



Nuclear Management Company, LLC
Prairie Island Nuclear Generating Plant
1717 Wakonade Dr. East • Welch MN 55089

September 20, 2000

10 CFR Part 50
Section 50.73

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

PRAIRIE ISLAND NUCLEAR GENERATING PLANT

Docket Nos. 50-282 License Nos. DPR-42
50-306 DPR-60

LER 1-00-02

Fuel Pellet Density Exceeds Assumption in Spent Fuel Pool Criticality Analysis

The Licensee Event Report for this occurrence is attached. Investigations are in progress and a supplement to this Licensee Event Report will be submitted after these activities have been completed. In this report, we have made no new NRC commitments.

This event was reported via the Emergency Notification System in accordance with 10 CFR 50.72, on August 21, 2000. Please contact us if you require additional information related to this event.

Joel P. Sorensen
Site General Manager
Prairie Island Nuclear Generating Plant

c: Regional Administrator - Region III, NRC
NRR Project Manager, NRC
Senior Resident Inspector, NRC
James Bernstein, State of Minnesota

Attachment

IE22

FACILITY NAME (1) **Prairie Island Nuclear Generating Plant (PINGP) Unit 1** DOCKET NUMBER (2) **05000 282** PAGE (3) **1 OF 4**

TITLE (4) **Fuel Pellet Density Exceeds Assumption in Spent Fuel Pool Criticality Analysis**

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENCE #	REV #	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
08	21	00	00	02	00	09	20	00	PINGP Unit 2	05000 306
									FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9) **1** THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

POWER LEVEL (10) 100	20.2201(b)	20.2203(a)(2)(v)	50.73(a)(2)(i)	50.73(a)(2)(viii)
	20.2203(a)(1)	20.2203(a)(3)(i)	X 50.73(a)(2)(ii)	50.73(a)(2)(x)
	20.2203(a)(2)(i)	20.2203(a)(3)(ii)	50.73(a)(2)(iii)	73.71
	20.2203(a)(2)(ii)	20.2203(a)(4)	50.73(a)(2)(iv)	OTHER:
	20.2203(a)(2)(iii)	50.36(c)(1)	50.73(a)(2)(v)	
	20.2203(a)(2)(iv)	50.36(c)(2)	50.73(a)(2)(vii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME **John Stanton** TELEPHONE NUMBER (Include Area Code) **651-388-1121 ext. 4083**

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)

X YES (If yes, complete EXPECTED SUBMISSION DATE). NO

EXPECTED SUBMISSION DATE (15) MONTH **12** DAY **8** YEAR **2000**

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

On August 21, 2000, with the Prairie Island Nuclear Generating Plant (PINGP) Units 1 and 2 operating at 100% power, a representative of the current PINGP nuclear fuel assembly vendor informed PINGP staff by telephone that recent batches of fuel assemblies delivered to PINGP contained fuel pellets with nominal densities greater than the 95% of theoretical density assumed in the criticality analysis submitted in support of Amendments 129/121 to the PINGP Unit 1 and 2 Operating Licenses DPR-42 and DPR-60. This increased nominal fuel pellet density results in the calculated 95/95 K_{eff} exceeding the Technical Specification 5.6.A.1.b limit ($K_{eff} < 1.0$ if the spent fuel pool were fully flooded with unborated water) for fuel assemblies stored in both unrestricted and restricted (3x3 checkerboard) configurations. Actions have been taken to provide increased assurance that any significant dilution event will be detected before the boron concentration in the spent fuel pit could be reduced below 750 ppm. The investigation into the root causes of this event is still in progress and a final determination of the root causes and corrective actions has not been made.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION	
Prairie Island Nuclear Generating Plant Unit 1	05000 282	00	-- 02 --	00	2 OF 4

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

EVENT DESCRIPTION

On August 21, 2000, with the Prairie Island Nuclear Generating Plant (PINGP) Units 1 and 2 operating at 100% power, a representative of the current PINGP nuclear fuel assembly vendor informed PINGP staff by telephone that recent batches of fuel assemblies delivered to PINGP contained fuel pellets with nominal densities greater than the 95% of theoretical density assumed in the criticality analysis¹ submitted in support of Amendments 129/121 to the PINGP Unit 1 and 2 Operating Licenses DPR-42 and DPR-60. This increased nominal fuel pellet density results in the calculated 95/95 K_{eff} exceeding the Technical Specification 5.6.A.1.b limit ($K_{eff} < 1.0$ if the spent fuel pool were fully flooded with unborated water) for fuel assemblies stored in both unrestricted and restricted (3x3 checkerboard) configurations.

