health and safety of the public was not affected.

CAUSE

Nuclear Management Company, LLC, (NMC) conducted an apparent cause evaluation (ACE) to determine why the CFCU leaks occurred. The ACE concluded that the apparent cause of the CFCU leaks was the design of the H-bends, which causes turbulent flow, which, in turn, causes erosion in the areas where the joint brazing of the H-bend appears flawed. The presence of erosion was indicated by smooth, deposit free grooves. The erosion occurred around braze material that had overflowed from the brazed joints onto the internal surfaces of the H-bends. The buildup of material caused flow disruptions in the H-bends, resulting in grooving and eventual leak formation in the copper base material. Corrosion may also have contributed to the failures. Some corrosion of the

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brazing material that was exposed to the inside diameter surface was observed. Any evidence of corrosion of the copper in the damaged areas was removed by the erosion. Additional evaluation of the cause is in progress. Following completion of this additional evaluation, NRC will issue a supplement to this report.

CORRECTIVE ACTION

Immediate:

1. Unit 2 was shut down per Technical Specification 3.0.3.

Subsequent:

2. The leaking CFCUs were repaired per the ASME Code and Unit 2 was returned to power operation.

Planned:

3. Complete CFCU face replacement,
4. Analyze CFCU flow rates to determine if existing flow rates are contributing to erosion.

PREVIOUS SIMILAR EVENTS

No previous unit shutdowns have been completed due to CFCU leakage.