CAUSE OF THE EVENT

The investigation into the root causes of this event is still in progress and a final determination of the root causes has not been made. A more detailed description of the event is expected to be provided in a Westinghouse Nuclear Service Advisory Letter (NSAL) that has not yet been issued. Any further inquiry necessary to determine the causes of this event will be identified and conducted after the receipt and review of this NSAL.

ANALYSIS OF THE EVENT

The results² presented in the criticality analysis report CAA-97-042 demonstrated that with a spent fuel pool boron concentration of at least 1300 ppm K_{eff} will be maintained less than 0.95000 should a loss of spent fuel pool cooling or a fuel assembly misloading occur. Significant safety margin to this condition is maintained by Technical Specification 3.8.E.2.(a), which requires the boron concentration in the spent fuel pool to be maintained greater than or equal to 1800 ppm. With the current spent fuel pool boron concentration at approximately 3200 ppm, substantial operational margin exists to the Technical Specification requirement.

Preliminary calculations indicate that revising the nominal fuel pellet density to be 96.5%³ incurs a K_{eff} penalty of approximately 200 pcm, while accounting for spacer grid and grid sleeve displacements will provide a K_{eff} credit of approximately 310 pcm. These preliminary results indicate that this event has minimal safety significance and has no adverse impact on the health and safety of the public.

¹ Northern States Power Prairie Island Units 1 and 2 Spent Fuel Rack Criticality Analysis Using Soluble Boron Credit, CAA-97-042, February 1997

² The NRC Safety Evaluation issued for Amendment 129/121 concurred with this finding.

³ The as-built nominal fuel pellet density reported by the fuel vendor is approximately 95.51%. A nominal fuel density of 96.5% is expected to provide a 95/95 upper bound on as-built fuel pellet densities.

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

Because the criticality analysis submitted in support of Amendment 129/121 explicitly assumed no credit for spacer grids and spacer sleeves, removing this assumption to compensate for the fuel pellet nominal density increase would constitute a change to an approved analysis methodology that requires prior NRC review and approval. Thus, this event is reportable pursuant to 10CFR50.73(a)(2)(ii)(B), as a condition that is outside the design basis of the plant.

Regulatory Performance Indicators

This event does not impact any of the performance indicators associated with the seven cornerstones of safety used in the risk-informed regulatory oversight process; initiating events, mitigating systems, barrier integrity, emergency preparedness, occupational radiation safety, public radiation safety, and physical protection.

In particular, this event is not reportable under 10CFR50.73(a)(2)(v), and as such, does not represent a safety system functional failure, because in itself this event could not have prevented the fulfillment of the safety function of structures or systems that are needed to:

- (A) Shutdown the reactor and maintain it in a safe shutdown condition;
- (B) Remove residual heat;
- (C) Control the release of radioactive material; or
- (D) Mitigate the consequences of an accident.

Significance Determination

This event does not fall within the scope of either the Power Operations, Emergency Preparedness, Occupational Radiation Safety, Public Radiation Safety, Physical Protection (Safeguards), Fire Protection, Shutdown Operations, or Containment Integrity Significance Determination Processes and has thus been identified as having minimal risk significance.

CORRECTIVE ACTION

This issue will be tracked and resolved through the PINGP Corrective Action program under Condition Report 20003150.

The following actions have been taken to provide increased assurance that any significant dilution event will be detected before the boron concentration in the spent fuel pit could be reduced below 750 ppm:

- 1) All operations crews were briefed on this event.
- 2) Spent fuel pool boron concentration sampling frequency was increased to three times a week.
- 3) Administrative control was established on potentially significant dilution sources.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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

Other corrective actions are expected to be identified after the investigation of this event is complete. As part of those corrective actions the discrepancy between the plant's configuration and its design basis will be resolved.

PREVIOUS SIMILAR EVENTS

No LERs have been identified for the years 1997 through 2000 that are similar to this issue.